

## SUBSCRIBERS.

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1879. Oct. ANGELL, A. Torrington, 144, *Fulham Road, S.W.*  
 1879. Oct. BATTEN, MAJ.-GEN. S. J., 14, *Notting Hill Square.*  
 1879. Sept. BOURNE, Stephen, *Atherley, Wallington, Surrey.*  
 1879. .... COBIAM, George R., *Gravesend.*  
 1879. June. COLES, Cowper, C.B., 2, *Albany, Piccadilly.*  
 1879. Apr. DENHAM, W. Hempson, F.L.S., F.S.S., *Southsea.*  
 1881. Jan. DIXON, Joshua, *Winslade, Exeter.*  
 1880. .... DOMENICHETTI, Richard, M.D., *Trinity Lodge, Louth, Lincolnshire.*  
 1877. Sept. FLEETWOOD, The Local Board of.  
 1879. Mar. GOODALL, Abraham, F.R.C.S., F.R.G.S., INSP. - GENL.,  
 4, *Elvaston Place, Queen's Gate.*  
 1879. June. HALL, Alexander Lyons, F.R.G.S., *Lyons Court, Ladbroke Road, W., and Lyons Court, co. Antrim, Ireland.*  
 1879. Oct. JENKINS, B., 37, *Outram Road, Croydon.*  
 1879. Sept. JEWEL, J.  
 1877. .... LADIES SANITARY ASSOCIATION, 22, *Berners Street, Oxford Street, W.*  
 1879. .... MIDDLETON, Reginald E., ASSOC.M.INST.C.E., 5, *Westminster Chambers, S.W.*  
 1879. Sept. \*PRATT, M., *Brigstock House, Thornton Heath, Croydon.*  
 1877. .... RIVERS PURIFICATION ASSOCIATION, 232, *Gresham House, E.C.*  
 1878. Oct. SOUTHPORT, The Mayor and Corporation of.  
 1880. .... STEPHENSON, F. C., *Hill House, Little Heath, Charlton, S.E.*  
 1877. Sept. TOTTENHAM SANITARY ASSOCIATION, *High Cross, Tottenham.*  
 1879. Feb. WALLACE, Miss, 6, *Hyde Park Gardens.*
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## APPENDIX.

## PAPERS READ

AT

## ORDINARY MEETINGS OF THE INSTITUTE,

AND DISCUSSIONS THEREUPON.

## ON THE LAW IN RELATION TO SANITARY PROGRESS.

BY W. H. MICHAEL, Q.C., F.C.S.

*Read February 9th, 1881.\**

IN the Ancient Temples of Japan wheels hang suspended from the walls, to which are attached copies of the sacred writings. These wheels, as an act of devotion, are turned round by the obedient and adoring worshippers of the Buddha Sakia Moune, in accordance with his divine command, "Make the wheel of the law turn." A similar labour is performed by those wishing to be learned in the law, but who, having no time or inclination to master the eight written books of divinely communicated wisdom, cause a ponderous book-case containing these scriptures to revolve on its pivot, and this, often enough repeated, is accounted to them as the knowledge of the incomprehensible.

"The intention is accounted as valuable as the act."

Are we entirely free from such devices in the execution of our laws, and in the practices of "how not to do it" of our local parliaments and local executive? Is the statement true which was made by a speaker claiming authority at a recent sanitary meeting, that out of 70,000 houses built annually in London, 50,000 are unfit for human habitation? And further, this has been commented upon by a leading London newspaper as being a disgrace to the Local Government Board.

It is not easy to determine whether the acquaintance of the speaker and the writer with the facts and law of the case are equal; but it is a strange, though true, commentary upon both that the Local Government Board has no voice in, or control over, the sanitary regulation of the metropolis.

By what at least to outsiders seemed to be a strange turn of the wheel of the Law, the Metropolis was altogether excluded from the operation of the Public Health Act, 1875, to which every other portion of England and Wales was made subject. One would often like to say "a truce to definitions," but in the present condition of sanitary science and sanitary action this is

\* The discussion occupied part of the evening of February 9th, and the whole of the evening of March 9th.

neither practicable nor desirable. And this at least is an instance in which the meaning of "uninhabitable" should be clearly explained, in order to take some action on a state of things which, if it has in any degree foundation in fact, reflects infinite discredit on the local government of the various sections of the Metropolis. Without in any way reflecting on the authority of the speaker, it may be urged, considering the present temper of the public mind, that unless provided with the most exact and thorough statistical and scientific information, it behoves those who wish for enlarged sanitary power and extended sanitary action to exercise the greatest self-restraint and care; and direct proof should not only be forthcoming, but at the time adduced and appended to every statement of alleged shortcomings of authorities in the execution of the Sanitary Acts. The objects of these Acts when shortly stated are: to provide for us in our houses and streets, dry subsoil, fresh air, and pure water. To obtain these desiderata is no easy task, not so much from inherent obstacles, as from those which we have ourselves created by faulty action or continued neglect, surrounding us on every hand with complications and impediments which defy complete enumeration. The natural impatience of taxation is intensified when the taxpayer is called on to pay his hardly earned monies to procure assumed benefits he has not yet learned to appreciate at their proper worth, and with respect to which he entertains strong doubts whether work undertaken for his alleged protection will be succeeded by results at all worth their cost.

This is so important a factor in considering the law with respect to future action, that it may be explicitly stated from ample experience, that permissive legislation in sanitary matters is something worse than useless. Health is to be provided for the ratepayer, and especially for the neighbour of the ratepayer, without his consent, first asked and obtained, and by slow but successive stages all our legislation is becoming modelled on this principle: although we are not without warnings that old mistakes are only waiting the opportunity again to assert themselves. Still it must not be forgotten, as a leading principle, that no laws having to deal with the person as such, can hope to be thoroughly successful in action if their provisions extend far beyond the education and convictions of the general public. It is true that the law should be somewhat in advance of popular belief, for laws should themselves educate by their teachings and sanctions; but if pushed too far they provoke, as in the past they have often done, although themselves entirely in accord with the principle of utility, so violent an opposition, as to defeat their proper objects, and thus throw back on the dial of progress a long continuing shadow of revolt and inaction.

Of this we are the witnesses on the great subject of sanitary progress, and we have been the sufferers, with those we most earnestly wish to protect. In view of the difficulties which beset the question, we might well despair, were it not that our greatest successes have been the outcome of our greatest defeats, from which we have learned both how to labour and how to wait.

To reform the laws, to ensure the adoption of more stringent provisions for improving the public health, we must be content with much less of advance than we know to be useful, and we must be prepared, not only for the glory of conflict with what is hurtful and pernicious, but for the much more difficult task of patient waiting and laborious drudgery to get our opinions adopted, and to ensure the enactment of laws, for the necessity of which we have been long convinced, and for which we believe there is forthcoming overwhelming proof.

Our legislators, after the most searching, and long continued enquiry, conducted by the most competent and painstaking enquirers in all countries, have been at last satisfied that one of the most loathsome diseases, and one of the direst scourges that ever afflicted humanity, is controlled exactly in proportion as the operation of vaccination is well and thoroughly performed among the population. That those nations where it is compulsory on the whole population, and where the law is enforced with the greatest care and precision, that there the disease is almost obliterated. That in exact proportion to this care and precision in various communities is the amount of immunity; that this immunity commences exactly at the age, whether three, six, or twelve months, when, in the several countries, the performance on the infant of the protective act becomes imperative; that large bodies of men aggregated together, in different localities, of differing nationalities, but under similar sanitary conditions, except in the particular of vaccination, differed in their mortality from small-pox, almost identically in proportion as the use of the prophylactic was enforceable and enforced by authority, while the mortality from other diseases of epidemic or endemic character, such as dysentery, cholera, or typhoid fever, followed the usual laws of suffering from neglect of sanitary precautions, and that while the deaths from small-pox were in proportion to the absence of vaccination, an entirely different ratio was observed in the mortality from other preventible diseases.

Since this protective agency has been discovered and used, doctors and nurses can attend hundreds and thousands of cases of the most virulent character without themselves being sufferers.

A careful and exhaustive enquiry into cases of alleged injury from vaccination show that less than 50 out of more than three

million cases of performance of the operation investigated, were really proved, which now, with the improved knowledge and means at our disposal, can never recur; and the direful roll of death and deformity from its beginning to its end, demonstrates that the ratio of deaths continually decreases as the unvaccinated give place to those upon whom the operation has been successfully performed, and these further diminish in exact proportion as the scars left by it show that it had been more or less carefully and efficiently carried out.

As a result of these proven facts, the law makes vaccination compulsory, or rather it imposes, and now happily continues to reimpose a fine upon those who disobey its behests. But should it not go further? and when consecutive fines show the obstinacy of the parents or guardians against complying with the provisions of the law, should it not, in the interests of Society, by its own officers, provide for obedience, by itself undertaking the operation, and thus securing the protection?

But this it is alleged is an unwarrantable interference with the liberty of the subject; to which I have only to reply, that the sooner the subject is deprived of the liberty to spread misery, disease and death among an innocent and helpless community, the better for all classes of her Majesty's subjects. This instance of compulsory application of law to the person to protect the public may have for its pendant a proposed application of the same principle to property, in order, if possible, to draw a broad line of demarcation between what should and what should not be compulsory, and also to lay down the rules which, in the opinion of the writer, should determine the question in all cases of acknowledged public injury: 1st, there should be certainty as to the cause of the injury; 2nd, certainty as to the efficiency of the proposed remedy; and 3rd, that the remedy is productive of no evil effects, and may advantageously be adopted. At the commencement of the present winter season we were assured that the prevalence of London fogs was constantly on the increase, both as to frequency and severity, owing to the ever-increasing volumes of smoke sent into the atmosphere of the Metropolis from houses, hotels, clubs, manufactories, and the like, and it was urged that the time had come for passing a law not only compelling every house to consume its own smoke, but rendering imperative the use of gas as a heating medium, or the adoption of Anthracite or some other of the class of smokeless coals for general domestic use. By the speeches and writings of public men, by the action of societies, much attention has of late been called to the question as one of urgent importance, and as one affecting public health and public property.

But whether the presiding genius of fogs was alarmed at the array of talent and energy brought to bear against his missives, or whether, to save us from a blunder, it has fortunately happened that spite of cold, frost, snow, and other sad visitations, the months when London is most usually visited have been singularly and most exceptionally free from dense fogs, and, with the exception of the frost of the past month, the winter of the year was as bright and delightful as that of its predecessor, 1879, was dismal and dark, and certainly as fine a one as with our climate we can ever expect to enjoy. This at once disposed of the allegation that fogs are altogether dependant on the presence of smoke over which we have control, and that as this last increases as the cause, so the result inevitably follows, in augmentation of the number and severity of fogs, such serious troublers of our rest, comfort and cleanliness.

The aqueous particles which make up London fogs, with their envelopes of dust and hydrocarbons require no smoke to put on their very densest and yellowest of mantles; and dust created by the consumption of gas and perfectly invisible, or from any other sources of heat, or the thousand and one producers of dirt and dust in our great metropolis are factors equal in production to the very densest smoke from the most frequented and fashionable of our Club-houses. Here our sources of certainty, authorizing compulsory application of prescribed remedies, entirely break down, and we further know that places far removed from the alleged causes of complaint, and without them in fact, and where the operation of the proposed remedy would be nil, suffer equally with ourselves from the infliction of ills inherent to our physiographical condition.

There are two causes always in action, and always tending to undermine and to break down either insidiously and indirectly, or directly and suddenly, the public health.

The first of these is defective sanitary condition of our dwellings, either defects of primary construction, or defects of care and continued attention to healthful conditions; and the second depends either on waves of malarious influence, the creators of algide and other fevers, or upon the communication of infectious diseases from person to person, from neglect of isolation of such cases of illness. Whatever may be the nature of malaria, whether germ or ferment, with their sources in dismal swamps of vast extent, reeking with masses of decaying vegetable and animal matter, with these we cannot now, if we can ever, hope to contend. But this we can do, we can build up in every individual, by following sanitary teachings, a wall of resistance, a fort to resist attack, and this is the first care of sanitary science. It seeks to remove from the dwelling all accumulations

of filth, and so to ensure that there shall be within or without the dwelling no nidus in which these diseases, although never self-originated, may yet develop and spread, and further to sweep away all the conditions favourable to their existence—for only when such conditions exist can they create disease. If it were not so, if men were not, as they now are, endowed either naturally or by attention to sanitary regulation of their houses and of themselves, with varying powers of resistance, all would fall alike victims to an epidemic of cholera, or scarlet fever, or dysentery; but the fact is, that it is only those whose powers of defence are, from whatever cause, reduced below the force of the attack, who fall victims to the onslaught. The law helps the defence by creating, or striving to create, conditions which drive away all traitors from the camp, agencies tending to reduce the *vis vitæ* of the combatants. It is because it has not effectually done so in the past that we have so often to reap a sad harvest of suffering and death. General legislation before 1848, when the first public Health Act became law, was practically nil, and even then it was to a large extent permissible, so far as the statute law was concerned, for large communities by every inhabitant to poison the air, not only of his own dwelling, but that of his neighbours, by foul emanations from receptacles or gouts of filth, and other sources of insalubrity.

Ten years after this came the Local Government Act of 1858, but no sanitary action was compulsory upon any authority until the Sanitary Act of 1866; and this Act, although amended year by year, was found to be practically unworkable, because, to use a sporting phrase, the fishing was with too long a line—the rod being held by the Local Government Board in London, with a line of command expected not only to control, but to capture the enemy, and make him a tractable and working slave in Northumberland. Then, after the labours of the Sanitary Commission, came the Public Health Act, 1872, which divided the whole country into sanitary districts, with varying powers, as these districts were called urban or rural. By the first Public Health Act of 1848, it was provided that the Act might be adopted by the ratepayers of any district after certain preliminaries. In many cases it was so adopted for the express purpose of avoiding the necessity of doing anything or spending a single penny in furtherance of its provisions. Once the Act had been adopted, and the district was free from contribution to the Highway Board of the district. The Local Boards were elected, and never met for the dispatch of business. This necessitated the passing of another Act, limiting the adoption of the Public Health Act to districts which contained at least a certain minimum number of inhabitants, except with the consent

of the Local Government Board. Then came another Act, allowing small districts, called special drainage districts, to be carved out of large ones—a special provision for inaction and misrule.

When the Public Health Act, 1872, swept away sewerage and special drainage districts, and divided the whole country into urban and rural districts, a large portion of all the urban districts were rural, and of the rural districts urban; so that rural districts, often consisting of large villages as large as the urban towns, were left without control over the highways, and without any power to make bye-laws regulating buildings or streets or roads. From this state of things has grown up an aggravated insanitary condition, continually getting worse, creating some of the greatest difficulties to be to-day contended with by the arm of sanitary progress. On the outskirts of populous and prosperous urban districts manufacturers, to avoid control and the payment of rates,—borough and general district rates,—have set up their works, quickly to become surrounded by a teeming population, denser than the very towns to which they have become suburbs. Here, without control and without the pretence of sanitary supervision, everyone has hunted his own hare and has built his house in accordance with his own whim and will, and in many cases with the most utter contempt for sanitary precautions. Thus it happens, that one side of a street in these districts is urban and is stringently governed upon the most approved principles, and the other, the rural—well the least said of it the soonest mended, but everyone conversant with these matters knows the scenes to be met with in such localities, the description of which seem like the grossest exaggeration in a civilized country pretending to advanced progress.

What a farce is sanitary protection under such circumstances, as though disease and death would be arrested on their way to take note of the arbitrary divisions of districts created by the greed of wealth, and maintained because their removal would entail monetary burdens on self interest in exchange for benefit to others. Every day's delay in providing a remedy, makes it, when obtained, the more costly and difficult of application, unless some great calamity like the fire of London, shall come to remove these precursors of plague. But, however far away in the provinces may be these centres of disease, we are here in the metropolis, all deeply interested in their removal, for in sanitary matters what is local is general—not merely as affecting national prosperity, but as influencing in a greater or less degree the health and safety of every member of the community.

Are we to allow this state of things to go on increasing, as it is daily doing, with only such protest as is to be seen by the introduction into Parliament every Session of three or four private Bills, by which the Municipal authorities of boroughs strive to extend their boundaries, in order to include and lay under rule these recognized sources of injury. But nothing is more difficult than to secure the success of such attempts at private legislation—opposed always on the score of the entailed additional pecuniary burden which they involve, for committees of both Houses of the Legislature are most unwilling to impose burdens on property, especially when these should be in conformity with general instead of patch-work and piece-meal legislation. It is much to be regretted that before the passing of the Act of 1875, which consolidated into itself all existing legislation, a Commission had not been appointed to enquire into the difficulties which had been met with by sanitary authorities in carrying into effect the provisions of the Act of 1872, and also what were the boundaries of districts that should be determined on in the case of each sanitary authority. It is firmly believed such a Commission would have recommended that the distinction between rural and urban sanitary districts and authorities should be removed. For if we are to judge by experience, these have been productive of little else than difficulty and confusion in the working of the Sanitary Acts.

In lieu of splitting up districts and dividing duties and responsibilities, it is suggested that what is urgently required, both with regard to efficiency and economy, is how to ascertain in each county what should be the limits for municipal purposes within which one local authority should exercise all powers of poor relief, education, town government, sanitary supervision, and all other such local functions under one taxing authority. Sufficient elasticity might be provided for all inequalities of town and country, houses and lands, by making the amount of rating depend upon the benefits conferred, and modifying the stringency of the law in view of the conditions existing or required. There are wider limits than these within which experience has taught us powers must be exercised, and for these, and in order to secure other advantages resulting from the establishment of a strong intermediate authority between local bodies and a central direction, county-boards are required. To such authorities, consisting of the chairman of the board of each several local district within the control of the county, with the addition of an element of representation from the magistracy, might well be entrusted those compulsory powers which already exist for enforcing due sanitary provision in every district, to enquire into and report upon the applications of local authorities for powers to acquire land for

the disposal of sewage, to report upon joint works, and in certain cases to carry them out, to manage county institutions and finance, and to act as an appellant authority in conflicts occurring between local boards and their constituents; cases in which the presence of a board of high authority and clothed with quasi-judicial functions would be of immense advantage.

To such a county authority should also be entrusted the conservation of river basins and the powers of a water trust. It is discouraging to witness again this session the introduction of a measure for a river conservancy on the old lines of optional adoption, proposing to create a new authority with arbitrary districts. Either we are without sufficient information to enable a general measure of protection against floods and conservation of rivers for the good of the whole land to be passed by Parliament, in which case we should at once strive to obtain the required knowledge; or, if we are in possession of adequate information, every year's delay makes the difficulty of dealing with the question more embarrassing by allowing further private interests to grow up and further complicate a question already beset with enormous difficulties—not the least of which is the appropriation of water by districts or individuals entirely independent of their own appropriate water-shed areas and proper areas of supply. There are no words with which we can measure the importance of this question, both as to the domestic and manufacturing use of water.

To these must be added the further great question of injury from floods, making us suffer equally from too much and too little of Nature's greatest boon. It is sufficient to condemn the partial character of the present measure that the greatest of our rivers—the Thames—and the one most urgently calling for treatment, is to be excluded from the operation of the Bill. But we want to know more about water—more as to the subterranean stores which may be utilised, and much more as to the best measures for storing what we have already ascertained to be at hand for use, but which now becomes a curse instead of a blessing. We must recognise the fact, however much we may agitate for cheap supplies of water to our town populations, that the rich in this case must pay for the poor, that no restrictions, as in the case of gas, can be put on its fullest use, and whether in the metropolis or elsewhere we shall be forced to the adoption of general rating by a public body, to meet the cost instead of payment for quantity used. This will make the use of the provided public supply quasi-compulsory, for the payment will follow, whether the water be used or not, with relief in certain cases on the basis of the exemptions in the Public Health Act, and those now observed in the incidence of

the Inhabited House Duty. If, indeed, public health is public wealth, the importance of its conservation should have greater recognition in the machinery of the state, and its proper estimation should be enforced by the creation of a ministry of health charged with the supervision of all sanitary authorities, not merely as a controlling body to regulate expenditure, but to afford help and encouragement when required, and by its influence and character to smooth over the daily obstacles which are inevitable, if local authorities are to act up to the spirit of the law, even as it now is, without taking into account popular prejudice against further extensions of compulsory provisions.

What then is most required is the reconstitution of authorities, so that powers already granted may be better used for the good of the public, rather than the increase of the powers themselves; in almost all cases these in the hands of such authorities will be found adequate, but it is not so in every particular. If opportunity offer, we crush beneath the heel of our boot the head of any venomous reptile that may come in our way, to prevent injury to ourselves as well as to others; we should hardly think of exciting the beast by the toe of a dress shoe, to sting us to our death. Yet how do we deal at the present time with cases of infectious diseases occurring in our midst, one of the great sources of danger to the public health which we can easily stamp out, but which we deliberately allow to run on its course unmolested. If a member of our own family should unhappily be laid up with an attack of measles or scarlet fever, we, as soon as it is known, become isolated and cut off from our social belongings. Our friends no longer call upon us, we are prevented from going into society, and our acquaintances when they meet us rein up their horses at a safe distance from the curb of the pavement on which we stand, while they enquire as to the sanitary condition of our little home community. At the same time these very friends and acquaintances in shops or warehouses which they frequent or use, in laundries, and in workshops, are daily shaking hands with infection, and dealing directly with persons who come straight from their habitations, where infectious disease is present, and who in their clothes, and otherwise convey to the unsuspecting, the matters which engender disease. The tailor who makes or mends our coat does so in the company of measles or small-pox; the laundress, who is busy with the garments soon to be applied as coverings to those we love best, bestows her care equally on the snowy surface of our linen, and on the scarlet desquamating skin of her child, and then we wonder at the spread of infectious disease, and that so little good results from sanitary measures, as though sewer and ventilating apparatus outside our houses were all the protection that is required to

ward off disease, and that the interiors, and all that there occurs, is beyond the need of our attention and our laws.

We have the means at hand effectually to stamp out infectious disease at its first approach. Already private legislation has in several towns gone far ahead of any general provisions of the law for the public safety, and in these towns it is obligatory on the householder under penalties to give the earliest information to the medical officer of health of the occurrence in his house or premises of any case of infectious disease. There is, however, more than this required, and it will sooner or later, spite of sentimental outcry, be adopted in the isolation of cases of infectious disease in special hospitals under carefully considered conditions, where the treatment of cases can be best carried on, and the subsequent convalescents placed under the most favourable conditions for perfect recovery. This will be done primarily in the interests of the healthy as against the sick, but with an equal amount of benefit to the sufferers themselves, and to their relatives and friends. Such a system efficiently carried out would in a limited period add five years to the mean duration of life in this country. And who is there here who can sum up in figures the amount of suffering and misery which is represented in the five years thus cut off from the short span of human existence?

At present sanitary authorities require teaching equally with their constituents. Let us do what we can to instruct them. But those of us who are most urgent for improved law as an agent in sanitary progress are the first to recognise the truth—that all external law will be useless, unless every man in his own sphere, and specially in his own house, becomes a law to himself.

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After Mr. MICHAEL, Q.C., had read his Paper, the following discussion ensued, Dr. RICHARDSON, F.R.S., occupying the Chair:—

THE CHAIRMAN: The importance of this paper is such that, in discussing the matter, you must keep in mind the three great questions which Mr. Michael has brought forward. He says, before you admit anything in the way of legislation of a sanitary kind you must have an absolute knowledge that that which is going to be done will be a success. Next, he says, there should be in country districts an intermediate body between the local body and the central Government body. The third point he urges is that there should be a reconstitution of the authorities rather than new powers conferred on the existing bodies. Finally, he suggests in a very clear and able way this point, whether, after all, legislation is really wanted for the *summum bonum* of sanitary science, in respect of which every man

should be a law unto himself. If these points are borne in mind I think the discussion will go on as smoothly and merrily as a marriage bell.

MR. H. C. STEPHENS, F.C.S., said he rather gathered that the author of the paper proposed that they should endeavour to do without legislation altogether, or to aim at that, and certainly, according to the last paragraph of the paper, under certain circumstances, this might be desirable. His object in rising was, however, to point out how the law instead of aiding sanitary progress contrives to obstruct and thwart it. There was no question upon which the mind of the country was exercised more than upon the question of the disposal of sewage, and opinion was now pretty generally settled that the rainfall should go into the natural water-courses of the country, and that the sewage proper should be treated so that the solid matters which it contained in suspension and solution should be separated from the water: but instead of the law assisting the sanitary authorities to do this, the law itself presented an insurmountable obstruction to the working of any honest and regular system of sewage purification. By the 15th and 21st sections of the Public Health Act, all sanitary authorities are required to admit roof-water and surplus sub-soil water into their systems of sewers; so that, instead of having a constant regular volume of sewage they had a volume of sewage most irregular in quantity, sometimes enormously swollen by a heavy rainfall, which could only be disposed of by what was known as the storm overflow, a back door which was opened not only on legitimate occasions but on illegitimate also. On show days, when some taking system of separation or purification was to be seen in operation, and when it was desirable to put on the best appearances, the system was exhibited in attractive and successful operation. But if a surprise visit were made it would be found, whether there had been a rainfall or not, that most frequently this back door was still open, and the sewage was allowed, under cover of the supposed working of a sewage purification process, to pollute the natural water-courses of the country. Of course it was very difficult to deal with such a state of things as this. He submitted that in consequence of this obstruction by the law there was a general system of make-believe all over the country as to the purification of sewage, and while it was supposed the sewage was being purified the real facts were very different to the generally prevailing impression. The great difficulty was that the local authority had very little power or option, and instead of carrying on the work on a level with the engineering and sanitary intelligence of the present day it had to carry out a rude and out-of-date method, by providing large outlets to admit roof-drainage and subsoil water, the very large and irregular flow of which had to be provided for to the complete destruction of any proper system of sewerage. Another matter in which the law really obstructs instead of aiding the sanitary progress of the country was with reference to the water supply. He lived in a district which was supplied by a public company with hard water. This

company had taken possession, under the powers of an Act of Parliament, of a very large rural district which was now passing into an urban sanitary district, in which it was generally admitted that a great depreciation of property resulted from the character of the water supplied, and it was unfortunately the case that, from the nature of the water, boilers and machinery and the pipes in the course of a few months became choked, and they had to be removed at a great expense. To render this state of things more bitter the inhabitants had very near to them a water company which supplied its own district with good artificially-softened water, and had every condition for giving his district a far better service than the hard water company. His district was compelled to take the hard water only because the law insisted upon their submitting to it, just in the same way as before the French Revolution people, instead of dealing with whom they pleased, were compelled to go round the corner and deal with some particular baker, butcher, or other tradesman. It was, however, the fact that the inhabitants of his district could not get this softened water—which was one of the best waters in the country, it was the Colne Valley water—yet they could not have it, but were obliged to submit, and by the operation of the law were compelled to take this hard water and see the value of their property disappearing, besides having to submit to the greatest possible inconvenience and discomfort. That was certainly a great sanitary disadvantage, inflicted upon his district by the operation of the existing law. He submitted that the first thing requiring attention was to do away with the retarding and obstructing influences of the law, and this aspect of the question certainly merited attention before they considered how the law could promote sanitary progress. The country was now under a popular Government and under institutions becoming every day more free, and it was said that the law could be an educator of the people, but it was evident that those who made the laws still required to be very considerably educated.

MR. CUNNINGHAM GLEN, Q.C., was struck by one very remarkable omission in the able paper which had been read. When medical men met together, he had heard them speak with reverence of men who were the pioneers of medical science—of Harvey, Simpson, and many others, but he had not heard in the paper any mention made of the name of the discoverer of sanitary science. That name had been forgotten—he referred to Dr. Southwood Smith, who was the discoverer of sanitary science, so called. In his (Mr. Glen's) younger days he remembered him as the Physician of the Fever Hospital at King's Cross, now at Islington. From the experience he there gathered from the patients who from the surrounding district and outlying localities were sent to the hospital, he formed the conclusion that there were large classes of disease which he described as preventable diseases, the recurrence of which, by the adoption of sanitary means, would be brought under control. He laid down his views on that subject in a work which he published in 1834 or 1835, which was



now scarcely to be met with. After Dr. Southwood Smith's book had attracted some interest, the matter remained dormant, and no further action was taken upon the matter until 1844 or 1845. At that time Mr. Chadwick, having been relieved from his more active duties under the Poor Law Commission, took up the subject which had been broached by Dr. Southwood Smith, and he and his fellow sanitary reformers published the result of the enquiries compiled from answers to various questions he had put, and the information obtained from medical men who had been examined on the question. This book was published, and caused a great sensation both in England and Scotland at the time. After the publication of that book the first sanitary legislation took place, but it was only of a temporary character, to endure to the end of the then next Session of Parliament, that is, for one year only. That Act was known as "The Nuisances Removal Act." It was a short Act, which was found to work very well indeed. It was in fact an enabling Act for certain local authorities to do certain things in the way of removing nuisances considered injurious to health. In the year 1848 the Act was renewed with amendments, and made permanent by the 11 & 12 Vict., c. 123, which again became by re-enactment the 18 & 19 Vict., c. 121, which is still in force in the metropolis, though repealed beyond the limits of the metropolis. Then followed the expiration of the power of the Poor Law Commissioners, and Mr. Chadwick not being re-appointed to his former office on the Poor Law Board; the Board of Health was constituted, when Mr. Chadwick, Dr. Southwood Smith, and Lord Ashley were appointed Commissioners to carry out the objects desired. That state of things continued, notwithstanding many blunders, until the year 1858, when the Local Government Act was passed, the effect of which was that first Sir Benjamin Hall, then Mr. Chadwick, and Mr. Tom Taylor carried on this business for a long time. They all knew how the matter now stood. All the former legislation was repealed, and everything placed under the direction of the Local Government Board. The duty of that Board was to hold local enquiries in places where loans for district purposes were needed, or, with the assistance of a medical officer, into the causes of diseases prevailing in certain localities; but as to any compulsory powers they had, or might have, he should be very sorry to see them extensively acted upon. There was one instance in which the compulsory power was acted upon nominally by the Secretary of State, but really by Mr. Tom Taylor, and frightful was the effect. In a place not far from the Metropolis he acted upon his compulsory powers and appointed an engineer to carry out certain sanitary works, who entered into the matter helter-skelter, and to carry out what he thought was necessary for the purpose, laid out a new system of drainage, sewerage, new waterworks, a sewage farm—in fact, almost everything conceivable to sanitary science. Mr. Taylor thereby involved the local authorities to such an extent that they had to mortgage their rates up to the very hilt. He (the speaker) would be very sorry to see the compulsory powers of the Board often put in force. He should be very chary in acting

upon such a power, and taking it out of the hands of the local authority and placing it in the hands of a central authority. Speaking as a vestryman, he should be very sorry to see the Local Government Board exercise such powers. He had had a great deal of experience throughout the country, and for the last ten or twelve years especially in Kensington, and he must say that, although taking part in the management of that parish, it was one of the best sanitariously managed parishes in the kingdom. The manner in which the Medical Officer (Dr. Dudfield) and inspectors performed their duties was most excellent, and as far as local administration was concerned the parish of Kensington could not be improved. He did not know that any other points occurred to him, but with reference to sanitary science itself he was not disposed to go in for all the measures advocated by the promoters of sanitary science. He had very great respect for soap and water, the scrubbing brush, and a full meal. Those were the best sanitary appliances he knew of. With regard to drainage, he did not go against natural drainage. The Almighty had provided for that in the rivers which were the natural drainage of the land, but they must not be allowed to silt up with the pollution of sewage matter. A stop must put to that, and if that were done, a great point would be gained. He would further draw attention to the fact that during one year upwards of twenty millions of money had been sunk in the execution of sanitary works without the ratepayers, who had to meet the expenditure, having any effective control over the expenditure. It was not of course in one year alone, but year after year those sums had been expended. He remembered a sanitary engineer coming to him for advice in reference to carrying out some sanitary works. He (Mr. Glen) ventured to question the merits of the proposed operation, upon which the engineer explained the scheme; he (Mr. Glen) pointed out that it violated or disregarded some important sanitary principles. The engineer in answer said, "I perfectly agree with you,"—but the contract for the works was £85,000, and he was to have a commission of 5 per cent. upon it, and that, no doubt, was a sufficient answer on his part to the question whether the project was worth carrying out or not. With regard to the River Thames, he would just add that the present system of sewage was not by any means perfect. It had already done much mischief lower down the river, and sooner or later, he had been told by an eminent engineer, the river itself would become most seriously foul, unless a better system of sewerage was adopted. It was only a question of time, but he thought the present scheme was a gigantic blunder, and that it was quite clear that they must not neglect to keep in a sanitary and wholesome condition the rivers of the country which were the Almighty's natural drains.

MR. FOOKS, Q.C., said if he understood the paper aright, the view of the author was not so much that power which now existed, or the law as it now stood was defective, but that so far as sanitary regulations were concerned, though some extension of power, or possibly

some limitation of power was wanted, the powers which now existed could and should be more wisely and efficiently wielded. It appeared to him that that was the object of the paper, in which, if so, he entirely concurred. It was obvious to all that we had a central body and that we had local bodies armed with optional and discretionary powers, which might be—he would not say that they were not—sometimes tyrannically and injudiciously wielded, and they were often exercised, not so much for the advancement of the public welfare, and the improvement and promotion of the public health, as might be desirable. As practical men, they should address themselves to that evil. It appeared to him that the evil existed in giving too much latitude of action, without sufficient restraint, to the local bodies upon whom it devolved to carry out these sanitary laws. We had sanitary authorities in the shape of Local Boards all through the country, whose powers were exercised by a variety of officials, sometimes assisted by the scientific engineer, down to the overseer of the parish assisted by nobody—who had almost absolute power to order what should be done and what remedies should be applied to sanitary defects. He was satisfied from his experience as a country resident that if the powers of dealing with such measures were vested in Justices of the Peace, acting as magistrates in Petty Sessions, or as members of County Boards, it would amount to simply nothing. In large communities and towns the men who had to carry out such measures had too much rather than too little discretionary power. The smaller class of cottage property and larger houses let out in flats, were, in too many instances, overcrowded dwellings, and the fertile source of disease. As long as there were people who had but little clothing to wear, little food, and not the means of paying much for house accommodation, no matter what it was, they would rather live in cellars than have nothing over their heads. We, assembled here, would of course like every man to be well housed, well fed, and well clothed—that was going further than the mere sanitary view of the case—those however who had but poor lodging, little to eat, and but little clothing, would at all events, with such clothing as they had, and such food as they could acquire the means of paying for, content themselves with any lodging they could acquire in any houses in which they could get shelter. The people who made incomes, getting 10, 15, or 20 per cent. for their investments, by letting out small cottages and the buildings he had referred to, had to a great extent the governing power and the control of the rates, and were as a rule, opposed to any important sanitary improvements which would entail expense. The remedy, as it appeared to him to be applied to this state of things, was to strengthen somewhat the hands of the executive, by having a County or other District Board or authority interposed between the Government Board and the Local Bodies, with a controlling power over the latter. This was a point to which the late government and the government of the present day had to some extent already had their attention directed. The public however might assist by saying, "These things shall exist no more. You must have an effective control over those local bodies who will not put the

sanitary laws in force and check their vexatious and capricious exercise." For instance, if a gentleman wanted to put a bay window to his house, or to do something to increase the light and air to his own dwelling, without any detriment to the public, the cry is, "Oh! it is against the law to do that." He (the speaker) could say that within the last few years the courts were engaged in deciding such a question. In that case there was a street 100 feet broad, with gardens in front, and because the fronts of the houses were the building line, a gentleman who put out a bay window, was subjected to a long and useless litigation. There was too much of that sort of Bumbledom—a great deal too much. It required a strong hand applied to see that proper sanitary measures were carried out, and also to prevent arbitrary powers being carried to foolish extremities. With reference both to urban as well as rural authorities, and especially the overseers, it was a fact, that the men most active and influential in office were the owners of, and let out, cottages or dwellings which had not the common conditions and accommodation for decent people. That state of things would never be rectified unless authorities were appointed, with a district appointed to each, with the power to say, "This must be done, this must not be done, and this must be carried out. If you don't carry it out yourselves, it will nevertheless be done at your expense." The main points to which attention should be directed were the overcrowding of houses, insufficient sewerage, and bad water. They could never get effective sewerage introduced into some towns because it would increase the rates, falling chiefly upon mere occupying tenants forming the sanitary authority, and not upon the landlords, whose property would be permanently improved by it. There was a growing competition for land for building tenements and houses, and those who ought to fulfil the obligations which attached to such property, evaded them. If rates were levied upon property in towns for the permanent benefit of the inhabitants, why should not the permanent owner rather than the casual occupier have to pay for the benefit. As between town and country, as well as between landlord and tenant, there was a conflict of interest, under the existing law, which did militate practically against carrying out improvements that ought to take place, both in reference to sewerage and water supply. This was recognised as a great obstacle why sanitary improvements were not carried out, and the water supply was bad because of defective sewerage, which led to the pollution of streams. His friend Mr. Glen had said that the natural streams were one of God's great gifts to us, but appeared to think that the gift should be utilised more generally as the means of carrying away sewage. He (Mr. Fooks) granted that in some special cases streams might be converted into sewers, but as a general rule the prevention of the pollution of streams ought to occupy public attention above all things, and next to that the prevention of floods and the recurrence of drought, if that were possible, also demanded public attention. Generally, however, he fully agreed with the view so ably put forward by Mr. Glen with reference to the treatment of sewage and the question of water supply. As to the proper supply of water

he was quite satisfied that before a local board could be brought to adopt the sound principles of water supply, they must be very much more enlightened than they were at present. He had himself had some connection with waterworks companies, and with public and corporate bodies, and he had found that the latter really wanted water supplied to them at such a price as would not be remunerative to the company who supplied it; nay, more than that, they wanted to have water and sewerage provided in such a way that they could make a little profit out of it. Both sewerage and water supply were too often regarded by local authorities as things from which they might get a commercial profit. In his (Mr. Fooks's) opinion the public health was the first question to be considered, in comparison with which the commercial view of making profit was nothing, and that the obligation of providing efficient sewerage and a supply of pure water wherever needed should attach to landlords rather than to occupying tenants, and that whether as regards the incidence of the obligation, or the remedies for compelling its fulfilment, the law was in fault and required amendment. He thought the views propounded in the paper read by his friend, Mr. Michael, were most sound; and, in conclusion, he would say that although the present laws were not altogether satisfactory, still they were a step in the right direction. The laws, however, were not so much to blame as the mode in which they were carried out. They were, in fact, in advance of public sentiment and views, and the members of the association dealing practically with this important subject should seek to improve the public mind, and through them the legislature, in order to get the existing laws sufficiently supplemented. With these observations he concluded by earnestly supporting the views expressed in the paper which had been read, namely, that further legislation was required, not so much for obtaining more or larger powers, but for more effectually wielding and putting in force those powers that already existed.

MR. WYNTER BLYTH had not intended to address the meeting, but having heard the excellent paper of Mr. Michael, and having been engaged many years in sanitary science and experiments in sanitary science, he had much pleasure in supporting the general ideas enunciated in that paper. He would confine his remarks to the distinction between urban powers and rural powers, which he had always found in his six years' experience as a medical officer in Devonshire, was very injurious to the proper working and carrying out of the present sanitary law. He could instance many difficulties which arose in consequence of that absurd distinction between urban sanitary powers and rural sanitary powers. He would like to have one certain law, equally regulating alike those urban and rural powers. There was an instance in his own locality of a ruinous building, propped up by a few posts, which had become positively dangerous to passers by, and yet, because he had not urban powers he could not condemn that building, and it was allowed to stand or fall as the case might be. In one or two instances life had been nearly lost by the fall of chimneys,

houses, or other dangerous structures. Many people in his district had had narrow escapes from being killed by such occurrences. With regard to the reconstitution of the present sanitary authorities he was quite in accord with Mr. Michael's views. Some of the rural authorities in his district were very quiet authorities indeed. As an instance of the ability of rural authorities in postponing matters of improvement that might be urgently wanted, he would give this instance. He wanted, for sanitary purposes, a drain put down in a certain locality, and the rural authorities agreed that it was very desirable, and even necessary. They were agreed as to that, but instead of directing the work to be done, it was adjourned to the next meeting of the Board. Well, at their next meeting, a resolution was passed—it was resolved that a committee should be appointed, and that that committee should visit the spot. Between that meeting and the next the committee visited and inspected the spot, after which the matter went over to the next meeting. At that meeting there was a great unanimity of opinion as to the necessity for this work to be carried out, but decisive action was deferred until another meeting, and many subsequent meetings, at each of which something or other cropped up which prevented the requisite order being given. That sort of process went on for six years, and he supposed, for aught he knew, was going on still. As he understood, Mr. Michael did not wish to interfere with local government, and thought that it was not desirable to have an imperial legislative power which should compel all local, urban, or rural authorities to act contrary to their own ideas. Now, he (Mr. Blyth) admired the principle of local government very much, but personally he would rather not have too much to do with Local Government Boards. He did not care to have a body of gentlemen possessing absolute power in London, and controlling the actions of those who were located in such distant places as Northumberland, Carlisle, and possibly on the remote hill-sides of Wales and Scotland. In many respects it was desirable that the regulation of sanitary measures should be confined to local authorities because they were cognisant of and dealt with local matters of detail, in which local knowledge was most material and useful. On the other hand, if for every little thing that was required to be carried out in a remote part of the country, it was necessary, before that could be done, to write to a gentleman, an officer, at Whitehall, for instance, and defer the work until after an answer was received from him, and perhaps a long correspondence would thereupon ensue, the locality would suffer from the red-tape system which every one knew was a great drawback and hindrance to urgent business. He observed that Mr. Michael wished to constitute a county area, or something of that kind, and that, speaking from his own experience, he thought would be of great use, even if it did not disturb the functions of the local authorities. The cases he had mentioned would illustrate his meaning. If a local authority, or a county authority neglected or refused to carry out those sanitary measures which were required, and a higher authority had the power to compel them to do it, or to do it for them, he thought that would be a very great advantage. He did not exactly understand what was

stated in the paper read to them as to areas, but he inferred that Mr. Michael wished the areas he suggested to coincide either with the water area, or conservancy of rivers, or with areas of localities, but he (Mr. Blyth) was quite sure that any area which did not coincide with the registration areas would be useless as regarded sanitary purposes. If that were not provided for, although a large amount of statistical particulars and information had been collected, all those statistics would have to be gone over again and corrected if the present areas were altered.

MR. C. N. CRESSWELL said, that although he only came to the meeting as a visitor, on the invitation of a friend, to hear Mr. Michael's paper, he had been called upon to say a few words with reference to a subject upon which he had exercised himself for some time. The Chairman had suggested, after the paper had been read by Mr. Michael, that there were four leading characteristics of that paper, and that the discussion should be confined to those four points, but he failed to see that, with the exception of the third speaker, Mr. Fooks, the discussion had been so confined. His friend, Mr. Glen, who was a great authority in sanitary law, went into a long discussion, and started theories which nearly made his (Mr. Cresswell's) hair stand on end, so contrary were they to what they had heard from other quarters; but he (the speaker) would content himself by saying that he disputed what Mr. Glen had said. Mr. Fooks had spoken on those subjects with which he was familiar from experience, and so also had the gentleman behind him (Mr. Blyth). One always listens with pleasure to gentlemen who gave the results of professional experience, in order to throw light upon such subjects in a manner that ought to be appreciated. With reference to the second point to which attention had been called, Mr. Michael had alluded to the importance of an intermediate authority being constituted as between the rural and the urban authorities and the central authority or Local Government Department in London, a board of which almost everybody could say much, but very little in its favour. It was, he thought, impossible to conceive a greater drag upon their progress in matters, upon the importance of which all were agreed, than that system of centralization which had grown up amongst them, without their having had even a vote in the appointment of those who have to put important measures in force. He recollected in his own district—a rural area with which he had been connected for some years—that the building of a pig-stye in connection with the union workhouse was found to be necessary; and to give one instance out of many in his past experience he would tell them that the government inspector had to be consulted on this important subject, and visited the workhouse, inspecting the place where the stye was proposed to be built. He expressed his opinion upon it, and then went home, and nothing further was done. Time passed, and his attention was again and again called to the matter, but still as his formal sanction was not given, the work was not done, and so far as he (the speaker) knew to this day the pig-stye had not been

constructed. In another case, a complaint was made as to the constituents of a plum pudding which had been given to the paupers in the union workhouse, it was supposed to be a matter far beyond the needs of the paupers, and a government inspector was actually sent down to discuss that important question. An enquiry was held, but the matter was at length settled by a benevolent lady saying that, to avoid any such difficulty in future, she would herself supply the plum pudding gratuitously. That might be thought a *reductio ad absurdum*, but it was a sample of the exercise of the powers and authority of the Local Government Board. Such authority was only really required in important matters; but as had been pointed out, there were also important but simple duties which could be wisely and better carried out by those who had local knowledge and applied it to local needs. There was at present more than enough experience of the ill-effects of Whitehall officers instructing the urban and rural authorities as to the best mode of discharging their duties. Then came the important question as to how far the central authority should have power to act. He would say let them act in cases where advice was sought by despairing local authorities, who would be only too glad to seek the help of those who should help them, but which, according to his experience, they were never willing to do. They had heard, upon the best authority, within the last few weeks, that the Government were about to try the experiment of County Boards in Ireland. He hoped it would not be said that that was an *experimentum in corpore vili*. It might be a benefit to Ireland, if it were applied stringently, but it was strange and anomalous that an experiment in sanitary progress should be tried first in a country which seemed at present to need legislation upon much more important matters. He thought it would have been far better to adopt the principle of establishing County Boards in England. They had been advocated and discussed, and urged by the Society of Arts, and arguments in favour of them addressed to the Government by the highest authorities in the scientific and sanitary world—arguments proving the great importance of such Boards, if properly carried out, to the agricultural and commercial interests of the country. This principle, he believed, would be found to be a remedy for many of the sufferings and heavy burdens under which they were at present labouring. He hoped all those who had at heart, and he believed they all had, the progress of sanitary science, would express their conviction that the real solution of the difficulties which had been so ably pointed out was to be found in this—the most important question of the day. At present, whenever a Board wished to borrow even one thousand pounds for a valuable sanitary improvement, they were obliged to apply to the Government Board for their approval before venturing to contract such a loan. That often implied a local enquiry, and an expensive and inconvenient correspondence, and much delay. In many instances of that kind the money had not only been forthcoming, but actually paid into the bankers before the inspector could find time to come down to make enquiry and report upon the matter. In several cases he had known urban and rural Boards, instead of

waiting for the visit of the inspector, think it worth while to incur responsibility, sometimes grave personal responsibility; and instead of waiting for that official, the Boards had, in many cases drawn a cheque for the amount required at their board-room table, and taken the responsibility upon themselves. He could mention many other instances where injury had been occasioned in consequence of defects in the Sanitary Acts, which could be supplied by these County Boards. The only question and only obstacle which stood in the way of establishing such Boards was the difficulty as to how they should be constituted—whether they should be composed of Justices of the Peace and gentlemen of position, with others of lower grade. Surely that was a question which could easily be solved. It might, by some be thought they should be truly local institutions, and he thought the Guardians of the Poor should be represented on the Board, which should also have educated men among its members. At all events a trial might be made. He could conceive that such boards might become a sort of local parliament which was by all means desirable. Such boards would be the means of moral and political education as well, and would enable many young men to fit themselves for higher work in a larger arena. They would elevate, educate, and to a great extent enable men to carry out the valuable principle of local self-government, and induce gentlemen to join in that work, by introducing them to men from whom they had formerly kept aloof. Although these Boards might combine some elements of incongruity they would have the effect of fitting men to discharge important duties, and he saw no reason why they should not combine all the valuable elements of local self-government. He could conceive these Boards acting as financial committees, both with regard to rural parishes and municipal boroughs. He could even conceive their acting as a judicial committee, as a part of local government and as a parliament of the county, combining within itself all the requisite attributes which would render it much easier to carry out important sanitary works of drainage, and waterworks. With reference to the pollution of rivers, he had recently heard that two very important Bills were intended to be brought before Parliament, one, "The Prevention of Floods Bill," which had already been passed by the House of Lords, and was about to be referred to a Select Committee; the other was Mr. Magniac's Bill, as to the pollution of rivers. He had carefully read these Bills, and they were entitled to much admiration for the care and accuracy with which they were drawn by experienced men. Curiously enough they were unanimous on one point with reference to conservancy boards, that these boards should be charged with the enforcement of the "Rivers Pollution Prevention Act, 1876." Those who had observed the working of that Act knew that it was a lame and impotent piece of legislation, because no one had the power to put it in force. If it were necessary to bell the cat, everybody knew it was a difficult thing to do. With reference to the offences sought to be prevented by this Act, according to his experience in almost all cases, the principal delinquents were the owners of small cottage property. The members of local boards were elected by

voting papers, filled up by gentlemen who could read and write, (which was not always the case with the occupants of small cottages,) consequently these gentlemen nominated themselves or their friends, who were also owners of cottage property. Many of the inmates of cottages, as he knew, had much to complain of with regard to the state or surroundings of their dwellings. When he had advised a man to make a complaint of unsanitary matters, and to speak to the sanitary inspector, he said he did not want to mention it because it would offend his landlord. The man would not interfere because, perhaps, if he did, he would get into trouble with the landlord for causing the rates to be increased. That was patent to all. In one instance, when a man had been urged by the speaker to complain to his landlord of the bad state of his cottage, the instant reply was, "Do you think I should be such a fool? Why, there is not another cottage to be had about here, and if I spoke to my landlord he would turn me out." In fact, the real power in such matters was too often in the hands of the owners of cottage property. He knew an instance in which three-fourths of the members of the Board were small tenement owners and the greatest delinquents. Then with regard to pollution, when the men, who were engaged in manufacturing or other business, were asked to do what the law required to prevent that, what was their reply? It was in effect, "never," and too often they incorporated among themselves such powerful influences as to set the law at naught. It therefore became necessary to have an intermediate body with power to enforce the law—a body consisting of, not such men as too frequently constituted the sanitary authorities, but independent men far above suspicion, and who should firmly put into force an Act which the legislature thought necessary for the welfare of the country at large. Whenever that law was set in operation it was in a sort of interlocutory and circuitous manner. His experience was, that there had only been about four or five cases in which the Act had been attempted to be put in operation; never had it been put into effectual force. If there were an intermediate authority, the difficulties he had mentioned could be easily overcome, because the county board would stand in the position of a protector to the local medical practitioner, having superior power over the local authority and the local practitioner. By such means, people aggrieved by improper sanitary work or other defects would be able to get an order for their rectification, and the local authorities would be compelled to do their duty, even taking the Act as it stands, in reference to sanitary provisions. Turn to the Act for the prevention of floods, the latest production of the present government, and what was to be found in its clauses? Among them there was an exception and saving clause that it should not apply to the Thames—the river which Englishmen maintain to be the largest and finest port in the world. That was to be excepted from the operation of the Act. For what reason? It might be said because it was already under the control of the Thames Conservancy Board; but people living in the Thames Valley knew well that no river demands instant legislation more than the Thames. It

was just as if a Bill were brought into Parliament—a Bill to alter or increase the power of an already existing law, but excepting from its jurisdiction every man who was rated to the poor, *i.e.*, the majority of the population.

MR. G. J. SYMONS, F.R.S., said he would not have risen to speak on a merely legal question, but it was not merely a legal question put before them. Having no connection with the law, he would nevertheless say there was one point on which the last speaker had raised considerable doubt in his mind, that was in reference to the establishment of County Boards. He would not attempt to indicate what their powers ought to be, but if their jurisdiction was to follow the existing lines of county boundaries, he feared the effect would be that they would cut some of the most important watersheds in half, in one or two places. He would infinitely prefer, if possible, that all areas should be well and sensibly defined. At present the registration districts, and indeed all districts, were of a most arbitrary and, in some instances, of an absurd character. Not only counties, but small towns and little villages, were in some instances divided in a most anomalous way. He knew that the Registration districts and boundaries had been established ever since 1837, and it was a very serious thing even to suggest an alteration of those boundaries, but any one who had studied the reports of the Registrar-General since 1837, must have noticed that considerable alterations had been made. He thought he was within the mark in saying that modifications to the extent of 200 or 300, of one sort or another, were necessary. He was not prepared to say that even such an occurrence as a disastrous fire was as serious an evil as generally considered, for they were the means of consuming and sweeping away sometimes large unhealthy districts which were far better cleansed. A remark had been made by Mr. Michael as to the great fire of London being a calamity—he (the speaker) was not so sure of that. No doubt it was a calamity to many of the poor people who got their livelihood in London and were burned out—to them it really was one. But considering what London was before and what it became after the fire, although they might think that as a fire it was a calamity, so far as the rebuilding of London was concerned it was the reverse, as it swept away a great many most confined and unsanitary parts and divisions in the city, and resulted in as much benefit as counterbalanced the inconvenience and distress caused by that fire. With respect to the question of the pollution of rivers, he remembered some time ago hearing a remark by an important official declaring that after a heavy rain in Northamptonshire it was twenty-three days before the river in the district could carry off the superabundant water. The idea that twenty-three days were necessary or required for that river to perform its proper function of carrying off the surface water from the land showed that it was necessary to remedy that by some legislative enactments, and the sooner such anomalies were got rid of the better. All simply permissive law was a mistake, no doubt about it. Another point to which he wished to

call attention was that the legislature was sometimes a little too impulsive. That was illustrated by what Mr. Michael had said about the prevention of smoke and the frequent occurrence of fogs—he thought Mr. Michael must have read the pamphlet about the “Doom of the Great City”—London destroyed by a fog. They had heard from Mr. Michael a great deal about the injury resulting from fog, but he thought with regard to the suppression of smoke, that some persons had been rather too impulsive, their action being apparently not entirely disinterested. He thought that the two Rivers Conservancy bills introduced this session were of the character he had mentioned—a little too impulsive. In the south-east of England they had had a succession of six wet years, and partly from that, but to a great extent from the water being drained too rapidly from the land, they had had such a succession of floods as was unprecedented at any rate in historic times. Two bills had been introduced into Parliament with a view to diminish the evils resulting from floods. So far as he had seen these bills they did not take into account the occurrence of droughts, but certain it was, that, sooner or later, there would be droughts as well as floods to contend with; droughts however were not in the public mind at present and consequently the two bills were strong measures taken to diminish the evils from floods. That he thought was a very lame way of dealing with the subject. He thought that it would have been better to have examined the water resources of the country before such strong measures were taken as the introduction of these Bills. It seemed to him something like taking a leap in the dark. He would touch upon only one other thing, the sewers. The present large size of sewers was no doubt rendered necessary in consequence of their having to carry off not only the rain water but the subsoil water as well. That had a bad result in two ways: first, in making the sewage matter too poor to be profitably utilized; secondly, the sewers being so large, were more expensive to construct. The sewage was spoilt in two or three ways; first, by diluting it largely with much water that need not go through the sewers; secondly, this mode of diluting it involves cost in addition to that of the sewers—the cost of pumping power to lift it up to the level required for its discharge or treatment; besides that, there was exposed a large surface covered with very foul matter. Lastly, through the large size of the sewers, the sewage matter passed through so slowly that there was time for the deposit of the more solid matter, rendering the effluent sewage infinitely less valuable.

THE discussion was resumed on Wednesday, the 9th of March, Dr. B. W. RICHARDSON, F.R.S., occupying the Chair.

Mr. J. F. BATEMAN, F.R.S.S.L. & E., said it was apparent that Mr. Michael had given most elaborate consideration to the whole matter, and few would find themselves able to enter into the subject discussed, with the readiness and power displayed by Mr. Michael. For his own part, he acknowledged that he had been unable to give the time which would be necessary to discuss adequately the whole of the important questions dealt with in the paper. As to the first point proposed, the re-arrangement of districts, there would be great difficulties in the way of carrying out the suggestions of making the magistrates sanitary authorities. The magistrates in the various counties and divisions of counties were entrusted with great powers, and had great responsibilities, but these could not extend beyond the borders of those counties or divisions of counties. Hence, if it were proposed to make the magistrates the sanitary authority over a river, there would be a number of such authorities for every river; for the Thames, for instance, passes through several counties, and the sanitary powers of magistrates could only extend over such parts of the river as belonged to their counties. Then again, there were comparatively small river basins in which there were large and important townships, and large basins in which there were small and unimportant places. The River Irwell supplied an instance of the many important places which there might be in a comparatively small area, and this had been called the hardest worked stream in the world. It rose some thirty or forty miles from the tide-way, and in that narrow compass passed by many towns, draining hill and vale. The instance he could find of the other areas was the town of Greenock, on the Clyde, where there was the tide, and, to a town like this, as well as to Liverpool, the most convenient manner of dealing with the sewage would be to discharge it into the tide running past the town at the rate of many miles per hour. But with regard to the Irwell, there was continuous population throughout the whole of the narrow valley. There was no land upon which the sewage could be used, and therefore, other means would be necessary to deal with the sewage in some form other than by irrigation unless it was carried to a great distance, which was not possible there. And he should be sorry to say that sanitarians were yet agreed as to the best mode of applying sewage. Some said that the direct application of it to land was the best, while others held that it should be always dealt with by chemical precipitation. Some saying one thing and some another, but he held that in all cases it was necessary to consider the circumstances of each town, and also the peculiarities of the surrounding districts. In some cases he had no doubt that the application of the sewage to land, under favourable circumstances, might be the best; in other cases such application of sewage might be utterly out of the question, and some other means—precipitation, or by turning it directly into the river—might be the best. But in every case he thought that all the circumstances

ought to be taken into account which might affect the proper distribution of the sewage. Some persons thought the river basins might be arranged into districts. Well, he happened to live himself in what was called a river basin. He lived, too, below a town prohibited from draining its sewage into the river. This river passed through a most beautiful part of the country, and it was thought that it would be a pity that the beauty of that river country should be destroyed by the sewage of a town being drained into it. It was the duty of every riparian owner to keep the river as pure as possible, and it was also to the interest of the town through which it ran to keep it pure as a precaution against contagious diseases. There were other towns in the valley, and they could not irrigate the land without considerable expense in pumping the sewage on to suitable land. If the sewage was precipitated by a chemical process they might succeed, but, at any rate, there were various advocates for the various means suggested with respect to the best mode of disposing of the sewage. One thing he wished to impress upon them was that the question of making a profit out of the sewage ought not to be considered. Every town ought to provide for the health and well-being of its inhabitants, and, therefore, if it was necessary that the sewage should be disposed of, the best way that could be conceived should be adopted without reference to any commercial results: whether it paid or not, it was clearly the duty of that town to incur the outlay necessary. London ought to incur whatever expense was requisite in order to purify London. If the Thames, by discharging sewage at the places north and south where it was discharged, was injurious it was clearly the duty of the authorities of London to be at the expense of removing the nuisance which they themselves created, without reference to any commercial advantage and with the sole object of purifying the City of London; and so with every other town. The re-arrangement of districts would, indeed, be a very difficult task. He was in favour of some central authority which should be able to call upon a town to do its duty. And here, he said, he did not quite agree with those gentlemen who claimed to have a great deal of experience because they happened to be Vestrymen. All he could say was, that so far as London was concerned, the sooner vestries were knocked on the head the better. There should be one great central authority working for the benefit of the four millions of London and its suburbs. That would be better for the inhabitants than the present sub-division of the Metropolis into some 30 or 40 petty districts. The experience gained by sitting on such boards for a dozen years it would be better, as a rule, to forget entirely. He altogether objected to the remarks of one gentleman who had in the discussion spoken very disrespectfully of an engineer, alleging that he had admitted that certain advice given him was correct, but stating that there was a contract for £85,000, and that his commission on that was 5 per cent. Of course it was insinuated that the engineer went on with an undertaking which he knew to be defective because he should get 5 per cent. on a contract for £85,000. Now he (the speaker), on the part of civil engineers, denied that they were guided by such considerations, and urged that it was a sugges-

tion which never ought to have been made. The interest of their clients and their own reputation were too dear to civil engineers to induce them to be influenced by the 5 per cent. commission they received, and which 5 per cent. did not all go into their pockets, but was subject to large deductions for great expenses and trouble incurred. He concluded that engineers were not paid beyond what they were entitled to, having regard to their education and the special attention they gave to particular subjects, and he did not believe it was possible that any respectable engineer could have been guilty of recommending a scheme which he believed to be defective merely in order to put money into his pocket. Passing to the next question—the reconstitution of authorities,—he said he did not think there should be such a redistribution of authorities as would prevent a town or village—especially a large town—from carrying out what, under all the circumstances, might appear to be the best for its own purposes; but at the same time he thought there should be a general board which should undertake the supervision of all the country—of every river basin, and of every town, for the benefit of the whole community. To that extent he thought there might be a redistribution of authority. Local parishes or local towns should carry out the works necessary for their own amelioration or preservation under the guidance of some central body which, like a Board of Health, should exercise such a supervision over the whole administration of the country as would tend to the benefit of all. As to the extension of sanitary powers, it might be very desirable in many cases. A town might be so cramped that it could not drain itself properly because there might be somebody interposing a difficulty with regard to the sewage being discharged into the river. It might be necessary to irrigate the land or to precipitate the sewage by chemical means, and it might be that the town could not carry either of these plans out because there might be an impediment in the way. He thought there ought to be power to remove such impediments—in fact, that the good of all ought to be considered before the benefit of the private individual. Whatever might be necessary, to extend the authority of sanitary boards or towns should be secured, and in that way not only would the distribution of districts have to be very carefully considered (and he was not at all sure that the division into “river basins” would be the best mode of dividing districts), but they would have to be considered especially with reference to the extent of the “basin,” the size of the towns, and the importance or otherwise of the towns. There were many rivers like the Irwell, the Clyde, and the Thames, with a succession of towns upon them, and, therefore, not only the interest of the rural or urban population would have to be thought of, but those towns would also have to be considered in any decision as to what the district should be. As for the reconstitution of authority he did not know what he could say in regard to the question. There should, however, in his opinion, be such an extension of powers as would enable a population aggregated in hundreds or hundreds of thousands to carry out such sewage works

as might be needful for the purpose of completely disposing of the sewage of the town and destroying everything like bad drainage or damp sub-soil. There might be objections to a central authority, but, inasmuch as certain diseases and offensive animals had entirely disappeared from this country, or nearly so, we could very fairly test by the experience which the past exhibited what should be done in the future in putting an end to a great many nuisances which now existed, and which ought not to exist. And, although the operation of such a Board might interfere with the comfort of individuals, he did not think that the comfort of individuals should be allowed to interfere with the general health or the general welfare of the community at large. In conclusion, he thanked them for the patient hearing they had accorded him, and expressed the great pleasure he felt at being present.

Mr. CUNNINGHAM GLEN, Q.C., regretted that any observation of his should be construed as casting a reflection upon civil engineers generally, in the carrying out of sanitary works; at the same time he could but add that what he had said was perfectly true. That a sanitary engineer came to him and asked his opinion upon a scheme for carrying out some proposed sanitary works, and when he (Mr. Glen) pointed out that the scheme violated or disregarded some important sanitary principles, the engineer replied that he agreed with Mr. Glen, but the contract for the work was £85,000, and he was to have a commission of 5 per cent. upon it.

Dr. E. F. WILLOUGHBY said that he felt some diffidence in rising, since he had had no personal experience in any official capacity, of the working of the Sanitary Acts, though he had for years taken an active interest in all that concerned the public health. He should direct his remarks chiefly to the question of the constitution of the Sanitary Authorities, for he thought it premature to discuss the extension of sanitary powers until some definite conclusion had been arrived at as to the constitution of the authorities, by whom these powers were to be exercised. With regard, however, to the first question, the redistribution of sanitary areas, he would call attention to one point which had not been noticed. While fully realising the importance of having regard to the natural configuration of the country, and convinced that for purposes of drainage and of water supply, river basins would make the most convenient sanitary units, he must say that the absolute necessity for a close correspondence between the sanitary and registration districts for all statistical purposes was so obvious, that unless the latter could be revised, all other considerations must give way to this. Most of the inconveniences incident to a want of correspondence between the natural features and the conventional divisions of a country would be obviated by the establishment of County Boards, and the Boards of contiguous counties would find no difficulty in co-operating for the execution of drainage schemes, and the conservancy of rivers. But these Boards should be composed, not merely of gentlemen of high social position and of liberal views, in numbers



sufficient to overpower the obstructive and selfish element, but should contain a considerable proportion of gentlemen possessing special professional and scientific knowledge, as medical men known to take an interest in sanitation, and not holding poor-law appointments, engineers and architects of repute and independence who might advise, but should be disqualified from taking contracts within the jurisdiction of their own boards, and a sprinkling of gentlemen of any or of no profession, but possessing special knowledge, as geologists, meteorologists, or chemists. By their means many a costly blunder would be avoided, and in such a board, as we now contemplate, their opinions would be received with the respect due to them. Something of the kind already exists in Holland, where the medical and scientific element is largely represented in the superior boards. Recent legislation with regard to the appointments of Medical Officers of Health, and the relation in which those Officers stood to the local authorities had resulted in a mass of confusion and anomalies. In many districts, these duties were thrust upon parochial surgeons, without any regard to their special fitness for the work; and the remuneration was often of the most paltry character, in one case nothing was given, and in others, sums of £2, £5, £10, and £20 per annum. Of course these Officers were at the mercy of the Guardians, who were, too often, the very offenders. Not only were the Guardians jealous of any expenditure on matters of which they were profoundly ignorant, but they were too often actually the very offenders against whom proceedings ought to be taken. The position of a Medical Officer of a large combined county district seemed at first sight all that could be desired; he was a man of high scientific attainments, with an adequate salary, devoting his whole time to the duties of his office; and the Local Government Board, who paid half his salary, reserved to themselves the right of approving the terms and conditions of the appointment, so that he could not be dismissed without their approval. But this apparent security was quite delusive. These combinations may not have been made for terms exceeding five years, and as the combination of rural districts was voluntary, at the end of that time the districts might voluntarily dissociate themselves. The Local Government Board might know perfectly well that the constituent districts were withdrawing solely because the Officer had done his duty, in fact because he had, perhaps, carried out the injunctions of their own inspectors, yet they must acquiesce in his dismissal,—they could not compel continuous combination. They might protest, but it would be powerlessly, and they must afterwards approve of the acts of recalcitrant boards. Many gentlemen present knew that this had happened. The offence of the Medical Officer was that he called the attention of the Sanitary and Local Authorities to the abominable condition of certain villages which were annually decimated by diphtheria and typhoid fever, and though his reports were borne out fully by inspectors sent down from Whitehall, he was thrown upon the world, having previously relinquished a large and lucrative practice for his official duties. In another case, the Medical Officer committed the offence of calling the attention of one of the boards to the conduct of their own chairman

in turning his sewage into a river which ultimately supplied the London water companies, and his salary diminished by a hundred pounds. That a man who could not be supposed to have any interest at heart but the interest of his fellow-creatures should be thus at the mercy of the people who were the very offenders themselves, was scandalous and would not be tolerated for a single day in any other department. He did not mean to say that all guardians were selfish, any more than that all shipowners and mine-owners were, but they would realise the state of affairs if they could imagine an inspector of shipping, under Mr. Plimsoll's Act, holding office so long only as he could avoid giving offence to the owners of rotten hulks and coffin ships. Yet such was a simple statement of the position of the Local Officer of Health in England now. The whole sanitary administration required reconstituting. If not actually state servants they ought to be secured in their offices so long as they discharged their duties with discretion and efficiency. What was wanted was a compulsory and permanent combination of rural districts, a complete assimilation of the rural and urban regulations. In towns where it might not be difficult to give such a salary as would induce a man of high position to forego all other employment, he should give proof of special qualifications, and then be made independent of the favour or the fear of the Guardians. He would just say a few words on one other point,—the expediency of appointing a Minister of Health. This subject had been very fully discussed at the National Congress of Hygiene, held last year at Milan. An almost unanimous opinion was expressed against the appointment of a Minister who should change with every change of party; on the other hand, it had been generally agreed that there should be a Board of Health in each country—a precedent being found in the National Board of Washington—which should be composed partly of men representing Hygienic science, and partly of men of administrative capacity. Whether the Chairman should be a physician or a layman was not agreed, but preponderance of opinion was decidedly in favour of the former. This individual was to be in the position of, in England, a permanent Under-Secretary of State. One objection to a Minister who should change with his party would be, in this country, where barristers were considered the best Ministers of War, and stationers the best men to whom to entrust the management of the navy, that he would rarely have any special knowledge of his work. This Officer should be in direct communication with one member of the Cabinet. In this country we had the materials for this Board ready to hand in the Medical and Engineering Departments of the Local Government Board, the Registrar-General's Office, and the Factory and other inspectors of the Board of Trade, and he thought that, since medical men take so little part in politics, there would be no difficulty in finding a permanent President who would be acceptable to Sanatarians in general, and to any Minister who might be in power for the time being.

Mr. HENRY LAW, M.I.C.E., had not had the pleasure of being present at the last meeting, but had read with great care and satisfaction the paper which Mr. Michael had prepared, and the observations also which had been made by those who had taken part in the discussion on the last occasion. He saw, however, that Mr. Stephens had stated that the 15th and 21st clauses of the Public Health Act rendered it compulsory on Sanitary Authorities to take the whole of the roof water and the subsoil water. The fact was that these clauses did not place any obligation at all of this nature. The 15th clause simply said that the Local Authorities should make effectual drains, and the 21st set forth that every owner of property should have a right to his drains being connected with a sewer; but every Authority was at liberty to adopt either the separate or the combined system, and to dispose of the sewage as might seem necessary, according to the special circumstances of the district. There was nothing compulsory. It had been his intention to refer to the matter which Mr. Bateman had spoken upon, with respect to the engineer referred to by Mr. Glen, but as the circumstances had been touched on by another speaker, he would not do so. He trusted, however, that no person who allowed an expenditure of £85,000 upon what he knew would be an abortive scheme, because he could gain his per-centage, would be either a member of the Institution of Civil Engineers or of the Sanitary Institute of Great Britain. He did not think the other instance quoted by Mr. Glen, with regard to the Thames, had been more fortunate. It was not very long since two eminent Authorities had prepared a highly sensational report, which culminated in legal proceedings being taken by the Thames Conservators against the Metropolitan Board of Works, resulting in a wasteful expenditure to the public of about £20,000. The result of this case had been the unanimous decision of the umpire and two arbitrators that the Conservators were mistaken in supposing that the sewage discharged at Barking and Crossness caused any injury to the navigation. The chemical evidence had occupied more than half of the enquiry, and it had been shown that the Thames was to a certain extent polluted throughout its whole length, but the greatest amount of pollution was above Teddington Lock. He could say that he himself had been acquainted with the Thames for over 40 years, and that he had no hesitation in asserting that, both as regarded navigation and chemical pollution, it was in a better state now than it had ever been before. He quite admitted that the river was muddier, that it contained much more matter in suspension, but this arose from the improved drainage of the uplands, from the greater height attained by the tides, and from the extent to which steam navigation prevailed. Having made a very careful examination of the Thames during the past autumn, from Oxford downwards, he was able to state positively, that throughout almost the entire length, the banks were being rapidly washed away, and that it would be a very great improvement if something could be done to protect them. He did not bring this forward as a complaint against the Conservators; they did not possess the financial

means of accomplishing what was desirable. Mr. Glen had expressed an engineering opinion, but there was a very good old adage, that a cobbler should always stick to his last. They had been told by Mr. Glen that the large system of metropolitan drainage was a gigantic blunder. He did not think that Sir Joseph Bazalgette or the ratepayers would be very much concerned about the expression of that opinion. The re-arrangement of districts was a subject to which he had for a long time specially directed his attention. One or two of the speakers had said that in any re-arrangement the area should be made coterminous with the registration districts and with the counties. He thought, however, that Mr. Symons had really pointed to what should, as far as possible, be the leading principle in the arrangement of areas, viz., that they should be guided by the physical features of the country. Mr. Bateman, who knew what the difficulties would be in having any wholesale re-arrangements, recommended, as far as possible, that there should be a central controlling body, which would be of course required: then there must be bodies who would have control over the water-sheds, so that works for the improvement of the drainage of the water-sheds, and for the economical distribution of the waters, should be under one management; then those water-sheds should be broken up into manageable areas, which should be properly represented upon the larger boards, and in this way the works would only be carried out upon a combined and general scheme. Of course they could not draw any hard and fast line; there must be an elastic plan, because frequently there would be a large town situated, perhaps, partly in one water-shed and partly in another. No person who had had much experience of the working of the present Public Health Act could fail to see how many difficulties had been entailed by adopting the arbitrary areas of the Poor Law Act. The greatest confusion had resulted from this cause. As a general rule, a public road formed the boundary. The sewers usually followed the lines of the public roads, and, therefore, innumerable instances arose in which the houses on one side of a road were drained into the sewer, and those on the other were not drained into it at all. In other cases there would be some high lands intervening between two parts of the district without there being a possibility of one Sanitary Authority draining both portions of the area. Cases such as this would be met by enlarging the sphere of action, so as to get a greater number of the unions together; there would thus be fewer of these districts separated by intervening spurs. He would not detain them longer, there being so many gentlemen in the room more capable than he was of speaking on the legal points.

Mr. STEPHENS: With regard to what I said about the Public Health Act, I think, Mr. Chairman, that the gentleman who has just sat down will find, if he will refer again to the language of the 15th and 21st sections, that he will be under the necessity of agreeing with me, and not of differing from me.

Mr. LAW: I have them here; I will read them if you like.

The CHAIRMAN, however, called upon

Mr. ROGERS FIELD, B.A., who remarked that he felt bound to agree with Mr. Stephens rather than with Mr. Law. He was acquainted with the actual state of affairs from his own experience. A town had adopted the separate system of sewers to a large extent, and had got two sets of sewers, one for sewage and one for rainfall. He himself was consulting-engineer to the Local Board of Health, and had been asked to draw up certain bye-laws and regulations with reference to the drainage of the houses. It was wished by the Local Board that the houses should send their surface-water into the surface drains and their sewage into the sewage drains, but it was found that a regulation could not be made, requiring the separation of the two systems. He himself had gone to the Local Government Board, and had inquired about the matter, and he was referred to the Public Health Act, with the observation that the householders could not be compelled to separate their rainfall from their sewage. Certain conditions there were which could be enforced, but this was not a matter which the householders could be obliged to comply with.

A MEMBER: That is precisely what Mr. Law said: it was optional.

Mr. ROGERS FIELD replied that it was not optional as regards the Local Board. He had understood Mr. Stephens to say that the Board could not do as they wished, and such was the case.

The CHAIRMAN: I will give Mr. Stephens the opportunity in a moment of making any further explanation.

Mr. ROGERS FIELD proceeded: on the last occasion a good deal had been said about the interference of the Local Government Board, and the great mischief they did. So far as his own experience went he must say he was rather inclined to complain the other way. The inspectors, he believed, hardly ever interfered in any local scheme, unless it was very bad indeed. Their tendency, he considered, was to pass any scheme brought forward by the Sanitary Authority, if there was anything in the world to be said in favour of it; and he had certainly not seen any instance in which schemes had been forced upon the Authorities by the Local Government Board. House drainage was a most important point, and he thought the Local Government Board had done a great deal of good in that direction. It was very little use having a good system of sewers, if they did not have also a good system of house drainage. The Model Bye-laws which had been drawn up by the Local Government Board, and which could now be adopted by Sanitary Authorities, were doing a vast deal of good. They embodied the most modern improvements in drainage, indeed all those matters which were now generally admitted to be right. Here, therefore, was a code of Bye-laws, laying down the proper way of carrying out house drainage; of course the Bye-laws were not always adopted, but the very first step in the direction of seeing them

adopted was to have such a code. Unfortunately the Metropolis was not under the Public Health Act; the Vestries had no Bye-laws,—at least, very inefficient ones. The kind of thing constantly occurring was this: one pointed out certain defects in the drainage of a house which any man who knew anything about the subject would agree with, and then, although the householder or the builder might be shown that the condition of things was grossly wrong, one was met with the remark, "Oh, there is a difference of opinion about that." But certain matters existed, about which there could be no possible difference of opinion, and in their case one ought to be able to appeal to some regulations of acknowledged authority. At present one could say nothing except what he himself had not long ago said to a builder, who was also a member of a vestry in London: "There is no difference of opinion amongst people who know anything about it," and he hoped, before many years were over, to find that the Bye-laws of the vestry itself would oblige the observance of the precaution which it was endeavoured to avoid by alleging "difference of opinion." The precaution in question was the "disconnection" of an over-flow pipe from the drain, or something of that sort. He contended that merely by framing these Model Bye-laws the Local Government Board had done good service to the cause of sanitary progress.

Mr. W. C. FOOKS, Jun.: Speaking as one of the legal profession, said that while it was evident that a great interest in this subject was felt by the medical profession, the body to which he belonged also claimed an interest in the matter. It seemed to him that after all they had heard upon it they must confess that our sanitary administration, as at present carried out, had altogether broken down, so far as complete efficiency was concerned. In answer to those who differed from him in this opinion, he would call in evidence the speeches which had been delivered on the paper. He should also start with the proposition that the principles of sanitation, as applied to social life, must necessarily be a progressive science, and that consequently it was impossible to frame, once and for all time, a precise and definite code of laws, but what was required was an elastic or progressive system to be of any use. He proposed to take as his text the following words used by Mr. Michael, on page 12 of his paper:—"The importance of the conservation of the public health should have greater recognition in the machinery of the state, and its proper estimation should be enforced by the creation of a Ministry of Health, charged with the supervision of all Sanitary Authorities, not merely as a controlling body to regulate expenditure." He cordially agreed with the conclusion to which the learned writer had come; that what was required was the reconstitution of authorities, so that the powers already granted might be better used for the good of the public rather than that the powers themselves should be increased. In illustration of his remarks, he might remind those present that the laws relating to sanitation were scattered over a variety of statutes numbering upwards of five-and-twenty, and ranging from the time of Henry the Eighth to the present. Some of these were devoted entirely to sani-

tary legislation, and some dealt of divers other subjects, and not only had this very confusing, and sometimes conflicting, mass of authorities to be consulted, but the power to carry the laws into effect ranged from the policeman to the Privy Council—the Alpha and Omega, it might be said, of official administration. Such a state of things as this ought not to be allowed to continue in the nineteenth century. The first essential towards amelioration would be to constitute a Ministry of Health, with directory and compulsory powers under a permanent president. Next it was desirable that a permanent commission should be constituted for the purpose of regulating and settling from time to time the basis on which the Ministry of Health should carry its powers into effect. He was not an advocate for county boards, and would like to see abolished all intermediary powers, so that the Ministry of Health might be brought into direct contact with the authorities charged to carry its resolutions into effect. He could quite conceive the passing of an Act of Parliament establishing such a Ministry, and that Ministry and the permanent committee associated with it, promulgating from time to time, after due notice, the regulations which ought to be observed in reference to the application of sanitary principles to social life. Of course they could not be blind to the difficulties besetting this subject. Not only the different municipal and other bodies had to be consulted, but even individuals would need to be considered and conciliated. The office of such a Ministerial Department would be to settle and apply the laws under which habitations should be erected; and the more difficult question, what should be the extent of interference with the personal rights of individuals in the administration of their own homes? He could not help feeling some diffidence after what had been said about vestries, but he would venture to give his own experience as a Vestryman on the ground that an ounce of experience was said to be worth more than a pound of theory. And his experience was that in the proper and efficient administration of the Sanitary Laws there is at present a failure. As an instance of sanitary breakdown he referred to the recent case of "Hill v. the Metropolitan Asylums Board." It ought to have been known beforehand whether or not it was desirable that such a building as the one in the case in question ought to have been erected at such a place, and for such a purpose. No proper previous inquiry seemed however to have been made, and the result was a practical breakdown in the administration of the law with reference to a contagious disease like small-pox. As a Vestryman of the parish of Hampstead, he could assure the meeting that the case he had just referred to had given his board no little trouble. The statutory powers enabling metropolitan asylums to be established, seemed divided between the Boards of Guardians and the Metropolitan Asylums Board; and what with recommendations sent for their guidance by the Local Government Board, correspondence with the Asylums Board, and intercommunication between his board and the Guardians, the Vestry really did not know what they ought to do; the Guardians, he was told, did not know what they themselves ought to do; and the Local Govern-

ment Board said that all they had to do was to give advice. The whole thing thus resulted in a *fiasco*. There was one other matter that he would like to refer to, which, although it might be deemed by some a very small matter, was really very important, and in which there had been, in his view, a breakdown, viz., the removal of dust; and after remarking that it was admitted that the non-removal of dust was likely to prove a nuisance, and extremely dangerous to health, Mr. Fooks urged that, in order to effectually remove any difficulty on that score, there should be a remedy capable of easy enforcement, placed in the hands of the householder, against the person directly charged with the duty of removing dust, which, under the system at present obtaining in his parish, at all events, was not the case, owing to divided authority and responsibility. He thanked the President for allowing him, by calling upon him, the opportunity of saying a few words, and the meeting for the patience with which they had heard him.

Mr. HENRY C. BURDETT, F.S.S., very much regretted that he had been unable to attend at the reading of the paper. As a member of the Council, he desired to have shown by his presence how much he appreciated the care and time Mr. Michael had evidently devoted to it. The paper would worthily inaugurate a course of meetings which he hoped would prove of benefit to a large number of people, and which would at any rate be valued by that portion of the public which took an immediate interest in sanitary subjects. In the remarks he was about to make he would try to confine himself entirely to the practical aspects of the question, as they had presented themselves to him, in his own actual experience. One re-arrangement sadly needed was that throughout the country, with the exception of boroughs and large towns, there should be a combination of the small districts, and it should be made compulsory upon a certain number of authorities within a given area to combine for the purposes of health legislation. It could not be expected that a Medical Officer would give up his whole time, or even a great part of it, to the duties of such an office in a small district, where the remuneration was so small as to be scarcely a consideration to him. In one case, in a small town in Essex, the gentleman who was appointed Medical Officer of Health received £10 a year for his services. This was rather a large sum compared with the scale which usually regulated these payments. What happened? One day, when he had been appointed about a month, he was called to the market-place, and there he found a lot of stinking fish. He condemned the fish, as he was bound to do: he was new to his work. In the evening he was visited by several of the principal tradesmen of the town and his private patients, who told him that Jones he would say—the fishmonger, was a very great friend of theirs, and that if he (the Medical Officer) meant to interfere with trade in that way they would be under the necessity of finding another private medical attendant for themselves and their families. His response was that in these circumstances he had three courses open to him. He could take his salary as Medical Officer of

Heath, and neglect his duty; he could resign the appointment; or he could hold on to the appointment, do his duty, and lose his private practice. Being a family man, and, he hoped, an honest one, he resigned his appointment, and decided to devote himself to the duties of an ordinary medical practitioner. If they were all to talk for an hour they would scarcely get anything more forcibly showing the reason of the failure of the present system to secure adequate sanitary arrangements in the smaller districts.

In combined districts what was the state of the case? The combination being entirely voluntary, it lasted just so long as the Medical Officer of Health, whoever he might be for the time being, did not tread upon the toes of some of the minor Local Authorities. Directly he did so, directly he condemned the health arrangements of Little Bumbledom, he was liable to an immediate curtailment of his income, because one by one the districts rejected health supervision, and the income became so small that the Medical Officer was compelled to commit the happy dispatch, as Dr. Fox had done. Dr. Fox said, "This district is in a very bad state, and requires a great amount of work to be done. If you decline to do that work, and withdraw from the combination, as I must have an income to live upon, I must retire, and resign my appointment." Now, did Parliament mean that health legislation should be a practical fact, or did it not? If it did mean it to be a practical fact, then it was no use having an Act of Parliament without powers to enforce its provisions where necessary. If we are to have adequate measures for the prevention of, and protection against, disease in England, there must be combined districts, and there must be sufficient power vested in the central Authorities to protect the Medical Officer, when the latter is earnest and hard-working enough to do his duty conscientiously. For his own part, he would like to see all small districts disappear; he would like to see, as far as possible, districts made so large that every Medical Officer of Health must necessarily devote his whole time to the duties of his office. If this was once accomplished, he believed they would realise in a small time an amount of progress which would convince the people generally how much sound sense there had been in the contentions of those who had stood in the forefront of sanitary agitation for years past. As to reconstitution of authorities, he himself had lived in one district of the Metropolis for the last six years, and had taken an active interest in all health matters there. As a matter of fact, there was no efficient health jurisdiction at all at Greenwich. The streets were, many of them, in a condition which made it extremely disagreeable for ladies to walk in at all. Outbreaks of small-pox and infectious diseases were not nearly so carefully looked after as they ought to be; and when, a few years ago, the health authorities were warned that if they did not take adequate steps to prevent the evils which threatened, a high death-rate would ensue; the only steps taken were to send inspectors round to disinfect dwellings *after* the outbreak of fever had occurred. One of these men had been followed in order to see what he really did, and it was found that the inspector, instead

of entering any of the houses, merely knocked at each door and said, "You have some cases of scarlet fever here?" and then, the reply being "Yes," would add, "Here is a box of disinfecting powder—use it *freely*." This was not in Ireland, nor in a remote country district, but at Greenwich, within a few miles of the Metropolis. Such a state of affairs, he thought, demanded amelioration—and very speedy amelioration. At the present time the health authorities were not very much controlled by the ratepayers. The election of these bodies was made by the Vestries, and the ratepayers did not understand how the thing was managed. There ought to be a separate election of all health authorities.

The extension of sanitary powers was certainly needed for isolating infectious diseases. In all centres of population there ought to be a hospital to which all cases of infectious disease could be sent. In that way they would do something towards making mothers understand that it was by no means necessary that children should have the measles, whooping-cough, scarlet fever, and other things they now looked upon as a matter of course. The powers to prevent overcrowding ought certainly to be increased. He had found it very difficult, indeed, to get the Authorities anywhere to come down with sufficient force and speed on the owners of property where overcrowding existed. It was the sub-letting of tenement-houses which was the prime cause of overcrowding. Tenement-houses were sub-let to a class of men known as "deputies." The deputy endeavoured to get as much money as he could, and, accordingly, crowded every room in the house. Dangers were thus created which could easily be avoided if the clauses were clearer, and the penalties greater and more easily enforced. In conclusion, he did hope, in spite of the control which the Local Government Board now nominally exercised, that there was a determination in the country to have a proper, that is to say, a distinct Department of Public Health. There was no doubt at all that unless there was such a department, with adequate power to support and enforce its authority, the country would always be in the same slipshod condition in reference to health matters. Local Government Board Inspectors at present went down to a place and made long reports to the effect that it was in as bad a state as it could possibly be. Yet amelioration was seldom effected. In one case, at Northampton, the condition was worse now than it had been ten years ago, when the Local Government Inspector reported that it was almost intolerable. He should welcome any measure which gave an extension of sanitary powers with adequate provisions for their enforcement. He did not wish to be misunderstood. By all means let them be practical reformers, as those who strove to enforce the truths of preventive medicine ought to be. What was necessary was the creation of powers, and not necessarily the enforcement, and certainly not the two frequent or hasty enforcement, of these powers. At present a Local Authority could, and often did, snap its fingers at the Local Government Board with impunity, and thus prevent the sanitary improvement of all places within its jurisdiction. These extreme cases ought to be promptly

met by the law asserting its authority and forbidding the needless, and perhaps culpable sacrifice of life, by a small body composed mainly, if not wholly, of interested persons. It was no good legislating in advance of the education of a people; but the legislation he asked for would be popular and efficient, because it would protect the weak against the strong—because it would prevent the abuse of the law by Local Authorities, which at present too often did much to destroy the health and to ruin the morals of the people.

Dr. C. E. SAUNDERS could not help thinking that a highly pessimist view had been taken of sanitary legislation and administration in this country. He did not think it should be admitted that the sanitary administration had entirely broken down—at all events, from his own point of view as medical officer to one of the largest combined districts in the kingdom, he claimed that that was not the case. He admitted that greater powers were wanted, and that there ought to be greater attention paid to the reports of medical officers; but a very important work was being done in the country by medical officers of health. The subject of re-arrangement of districts must be approached from two points of view. From the engineer's point of view no doubt it was very desirable that there should be a re-arrangement on the basis of a drainage area, but for the purposes of the Medical Officer of Health's supervision and statistical work, the Poor-Law Union and registration districts were found sufficiently convenient. The combination of sanitary authorities in the appointment of a Medical Officer of Health was the most important element for efficient work. He entirely agreed in all that had been said as to the injustice that had been shown to medical officers of health, and it was quite time that their tenure of office was better secured. The re-constitution of the authorities was a question which he thought would not be very well dealt with by the constitution of county boards. After all, they had to consider the individuals who would form a county board. He apprehended that the people who now were the Guardians and Members of Urban Sanitary Authorities, and Magistrates, would necessarily compose a portion of such a board; and he could only say that the Justices at Quarter Sessions had not shown themselves at all better fitted to administer sanitary affairs than the Guardians or other Local Sanitary Authorities. In the Contagious Diseases (Animals) Act, the Privy Council were empowered to make bye-laws requiring that milk shops should be registered for inspection. This duty was entrusted to the Justices at Quarter Sessions, but although it was a most important provision, it has become almost a dead letter, for only in one or two counties had any action been taken. He thought the re-constitution of sanitary authorities and the extension of sanitary powers might be accomplished in a less sweeping way than that which had been contemplated by the learned author of the paper. He could not help thinking that many of the objections would be overcome by removing the anomalous distinction between urban and rural powers. He would not detain the meeting any longer, seeing the lateness of the hour.

Dr. H. C. BARTLETT remarked that the re-arrangement of districts had been dealt with from various standpoints during the discussion, but that not much could be added to what had been stated previously. Many of those present would probably remember how thoroughly the subject had been discussed at the Society of Arts, which discussion had brought out nearly all the suggestions now made. He was very glad to hear that Mr. Michael thought compulsory legislation necessary, for unless compulsory, legislation in sanitary matters was almost useless. He went on to say that many Medical Officers of Health and Inspectors of Nuisances were incompetent to perform their work. He referred to the benefit arising from the Examinations of the Sanitary Institute for Local Surveyors and Inspectors of Nuisances, and the Certificates granted to successful Candidates, and he thought that all Local Authorities should require Inspectors to produce a recognised certificate of this kind as to their competence to discharge their duties.

Mr. H. A. RIGG had gone there that evening for the purpose of learning something, and not with any intention of making a speech. What, however, had struck him, as an outsider—and it might perhaps be a useful suggestion to those who were learned on the subject—was that they did not appear to be sufficiently considering that very important factor, the British public. The British public had a great horror of any further step in the matter of sanitary legislation. He, himself, lived in a country place, about twenty miles from London, and they certainly did possess a plethora of authorities. If he wanted to have anything done to the road, he had to go six miles in one direction; if he wanted to go to the sanitary authorities, he had to travel six miles in the other direction. He was in one poor-law union, in another highway union, and there was a very good chance of his being soon in a local board district. The British public had been treated to so many authorities that they dreaded any fresh ones, and unless they set themselves to the task of consolidating, if possible, the authorities which existed now, they would not get the public on their side. His village was very badly drained; it was in a part of the Thames Valley where there was a flow of sub-soil water in a particular direction, and if they got their wells on the wrong side of the cesspool they were all wrong. With regard to their sewage, some of them had cesspools, some belonged to a special drainage district, some drained into the ditches: consequently, there was rather a mess. Some of them proposed that they should have a local board, but whether it was the medical officer, or the guardians of the poor, or whoever it might be, the ordinary country public had a great horror of local boards. Travelling the other night with a man who had the reputation of being a man of common sense in his district, he had found his idea of a local board, expressed in the words: "Oh, if you get a local board, you cannot put up a pigsty without asking their consent." The present idea was to have the Guardians over a local sanitary authority. They all knew what the Guardians were: they were properly described as very respectable men, and they could not be got

to do a thing they thought they ought not to do. He did not agree that the Court of Quarter Sessions was a bad court. The Chairman of Quarter Sessions in one district, which he knew, was Lord Derby, and in that case the tribunal was a very efficient one. He thought, however, it would be a mistake to get as an authority the local board or any body consisting purely of elected members, because the better class of people who lived in the country could not be got, except with very great difficulty, to serve, and they thus got an inferior set of men, who perpetrated jobs. First of all, it would be necessary to go in for a sort of crusade; they must wake the public up to the necessity of taking care of themselves, and he thought good would be done if such a society as their own were to emulate, say, the School of Cookery at South Kensington, and to send people round to show that a woman with typhus fever ought not to be put into the same room with her children. By simply directing the attention of the Legislature to the subject he did not think much would be gained.

The CHAIRMAN (Dr. Richardson, F.R.S.): I have thought, as I have listened to the discussion on Mr. Michael's excellent paper, that what may be called the flesh and blood argument has not altogether been considered or duly borne in mind. I shall perhaps be pardoned if I say that the various speakers seem to have forgotten largely that the basis of all human action lies, not in reasoning and knowledge, but in sentiment or emotion, and until you have overcome this, until you have won sentiment and tendency of feeling towards what you know and feel to be right, you will have no case at all to present to the people which will be of any kind of efficacy. Knowledge wins, I think, only when it conquers sentiment. How do we stand in respect to this matter? Out of the 25,000,000 of people, are there 25,000 who understands these questions at all? I should doubt it. The small bodies who stand forward as we do to devote ourselves to such questions, hardly make our voices heard amongst the great community; and, therefore, to go before the public offering ourselves as exponents of compulsion in any extreme form is entirely to defeat the object we have in view. We have had the case of vaccination exemplified, and the author of the paper is very strong on this point. He has taken it as a typical case, and he says that vaccination is such a necessity, that in respect to it compulsion should begin in the sternest possible manner. I would not be second to him in declaring the value of vaccination; I have always declared and felt the value of it, and I have ventured to differ with many of my medical brethren on the matter; for I believe that certain sources of evil which they have traced to vaccination do not spring from that at all, but from another cause which might be named, and which is not vaccination. But I entirely differ from Mr. Michael when he speaks of that compulsory vaccination, which would take the child out of the arms of its mother and put it into the hands of a policeman, for that would be to make the law an instrument to outrage all sentiment and everything humane. If ever that kind of experiment

were tried in England, vaccination would be doomed from that day for a very long time. Well, then we come to the local matters—redistribution of districts. Again we feel the same difficulty. There shall be a country place surrounded by old historical associations; the people have been long familiar with it, they like the place and everything connected with it. Do you think the natives of particular spots, the persons resident in places which are beloved by them, would allow a sanitary authority to come down to them and outrage all that they have become attached to? You would have just the same disturbance there as in the house in which a child was being taken from its mother to be put into the hands of a policeman. You cannot change a country in this rapid way,—you cannot change home life like this. Then, again, a central authority has not really the local knowledge necessary for carrying out such duties. Suppose I myself go down to a place of which I have no knowledge, though I may possess some knowledge of sanitary science, what do I do when I get there? Do I go through the district to see what is in progress, and ask no questions? Not at all. I go to the old inhabitants and to the most sensible persons there, and I ask them questions, and I get what information they themselves have; and every man who sets about work in this way comes back with a good report in his note book, a report which is not his own, but gleaned from the inhabitants themselves. Local knowledge must be applied in dealing with questions of this sort. We may know nothing of the local necessities of a place; nothing of the power of the people to pay for the changes which have to be made, and there are endless details of this nature. Therefore I should say that the re-arrangement would be the best which would more determinately localise, in any particular spot, an authority which would recognise the importance of promoting the public health. If you could get towns and villages to work with you in the same spirit, if you could get the proper sentiment at work, you would get each of those spots transformed into a place which would become healthy for and from the work of the inhabitants there. In no other way can I see that true reforms would be effectually carried out. As much can be done in a little place by those who have a good knowledge of it, as any woman of common sense can do to make her house perfectly healthy if she likes to exercise her skill. I would say, therefore, with regard to a central authority, and a distribution and re-arrangement of districts, that the better plan would be to make all the local parts perfect in themselves, and not to try to bring them together, and so produce clash and confusion. A re-distribution of authorities would simply lead to differences of opinion, and there would be no chance of unanimity being arrived at on the basis of divisions into districts of different character. As to the extension of sanitary powers, a central authority in London would, I believe, be of the greatest possible use, but it should, I think, be a directing not a compulsory authority. I believe that if we could aim towards the great end of raising sanitary science, as a science, to its highest pitch, and showing to the people its importance, its intention, its object, its perfect influence for the

good of the whole community; if we could induce our Government to make a sanitary authority not feared but respected; if we could get a Minister of Health who should not be in the cabinet nor change with changes of Government, nor have any veto on any subject, but be a directing authority,—a life peer if you like, that he might have a good position in society,—and if he had associated with him a good chemist a good meteorologist, a good registrar, a good veterinarian, a good agriculturist, if you could get such a directing body as that in London, which everybody would look up to with respect, and I had almost said with affection, then you would get such an influence in this country as would tell in every direction. There might be one other addition which I think Mr. Michael would say would not be difficult: there might be formed in connection with the Houses of Parliament a permanent committee, of those houses which might hear both sides of all disputed points, and suggest, or even order, what should be done in emergencies or in cases of extreme difficulty. One point in Mr. Michael's paper is the best of all; it is that where he says that every man should be a law unto himself. I agree with him there entirely, and I would that this principle should extend from every man to every village, to every town, from the unit to the whole, to the country altogether.

Mr. MICHAEL replied: In commencing my reply to the discussion which has taken place, I would say what an eloquent commentary on the Local Government Board has been afforded by the speech of Mr. Glen, who was one of its legal advisers for a great number of years, when he assured us that the rivers of this country were its proper sewers, and ought to be utilised for that purpose. I am bound to say that I think he was a little inconsistent in what he goes on to say; and it becomes of even greater importance in telling you, sir, what should be your duty in order to disseminate information, when the writer of the most "used" book on sanitary law—I may call it the standard authority—comes to a meeting and makes a speech so startling as the one he delivered. I should have thought that such a speech could only have been properly delivered in some of the swamps of the Indian Ocean. And when Mr. Glen says, further, that £20,000,000 or £30,000,000 have been sunk in sanitary measures in this country, as if that were a reproach, it is another of the most startling observations that I have ever heard at a public meeting. It is a statement which totally ignores the fact that a very large amount of money has been expended in buying up and constructing works of the utmost value, not only in the assistance they afford to the public, but as furnishing in times to come a source of great revenue. A large amount of money has been expended in the purchase or construction, or both, of gas and water-works, and by that very money so expended the time is coming, at no very distant period, when persons will have an opportunity of having gas and water entirely free of charge. So much for that sinking of the public money in sanitary measures; and I cannot pass over without a protest the case of the Engineer which we were told of. What it amounts to is, that he proposed a plan of

drainage to cost £85,000, solely for the purpose of getting between £4,000 and 5,000 into his own pocket as commission, and, as a consequence, to carry out a scheme which would be of no advantage whatever. I must say that such conduct is totally inconsistent with the high character, which, in my opinion, Engineers in this country have always deserved and maintained. I will not say that Dr. Saunders does not understand the Public Health Act, 1875, there are a great number of persons who have fallen into exactly the same difficulty; and when we remember that upon this very subject of sewage and sewerage works, it expressly enacts that no works for an out-fall or the distribution of sewage shall be taken to be made until the sewage transmitted through them has been purified—it is in the very section he quotes to us—we cannot wonder that he has fallen into the error. Still, if he will allow me, as a person who has to study this subject, to give him any information, I may tell him that there is not a single word in the Public Health Act which casts any duty upon a local authority, binding them to one, two, three, four, five, or six systems of sewerage, if necessary for the purposes of disposal. But in several cases I know there are even so many as five distinct systems of sewerage carried out in one district. It becomes, indeed, almost inevitable when large districts are divided into sub-districts, where "hogs-backs" running through them, renders such division necessary. I may tell him also that there is not a single word which prevents the local authority from separating, as far as they possibly can, the road water, and storm water, from the ordinary sewage, in providing means for their disposal. Although it may be that there is no power in the Public Health Act to enforce bye-laws, and the Sanitary Authority has no power to say to an inhabitant, "You shall put your sewage matter into one sewer, and your rain and waste-water into another," that is proceeding on an entirely different matter, which has nothing whatever to do with the primary question as to the construction of two systems of sewage, or a system of storm overflows. I was sorry to hear from you, sir (addressing Chairman), some of the observations you have made, because you have shown by your remarks that you are not practically acquainted with the carrying out, and the action, of works of sanitary authorities all through this country. It is very delightful to listen to you; you are always charming and always poetical, but charm and matters of poetry will not do in the ordinary business of every-day life, and what you have said in those remarks of yours, shows me that you are not conversant with what is done every day in every district throughout this country. Neither do you appear at all conversant with the plan which I have ventured, after an experience of twenty-five or thirty years, to put forward as the only one which may be said to solve the difficulties of this question. You speak of the 25,000,000 who are going to rise up in insurrection; there are no 25,000,000 possible; it is 25,000 who give us the trouble. The whole remainder of the population of England are as much convinced as you yourself are of the value of vaccination—"No, no"—the gentlemen who say "No, no" can know nothing, can have seen nothing of the wholesale adherence—



except in the case of those few obstinate persons who create a great deal of noise throughout the country—of the avidity with which women seize the opportunity of having their children vaccinated.

A MEMBER: I beg to state that I have the Registrar-General's reports, which I can quote from.

Mr. MICHAEL: You are quite at liberty to have your opinion. There must be a good deal of difference of opinion. Now let me give you a sketch of what I propose. The first needful principle is to encourage by every possible means local self-government; and nothing will be done, and nothing ought to be done, and most disastrous would it be if anything could be done in this country to diminish the importance of local self-government. It is the bounden duty of every Englishman to encourage by every means in his power the extension of local government, and to place it on a basis from which it can act for the benefit of the community, and you will find in my paper—it is necessarily so condensed as to make it, I know, rather obscure: I felt the difficulty, but I felt constrained to only trouble you for half-an-hour on a subject which might have occupied six hours—you will find that I say the failure of antecedent attempts has been the endeavour to impose what may be called a paternal legislation upon the country, and to attempt to carry it out from a central institution in London, and so to rule the remote parts of this great empire. In reality, the very basis of this question, as of so many others, is the matter of money. You should have in one authority an investiture of the rating power with all the other functions incident to sanitary and municipal government. Then you ought to have an intermediate authority of a very high character, acting locally, not in London, where it must fail, but in the district to be legislated upon, knowing all the local peculiarities, and able to see whether the means which are striven to be carried out should or should not be carried out, and to help in the consideration of those matters which are known to every one who is conversant with this subject as essentially local, and only to be decided by local considerations. That is my scheme; not a county authority to rule in the first instance, but as a buffer to intervene between the local authorities and central authority in London, the latter being a board which should assist with advice, and help in those difficult emergencies which have intervened, and inevitably must in the future as in the past intervene, to prevent the proper carrying out of sanitary precautions among the people. Excuse these few words, but it would take far too great an expenditure of my time and of your patience if I were to enter into all the matters which have been dealt with.

A cordial vote of thanks was passed to Mr. Michael for his valuable paper. The proceedings then terminated.

## SUGGESTIONS FOR THE MANAGEMENT OF CASES OF SMALL-POX AND OTHER INFECTIOUS DISEASES

IN THE METROPOLIS AND LARGE TOWNS.

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*Read Wednesday, April 13th, 1881.\**

### ABSTRACT.

I.—The author deals, in the first instance, with the present position of the subject, and explains some of the difficulties that lie in the way of the practical management of persons suffering from infectious diseases in large cities and towns.

II.—He next treats on the question of registration of such diseases, gives some details of the early attempts at such registration, and explains what, in his opinion, should be included in the registration, and by whom it should be certified to the local authority.

III.—He maintains the thesis that there should be no aggregation of infectious cases in large central institutions, and describes the objections to such aggregation.

IV.—He suggests that every parish should bear its own burthens and accept its own responsibilities for the retention and management of the infectious cases occurring within its own boundaries.

V.—He suggests, further, that the sanitary committee or authority in every parish should have all the special centres of infection in each of its districts thoroughly mapped out, and that it should know, on a calculation of cases occurring in quinquennial periods, what is the permanent accommodation required for its infectious sick.

VI.—He urges that the required accommodation being known the local authorities should keep ready, at all times, within the

\* The discussion occupied part of the evening of April 13th, and the whole of the evenings of April 27th and May 18th.

parish, such necessary accommodation, in small hospitals situated in different parts of the parish or locality.

VII.—He describes the size, mode of construction, and position of such hospitals:—

- (a) That each hospital should not be larger than is sufficient to receive twenty-four persons at one time.
- (b) That each should be constructed on the separate system for the patients.
- (c) That each should be constructed of iron, so that it may at any time be absolutely purified by fire throughout all its structure.
- (d) That each should be placed on the upper storey of a building, forming, in fact, the top storey of one or more houses, so that it may be lighted and ventilated directly from its roof.
- (e) That all the air that passes out of the hospital when it is occupied by infectious persons, should pass through fire.
- (f) That each patient should be carried into the hospital by a valved lift, which lift should pass through a shaft, so as to draw up air during its ascent, and which should, when required, be effective for flushing the hospital with air.

VIII.—He enters into the subject of the organisation of these hospitals in respect to general supervision and nursing. Under this head he recommends

- (a) That the general supervision should be in the hands of the Medical Officer of Health.
- (b) That the nursing, also under the supervision of the Medical Officer of Health, should be carried out by trained nurses, who might be educated to their work in the Union Infirmaries.

IX.—Lastly, the author suggests that the medical attendance should be conducted by a special staff of duly qualified medical men, acting under the Medical Officer of Health, and responsible to the local authority, by whom they should be approved and remunerated.

After the reading of the Paper, the following discussion ensued:—

Dr. B. W. RICHARDSON, occupying the Chair.

Mr. T. WALLER thought that the isolation of cases of infectious diseases in the elaborate way proposed in Dr. Richardson's address was not at all necessary, except when cases occurred in small houses or tenements where a room could not be set apart, and that they

might be quite safely treated in a private house, if ordinary care were used, and the room thoroughly ventilated; he had treated cases of small-pox and scarlet fever in his own house, while the room next to the patient and other rooms in the house were used by the family, without any spread of the disease. He thought that it was the duty of everyone to see that they had a well-ventilated room on the top story of their own house suitable for the reception of a case of infectious disease, before they set to tell others what they should do; the public would have greater confidence in their recommendations if they themselves practised what they recommended.

Dr. HAUGHTON considered that the distance which patients often had to be brought to the large hospitals was a great objection, because the sufferers occasionally died on the way; and were even a means of spreading infection, as they were conveyed along the streets. He said that people die in a much larger proportion in the hospitals than in their own homes; and that we have no right to compel them to go to the hospitals when this is the case.

He thought Dr. Richardson's suggestion of placing the hospitals over a row of terrace houses a good one in theory, but that popular feeling would be very strong against using the houses under the hospital. He did not quite agree with the proposal to use iron for the external walls; for, although it might do very well for portable or temporary structures, it was, he thought, not suitable for a permanent hospital, nor adapted for all seasons of the year. As an instance of the bad effect of aggregating cases of infectious diseases in large hospitals, he mentioned the case of a ward in the Royal Free Hospital, which, after several years, got so saturated with morbid germs that surgical operations could not be performed in it without bad results, which results immediately ceased after the replastering of the walls one inch deep. The proper registration of infectious diseases was no doubt very desirable; but there were many reasons why a medical practitioner did not like to give notice of diseases, and it would be hard to compel him to do so in all cases.

Dr. COLLIE remarked that with reference to the case mentioned by Dr. Haughton, it was quite true that if you did not properly cleanse and ventilate a hospital the wards would get foul, but that it was quite possible, with proper attention to these precautions, to keep them pure, and that such a case as that of the Royal Free Hospital ought never to occur. He considered that the word over-crowding was misapplied to large hospitals, as it did not, he thought, matter how many patients were put in one hospital or one ward, as long as a sufficient cubic space was allowed to each. He dissented from the statement of Dr. Richardson that the efficient supervision of large hospitals was impossible, and said that he had found no difficulty during his experience in the management of a hospital with 300 beds for infectious diseases, in seeing that the rules with reference to nurses, and the admission of visitors to patients were strictly observed, and he did not see that it would be easier to prevent the ad-

mission of visitors to small hospitals than to large ones; then, on the other hand, it would be easier to get a good matron and good medical officers, and thereby necessarily better supervision for a large hospital, as a higher remuneration could be offered; and the medical officers in the large hospitals would get a much larger experience of the disease, which would be a benefit to the sick. He contended that there was no evidence to show that the large infectious disease hospitals exerted a bad influence on the surrounding neighbourhood, but much the other way. The windows of the Homerton Hospital, and the windows of the City of London Union Infirmary were parallel, and not very far apart, and yet no case of infectious disease had been communicated, although there were in the Union Infirmary parturient women and young children in a state particularly susceptible to infection; he, therefore, considered that so far as the evidence went it pointed to the conclusion that the large hospitals did not, as hospitals, *per se*, spread infection in the neighbourhoods in which they were situated, and that on this all-important point that the large hospitals do of themselves spread infection, Dr. Richardson had not produced *any evidence*. With regard to the large mortality in hospitals this was due to the fact that the more severe cases were sent to the hospitals, whereas the milder cases were kept at home.

Mr. WYNTER BLYTH said that if Dr. Richardson's proposals were carried out at once it would relieve the local boards from a difficulty in which they were now placed, by having a number of cases of small-pox and not knowing where to send them. He thought that if we could get registration of disease, and a proper disease map compiled, it would be of great assistance to medical men. He agreed with the author, that every parish should bear the burden of its own sick, but under the present arrangement this was impossible. Respecting the danger attending the aggregation of cases of disease in large hospitals, the danger arose not so much from the buildings themselves, as from the number of callers, patients, ambulances, &c., brought into the neighbourhood; and that this danger did not occur in the case of small hospitals, they had the best proof, as small hospitals had been practically tried in Marylebone in 1871 without causing any spread of disease. Dr. Tripe had given statistics to prove that large hospitals did have a baneful effect on the neighbourhood surrounding them, though he (the speaker) was not in a position to support this evidence by his own experience. With regard to the plan suggested by Dr. Richardson for small-pox hospitals, he thought it was decidedly novel, but he saw nothing against it.

Dr. McCOMBIE thought that hospitals were an assumed rather than a real danger to the neighbourhood. It was alleged that nurses carried infection out in their clothes. This, he thought, impossible, for during the past three years over 200 persons had been employed at the Deptford Hospital, and in only two instances had small-pox appeared in the homes of any of the staff. One case was in the family of a housemaid, and the other in that of an assistant-nurse,

and in neither case did the visits of these persons to their homes, and the occurrence of the cases of small-pox, show that they bore any relation as cause and effect. He had often transferred nurses from small-pox wards to fever wards, taking care that they put on fresh clothing, without any bad result ensuing. As nurses were obliged to change their dress before going out, and to wash their hands and face, he thought there was little, if any danger of their carrying infection to the neighbourhood. With regard to wards becoming leprous with continued use, as affirmed by Dr. Haughton, he had had a ward, occupied continuously for three years by small-pox patients, and a surgical case (excision of part of scapula) treated in it recently, recovered without any ill effects. In reply to the remark that the mortality was higher in large wards, in which all the beds were occupied, than in small wards, he would state the fact that the wards at Deptford Hospital were fuller than they had ever been before, and yet the mortality was less.

Dr. W. J. COLLINS commenced some remarks relating to vaccination, but the Chairman ruled that as he had carefully avoided introducing the subject of vaccination into his paper, any discussion upon it was out of order.

Mr. EMERY said that infectious diseases occurred chiefly among the poor, and he thought that the first consideration should be to improve the dwellings of the poor, and thus cut at the root of the evil.

He thought that compulsory registration of disease was too much of an inquisition, and not likely to be adopted, as it would injure small tradesmen and others who would lose their custom directly it was known that there was infectious disease in the house; besides, it was only the doctors who wanted this registration, because of the 2s. 6d. fee for every return made, which would amount to more than one hundred thousand per annum to the medical profession; the public would rather be without it. In his opinion hospitals, either large or small, were bad, and it would be much better to treat the patients at home, than to kill them by Act of Parliament. That is, by compulsory removal you endanger their lives and increase the mortality.

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The discussion was resumed on April 27th, Dr. B. W. RICHARDSON, F.R.S., occupying the Chair.

Mr. EDWIN CHADWICK, C.B., thought that the first step to be taken in dealing with small-pox or any other epidemic disease, was to make a thorough enquiry, without reference to pre-conceived notions, as to the results attending methods previously tried, and from the information thus obtained to see what would and what would not do, and then

carefully consider the best means to be adopted. This was the plan adopted at his suggestion by the first General Board of Health, in dealing with the attack of cholera in 1848; in the course of these enquiries they found that the removal of patients to hospitals was attended with great danger, and other facts which they discovered as to the general existence of premonitory symptoms, which had previously escaped notice, led to the establishment of a system of house to house visitation, to the immediate treatment of these premonitory symptoms, and to the abandonment, in this instance, of the former course of meeting epidemics by almost exclusive hospital treatment.

This house to house visitation and treatment was followed by such a marked decrease in the death rate that he (the speaker) could tell by looking at the daily returns which were sent to the Board of Health from the different places, whether the system was being properly carried out or not; and the success obtained was greater than had been obtained anywhere before. A statement was made at the Medical Congress, at Brussels, to the effect that when this system of house to house visitation had been adopted the loss to St. Petersburg by the visitation of an epidemic was reduced from £25,000 to £3,000. Not less than sixty thousand lives, it was estimated, had been saved in Great Britain by acting on the principles adopted by the Board. There was one great factor, he was convinced, of mortality in large hospitals, which had been overlooked: the psychological factor, the effect of terror on the mind in the view of the sufferings of assembled patients. Once when he had visited one of the finest hospitals, the best warmed, the best ventilated, the best lighted, and most cleanly and orderly, he could not but be appalled by one condition—the resounding agonies of the suffering patients. Who does not know the power of mental depression upon disease? Who does not know that the effects of announcements to patients that there is no hope of their recovery is to accelerate the fatal termination? He thought that the excessive mortality of large lying-in hospitals, as compared with the smaller workhouses, was due to this cause, notwithstanding the very inferior treatment at the workhouses. Dr. Mouat had lately been in Paris on a course of enquiry into the treatment of the sick; and he (the speaker) had learned from him that his conclusions are entirely corroborative of those propounded by Dr. Richardson against large hospitals.

The early house to house visitations enabled arrangements to be made for the separation of those who were well from those who were ill, and home treatment to be given very successfully, and the necessity for even small hospitals to be diminished to a greater extent than was imagined.

Mr. E. H. GALSWORTHY asked with what Mr. Chadwick compared his house-to-house visitation, with treatment in large hospitals, or with no treatment at all? He quite agreed with Dr. Richardson as to the benefits that would arise from a registration of disease, and he thought that it should be made compulsory. What we wanted was the expression of public opinion on the subject, and not only the views of

delegates at meetings and of societies. He did not agree that power should be given to any Justice of the Peace to order the removal of cases of infectious disease to the hospital, even where proper treatment could not be obtained at home. With regard to what the Chairman said in his paper, that friends go to and from the hospital, and it is impossible but that they should carry disease, he would say that the rules for the admission of visitors made this improbable, as they were very stringent. He thought that if the burden of providing for infectious diseases were thrown on the parishes, as suggested, that much more stringent legislature for providing accommodation would have to be passed to make the parishes do the work satisfactorily. The mapping out of special centres of infection, referred to in Section 5 of the paper, was done by the Metropolitan Asylums Board, but if the parishes would take it up the Asylums Board would certainly have no objection. He did not know why Dr. Richardson had chosen 24 as the most desirable number of patients to be placed in one hospital, for the medical conferences held at the time of the establishment of the Asylums Board had decided that large hospitals would be most suitable for the treatment of infectious diseases. Then, again, it would be almost impossible, with such small hospitals to get sufficient accommodation in the case of an epidemic, and it would be difficult to keep them always ready, even though very desirable. The suggestion of placing them on the tops of houses he thought altogether impracticable, as difficulties would arise with ground landlords, architects, &c., &c. Many of the speakers had said that the mortality was greater in large than in small hospitals, but he did not know where to find any statistics to prove this statement. The argument that large hospitals may be a nuisance to the neighbourhood does not necessarily prove that they need be. He agreed that some further legislation was necessary, as it was quite impossible for the Asylums Board to carry out its duties without more power being given to it.

Dr. ARCHER FARR thought that the question to be considered was, in what way hospital accommodation could best be provided for the infectious sick; whatever might be said in favour of home treatment of infectious diseases, hospitals would always be necessary, and that more especially under a system of compulsory notification of infectious diseases, which will soon probably become law. If infectious hospitals could be so arranged as not to be a danger to the neighbourhood, one great difficulty of the Asylums Board would be removed; and he thought that in the present advanced state of sanitary science, it ought to be possible to construct hospitals that were not open to objection on this ground; he agreed with Dr. Richardson's plan for small hospitals, but suggested larger hospitals, arranged in blocks, each block to contain only 24 patients. He suggested also that the ambulance used for the conveyance of patients should have no side windows, but be lighted and ventilated from the roof, and that it should be made sufficiently large to carry away the bedding along with the patient. The ambulances should contain a separate compart-

ment for an attendant, so arranged as to admit of the patient being kept in view during the journey to hospital: when not in use it would be better to keep the ambulances at the hospital. There was one point which he thought had been overlooked with regard to small-pox, and that was the power of the infection to strike at a distance from the source in which it might arise.

Mr. H. H. COLLINS, F.R.I.B.A., said that with regard to the compulsory notification of infectious diseases, the matter had been recently brought before Mr. Dodson, by an important deputation, of which he was a member. Mr. Dodson, after hearing the views set forth by the deputation, remarked that it would be useless to make registration compulsory unless arrangements were made for the reception of patients suffering from infectious diseases; this underlies the whole matter, and is one of the principal difficulties in the way of rendering legislation on this point effective.

The sanitary authority for the Parish of Paddington had proposed to build an infectious disease hospital, somewhat on the plan proposed by Dr. Richardson, about 20 miles from London. If, as had been stated by several medical gentlemen, the removal of a small-pox patient during the first three days of the illness was not prejudicial to the patient, nor calculated to create infection to the surroundings, such an arrangement would be a step in the right direction. Mr. Galsworthy might be right as to large hospitals not being a nuisance despite the decision with regard to that at Hampstead, but there could be no doubt that a hospital for infectious diseases materially depreciated the value of property in its neighbourhood. Sir John Rose Cormack, M.D., read a paper at the last conference of the Social Science Association, in which he pointed out how, in the year 1879, an outbreak of small-pox had been created through the use of a building in the Rue de la Révolte as a temporary hospital.

He attributed the spread of the disease to the action of the wind blowing the epithelial scales through the windows, and carrying the infection into the houses on the side of the street opposite to the hospital; and in his paper he narrates several instances of the spread of diseases caused by infectious hospitals being situated in the midst of teeming populations; on the other hand one could not fail to notice that many of the fever and small-pox hospitals had had houses built close to them, notably the Stockwell Hospital, in which the yards or gardens of the houses looked on to the recreation grounds of the convalescent small-pox patients. The plan suggested by Dr. Richardson, however delightful in theory, would be very difficult to carry out in practice, both as regards legal considerations and details of construction.

There was one point which required grave consideration: there was no doubt that if the registration of infectious diseases were made compulsory the class of people who live in model lodging houses and artizans' dwellings, such as the Peabody Buildings, &c., would, in a great measure, desert these buildings, and would strongly object to

the supervision and isolation to which they would be rendered amenable in the event of an infectious disease attacking any member of their family; they would probably never consider themselves safe from the interference of the medical officer of health or his deputies; many of them would resist the inquisitorial nature of the proceedings, and would probably deprive themselves of medical assistance in order to prevent the knowledge of the infectious character of the disease becoming known to the authorities. This is a point which would have to be well considered and guarded against if the proposed act were meant to be effective, and great care would have to be exercised in carrying out its provisions with tenderness and consideration. At Edinburgh he was led to believe the system proposed had been very successful; but of course it was one thing to apply an act to a small city like Edinburgh, and quite another to a leviathan Metropolitan City, such as London.

Mr. BRIDGWATER said that the state of facts as to the Fulham Hospital confirmed the views so ably expressed by Mr. Pearson Hill with regard to the injurious effects of large hospitals upon the immediate neighbourhoods; they intensified the disease within a certain radius, outside which, it decreased in a marked ratio, though no place could now boast of an entire immunity. The transit of patients was in itself a source of contagion anywhere and everywhere, but all the evils were centralised at the hospitals themselves.

There was antagonism, but no hostility, to the Asylums Board; they were only asked to be reasonable and to listen to advice, and that they had in the able paper read by Dr. Richardson, under the auspices of this Society, and its introduction was very opportune.

It would be hopeless to expect unanimity of opinion upon such a subject, but he would remark that in close connection with the medical treatment of small-pox, and fevers generally, is the injustice of the incidence of these large hospitals; that they are an evil in themselves had been proved to demonstration, and that they conduce to a greater mortality amongst the patients may be accepted as a fact.

Hampstead had been successful in closing the hospital there, and the health of the immediate district had improved. Fulham hoped to obtain similar relief; meantime every district in its turn rebelled against the introduction of even temporary shelter for the surplus cases of the present epidemic, so anxious did all seem to impose their burdens upon others.

To inflict the country, or the suburbs of London with Metropolitan impurities was cowardly and inhuman; and in the matter of transit the points of convergence would be centres of disease. He understood Mr. Galsworthy and others to contend that they were dealing with a governable evil. Hospitals, they said, could be made non-contagious: that being so, a very simple remedy presented itself, which would have the special advantage of making each parish responsible for its own sick. Let each of the thirty-nine sanitary districts of the Metropolis provide say twenty-five beds at its workhouse, if in the parish, and if not, then on some convenient site within the parish.

The evils of transit would be minimised, and there would be less parade of the disease in the streets. A chance excess of cases at one place might be passed to the next nearest hospital without rateable disturbance, the cost would be on the common poor fund, and not upon the local rates, and pauper and non-pauper cases could be accommodated. This was very much in accord with the proposals in the paper, and he regretted that the rules of the Institute did not admit of a resolution being moved in general support of it.

MR. H. SAXON SNELL, F.R.I.B.A., said it was true that the guardians of the poor had power to purchase land adjoining any workhouse existing at the date of the Poor Law Act of 1867; but when it was considered how enormous was the value of land in the midst of the most densely populated parishes of the Metropolis, it was hardly likely the authorities would take advantage of this power for the creation of local small-pox hospitals; and he could not see the necessity for their so doing, for it was shown very clearly by the plan produced by the previous speaker, that the small-pox hospital at Fulham certainly did communicate disease to the surrounding neighbourhood, and that the number of cases of small-pox in the neighbourhood decreased as the distance from the hospital as a centre increased. To dot small-pox hospitals about various parts of London, as proposed, would be simply multiplying these infectious centres for the radiation of disease.

DR. F. R. BERNARD, called attention to the fact that, although several speakers had remarked upon the excessive mortality in large hospitals, none had given the mortality in small ones. The mortality in Stockwell hospital (102 beds), during 1880, was 12.9, and this would be considerably decreased if the deaths occurring within 24 hours after admission were deducted. With regard to the registration of infectious diseases, he considered this should be compulsory, and the householder or head of the family should forthwith report to the sanitary officer of the district any infectious case, enclosing a certificate from the medical attendant to the effect that the case could (or could not) be treated where it then was without danger to the other inmates and the neighbourhood; if likely to be detrimental, instructions should be given for the removal of the patient, and for the disinfection of the premises, and a strict enquiry instituted as to the presumable source of infection, as cases cropping up year by year from the same house and street, seem to indicate that the *fons et origo* has not been found out and removed.

He maintained that there could be no harmful aggregation (he used Dr. Richardson's own word) of patients suffering from small-pox, in a properly-constructed hospital, the wards of which had the proper cubic space, and where the hospital site was judiciously chosen. The question of site and surroundings was, he said, too large a one to enter into at present.

The question of parishes or unions in the metropolitan area managing their own infectious sick was also a great question; and, in his experience the parish authorities were only too pleased to send their sick

to the hospitals of the Metropolitan Asylums Board. There were few parishes or unions where suitable sites could be acquired, and parishioners were generally in a hurry to send infectious cases out of their midst.

It appeared to him that much valuable time would elapse before any given parish could acquire the information mentioned as necessary under the sixth head of the Paper; and with regard to Dr. Richardson's idea of small hospitals for 24 patients only, the Parish of Lambeth and the Union of Wandsworth and Clapham would during an epidemic require at least three such hospitals for small-pox only. Boards of guardians would hardly be likely to go to such expense when there appeared no necessity for it.

There appeared to him grave objections to the suggestions given under heads VII., VIII., and IX., among which might be mentioned: 1st, expense; 2nd, difficulty in getting proper nursing; 3rd, medical superintendance, &c., &c.

He contended that small-pox need not, and did not spread from properly-constructed and well-managed hospitals; and that such hospitals were not sources of danger to the neighbourhood: if this were so, however, he contended that the small hospitals would be equally, if not more dangerous, and their multiplication would also greatly increase the risk.

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The discussion was again resumed on May 18th, Dr. B. W. RICHARDSON, F.R.S., occupying the Chair.

MR. PEARSON HILL, who stated that he was a member of a committee which for many years had been engaged in watching the effect on the surrounding population of a huge hospital for small-pox patients, said that if any persons of average intelligence examined into the admitted facts of the case, they could, he thought, hardly fail to come to the conclusion that there was something faulty in the present method of dealing with small-pox epidemics in London. The Asylums Board for ten or twelve years had had almost unlimited power to do whatever it thought best; it had spent about a million sterling of the ratepayers' money, raised by loan, in addition to the tens of thousands expended annually for the Board's current expenses, and yet, with all these great advantages of boundless means and opportunity, so far from having succeeded in "stamping out" small-pox, the deaths annually from that disease in London since the establishment of the Board had been on the average about twice as numerous as they were before.

Even if the Board were allowed its somewhat extraordinary claim, to strike out from the account against it the year of its greatest failure, viz., 1870, the average number of deaths from small-pox in London every year would still be found to be considerably greater since the establishment of the Board than previously, showing that so far

as London was concerned something, yet to be explained, had counteracted all the benefits it ought to have derived from the advance in medical science, the improvement in sanitary knowledge, and the clearing away of "rookeries" and other unhealthy dwellings which had taken place in the last ten or twelve years.

This bad pre-eminence of London was also strikingly shown by the Returns published weekly by the Registrar-General. These Returns showed that small-pox, in proportion to population, had, during the last three years, been eighty times as fatal in London as in the nineteen large provincial towns which, in the aggregate, had a somewhat larger population than London itself. Indeed, since 1877, small-pox had practically died out in Liverpool, Manchester, and the other large towns, but continued with unabated violence in London.

This unfortunate state of things in the Metropolis appeared to coincide with the establishment of the Asylums Board, and he (Mr. Hill) suggested that if it could be shown that the Board, instead of following established precedents, had adopted some entirely new method of dealing with small-pox patients, it might reasonably be inferred that these disastrous results were attributable in some measure to the Board's innovations.

Now prior to the establishment of the Asylums Board the present gigantic hospitals in which 400 or 500 small-pox patients were crowded together were things unknown in this country. The largest Metropolitan hospital for small-pox patients then existing was that at Highgate, where, on about twelve or fourteen acres of ground, in a well isolated situation, a hospital had been erected for about eighty or one hundred patients, giving an average of seven or eight patients to the acre; but at Hampstead the Asylums Board selected a site of about seven or eight acres of land—not isolated, but in close proximity to a densely-populated neighbourhood—and had put on the site, not fifty or sixty patients, which would have been the same proportion as at Highgate, but 560 patients; in other words, the patients were packed ten times as closely as they had ever been packed before, and yet a good result was expected!

He (Mr. Hill) proceeded to show what were the consequences of this departure from established usage. In 1870, when the Hampstead hospital was opened for small-pox patients (though in the rest of London there were more than 2,000 cases awaiting treatment) not a single case of small-pox was known in Hampstead; but within a month of the opening of the hospital the disease broke out and concentrated itself with great severity in the houses adjoining the hospital. In one of these streets, containing about sixty-six houses, there were no less than eighty-eight cases of small-pox.

The second small-pox epidemic of 1876—8 gave similar results.

The hospital was re-opened in November, 1876. At that time the other hospitals of the Asylums Board were full of small-pox patients—and again Hampstead was free from the disease—but in less than three weeks after the opening of the hospital, small-pox broke out in Hampstead and again concentrated itself in the neighbourhood of the hospital.

Within a belt 300 yards wide surrounding the hospital, which belt contained about one-sixteenth of the parish of Hampstead, there were (between November, 1876, and August, 1878,) no less than fifty-one cases of small-pox, while in the remaining fifteen-sixteenths of the parish there were but fifty-nine cases. A comparison of cases with population, showed that in the poorest and most squalid part of the parish there were to each 3,000 inhabitants about seven cases of small-pox. In the good parts of the parish there were to each 3,000 inhabitants about four cases, while in the neighbourhood surrounding the hospital—a district admitted by the Chairman of the Asylums Board (Dr. Brewer) to be one of unusual natural salubrity—there were amongst its 3,000 inhabitants no less than fifty-one cases of small-pox. The amount of disease round the hospital, in proportion to population, being more than twelve times as great as in the rest of the parish.

In the two years which had now elapsed since the Hampstead hospital was closed by injunction, there had been very few cases and only one death from small-pox in the parish: a degree of healthiness which would only be equalled in London generally when the deaths from small-pox in the whole Metropolis amounted to only one per week.

He (Mr. Hill) then stated that this experience of the spread of disease from the hospital at Hampstead, was by no means peculiar, as similar results had followed the use of the other hospitals of the Asylums Board, and had also obtained in Paris and elsewhere—that in every instance (ten in number) in which the effect of these large hospitals for small-pox had been carefully investigated, it had been found that small-pox broke out in the surrounding houses and prevailed to an extent far exceeding what was due to the number of the population. This absolute uniformity of result proving that the excessive amount of small-pox in the neighbourhood of the hospitals could not be the result of mere chance or accident.

He then showed by statistics that not only did disease spread from the hospitals, but—if the statements made at the previous meeting by officers of the Asylums Board were correct—that it spread in a far more virulent form, and suggested that possibly small-pox became intensified when large numbers of cases were aggregated together, just as hot cinders, when heaped together, made a raging fire, but, when separated, soon cooled down.

He reminded the meeting that while all these evils in the second epidemic were falling upon Hampstead, the Asylums Board knew the trial was hanging over its head; it took, as is known, special precautions to prevent the spread of disease, and yet failed to do so—proving that under even the best of its management, the hospitals were so conducted as to be a danger to the public. He expressed his surprise to hear that Dr. Collie, the superintendent of the Homerton Small-Pox Hospital, had, at the meeting, in April, when Dr. Richardson's paper was first discussed, expressed an opinion that disease did not spread from the hospitals, as Dr. Collie's own paper on the dangers of small-pox hospitals, which he read before the

Society of Medical Officers of Health, and published in the *Medical Times* of 5th and 12th June, 1880, showed that at that time he held a totally different opinion.

He pointed out the fallacy of Dr. Brewer's argument, repeated in a letter recently published, that because the death-rate of all Hampstead was not very high, the parish had not suffered by the hospital. This same fallacy he stated was brought forward by Dr. Brewer and exposed in the "Joint Reply" issued by the Hampstead Committees as far back as December, 1874. Hampstead parish contained between three and four square miles, and about 40,000 inhabitants, the vast majority of whom lived far away (some of them miles away) from the hospital, and were, of course, unaffected by it, as its evil effects were necessarily confined almost entirely to the small portion of the parish (one-sixteenth part) immediately adjoining. Indeed, to take an extreme case, every one of the 3,000 inhabitants living near the hospital might have caught the disease, and had the usual per centage of deaths (600) without raising the mortality of all Hampstead by more than one and a half per cent.

He stated that more than ten years had elapsed since the attention of the Local Government Board and Asylums Board was called to the terrible spread of disease from the Hampstead hospital, but that even to this day the managers seemed to think it unnecessary to make any real enquiry into the matter. They seemed to shut their eyes to all facts but those they wished to see.

He next alluded to the great mortality which prevailed in the large hospitals of the Asylums Board. More than eight years ago Dr. Gibbon, health officer of the Holborn District, taking as a basis the results in about 700 small-pox cases which had come under his own observation, showed that the mortality amongst patients sent to the hospitals of the Asylums Board, was twice as great as amongst patients treated at their own homes, and six times as great as amongst those treated in small infirmaries attached to their own parishes. Now, if Dr. Gibbon's statement and inference were correct, it would follow that at the Hampstead hospital alone, more than 1,000 lives had been needlessly sacrificed by a blind adherence to the plan of aggregating together large numbers of patients.

The Asylums Board had had more than eight years in which to investigate this most serious charge against its management, but contented itself with "pooh-poohing" the statement, and declaring that it did not know where to find any evidence bearing on the question.

He maintained that facts vouched for by Dr. Gibbon (and which were, moreover, in accordance with the admitted excessive mortality from small-pox in London) were more trustworthy than mere vague denials from the managers, which denials were admittedly based on their ignorance of the facts. He pointed out that the evidence lay plainly before the Board whenever it cared to make enquiry.

With regard to Dr. Richardson's plan for small hospitals in each parish he thought, however good it might be in theory, it had one great difficulty to overcome—viz., the opposition it would encounter from every

one living near them. And on the principle that it was sometimes wiser to attempt that which was practicable, rather than to strive for something really better but not to be had, he suggested whether a ring of smaller hospitals (similar to that at Highgate) might not be established round London, sufficiently far a-field to be away from inhabited houses—one hospital to each parish, though not situated in each parish—in which small-pox patients could be safely treated—following, in fact, the example of the St. Pancras and Islington Vestries, which had, he was informed, secured, near Finchley, about 25 or 30 acres of agricultural land on which to place a properly isolated hospital.

Of course such a plan might be objected to on the ground that it would increase the danger to patients by the longer journey, and to the public at large through the greater chance of spreading disease from the ambulances, but he thought these difficulties were not insuperable. He had been assured by high medical authorities that with properly constructed ambulances the additional distance could be accomplished without risk to the patient—while as regards the danger to the public, the experience gained at Hampstead tended to show that under the present system there were two dangers: one, which he would call the terminal danger, *i.e.*, the risks of spreading disease from the hospital itself, or from the patient, nurses, or attendants, when the former was being lifted out of the ambulance, or from persons passing in and out of the hospital gates. The other danger—the danger of transit—was the risk of the patient spreading disease as the ambulance went along, and that danger might, perhaps, be somewhat increased by increased distance—but in his opinion, if the danger of transit be expressed by one, the terminal danger should be expressed by 100; and if this great danger could be abolished, as it would be if there were no people living near the hospital, an increase of the smaller danger might wisely be encountered; but he was of opinion that even this might be reduced, rather than increased, if patients were taken either at night, or very early in the morning, when not only the streets would be empty, but all houses—public as well as private—closed.

Finally, he (Mr. Hill) strongly urged the vital importance of entrusting the care of the sick poor of London to some more competent Board. The failure of the present system was, in his opinion, in great measure attributable to the fact that the Asylums Board was an unpaid Board, so that no medical man of any reputation could afford to give up his time to its affairs. Though there were, doubtless, exceptions to the rule, it might almost be taken as an axiom, that services given for nothing were generally good for nothing, and though, at the beginning, many eminent medical men generously gave their services to the Board, after a little while they one by one left it, and had been succeeded by members who were less capable, and it seemed to him, that to expect a set of gentlemen who had been elected to the Board, as a rule, quite irrespective of their possessing any special qualification for the post, to be able successfully to deal with a great question of medical science, was almost as wise as it would be to expect them



successfully to carry on the duties of the Astronomer-Royal at the Greenwich Observatory, or to undertake the judicial functions of the House of Lords.

Prof. CORFIELD did not at all agree with the outcry against large hospitals, nor with the idea of a small hospital for each parish. He considered that there was no evidence to prove that the mortality in large hospitals was greater than in small ones. The large mortality in hospitals was due to the number of unvaccinated cases, and to the fact that the worst cases were sent there. He considered that there was not the smallest evidence to prove that fever hospitals were any danger to the neighbourhood; not a single case of fever has ever been traced to the London Fever Hospital; and he wanted a great deal more evidence to satisfy him that small-pox was disseminated in the neighbourhood of the small-pox hospitals. He did not see that it was a parish affair to provide accommodation for small-pox patients; no other hospitals were organised by the parishes; and if hospitals were a danger, the danger would be increased by having forty hospitals. It was, he thought, quite unnecessary to require the local authorities to have accommodation ready at all times for the reception of patients. In the parish for which he was Medical Officer of Health (St. George's, Hanover Square), they had had some ground offered to them on which to build a hospital, but he had advised the authorities not to accept it.

Dr. WILLOUGHBY could not agree with Mr. Hill in his censures on the system adopted by the Asylums Board, still less could he admit that the hospitals played any considerable part in the recent prevalence of small-pox in London, the causes of which must be sought elsewhere. At the same time he differed decidedly from Dr. Corfield, who denied that they were sources of local danger. As they were at present managed the evidence of Dr. Tripe and others proved beyond the possibility of doubt that they were local foci of infection, but this he attributed to the gross neglect of precautions, of which Dr. Tripe and Mr. Hill had given examples. The entire immunity of the inmates of the City of London Union—parturient women and unvaccinated infants—though its open windows were but ninety feet from those of the Homerton Small-Pox Hospital, proved that in themselves they might be as innocuous as the Fever Hospital at Islington was well known to be.

It was, he argued, idle to talk of the *concentration* of the poison by the aggregation of cases when each had an allowance of cubic space vastly greater than could be enjoyed in the best of private houses.

He thought the plan of hospitals suggested by Dr. Richardson was impracticable, especially with regard to the carrying of all out-going air through fire; adequate ventilation under such an arrangement could not, he believed, be attained without producing a painful draught. He would rather have larger hospitals for each great parish or union, constructed after the admirable design which Dr. Collie laid before the Society of Medical Officers of Health.

Mr. HEMPSON DENHAM did not at all approve the idea of removing small-pox hospitals into the country. He considered that the inhabitants of a town had no right to send bad cases of infectious disease into pleasant country places. He suggested that a fleet of ships should be moored at the mouth of the Thames and made into a floating hospital for the treatment of such cases.\* He did not think that placing small hospitals on the tops of houses would meet the requirements of London or of the country. But what was most wanted to successfully deal with infectious diseases was an improvement in the sanitary condition of London and towns generally, so as to remove the conditions favourable to the development of those diseases.

The following letter was read from Dr. Tripe, Medical Officer of Health for Hackney:—

“DEAR DR. RICHARDSON,—I write in accordance with your request to express my strong conviction that large hospitals for the treatment of small-pox are very objectionable, as they apparently spread the disease in their vicinity. The same objection, however, does not apply to scarlet fever and typhoid, if the experience obtained in this district is to be taken into account. I send herewith a summary of the statistics I have prepared for this district, but it must not be supposed that I consider the whole or nearly the whole of the large mortality near the hospital to have arisen from unavoidable causes, as the accompanying report will show. I believe that if there be good approaches to a hospital; if the wards, laundry, and dead-house are not within at least 100 feet of the outer walls surrounding the premises; if the stores and dwellings of the medical officers and steward are so placed as to be entered from the road; and the surrounding walls are say ten feet high, but a small mortality, if any, should be engendered by the hospital. The chief danger, so far as my experience goes, arises from carelessness of the ambulance drivers, insufficient disinfection of the ambulances before their return from the hospital, and especially from visitors to the patients. I also object to too many patients being allowed to an acre, and to the buildings being too close together: the present allowance of fifty patients to an acre is, I think, too large. If there was one hospital to each Metropolitan borough, with a reserve piece of ground on which double bell-tents or huts could be placed, if necessary, in each of the four great divisions of the Metropolis, *i.e.*, North, South, East, and West, I think the necessary requirements of London would be provided for. Of course the law would have to be altered to enable the managers to erect and maintain the hospitals in situations approved by the Local Government Board, or some other responsible authority.

Sincerely yours,  
JOHN W. TRIPE.”

\* The Government afterwards adopted this suggestion, and provided vessels for the purpose.

## REPORT AND SUMMARY ACCOMPANYING DR. TRIPE'S LETTER.

STATEMENT PREPARED BY DR. TRIPE OF THE DEATHS FROM SMALL-POX IN HACKNEY DISTRICT, 1871-80 AND 1861-70.

In Albert Street, Brooksby's Walk, College Street, College Lane, Farm Place, Holmbrook Street, Templar Road, and the Grove, being the streets nearest to the Small-Pox Hospital, the deaths from small-pox amounted to 95 in ten years amongst 2,314 people, and there were also 277 cases reported to me from these streets. These deaths give an annual death-rate of 4.1 deaths per 1,000 population. In the streets within a quarter of a mile radius in front and at the sides of the hospital, there were 164 deaths, and 625 cases reported in the ten years amongst a mean number of 6,823 inhabitants, giving an annual death-rate of 2.45 persons per 1,000 population. Amongst 30,171 residents of the other small houses occupied by poor persons which are inspected annually, after deducting the deaths in and population of the above-mentioned streets, there were 484 deaths and 1,745 cases, which give a death-rate of 1.6 deaths annually per 1,000 population. The death-rate from small-pox amongst 119,400 residents in the rest of the district was only 0.21 per 1,000 population per annum, 261 deaths only having been registered amongst them in the ten years. The death-rate was 0.58 per annum per 1,000 population for the whole district. These figures are necessarily calculated on the deaths as cases in respectable houses are rarely reported to me, and the calculations would consequently be misleading. If all the deaths in hospitals assigned to Hackney, or for which no addresses are given, had been included, a larger per centage of deaths in the poorer streets would have been shown. I was unable to assign 53 deaths in hospitals to the localities from which the patients had been removed, as their place of abode was not stated. The cases per 1,000 population per annum in the ten years were as follows:—In the streets around the hospital, 12.0; in those within a quarter of a mile radius in front and at the sides, 9.2; in the other small houses, 5.8 per 1,000 population. The number of deaths from small-pox in 1861-70, after allowing for those removed to the Highgate Hospital, was 173, which gives an annual death-rate of 0.167 per 1,000 for the whole district. There were 15 deaths within the quarter-mile radius, which, with 3 added for the proportion of residents removed to Highgate Hospital, give 0.264 per 1,000 population against 2.45, or nearly ten times as many in 1871-80 as in 1861-70. The proportion of deaths in the quarter-mile radius in 1861-70 to the total deaths from small-pox in this district was 10.4 per cent., whilst in 1871-80 it was 18.3 per cent., showing that as compared with the rest of the district the inhabitants of these streets suffered to a much greater extent in 1871-80 than in 1861-70.

SUMMARY: Hackney 1871-80 and 1861-70.		Cases of, and Deaths from Small-Pox in the Streets situated within a ¼-mile radius of the Small- Pox Hospital, Homerton.				
1871-80.	Per 1000 Population.	Name of Street.	Population.	Deaths.		
			Cases. 1871-80.	1871-80.	1861-70.	
95 deaths in streets adjacent to the Hospital...	4.1	Albert Street, Homerton	131	15	6	0
164 deaths in streets situated within a ¼-mile radius of the Small-Pox Hospital .....	2.45	Bridge Street "	146	14	2	0
484 deaths amongst 30,077 poor persons living in other small houses	1.60	Brooksby Walk "	500	55	16	1
261 deaths amongst 119,400 population, excluding poor population and deaths .....	0.21	Churchill Road "	364	35	9	0
912 deaths (addresses known) amongst total population .....	0.58	Church Road "	287	17	3	0
965 total deaths amongst Hackney residents, including unknown addresses .....	0.64	Church Terrace "	115	15	1	0
		College Lane "	91	12	1	1
		College Street "	173	13	5	0
		Cross Street "	71	9	4	0
		Crozier Terrace "	428	18	6	1
		Digby Road "	602	31	5	1
		Farm Place "	91	8	3	0
		Fenn Street "	68	5	1	0
		The Grove "	198	29	10	0
		High Street "	1196	51	13	2
		Holmbrook Street "	559	79	25	7
		Homerton Row "	36	6	3	1
		John Street "	127	10	2	0
		Marion Street "	120	27	6	0
		Nesbitt Street "	440	26	2	0
		Plough Lane "	65	10	3	0
		Rosina Street "	128	32	9	0
		Sedgwick Street "	316	42	3	0
		Templar Road "	571	66	29	1
		Total .....	6823	625	167	15
						addresses not known
						3
Deaths from small-pox per 1000 population:						
	1861-70 London .....					28
	" Hackney.....					17
	1871-80 London .....					46
	" Hackney.....					64

NOTE.—The Hospital was not open during any part of the 10 years—1861-70.

Dr. RICHARDSON replied: The Discussion that has been carried on resolves itself into the following points:—

I.—I think that it may be fairly conceded that all are agreed as to the propriety of obtaining a complete registration of the communicable diseases.

II.—It seems to be an equal matter of agreement that the sanitary committee or local authority in every parish should have all the special centres of infection in its district thoroughly mapped out, and that it should know the actual accommodation that is required for its infectious sick from time to time.

III.—The suggestion that every parish should bear its own burthens and accept its own responsibilities for the management of its infectious sick within its own boundaries seems to be freely

admitted as sound and purely just. The argument used against it is that it is not practical: to that I answer, in a word, that, if it be practical to retain and treat infected people within the boundaries of four or five parishes, it is practical in all.

IV.—It has been urged that in large hospitals the management of the sick is not objectionable. The able superintendents of the large institutions are the chief supporters of this view. It has been insisted on by at least an equal number of speakers on the other side that the bringing together of a number of persons in a ward is not consistent with the most successful treatment. Mr. Chadwick has spoken specially on this point, and supported my thesis as to the serious psychological evils which attend this method. I have heard nothing that would lead me to retract a word I have said on the subject. I do not agree with Dr. Collic's statement that the great mortality in small-pox hospitals is accounted for by the fact that all the worst cases are sent there. The class of cases I have seen in private consulting practice has usually been of a bad type, and in fact the cases that, of all others, required to be relieved from surrounding influences of a depressing kind. From my point of view, the personal isolation of the sick is one of the most effective means of cure in such cases. It is these cases that should not go into a ward with others. Admitting (as all must who know how successful actual out-door treatment of infectious diseases is) that sufficient cubic space for each sick person is essential, that does not meet the necessity, equally essential, for individual isolation.

V.—The view that the large small-pox hospital is injurious to the surrounding neighbourhood is contested most earnestly by Drs. Collic, McCombie, and Corfield. They are met by Dr. Archer Farr, by Mr. Bridgewater, Mr. Pearson Hill, and by Dr. Tripe, who all give counter facts. The figures given by Dr. Tripe, the Medical Officer of Health for Hackney, read to me as unanswerable. He shows us that during ten years the proportion of deaths from small-pox in the streets near the hospital to which he refers was 12, within a quarter of a mile radius 9·2, and in other small houses, more remote, 5·8 per 1,000 population. Mr. Bridgewater's and Mr. Pearson Hill's facts are in the same direction.

VI.—Objection is taken to my plan of dealing with those small-pox patients in a district who have no home. The plan is said not to be practical, but it exists in practice already. In private houses we send the small-pox sufferer to the top room of the house; we isolate there, and we treat, notwithstanding the existing faulty arrangements, with success. London at this moment is, in fact, a badly managed upper floor hospital, even

now to a considerable extent. I say carry that plan out on a better scale for the poor who suffer, by making a sufficient number of small efficient upper floors. There are thirty-nine vestries concerned; for argument's sake, divide equally. Let each vestry, on its boundaries, set up four hospitals of light construction on the upper floors of existing or of new buildings. Let each hospital take in twelve patients. Then there would be accommodation for 1,872 patients; and if by a mutual accommodation between parishes one would receive for another in emergency, the whole question of dealing with the out of home infectious cases in London would be solved. Such small hospitals would not even be noticed after a time, and their management would be so easy that they could not be sources of danger if any efficiency deserving the name, were bestowed upon them.

VII.—To the last objection to my proposals, that if they were legislatively carried out the sick would not receive the highest medical care, I reply—only carry them out, and the medical care is sure enough. It would be as easy to secure the best consulting skill that medicine can afford for the small as for the large hospitals.

Dr. Richardson illustrated his observations by showing a very excellent model of a small iron hospital, arranged for destroying organic emanations by fire, constructed by Mr. Thomas Veryard, of 3, St. Andrews, Wandsworth Road.

A cordial vote of thanks was passed to Dr. Richardson for his valuable paper. The proceedings then terminated.

## THE PRESENT STATE OF THE SEWAGE QUESTION.

BY PROF. CORFIELD, M.A., M.D. OXON., F.R.C.P. LOND.,

*Read June 21st, 1881.*

There can be no doubt that the question of the removal of refuse matters from the vicinity of habitations is, and always has been, one of the most important of sanitary questions. In every large community where we find a slow removal of refuse matters of human beings, there we find a high death-rate, and wherever we find improved means for speedy removal, there we find a proportionately lower death-rate. This was shown to be the case, in a remarkable manner, by the researches of Dr. G. Buchanan, published in the ninth report of the Medical Officer of the Privy Council; in every town where the refuse matters had been removed more speedily, the death-rate was lowered; not only the general death-rate, but the death-rate from enteric fever and cholera, which are spread especially by this means. Before this, it had been noticed that cholera spread in filthy places; many witnesses before the Health of Towns Commission gave the most definite evidence that cholera spread wherever filth was kept, where the removal of refuse matters was not carried out thoroughly and quickly. The same was found to be the case in the time of the black death of the fourteenth century. If we read the accounts given of the streets and the houses at that time, we shall not wonder that the black death spread as it did; so it was with the Oriental plague in succeeding centuries. The fact that the Oriental plague now no longer appears in Europe, there can be no doubt, is due to the improved sanitary condition of the various towns in Europe. The fact that Constantinople is no longer a hot-bed of Oriental plague, is put down as due to the improved sanitary condition of that place. I think there can be no question but that several of these plagues of the middle ages, of some of which we know very little, spread more especially on account of the non-removal of filth. This is a fact, the importance of which has only been recognised during the last few years. I was very much struck by a remark that Dr. Acland

made to me the other day upon this subject; he said, "What do you think was the cause of the depopulation of so many of the cities of antiquity? I think it was pestilence rather than war," and I think there can be but very little question when you read the accounts. Why! the black death not only decimated towns, but almost entirely depopulated whole places, so that large and populous towns were left little straggling villages. I think you will be disposed to agree that it is not unlikely that many of the great cities were entirely depopulated in this way, and were lost, so that in some cases even their site is not known.

Having said thus much on the importance of the removal of refuse, I need hardly perhaps say that in the consideration of refuse matters, removal is the most important matter; they spread diseases in various ways, and the first thing we have to contend with is their removal. We want to get rid of them, and after we have got rid of them we may consider what we can do with them. As to the value of human excreta as a manurial substance, various authorities have put it at various sums, but an amount that is very usually accepted is, that the liquid excreta of an individual are worth 7s. 3d. a year, and the solids 1s. 3d., making together 8s. 6d. The amount given by Messrs. Lawes and Gilbert is 6s. 8d. Probably these are both too high values, when you put the matter to a practical test. Scarcely any manure will sell in the market for what it is theoretically worth in the laboratory. Dr. Voelcker, in his remarks on the value of farm-yard manure, comparing it with the value of artificial manure, gives his decision that it is worth about one-third of what is theoretically given to it in the laboratory.

There are, and always have been, a very large number of people who put the cart before the horse in these matters, who try first to see how much they can make out of this refuse matter, how much money they can save to the rates; that is the first thing they consider, and they put the first and most important thing second. Now that is a very great mistake indeed. The first thing to do with these refuse matters is to get rid of them; they are a nuisance, they cause a high death-rate. When we have got rid of them, then we may try to utilise them, and to make money out of them, but not till then. Now we come to the methods by which these matters are being dealt with. I shall divide them into two kinds. The first are commonly called the "conservancy" methods; they are called so, curiously enough, by their friends; I think it is a name that might have been given by their enemies, for of all things, *conservancy* of these matters is what we do not want. The second kind is the water-carriage system. There are really only these two methods.

The methods of conservancy or dry-carriage are of two sorts;

the first being simple methods by which these matters are collected in or about habitations without any admixture whatever, and the second when these refuse matters are mixed with various substances to absorb their moisture, to deodorise, or to disinfect them. The simplest form in use even now is to dig a hole in the ground and let the refuse matters fall into it. It was formerly thought that as much of the refuse matters should soak into the soil as possible, and it was not thought necessary to remove them. It was even thought a good plan to dig down till a spring was struck, when the top might be closed up permanently, as there was never any cause to empty the pit. I need not dwell upon this method, as it is now universally condemned. The improvements upon this method have been of two kinds; first, the receptacle was made impervious to water, and second, it was made gradually smaller and smaller, so that less and less of these refuse matters could be kept about. These improvements have clearly brought the matter more within the scope of sanitary law, and brought things into a more healthy state. These receptacles were made water-tight, they were ventilated, and they were reduced in size, until they came to a mere pail or tub placed under the seat of the closet, and which could be removed once or twice a week.

The system of collecting refuse matters in large water-tight ventilated cesspools underneath houses is a matter which must not be disposed of in a word, because it is a system largely adopted in the present day, both here and in many large cities on the Continent. A variety of devices have been invented for emptying the contents of these water-tight cesspools. In former years they used to be emptied by hand, bucket, and spade, and the results were very disastrous. In Paris there are two forms of disease which go by names given to them from their being caused in this way. The men were subject (before these cesspools were ventilated) to a form of asphyxia called *le plomb des vidangeurs*, and caused by the sulphuretted hydrogen, and also to inflammation of the eyes called *la mitte des vidangeurs*, and caused by the ammonia in the foul air. In order to do away with these disadvantages various contrivances have been invented, and the best thing known is the air-tight tub or carriage which is exhausted, and then connected by means of hose with the cesspool. A tap is turned on, and the contents of the cesspool rise through the hose into the cart. This is supposed to be done without any nuisance at all, but any one who has walked about the streets of Paris and Lyons at night will know perfectly well whether there is any odour or not connected with the process. During the last few years a great variety of improvements have been made.

An experiment has been recently tried at Kew with what is known as the *Système Vallard*. A large barrel or cart was exhausted of air by a stationary engine, connected with the cesspool by means of a tube jointed in a most ingenious manner, and the emptying was carried out without the smallest nuisance. It is clear that the cesspool system has not yet seen its last days, and so it is important to recognise any plan which reduces the nuisance of it. As to the system of collecting the refuse matters in pails or tubs underneath the seat of the closet, which has been adopted of late years in many of our large towns, such as Birmingham and Rochdale, it is the only system, with very few exceptions, that has ever been made to pay. If it is necessary to have a collection in towns at all, as appears to be the case at present in some of our large towns, I think that this collection should be made in small quantities, so that the excreta are removed as fast as possible. I think that there can be no question that the towns at the present moment have chosen the pail system, and that they have done rightly; because, if these things are to be collected about the house, they had better be kept in such a condition that they cannot be kept in excessive quantity. A quick removal is ensured by this method, more than by any other conservancy method. It is the only method which has ever been made to pay, and it has been made to pay in various parts of the world. It has been adopted in China for some thousands of years, and it is no doubt due to the utilisation of the crude sewage from this method that China is at this moment not a barren waste, but conspicuous for its cultivation of the tea plant. It is the system that has been adopted for a great many years along the Riviera, for the cultivation of roses and orange trees; and has also been successfully adopted in various large towns in Germany.

In the modification of this method which is known as Liernur's Process, which is in use in Amsterdam and Leyden, the contents of the closets are carried by air pressure into underground receptacles, and afterwards removed in air-tight carts; but it is not proposed, as a rule, to utilise it as it is, but to dry it, and convert it into a powder. This process of drying does not pay, and never will pay. The manure does not pay the cost of being treated in this way. It will pay the cost of carriage to a short distance for utilisation as it is, but it does not pay for conversion. *Poudrette* is a dangerous substance to keep; this is a fact which is not generally known. An instance is recorded by Parent Duchatelet of some *poudrette* being placed on board ship and becoming damp, when the majority of the people on board were attacked with fever showing symptoms which leave little doubt that it was severe typhoid fever.

The mixed methods commence with the middens and ash-pits, which are being removed in almost every part of the country where they are found. These had been improved in the same way. The two great improvements in the midden system are making the receptacle water-tight and smaller, until what was formerly known as the Hull system consisted merely of a small space between the seat of the closet and the ground, a space made water-tight by being rendered with cement; the ashes of the house were thrown in, and a hard mass was thus made, which was dug out from time to time. With regard to the midden system, it is true with this as with the other conservancy systems; cartage is expensive, and so it is an advantage to the local authorities to keep the refuse matters about the premises as long as possible, especially if they are dried. We know how difficult it is in London to get our dust removed, and we know what a nuisance our dust produces. There is no possible advantage in collecting the manure in this way; in the majority of cases the middens have to be drained, because the ashes are not sufficient to dry all that is in the middens. The liquid part is then allowed to go off; the liquid is worth 7s. 3d. and the solids only 1s. 3d., and if the midden or cesspool be drained the most valuable part is allowed to drain away, and the part left is not worth keeping. This, mixed with ashes and soil, has never been found worth the cost of carriage, any more than the refuse of the dust-bin is worth carrying. Testimony was given by Sir Joseph Heron that in no case was it found to pay; so far was it from paying as a manure, that at Manchester, and several other large towns, they have adopted a system of burning it, and that is about the best thing they can do with it. The Fryer Process is one which, I think, has a future before it, and is likely to be considerably adopted, and some of the London vestries have been considering whether it may not be adopted for the disposal of the contents of dust-bins.

The dry earth system, which is a very old way of treating excretal matters, was improved upon and re-introduced by the Rev. Henry Moule; but experience has shown that there are considerable disadvantages connected with this system; so many disadvantages, that no large towns have been found to adopt it as a permanent system. The disadvantages of this system are that a large amount of earth has to be sifted and carried to the required spot, and again the mixture has to be carried away, so there is a considerable amount of carriage. It is necessary that this compost should be kept dry, and that is a very difficult matter. Slops must not be thrown in; the supply of earth must not fail. It was found in some parts of India that this system would not work at all, on account of the dampness of

the air. Moreover, we do not know that the mixture with earth disinfects as well as deodorizes. The earth system, which was largely introduced into barracks in India, was described in early reports as being a great improvement on the previous systems. A short time after, however, the reports became very doubtful. When one looked back to see what the previous systems had been, one could not be surprised that the earth system was superior to the ones previously in vogue. In India they came to the conclusion, as in every civilised community, that for every 191 lbs of refuse matter that had to be carried away there was only one pound that was removed by the earth-closet, and the remaining 190 lbs. had to be removed by some other way, and therefore they came to the conclusion that it was impracticable. It can only be regarded as practicable for volunteer reviews, cattle shows, and other similar large temporary collections of people. It cannot be regarded as a satisfactory solution of the sewage question, except in small villages, where the closets are outside of the houses. I think it is quite conclusively shown that it is not suited for large institutions. As to the manurial value of the compost collected in the earth-closet: at first sight it would seem that all the manurial value of the excreta would be retained. This was apparently so clear, that in one of the Government Blue Books there was an elaborate calculation gone into, by means of which it was shown how large an income a town of 10,000 inhabitants would derive from the sale of the manure. This was made on the assumption that all the manurial constituents of the excretal matters were retained in the earth-compost. In the seventh report of the Sewage Committee of the British Association, it was shown clearly that the percentage of nitrogen in the soil used in earth-closets was increased only to a very slight extent by each use of the closet; and after the earth had been used six times in closets it was only fit to be used as a good garden mould, and would not bear the cost of carriage, except to a very short distance, so the whole question of the manurial value of the mould was solved in a very sudden manner.

With regard to conservancy systems, they are condemned by their name. The very fact that carriage is expensive makes the local authority remove the excretal matters as seldom as possible; and sooner or later all these systems become a nuisance, and they are only to be tolerated where no other system can be carried out. I am speaking now more especially of large towns. In small villages the dry earth system is often adopted with advantage when the earth can be readily got, and when the system is carried out under proper supervision.

In the water-carriage system very little is to be gained by

keeping any of the excretal matters out of the sewers. The sewage has to be treated all the same. The sewage of towns which adopt other systems than the water-closet system, has been observed to be fouler, because staler, than in towns, where all the excretal matters are carried away by water almost as soon as they are formed. I will merely say, with regard to the construction of sewers, that we have all come to the conclusion that sewers should be made water-tight, as small as possible (they are often too large) that they may be properly flushed, and they should be thoroughly well ventilated. I would remark upon this point the mischief of mixing water, which ought to go into drains, with the sewage. Surface water, which ought to go straight into the rivers, is allowed to mix with the sewage, and so renders more difficult the treatment of sewage at the outfall.

One of the greatest improvements we have arrived at in the present day in this matter is the way in which we deal with house sanitation. The fact that we have come to recognise that the drains of the house should be thoroughly and entirely disconnected from the sewer, and have an air break between them and the sewer, so that no sewer air can get into the house drains, is one of the most important improvements which has been introduced.

We come now to the treatment of sewage. There must in all towns be sewage to be treated: what I say now will apply to all towns. The sewage I am speaking of now is the liquid that runs through the sewers. We come to the point of the value of it. It is valuable, of course, because it contains a quantity of excretal matter, vegetable refuse, &c. Its value consists chiefly in the salts of ammonia (amounting to five or six grains in a gallon) and the organic matter. Each 100 tons of average sewage is estimated to contain dissolved matters worth about 15s., and suspended matters worth about 2s., so you will see that the suspended matters are worth very much less than the dissolved. The total is about 17s. per 100 tons, or about 2d. a ton; but it is worth to a farmer not more than 1d. a ton at the outside. With regard to the disposal of this sewage, it is very frequently turned into the rivers, to the pollution of the water, and the production of nuisances in various ways, not to mention the waste of the manure. It is also in many instances thrown into the sea, and when turning it into the sea does not cause a nuisance it may often be defended on the score of economy.

A variety of chemical substances have been used in the attempt to precipitate the valuable matters of sewage. When you consider that the most important manurial constituent is ammonia or salts of ammonia, you will see the utter futility of

using precipitating substances. To any chemist it is a self-evident absurdity. I have not time to describe to you the various precipitation processes, but must content myself with saying, that one and all have failed to precipitate four or five grains of ammonia from a gallon of sewage, and that the manures produced have been almost worthless. Some of these processes will be found to be of use, because they do precipitate the suspended matters from the sewage, and render the liquid more amenable to subsequent treatment; but the precipitates produced can never be valuable. Farmers have refused to take some of these precipitates when offered them for nothing, and in this have shown sound discrimination, rather than ignorance. One of these precipitation processes I propose mentioning, because it is a process which does not attempt utilising the precipitated matters as manure, and that is the process devised by Major-General Scott, in which the precipitate is burnt to form cement.

Intermittent downward filtration was suggested first by Dr. Frankland, who showed that sewage, when it is passed downwards and intermittently through soil, is purified, while if passed upwards, scarcely any purification takes place. It has been shown that large quantities of sewage can be purified on a small area; this plan was first carried out by Mr. Bailey Denton, at Merthyr-Tydfil, where the sewage of about 3000 persons was purified per acre of land, and has since been adopted at various other places.

On the question of wide irrigation, the first thing that should be stated, and which is not generally appreciated, is, that an irrigation farm should be an extended filter. The soils through which water will not go, are not capable of purifying sewage at all times of the year. It should be a soil which is pervious to water, through which the sewage can percolate into drains underneath. Purification, which is the first object to be attended to, goes on under all circumstances in pervious soils, so long as too much sewage is not put upon the soil.

In the winter the sewage is only partially purified upon impervious soils, so that one of the most important things in connection with it is that the soil should be pervious, and the sewage pass through it, and not merely over it. If sewage be taken and passed over a field which is impervious, it undergoes a certain amount of purification. If it be passed over a second field it may come off more impure than when put on it, and that was clearly shown in connection with some sewage at Redhill Farm. The Sewage Committee of the British Association made a number of experiments to determine what proportion of the manurial value of the sewage was utilised upon a farm. The farm which was experimented upon was Breton's Farm,

Romford. Samples were taken daily for several years, and subjected to analysis. The results were found to be that during five years the percentage of nitrogen recovered from the manurial constituents had been from 26 to 42 per cent., and averaged nearly 33 per cent., that is to say, one-third of the nitrogen which came from the town was recovered in the crops; about the same proportion as is recovered from the best artificial manures.

A word or two about the supposed dangers of sewage farms. The dangers are a myth; there is not the smallest evidence to prove that these dangers exist. There is no evidence that diseases like cholera, enteric fever, or entozöic diseases, have been spread by these means. One of the great difficulties in connection with sewage farms is, that the sewage has to be utilised and put on the farms at all times of the year, whether it is wanted or not. That is one of the great bugbears. That must be got over by laying out a certain area for the purpose of filtration at all times, whether the sewage is wanted on the land or not. In Birmingham, the committee appointed by the Town Council to report on the various sewage processes, came to the conclusion that it was impracticable to get sufficient area of land to adopt wide irrigation, and recommended the adoption of the plan of making a large filter. Different towns may adopt one or other of the two systems—either have irrigation supplemented by a filter, or have a large filter to purify the sewage without reference to irrigation. The staple crop on irrigation farms is Italian rye grass, which absorbs an enormous quantity of sewage. I hold in my hand reports of the British Association Sewage Committee which show that wheat, barley, oats, turnips, mangolds, cauliflowers, strawberries, peas, &c., have been grown successfully on these farms.

In very few instances have sewage farms been made to pay. They have been made to pay at Edinburgh, and at one or two places where the situations have been favourable. In many places pumping is required, but pumping is not so costly as people make out. It is a very slight expense to a town when the sewage has not to be lifted to any great height. The farmers will come to see that it is to their advantage to take the sewage and put it upon their farms, and I have no doubt we shall see a great many more places, in which, if money is not actually made by the sewage being utilised, at any rate very little expense will be incurred by the towns. Indeed, I adhere to my opinion, formulated ten years ago, that sewage irrigation will be ultimately found to be remunerative in many instances, and that opinion is shared by the Committee appointed by the Local Government Board in 1876 to inquire into modes of treating

town sewage. This, I believe, is the best solution of the difficulty for the largest number of places. I do not mean to say it is suitable for each and every place. In towns where it is found to be practicable, I think the inhabitants must submit to be taxed to a small extent for the removal of a serious nuisance, and the lowering of the death-rate.

After the reading of the paper, the following discussion ensued. Dr. CARPENTER occupying the Chair.

Mr. SILLAR thought that the author, in treating of the "present state of the sewage question," when enumerating the various means for the disposal of sewage, ought not so entirely to have set aside the various processes of precipitation. Any schemes of ordinary filtration were in a great measure frustrated by the amount of paper pulp which was contained in ordinary sewage, which by degrees clogged the soil to which the sewage was applied; if the sewage was chemically treated this evil was removed.

With regard to putting sewage on land, he wished to call attention to the fact that simple mechanical filtration was powerless to remove dissolved impurities, and that consequently their removal by passing over or through *land* must be due to the chemical action of the earth only; and that this chemical action could be more economically effected by bringing earth to the sewage than by conveying the sewage to the earth, for one cubic yard of finely divided clay presented a larger surface for this chemical action than many acres of land.

The depopulation of large ancient cities, alluded to by Prof. Corfield, was, he thought, due not so much to the contamination from sewage as to the fact of their populations eating up the produce of the country all around them, without any restoration to the soil of the manurial wealth necessary for its replenishment, but recklessly allowed to waste. The question is not a sanitary one only, it is essentially an agricultural one, and, as such, an important economical one, for we may depend upon it we too shall suffer from famine and pestilence if we continue to waste our sewage by throwing it into the rivers.

The author had raised an objection to manure produced by the chemical treatment of sewage on account of the evils which might arise from the dust of the Poudrette; but he (Mr. Sillar) considered that the dust from a sewage-farm in a dry season was open to precisely the same objection, and was more likely to spread disease, because a prepared manure is put *under* the earth, and not necessarily on its surface, and the process of preparation destroys the germs of disease. One great difficulty in the way of sewage irrigation was the difficulty of getting ground enough to treat the sewage from large towns by wide irrigation.

He maintained that experience had proved that a valuation founded on the chemical analysis of native guano, the produce of sewage, did not accurately represent its value or power for agricultural purposes.



Mr. DOUGLAS ONSLOW thought that in Prof. Corfield's address the money question had not been sufficiently dealt with, and he thought that this was a very important point in considering any scheme for the disposal of sewage.

There were many cases in this country where the system of wide irrigation suggested by the author was almost impossible; in the first place, land, and especially the right sort of land for the purpose, was not always obtainable; then there was the cost of the land, and the expense of pumping, &c., where pumping was necessary. In these cases precipitation was the only means that could be successfully and economically adopted, for even if the place was near the sea, it was a disgraceful waste to put your sewage into it, and was, in most cases, a great error. Precipitation had been successfully carried out at Coventry, during the last seven years, with very satisfactory and economical results, and the effluent water during dry weather made about half the stream into which it was discharged. The cost of the process, as carried out there, was 1s. per head of the population, and if the sewage of the town were disposed of by broad irrigation it had been carefully estimated it would cost not less than 3s. per head.

The money question was a very serious one, and in the interests of the ratepayers, by whom the burthen had to be borne, it should be given more careful consideration. He did not mean to say that precipitation gave better sanitary results than irrigation on land, but seven years experience proved incontestably, upon the highest authority, that where chemical treatment could be supplemented by filtration of the effluent from the tanks through a small area of land, excellent results could always be relied upon; and such a process would be often perfectly practicable at a comparatively small cost, whereas broad irrigation would be either absolutely unattainable or else so costly as to become a ruinous charge upon the community to be served.

Mr. R. W. PEREGRINE BIRCH thought that the pneumatic plan of emptying cesspools or receivers mentioned by the author would be rather too expensive for ordinary use, or to be employed on a large scale, as it would undoubtedly cost more than 2d. per ton to remove the material by pneumatic means and cartage; and this was an outside value for ordinary sewage.

To treat sewage profitably it must be done cheaply and roughly, and so, where rough treatment was undesirable it could not be made to pay.

He thought that the irrigation system had been adopted in Paris.

With regard to the suggestion of burning the refuse, the Corporation of London had a furnace for burning refuse that it was desirable to dispose of quickly.

He thought that no line could be drawn between a sewage farm and an intermittent filtration bed. The amount of land required, however, had, he thought, been rather under-estimated, and he doubted if the sewage of 3000 people had ever been practically and permanently disposed of upon one acre of land.

He considered that Mr. Sillar was scarcely justified in complaining of the waste of sewage, or in taking credit to his Company for the portability of the manure they produced, before he had on the one hand shown that this material was worth carrying, or on the other hand that the sewage was worth using. It was said that at Aylesbury native guano was sold for £3 10s. a ton, or rather that two tons which it was admitted contained about one ton of added material, worth about 2s., was worth £7, so that the ton of sewage sludge by being attached to a ton of rubbish, was made worth considerably above £6. This was very different to Col. Jones's experience. He was thought to have done well in realising £1 a ton for sludge, and he obtained this by mixing the sludge with a *higher* class manure, not stuff worth 2s. a ton.

Mr. G. B. JERRAM, A.M.I.C.E., said that he was using sludge in his experiments in growing peas and other vegetables on bad soil, or brick earth; and some of the farmers, who had given up using it on their farms when they had ceased to be paid for removing it, had come back and asked to be allowed to use it again.

He thought that the first necessity in the sewage question was to get rid of a nuisance as cheaply as possible, and if you could make the process pay so much the better. If sludge was treated on land, it ought to be deposited and dug in as quickly as possible; and he thought it would always be possible to find plots of waste land—such as Chatmoss, near Manchester, &c.—suitable for the purpose of sewage disposal in the vicinity of large towns.

Mr. THOMAS WILSON GRINDLE said that he had had considerable practical experience with various processes for the disposal of sewage. He had first tried the lime process, and with lime and chloride of lime he had obtained a good effluent; with the phosphate process he had also got a good effluent; and with the A.B.C. process he had seen a good effluent. The same with the process of the Rivers Purification Association, as now in operation at Hertford and Coventry; and he thought that it would be a good plan to have a meeting to settle whether some process combining the good qualities of these systems could not be adopted, which is impossible at present, owing to the ill feeling among the advocates of the different systems, and to the opposition of the Local Government Board to any other means of dealing with sewage than by passing it through land, which could not in all cases be obtained.

The Chairman (Dr. CARPENTER) commenced his remarks by stating that a congress held at Leamington sixteen years ago to consider this subject had, after the reading of papers—one of which was by himself—agreed unanimously that the treatment of sewage by irrigation was the best process to prevent the pollution of the rivers and streams of Great Britain. He then gave some particulars relating to the sewage-farm at Croydon (which was of an extent of 540 acres), and said that the vegetables, the cattle, and the milk from the cows fed on the

farm, were nearly all consumed in the town of Croydon without any ill effect; and he said there was no evidence that irrigated farms were in the least unhealthy. In other respects, he thought that the disposal of sewage by precipitation might be advantageous in some places, where land was not obtainable; but in all cases where the sewage was applied to land it should pass through a few inches of the soil of the land, and not merely flow over it. With regard to the produce of a sewage-farm, he said that if 5000 tons of ordinary town sewage were applied to the land he should expect to take off 40 tons of produce, and if that quantity was obtained nuisance would be impossible. He thought it would be a good plan in the arrangement of a sewage-farm, in some districts in which land was difficult of access, and in all places which consisted of a clay subsoil, to make part of the land into a kind of ballast-bed for the filtration of the sewage during mid-winter, when the same quantity could not be applied to the farm in the ordinary way as during the other parts of the year, the vegetation being at that time all but in abeyance.

There was a difficulty in placing the management of sewage-farms in the hands of local authorities, as they did not understand the practical working, and therefore could not make them pay. Until this (which was the present plan) was altered, they could not be expected to be financial successes.

The question of famine, referred to by Mr. Sillar, was no imaginary evil, but one that statesmen would soon have to face seriously; and there was no step which could be taken of a more practical character than the establishment of sewage-farms near to every large town in the kingdom, for it had been clearly shown that each acre of land under sewage irrigation raised four times the amount of produce which could be obtained by ordinary farming.

PROF. CORFIELD, in reply to the discussion, said that the intention of his paper was to put before the Institute the main facts that had been arrived at in the various methods adopted for the disposal of sewage, and that he had not attempted to deal with any of these schemes in detail.

It is of no use to tell chemists that you can precipitate the ammonia in sewage with any commercial success, or that any plan of "fortifying" sewage sludge can be made to pay.

Sewage sludge is not in itself valuable, and no mixture of other materials with it will make it so. Of course, if you add valuable matter to it you may make it worth carrying, but it is like adding gold dust to sand, and then sending it somewhere else for the gold to be separated again, and no one would contend that this was a rational proceeding, or likely to be a financial success.

The market value of one ton of sewage manure varies from about 1s. 6d. to 10s. 6d. With regard to Mr. Sillar's remark that chemical analysis would not show the value of sewage, he would say that it was quite possible to ascertain by analysis the parts of any sewage manure that would be useful in growing crops. He was of opinion that the value of all sludge had been over-estimated.

One advantage in sewage irrigation is the enormous increase in the value of land treated in this way.

In reply to Mr. Birch he would say that sewage, in the proportion of 3000 people to one acre of land, had been practically tried at Merthyr-Tydfil for a number of years.

With regard to Mr. Grindle's statement that he had produced "good effluents" with various precipitation processes, including the lime process, it must be observed that different people evidently had very different ideas as to what constituted a good effluent, for the Rivers Pollution Commissioners, after mentioning various places at which the lime process was used, say: "In all these places the plan has been a conspicuous failure, whether as regards the manufacture of valuable manure or the purification of the offensive liquid."

MR. ROGERS FIELD, M.I.C.E., in moving a vote of thanks to Prof. Corfield for his valuable address, said that some of the speakers had complained of certain points being omitted, but the fact was that the subject was so enormous that it was a wonder how Prof. Corfield had managed to condense into his address the amount of matter to which they had listened, and he was sure that they would all agree with him that a most cordial vote of thanks was due to Prof. Corfield for the able manner in which he had brought the subject before them.

The vote of thanks was seconded by Mr. G. J. SYMONS, F.R.S., and carried unanimously. The proceedings then terminated.

# INAUGURAL ADDRESS,

SESSION 1881—82,

BY ALFRED CARPENTER, M.D.,

VICE-CHAIRMAN OF THE COUNCIL.

*Delivered December 7th, 1881.*

GENTLEMEN OF THE SANITARY INSTITUTE,

It is my duty, in the absence of your Chairman, to preside on this occasion. I am a poor substitute for so accomplished a Hygeist as Professor de Chaumont, but I will do my best to occupy his place. I congratulate you most heartily upon the position which the Sanitary Institute of Great Britain occupies at this present time, notwithstanding the impediments which have been placed in the way of its progress by bodies who imagine themselves to be its rivals, as well as by the difficulties which have had to be encountered in founding a corporation upon so diversified a basis as that which we have taken as our area. I may instance the successes which have attended the congresses held first at Leamington, then at Stafford, then at Croydon, and last year at Exeter. These have given a solidarity to our body, and have placed its objects so forcibly before the public, that it might seem superfluous to urge the points which I propose this evening to submit to your notice. It has been said, and I think with justice, that a corporation like ours which is without pecuniary endowments, and without substantial income from some regular source, can scarcely expect to become an institution which shall be on a firm basis, and capable of influencing public opinion, unless its claims to support are such as are undoubted, and its members much larger in numbers than are at present our own. I wish this evening to point out, not so much for your information as for that of the public at large, the claims for recognition which the Sanitary Institute has upon the general public, and its right to be regarded as one of the necessary institutions of the country.

The volumes of transactions which have been published are standing witnesses of the work which the Institute has already performed. The list of Surveyors and Inspectors of Nuisances

who have obtained the certificate of the Institute, points to the fact that it is in actual operation, whilst the ignorance which has been evinced by some of the rejected candidates for those diplomas, and who already hold office under local boards and town councils, points out in a most decided manner the necessity for better education upon the points which are put forth in the syllabus of the Institute as those necessary for their members to be acquainted with.

Before proceeding to discuss the claims which the Institute has for public support, and the foundations upon which it ought to base its application for a Charter of Incorporation, I may be allowed to refer to the obstacles which have already appeared in its path, and which have postponed the consummation of this object. There has been opposition from members of established bodies who appear to think that the Sanitary Institute is likely to encroach upon the functions of the older bodies and to usurp their privileges. I wish to point out the error of this course of procedure, and to insist upon the fact that there is no antagonism between the bodies in question and our own. I can of course deal only with objections which have been made by individuals to myself, and with which I am personally acquainted.

It has been said that the Sanitary Institute is antagonistic to the *Social Science Association*, and some men have declined to help the one because they belong to the other, and see no object in the establishment of both. I contend that the Sanitary Institute is the legal offspring of the *Social Science Association*; the natural result of the teachings of social science, and that so far from being antagonistic they stand in the relationship of father and son, and as such ought to have a natural affection for each other. The Sanitary Institute by its certificate proposes to remove one of the many evils which have been so resolutely exposed at Adam Street, Adelphi, viz., the fact that there was no means of knowing the duties of sanitary inspectorship except by learning them after appointment to office; and that sanitary authorities could not tell whether those applying were qualified for the office they proposed to fill. That in electing men as surveyors and inspectors they elected those who had most influence with the electors from personal consideration rather than from any knowledge of the work they were undertaking to perform. The result has been, as is well known to the *Social Science Association*, that nineteen-twentieths of the inspectors appointed to do sanitary work have no really skilled knowledge of the work they are called upon to perform, because until the Institute was founded there was no guide upon such matters to whom the public could go for undoubted information, and for a stamp of fitness to do the work. The Sanitary Insti-

tute does not encroach upon the Social Science Association in any way, except so far that it organises a sanitary exhibition in the town which it visits, and makes that a financial success which in the hands of the Social Science Association has generally been held at a loss either to the Association or to the local Committee. The Sanitary Institute, however, sees no reason why the Social Science Association, as well as other kindred bodies, should not continue their exhibitions at their places of meeting, if they think fit, as likely to spread better notions upon Sanitary work among the general public, which it is the aim of both bodies to effect, and I have no doubt but that each will assist the other. For until the general public have far better notions upon the scope of that work than they have at present, it will be a long time before the benefits to be derived from such exhibitions will be slight, and the necessity for the performance of that function of the association will cease to exist.

I am told that some of the members of the Royal Institute of British Architects are opposed to this Institute obtaining a charter; and that a similar antagonism exists among some of the Surveyors and the Engineers. If we were proposing in any way to educate and examine men so as to fit them for the profession of an architect, of a surveyor, or of an engineer, there would be a reason for this antagonism; but it would be quite out of our province to propose anything of the kind, or in any way to come into antagonism with those bodies in their professional work. It is true that an architect ought to know the principles of public health, so far as they are connected with house-building, and that an engineer should be acquainted with the principles of sanitary science, so far as they are associated with sewage and water supply, and that surveyors could not be fitted for their duties if they did not know how to advise a highway board or a sanitary authority upon the right way to prevent nuisance. But these very points are those which the bodies in question have no means of knowing except from outside help, and especially that help which is forthcoming from members of the medical profession and professed hygeists. It would be far better for each of those bodies to do as the medical corporations are now doing with regard to general education—be content with a certificate from a recognised teaching authority—rather than to examine for themselves into matters which are outside their own immediate work: and it must be acknowledged that vital statistics and the laws of health are no part of the work belonging to either architects, engineers, or surveyors, as such, any more than the teaching of mathematics, or of Greek, or of Botany, are to the medical man. Foundations they may be upon which the science of medicine may rest, but no more necessarily belonging

to it than is the analysis of the water of an underground stream to the work of an engineer.

There is a still more important reason why the Institute should be recognised, and even supported, by the bodies I have just mentioned. Neither of those bodies would trouble themselves to provide an education, and a test of its appropriation, to the large class of men who are now necessary parts of our great sanitary army, viz., the local surveyors in small districts, and the sanitary inspectors of the whole of the kingdom. It is upon the knowledge possessed by these men that architects and engineers have very often to rest. The information obtained from these men is sometimes the basis upon which the professions I have mentioned have to act in deciding upon their own work. The depth of the foundations of a house, or the direction in which a sewer shall be laid, is very often determined by information obtained from men who are totally ignorant of the first principles which ought to guide the members of established institutes of the country in their own immediate work. I think our Institute ought therefore to look to the older corporations for assistance in its labours: for help, not for antagonism, in smoothing away its difficulties. It is to some of them that we should, and do, naturally look for assistance in our work, for some of their members guide our destinies, and take part in promoting our work in connection with the medical element in the council, work which cannot be brought into their own institutes or act in any way as part of their corporations. It would be quite as reasonable for the medical corporations and the British Medical Association to oppose our design from fear that we proposed to provide medical officers of health and medical attendants upon the poor, as for architects or engineers to think that we should in any way encroach upon their domains.

The importance of the duties which surveyors and inspectors of nuisances have to perform is more patent to medical men than to any other distinct class of persons. The ignorance which exists among these officials is marvellous, and yet these men very often guide the health committees of our vestries, our town councils, and our local boards, upon points which are intimately connected with the health of the people, and they are used very often for counteracting the activity of the medical officer of health. No wonder that small progress is made in our work: no wonder that the action of sanitary authorities is unsatisfactory, when the minor details upon which the principal success of the whole is often dependent are carried out in a way which enables the sanitary authority to show to the expert the best way of "*how not to do it.*"

Having dealt with the main object of the Institute, perhaps I

may now be allowed to glance at a few of the subjects which are at this moment most interesting to us as students in the Science of Health, and which come properly before us as part of our work. I will refer first to the existence of fever.

Typhus is amongst us, not to any extent, but there are, or have recently been odd, and only odd cases, in all the principal divisions of the metropolis. The appearance of these odd cases is suggestive of that which the Lisson Grove outbreak has shown us to be possible, if circumstances should arise which should compel people to keep themselves warm by aggregation. Let us understand that the germs or factors of typhus are among us, and it only wants cold, bad food, and close quarters to repeat an outbreak similar to that at Lisson Grove in every crowded part of London. There is, unfortunately, a conflict of sanitary authority still among us. The police have the care of lodging houses, and have to put sanitary laws in force; they have nothing to do with houses full of people, if the place is not registered as a lodging house; whilst the sanitary authority has no right of entry at night, when the over-crowding is in actual operation. In the majority of instances it is to the interest of the occupants of these over-crowded dwellings not to disclose the fact of the over-crowding which does take place, and as a consequence the germs of typhus and relapsing fever are sometimes spread broadcast before the existence of the disease in a given house is even suspected. The sanitary care of lodging houses, in regard to over-crowding, should be with the sanitary authority, with the assistance of the police, and should not be taken out of their hands by the latter, whilst there should be a power to enter in the night any house let out in tenements, whenever there is reason to suspect that there are too many occupants in any of the rooms thus let out as distinct apartments. Again, it is not right that there should be any conflict between the sanitary authority and the destitution authority. The care of the sick should be placed entirely in the hands of the sanitary authority, whilst the destitution authority should look after the able-bodied, the aged, and the infirm, and provide the funds for the expenses which may be incurred in looking after the sick paupers. By this means sickness alone would not be, and should not be, in any way connected with the pauperism of a given individual, as cause and effect.

Leaving typhus, let us look at typhoid, or gastric, or enteric fever. Every autumn for some years past this disease has appeared in our midst, and the mortality rises or falls in numbers in close attendance upon the rise and fall of the temperature of the water, and of the soil. Like to typhus the germs are every

where,—they only require to come from a case of the disease as excreta, and to find their way into the water-supply of a given district, when that water is a little warmer than usual, and when oxidation is rapidly appropriating the oxygen naturally contained in that water, to produce an epidemic in any or almost every part of London. As far as London is concerned, if its water supply continues to be taken as heretofore, from streams polluted with crude sewage, the epidemic, some day, will, in my opinion, come with fearful intensity when the temperature of the Thames water is raised a few degrees more than it has been during the past summer. Cases will then be very numerous in all parts of London, except that supplied by the Kent Water Works, and the sewers will become loaded with excreta in sufficient quantity to infect the whole mass of sewage, and enable the gases of decomposition which now arise from badly constructed sewers to carry the factors of mischief in every direction infecting water and milk, and several other articles of food which may be exposed to their influence. The sewers being warmed by the hotter season will give out in autumn and in a mild winter sufficient morbid matter to generally continue sporadic cases, even after the temperature of the Thames water has been reduced to its ordinary standard. For as the sewers of London are now constructed it is very possible in any given place into which typhoid excreta are thrown—such excreta not having been previously disinfected—for them to come into contact with some warm sewage, the warmth having been obtained from the waste-pipe of some steam-engine, or from some hot refuse from a manufactory, the germs of the disease would then multiply to a very considerable extent, and be distributed throughout the district which that sewer provides for. The real remedy for this state of things, is the ruthless exclusion of excreta from every part of the course of the Thames, and every other stream above the intake of water companies, unless that sewage has been previously most thoroughly utilised by irrigation; that principle alone has the power to abstract the factors of disease from the water in which they may be suspended, and in which, unless they be utilised in a proper manner, or destroyed by chemical action, they are certain to increase and multiply in a most rapid manner. Exclude all crude sewage from the Thames, and insist upon the sewers of London being self-cleansing, and not as they are now—simply sewers of deposit, and, in my opinion, typhoid would disappear as an epidemic, and be seldom present amongst us even in its sporadic form.

The subject of summer diarrhœa is intimately associated with that of typhoid. The cause which will produce the one will not fail, under some other conditions, to give rise to the other.

The prime factor is the same in each case, distributed, it is true, in a somewhat different manner, but both requiring the steady opposition of the local sanitary authority to a continued soaking of subsoil with unutilised excreta, and an intelligent supervision of their work by skilled inspectors.

There is a point in this part of the case which would be worthy of enquiry and continued observation by members of the Institute, and which requires a series of observations in numerous places at the same moment to be worth anything, viz.: the variation of the temperature of the soil and its relationship to the quantity of carbonic acid in the ground air, the ground water, and in the atmosphere proper. I believe that there is an intimate relationship between summer diarrhoea, temperature, and moisture, and the presence of an excess of carbonic acid in the subsoil, or in the water. It is in such conditions that the factor, capable of producing typhoid and summer diarrhoea, can assert its individuality.

I may, perhaps, be permitted also to make a few observations upon the subject of small-pox. The Government has, as you are aware, appointed a Commission to inquire into the subject of hospital accommodation for infectious diseases in the Metropolis, consequent upon the dead-lock which has followed the legal decision given in the Hampstead Hospital and Fulham Hospital cases. As I have the privilege of being a member of this Commission you will not expect me to make any revelations as to our plans or our designs.

I can say that the district in which I reside is adequately provided with hospital accommodation for infectious diseases, but, unfortunately, that hospital is in the hands of the destitution, and not in those of the sanitary authority. I have endeavoured to procure a transference of the buildings from the one body to the other, but such is the greed for power on the part of the Local Guardians, that they refuse to part with their hospitals to the Local Board of Health, by which means the hospitals might be made much more useful for the purposes for which they have been erected than they are at present. It has been shown that 80 per cent. of the patients admitted into the Metropolitan Asylums' Hospitals were not paupers. It follows that hospitals in the hands of sanitary authorities proper, will be four times more useful than they are now in our case, in which their operation is mainly limited to the pauperism of the district, and as a consequence they are scarcely used at all, at least in the general way in which they would be if they were not in the hands of the Guardians of the poor. I think it may be taken as an established fact that the pauper class (excluding the casuals) are much better

protected against the effects of small-pox than the class immediately above them, and who are more under the influence of those fanatics, who object to vaccination, and who provide the funds by means of which that inane objection is kept alive. The subject of hospital accommodation for infectious diseases is one which should be considered by the Council of this Institute, and it would assist the Commission if some evidence was formulated, and, with the approval of the Council, tendered to the Commission as the united opinion of the Council of the Sanitary Institute. This, of course, would only apply to the great principles upon which, I conclude, they would be in a great measure in accord, and that no disputed point would be tendered unless carried by a very large majority.

There is another subject which ought to engage the attention of the Institute as it is intimately associated with the health and the well-being of the people. I mean the water supply of great towns. There are arguments in favour of companies, as well as against them, and they are debateable points, but there surely is no valid argument against the necessity for a constant supply; for an abundance of water of a pure character at the corners of our main streets, and for a removal of those anomalous conditions which allow of whole districts being deprived of a necessary of life at the will of a commercial company, without the power of recovery of any of the damage which must necessarily arise to those exposed to the mischief, although the water has been already paid for by the unfortunate inhabitants. Water companies ought, as well as railway companies, to be liable for neglect to perform their contract, and for illness which they may have caused by distributing an impure article. If a railway company issues a ticket, but fails to convey the passenger, the latter has his remedy at law; a customer of a water company is deprived of his supply for days together, and appears to be without remedy. If a passenger is injured by the fault of a railway company's servant, the passenger has his remedy: the same should be law as against a water company, and it appears to me to be a part of the work of the Sanitary Institute to urge that such provisions should become law, and that the loss caused to an individual by the distribution of typhoid disease should be recoverable from the body distributing it, whether a company or a corporation.

I must not pass over the subject of smoke prevention without observation, having myself been instrumental in forcibly directing the attention of the public to the damage which accrues from the present faulty plan of burning coal, and the mischief which results to organic life from its use as at present carried out. I may be allowed a word or two in support of the principle

contained in the use of gas in the place of coal. I believe that we are year by year taking away more and more of that sunshine which is naturally our portion, and that we are year by year diminishing in consequence the proper proceeds which ought to be derived from the fruits of the earth. A cloud formed of vapour obstructs, and it is natural to our atmosphere that it should obstruct, the light of the sun, but let that cloud be only slightly imbued with a ton or two of coal diffused through it in the form of an impalpable powder, and the obstruction to the passage of the light and heat of the sun becomes immense. It injures vegetation, it injures animal life, and it is a damage to the prosperity of our country. Electricity is coming to our rescue, and when gas companies find out that the necessity for high illuminating power no longer exists, that a gas which shall produce more heat and less light is the more advantageous, and that it must be produced at a low price, say 2s. 6d. or even 2s. per thousand feet, we may hope to see it come into general use for cookery, for ventilating and heating purposes, to the immense advantage of the health of our people and the restoration of some of that sunshine which cooks and manufacturers are at present diminishing very materially in amount.

Electricity will light our places of public assembly, and let us hope our houses also, without destroying the salubrity of our atmosphere indoors; and whilst deposing gas from its present position as our principal lighting agent, it will compel it to occupy the place which belongs to it, viz., the production of heat, and then the thousands of tons of coal which now float in the air of our country and coat our trees, our shrubs, our animals, and even our annual plants with a coating of black, will no longer be permitted to begrime our landscape and deprive us of that sunshine which is not more plentiful with us than is necessary. There will be a much greater scope for gas manufacture than that which exists under the present regime, and gas shareholders need not in any way be afraid that their dividends will not be forthcoming.

The work of the Institute, however, is to try and interpret the laws of nature without reference to financial considerations, and if a certain action tends to diminish the health of the community, though financially that action may be profitable, it is our duty to point out the injury which results from it, and it may be even to suggest a remedy.

There is no greater injury to the community at large than that arising from the want of knowledge, which is so perceptible in the minor officers of our great sanitary army. If the corporals and sergeants of a regiment do not know their duty, how

is it possible for the captains and colonels to do their work? confusion must arise and there must be defeat in action.

The Sanitary Institute proposes to remedy this defect by imbuing the sanitary authorities of the country with the belief that the best way to do a thing is *to know how*, and that the stamp which the certificate of the Institute affords is the best guarantee that any sanitary board can possibly have that the candidate for a given office of surveyor or sanitary inspector has the requisite knowledge; and it is upon this fact that we ground our hope for a long and beneficial page in the future history of the institutes of our country, and in course of time to obtain a Charter of Incorporation from the Government.

It has been already announced that the next congress of the Institute will be held at Newcastle-on-Tyne in the autumn of 1882. It is a great advantage to have time for preparation, and I trust that the members of the Institute will take care that the meeting be even more successful than any which has preceded it. The arrangements which the Council are making for the formation of a local branch of the Institute in the town which invites them will be the means whereby a lasting impression may be made upon the district, and something tangible left behind, which shall mark the visit, and make it remembered by the student in sanitary science whose enlightenment commenced with the visit of the Institute to his place of residence. At any rate, *Rest and be thankful* is not the motto of our association. Let us determine that *Excelsior* shall be emblazoned upon our flag, and that we will not rest until we have planted it upon the highest pinnacle of the fortress of health.

A cordial vote of thanks was passed to Dr. Carpenter for his address. The proceedings then terminated.

# THE ADMINISTRATION AND HYGIENE OF BRITISH HOSPITALS.

By HENRY C. BURDETT, F.S.S.

Read Feb. 15th, 1882.

## ABSTRACT.

So much misapprehension prevails as to the origin of hospitals, that it seems desirable to show by actual evidence that they were known previous to the birth of Christ. The inhabitants of Arabia, Persia, and India, possessed hospitals, some of which were supported by their governments long before the Christian Era. The Buddhists cut on rocks their edicts on hospitals, one of which, dated B.C. 220, can be seen near Sourat to this day. Medicines were provided, and skilled physicians were appointed to these hospitals at the expense of the State. All the physicians attached to the court, male and female, were compelled to give their services gratuitously to each of the hospitals as they might be required. Hospitals were established amongst the fire worshippers of Persia from the earliest times, the people being compelled by law to maintain suitable houses for the suffering poor of their community, whilst the king provided the best medical treatment for the inmates, free of cost. It is declared, upon evidence not entirely unauthenticated, that the sick were treated so far back as 1124 B.C. in the temples of Æsculapius, at Titanus, a city of Peloponnesus. The Æsculapian temples had some features, at any rate, in common with our hospitals. Certain of these buildings were set aside for the exclusive treatment of patients suffering from infectious diseases. Tablets were suspended upon the walls, on which were recorded the history and treatment of each patient.

Finally, the Valetudinarius referred to by Seneca and others were in reality private pay hospitals or hydropathic establishments for the well-to-do. The first Christian hospital was founded at Bethlehem by St. Jerome in the year A.D. 300, and he it was who first used the word "Hospital" to describe an institution devoted exclusively to the reception and relief of the sick. St. Ephraim or St. Faviola is entitled to the credit of

founding infirmaries which were supported exclusively by voluntary contributions, and for the sole purpose of treating the sick.

The oldest hospital in Europe now in use is the Hôtel-Dieu, which was founded A.D. 600 by St. Landry, Bishop of Paris; and the first hospital opened in England was built at Canterbury by Archbishop Lanfranc. Mr. Burdett pointed out as a remarkable fact, that Guy's Hospital, which is one of a very few, if not the only English hospital founded on the monumental, as opposed to the Christian idea, has recently been the scene of serious controversy, which report declares to be due, at the bottom, to differences of opinion on religious matters.

This circumstance is noteworthy as showing that money left for a specific purpose by a benevolent founder may, in process of time, come under the absolute control of those whose views, and whose mode of administration, are probably very little in accord with the views and intentions of the originator himself.

Passing from the past to the present, Mr. Burdett showed that the number of beds available in the General, Special, and Convalescent Institutions throughout Great Britain approached 25,000, exclusive of Poor Law and Cottage Hospitals. The number of in-patients relieved every year at some 200 Institutions was nearly 190,000; the number of out-patients relieved at 250 General and Special Hospitals, and Provident and General Dispensaries, was nearly 2,000,000 annually. The average gross annual income from all sources received by British Hospitals, Convalescent Institutions, and Dispensaries amounts to £1,450,452, and the average gross annual expenditure to £1,447,601. These figures, which are based upon the average receipts, expenditure, and work during three years, prepared upon an identical basis, and checked by an accountant, went to prove that if the incomes of the different medical charities were fairly distributed according to the requirements of each centre of population, the funds available would be equal to the demand.

As a matter of fact, many of the leading London Hospitals are now very seriously embarrassed from want of funds. No less than three of the chief of them—St. George's, King's College, and Westminster—have, within the last few days, brought their impecuniosity prominently before the public in the columns of the *Times*. In a leading article which these appeals called forth, the *Times*, alluding to a deputation of two years ago to the Home Secretary, which urged upon him the necessity of appointing a Royal Commission to enquire into the whole subject, and to his reply "that public opinion was not yet ripe for such an enquiry," remarked: "It seems likely that the condition of ripeness, if not absolutely reached, is at least brought within a measurable distance of time." An



enquiry can do no possible harm. By its means alone can the exact facts be ascertained, and the sooner a Royal Commission is appointed the better it will be for the hospitals, the public, and the poor.

Mr. Burdett then proceeded to consider the best scheme upon which British Hospitals can be governed and managed. He pointed out the abuses attending the acceptance, without the fullest enquiry, of the offices of President or Vice-President of a Charity by a member of the Royal Family, a Bishop of the Church, a Peer of the Realm, or other representative personages. The name once given, the promoters were enabled to use it as a kind of peg upon which to hang any number of appeals for support, and any number of schemes for bleeding the charitable public. No name ought to be given to any Charity without the most careful, thorough and competent enquiry. Mr. Burdett further pointed out the evils attending the present system of selecting any apparently presentable person who might offer himself for the office of Superintendent or Secretary to a Hospital. There could be no doubt that to elect a half-pay officer, with a small pension, to such an office, because it enabled the Committee to pay something less than a fair rate of remuneration for the services of a gentleman in such a position, was to do great mischief to the Charity and great wrong to the individual. The labourer is worthy of his hire, and it would be a wise step for Hospital Committees to decide to pay such a rate of remuneration as would enable them to command the services of the most eligible candidates, especially as such a result could be obtained if the maximum salary of such an official were fixed at 5 per cent. upon the annual income of each Hospital. Mr. Burdett showed it would be possible to train men for these positions to the great advantage of the Institutions, and to the great economy of charitable funds.

He referred to the dangers of non-formula prescribing in out-patient rooms, by which system overworked Dispensers became the unwitting means of causing serious risks to the health and sometimes to the lives of those of Her Majesty's subjects who seek this kind of relief at the Hospitals. The ticket system was criticised unfavourably, while the free system was extolled, the advantages and disadvantages in each case being fully stated. Allusion was made to a proposal now in course of adoption, to establish a North Metropolitan Hospital for North London, with 300 beds, upon the most approved principles of Hospital administration known to those best competent to form an opinion on the subject. It was also declared to be desirable for enquiry to be made into the present system of managing British Hospitals, and for a Hospital Society to be

formed with the object of effecting a free interchange of views between Hospital Authorities.

On the question of hygiene Mr. Burdett showed, by quoting instances, that in the majority of cases the Hospital Committees have imperfect plans or none at all of the drainage of such Institutions, and are often in entire ignorance of many points relating thereto which ought to be as familiar to them as the letters of the alphabet. The relative mortality of large and small Hospitals, the right system of drainage, the advantages of isolated wards adjoining the operating theatre for the treatment of such cases, and the best system of managing infectious and convalescent hospitals with a due regard for the public health, were fully dealt with.

In conclusion, Mr. Burdett expressed his opinion, based as it was on actual experience, and many years' study of the subject, that Hospital Saturday had practically proved a failure everywhere. In London, Hospital Saturday more nearly resembled a fiasco than a failure, for, after several years' labour, begging for alms in the public streets, the institution of numerous benefit performances, and other means which the working men justly regarded as illegitimate, the sum subscribed by the whole of the working men in London for upwards of 100 Hospitals and other Institutions amounted to a less sum than the workmen in the Clyde have frequently subscribed for one of the Hospitals at Glasgow. The proposal to institute a Convalescent Institution, which should be founded and supported by the working classes in the metropolis, was worthy of commendation. He hoped that it would result in the abandonment of the Hospital Saturday movement, in favour of a working men's provident Convalescent Home. Such a result would relieve the London Hospitals from much anxiety, and would get rid of a movement which, in his opinion, did the Hospitals far more harm than good, and which had never proved, and was never likely to prove, a substantial financial success.

After the reading of the paper the following discussion ensued, Professor F. S. B. F. DE CHAUMONT, M.D., F.R.S., occupying the Chair:—

Mr. E. C. ROBINS, F.S.A., said that the idea of concentration and amalgamation, as suggested by the Author, was open to several objections, for if Hospitals are to remain a charity as at present, a certain amount of freedom must be allowed to the supporters. Charity will not go in a regular line, and people do not like to be told how they are to do their charity, and how their contributions must be apportioned. With regard to plans of the hygienic arrangements, he said that in any building which he designed, he always supplied plans of the drains, and gas, and water services, to the Board, Committee, or whoever

might be in charge of the building at its completion, and he thought that the deposit of such plans by the architect ought to be insisted on by the medical officer with regard to every hospital; the plans ought to have every pipe about the building marked, with its direction, and instructions as to the purpose for which it was intended, as a guide to those who had the responsibility of keeping them in order, and also to prevent disarrangement in the case of alterations.

Dr. BRAXTON HICKS thought that a Conference on the question of Hospital Administration would be very useful, if the medical men connected with hospitals were well represented; as a general rule he thought that the medical men did not have enough to do with the sanitary arrangements and general management. In Guy's Hospital, with which he was connected, the Governors and the Medical Staff were never (before the last difficulties arose) brought together, except at the half-yearly dinner; now two members of the Staff met in the House Committee. One great fault of committees generally was, their fluctuating character. Sometimes only a few, often not the same as at the previous meeting, came to them. He wished that those who were so kind as to undertake the responsibilities of a Governor, would also be constant in attendance, difficulties would arise much less frequently in a full meeting.

The name of Matron was, he thought, of more importance than appeared at first sight. It was very important to attend to the domestic comforts of the ward; and one had only to ask the patients to find that when the head of each ward attended to their comforts the arrangements were much more satisfactory. He considered it a very great disadvantage to divide the work of the matron, as dual responsibility was always bad.

He agreed with the Author of the paper, that a great evil arose from the practice of passing nurses on year by year from one ward to another. Sometimes the proficient nurses were taken away to attend the pay wards, where they existed. Doctors did not get used to the nurses, nor the nurses get used to the ways of the doctors, it was not nearly so easy to perform an operation satisfactorily if you had to instruct the nurse in every particular, instead of keeping your mind clear for the work.

Mr. C. MACNAMARA, F.R.C.S., said, that the best thanks of the public were due to Mr. Burdett, not only for the valuable paper he had just read, but also for his untiring labours in the cause of hospital reform. He was of opinion, however, that Mr. Burdett was over sanguine in his ideas regarding the advantages to be derived from a conference of our hospital authorities, for the purposes of promoting co-operation among these institutions. The truth was, few people acquainted with the subject could reasonably hope that any such action would lead to a satisfactory result. In many cases the interests of the non-medical, the medical, and the school authorities were at variance, and still more so in the case of different hospitals, it was because of these conflicting interests that it had become necessary to invoke the aid of a Royal Commission to solve the difficulty.

For instance, the out-patient system of our hospitals was in a very unsatisfactory condition; but if reforms were effected in this respect in one institution, a neighbouring hospital not following the same course was overburdened with patients, and by its rules might be prevented from turning any patients away from its doors. Again, there were strong arguments advanced in favour of making out-patients contribute to the expenses of the hospital; but if one institution enforced payment the patients would entirely forsake it, and go to another hospital where no such charge was made. The system, or rather want of system, was most demoralizing to the poor, and of very doubtful advantage to them from a medical point of view. The same might be said especially with reference to the in-patients admitted into many of our special hospitals.

The relation between our hospitals and medical schools was a matter of very great public interest, and recent experience had demonstrated the fact, that these interests were not at present (in all cases) on a satisfactory footing, and nothing less than a Royal Commission could sift the evidence necessary to form a clear opinion on this matter.

No one had shewn more clearly than Mr. Burdett, how necessary it was that the public should be informed regarding the difference in expenditure that existed in our various hospitals, some of them were not spending enough, or others were evidently spending far too much under existing circumstances. It was impossible, however, to form a just idea on this important matter, unless our hospital accounts and returns were based on similar forms; and considering the large sums of money subscribed for these charities, it was most important that accounts, dates, &c., should be available. This again was a work which the labours of a Royal Commission alone could bring to a satisfactory conclusion.

Lastly, large as the sums at the disposal of our hospitals were, many of them were sadly in want of means, in fact the time was probably not far distant when they would have to curtail their operations, unless more money came to hand. So high an authority as Lord Kimberley had lately referred to this subject, and thrown out hints as to the necessity that exists for giving support to our hospitals from the public purse. A Royal Commission could alone enter into this subject, so as to convince the ratepayers that the time had arrived for adopting some such course of action.

Mr. H. C. BURDETT in reply said, that at discussions on hospitals people always agree as to what should be done, but it is not done.

He thought that Mr. Braxton Hicks had rather misunderstood his idea of a Hospital Committee, he strongly objected to a medical and lay Committee working separately, and urged that there should be one Committee in which both elements were well represented.

Until we had the evidence that would be brought out by a Royal Commission, we should not be able to say what was the best method of management.

A cordial vote of thanks was passed to Mr. Burdett for his paper. The proceedings then terminated.

## THE RANGE OF HEREDITARY TENDENCIES IN HEALTH AND DISEASE.\*

BY GEORGE GASKOIN,

SURGEON TO THE BRITISH HOSPITAL FOR DISEASES OF THE SKIN,

*Read March 8th, 1882.*

### ABSTRACT.

AFTER acknowledgments paid to the munificence of the donor of the prize, and to the liberal spirit with which he allowed the subject to be treated, the author of the paper touched slightly on the limitation which had been placed on the subject of heredity, and allowed that he experienced some feeling of hesitation and discouragement, however, prepared by previous observation and experience, under the idea that the conclusion was already prejudged—he being well assured in his mind that to hereditary tendencies, either in health or disease, no boundary could be fixed, that is to say, that it could never be found. He allowed, however, that the subject gained somewhat in simplicity and in practical bearings through this curtailment. It also brought the subject more into the grasp of the writer, whose qualifications for the task came wholly from his course of study in the practice of his profession as specialist and clinical observer, and not by any means as scientist.

The subject of heredity, so extremely complex, and allied to some of the deepest problems of organised existence has been, at least of late years, more earnestly and exhaustively dealt with by devotees to natural science than by professors of the medical art, who, with some marked exceptions, have rather slighted it or neglected its cultivation. Quite recently one

\* In the autumn of 1879 the Rev. E. Wyatt Edgell, then Treasurer of the Institute, offered to place in the hands of the Council a sum of £200, to be given by the Institute as a prize for an Essay on "The Range of Hereditary Tendencies in Health and Disease;" and, at a Meeting of the Council, held on December 18th, 1879, it was unanimously resolved that this munificent offer be accepted, with the grateful thanks of the Council. After the prize was awarded, on December 12th, 1881, the Council invited Mr. Gaskoin, the author of the Prize Essay, to read a Paper on the subject at one of the Ordinary Meetings of the Institute.

must allow it has been the subject of renewed attention, but not to any satisfactory extent. In etiology as little as possible is spared to hereditary influence. Its presence is very commonly ignored. The author acknowledges that the papers by Mr. Sedgwick\* some twenty years back did not at the time make on him the impression they deserved, nor did they excite then the feeling they have since raised of great merit and desert. They were indeed in advance of the time. The way the author first became convinced of the very principal part played by heredity in causation of disease was from the experience gained by him in a very earnest and prolonged enquiry into the causes of diseases of the skin, an enquiry which he carried on for many years over a very wide area of cases. He thus was made aware of its universality and potency as a condition or factor in the production of disease; but his participation in this study, however earnest and prolonged, might still be called narrow and empirical. As an initiation, however, it was commendably safe, and indeed might be preferred, he conceives, to any other kind of experience, as it brought him in contact with a number of concrete data which it was impossible to disallow or misapply. It also furnished a very necessary training, for in the pursuit there is really a knack or method to be acquired. Seldom can such enquiry be made to extend over a wide field: if something is found, far more escapes. There is commonly a disinclination or aversion on the part of the patient to minute enquiry, which, to be of value, should be copious in detail. Thus, in most cases, the search after heredity is a disappointing task in which the trouble is great and the fruits are few. So it happens that the family practitioner, whose opportunities are of the very best, is seldom alive to the performance of it, and does not contribute so much as he should to the general fund. It has been affirmed that the study of skin diseases offers the best field for gathering facts of heredity. Without pledging himself to so disputable an opinion, the author will allow that there is some inequality among diseases—those affecting the nervous system notoriously presenting abundant examples. Beyond the two classes we have particularised, and arthritic affections, hereditary influence is little sought for; yet many curious revelations will be made. The author has been much struck with the hereditary character of varix sometimes occurring very early in adult life; and phlegmasia dolens is also hereditary. In hemophilia perchance the vessels are involved. No structure or tissue seems exempt, and even parasitic and contagious diseases are governed by heredity.

\* Mr. W. Sedgwick, *British & Foreign Medico-Chirurgical Review*, April and July, 1861, and April and July, 1863.

As to direct heredity, *i.e.*, the direct transmission from parent to child of a disease identical in character and species, it is only now and then that this is found; but it is pretty sure to be met with in the common course of professional experience. Its occurrence in three successive generations may be called quite a rare event, and always worthy of a record. When a disease is repeated four times in direct succession it is a fact so rare as to lie quite beyond the experience of most practitioners. The author has met with the case of four generations affected by ichthyosis, but the succession in the last ascending link was collateral. In the rare and singular case of ichthyosis, of old date, reported by Mr. Baker in the "Philosophical Transactions," when it last came into view, it had been prolonged in the line of male descent without a break for five generations. In all probability it would extend further, but there is no record.

Considering that about one half of the cases of ichthyosis betray an hereditary element, one has a right to conjecture that if the ancestor could be subjected to interrogation a second series would be unfolded. In heredity it is not what exists, but what is found that is recorded. Some writers have considered four generations\* sufficient for a complete change of type in the system. Prosper Lucas, of high authority on the subject, agrees with certain other authorities in finding a limit at six or seven generations,† which he thinks quite as much as experience will warrant, he can go no farther than this; but he refuses to abide by it as a law, or even as a rule—it is simply a matter of record. Heredity, according to Prosper Lucas, has no assignable limit. The prescriptions of Hindoo law, as is well known, give seven generations as all that nature can require for clearing off impurity from infusion of baser blood. But in the light of modern research we have instances of reversion which go beyond this boundary. Such was the case of our late revered Sovereign, George the Third, quoted by Mr. Sedgwick from the pages of Thackeray's "History of the Four Georges," which in this particular at least seems beyond dispute. The dreadful calamity under which our worthy monarch suffered seemed inherited from his ancestor in the eighth degree of ascent, who, with quite a remarkable similarity, was also like him in his æsthetic tastes, and further in the number of his children. In cases of deficient phalanges of the fingers, ten generations have been mentioned inherited by females alone.‡

With the increased industry which is being applied to these

\* Bomare, Dic. Univers. d'Hist. Natur., Tom. I., p. 54.

† Prosper Lucas, Traite de l'Heredité Naturelle, Vol. II., p. 893.

‡ See Darwin, Antiquity of Man, Vol. II., p. 73. London, 1868.

researches we may in time possibly reach a little further. If it is allowable to seek for analogy in natural history, we shall find in the words of Mr. Darwin, "that characters of almost every kind are capable of re-appearance after being lost for a great length of time." In silk-worms it has been found that proofs of atavism, *i.e.*, reversion to a lost type under the influence of heredity, will occur after a hundred generations.

The facts obtained from breeding and stock-keeping are patent and powerful as regards the broad truths of heredity, and they have probably fastened on the minds of the lower ranks of society. It might be expected that out of wide experience of an empirical character we might find in this field some hard and fast rule, or at least an approach to certainty: but breeders differ so much as to be little reliable in a scientific sense. Some say four generations are enough for complete conversion of type, others that twenty hardly suffice. Mr. Darwin, in the case of bantam fowls, notices reversion after thirty generations. But with regard to the human race one has to regret that the recorded data as to atavism are far too few to afford anything like deduction from an average, yet there is no reason for believing that they are of unfrequent recurrence, however otherwise than easy of apprehension, nor is there reason to conclude that they are less sudden or capricious than in the animal and vegetable kingdoms, for many a case which we call idiopathic may possibly be atavic, and of distant reversion. In endemic complaints, such as goitre and cretinism, no doubt some large share is attributable to the law of inheritance. It is right, however, to state that an author of much talent, Mr. Francis Galton, in a deservedly admired and popular work,\* has expressed an opinion rather opposed to the frequency of atavism. As regards the transmission of qualities insuring some degree of social eminence, he believes the growth and decrease of ability and intellect in families is pretty regular and rapid without being sudden. In inheriting superior ability, speaking roughly, according to this author, the percentages are quartered at every remove, and the frequent sports of nature in producing prodigies must be regarded as apparent and not real. Scarce reconcileable with these data are those furnished by Moreau of Tours, who, in his work "On Morbid Psychology in Relation to the Philosophy of History," has supported the opinion that all marked deviations, whether in plus or minus, from an average standard, are bordering on disease, and partake in some degree of a morbid principle. Works of this kind, however admirable, are seldom of a final character, and it may yet be a subject of doubt

\* Galton "On Hereditary Genius," p. 83.

whether the highest class of genius is inherited, that is to say, in direct transmission from the more immediate progenitors.

The amount of definiteness which attaches to diseases in their several types has encouraged us to class them, like organisms, into something like genus and species, which is simply an analogy. Diseases are far from having that fixity or permanence of type that we find in the organic world, being rather conditions or accidents of living matter in the serial evolution of generated beings. As in the individual, so from generation to generation, diseases undergo metamorphoses, more or less complete, being often changed into what Burton,\* in his "Anatomy of Melancholy" calls some "symbolising" disease.

Thus, as Baillarger has long ago pointed out, insanity is correlative with phthisis, dartsous affections, scrophula, asthma, and gout. It is often masked by neuralgic and hysterical affections, by strabismus and contracted limbs. So skin disease alternates with rheumatism, bronchitis, epilepsy, and other affections. What is called the metamorphosis or transmutation of diseases will greatly occupy those who make in the consulting-room an earnest study of heredity, the best fruit of which will be to make one acquainted with the *nexus* or interdependence of diseases and their true succession. This study, more or less neglected in the present day, forms one of the highest accomplishments of the physician, and can only be carried on by long and detailed history of cases. It is also well if an abiding trust is given to clinical work, and that it should not be so much interfered with as is common by pathological preconceptions. It is not enough to say that a family is unhealthy, but all the morbid forms should be exactly particularised; as, for instance, in a family subject to insanity; obesity, asthma, and strabismus, would be revelations of an important class; and with skin diseases, it is not sufficient to say they arise from scrophula or arthritic affections: all nicer particulars should be written down, or we should have a poor idea of their casuality. It is, indeed, under these masked forms, under such correlations, that diseases are lengthened out; and it is not too much to say, that subjected to this change of form the reality of hereditary transmission is largely manifested. It is also the commonest mode of transmission of disease in the sense of heredity.

Only when clinical work is pursued in this spirit, the study of heredity ceases to be disheartening, for though it is necessary to travel over a wide field before meeting with what are called its most striking facts, there is here source enough to nourish a continual study. But this is so little felt and so little understood

\* *Anatomy of Melancholy*, Vol. I., p. 89, Lond., A.D. 1827.

by the practitioner, that at last it comes to be ignored—and yet there is reason to believe that the record of cases is generally esteemed. The fidelity of some of the repetitions of heredity go beyond all expectation, which is the more remarkable as, allowing for hereditary aptitudes, predispositions, and shaping reactions, we are not prepared to look for such precise results. I may refer to cases of apoplexy from sanguineous effusion in the Pons Varolii recorded of late, as repeated successively in parent and child at adult age; the same with cases of multiple tumours and multiple exostoses. There seems, however, a great inequality as to capacity for transmission among diseases: thus, insanity is notoriously hereditary, and of its forms some more than others. It is the same in skin diseases, they vary among themselves. Cancer, again, is notoriously hereditary, but lupus, also reckoned among the neoplasms, is scarcely hereditary, at least I have not seen it to be so, yet sometimes in brother and sister it occurs as a family complaint.

Let so much suffice as to the heredity of disease and its range, which is what I can treat of with most confidence as with most experience. I cannot fail to speak with admiration of the labour of naturalists in the field of heredity, in which they have indeed been far in advance, at least at the present epoch, of our physicians, affording them hints of which they should not be slow to avail themselves. The study of heredity in the sick room or in family practice, if carried on with spirit, is a safe introduction, and perhaps the best, to a more enlarged acquaintance with it through books and intercourse with mankind, as in the wider field of natural science. And, if, with the advantage of such an introduction, we bend our attention to the historical page, and to the observation of ethnological and genealogical facts, we shall find indisputable evidence that hereditary principle is of an irresistible force. History indeed will form the principal, and society the ultimate, field of study. In the rich and ample *mémoires* of recent times, especially I might say of the French, we shall find lively examples and proofs of heredity; nor is ancient lore to be neglected, from its intensely personal and legendic character it is full of material for our instruction. Josephus, in his "Antiquities of the Jews," says, that in the enumeration by Herodotus of the nations that followed Xerxes, in his campaign against Greece, he can single out, by description of their features, the Jewish tribes. They are spoken of as having faces like horses, with a round denudation on the crown of the head, very much as one sees them in the present day. The negro preserves that type which we find in inscriptions and engravings of the earliest date. The Celt and German retains the characteristics which were so admirably described by

Roman writers. The Aramæan, as represented by the Jew, and also, in great part perhaps, by the modern Greek, is in living contrast with Indo-Germanic or Aryan stock, a contrast which it has been conjectured to have pre-existed before the issue of original swarms from the north-east corner of their Asian home, so that these differences may be supposed to date from the earliest records of the human race. It cannot be denied that the labours of modern Orientalists have thrown a flood of light on the early history of mankind, and that a certain identity has been established between the northmen of Europe and Asia; so that, in fact, the German, and especially the English, find themselves the least alloyed representatives of the Aryan races, whose traditions, allowing for the long lapse of time, are wonderfully preserved. It is curious to see our passions, our industries, our policies, nay, even to the type of our vices imaged in this race or people, whom a sharp line divides from all that surrounds them, and when they have mixed largely with other races, seem to have done so to their loss in deterioration of stock. One of the greatest advocates of purity of family blood, Mons. le Comte de Gobineau, a modern historian and Orientalist, has particularly insisted on the inequality of races, and the danger of deterioration by admixture. To his historical and ethnological works he has added one of lighter vein, the history of the Gurney family in France and England, which gives the most lively illustrations of his matured convictions.\* This shade of opinion, however, is liable to meet with considerable opposition in these days of advanced liberalism, which are extremely favourable to admixture of stocks, or *miscegenation*, as it has been called. Modern society absorbs some very low types, probably to its detriment, reason entering less largely than passion and interest, or convenience, into considerations of marriage. This has probably been always much the case, even when pride of race and family had more empire it would be scarce a match for interest or wealth. Even royal marriages and adoptions are subject to this law. When the Stuarts were brought in as sovereigns of this country, the union of Scotland and England was too overpowering a consideration to allow of any counter-check. Less excusable, in point of policy, was the marriage of Katherine of Valois with our Henry the Fifth, which brought speedy ruin to his dynasty, and introduced a thread of insanity that lasted to its ultimate extinction. The election of Charles Quint to the imperial throne seems one of those occasions where reason might have dictated a better choice, regard being had to the wretched antecedents of the Spanish family from which he was derived.

\* "Histoire d' Ottar Jarl, Pirate Norvegien et de sa descendance." Paris, 1879.

The study of heredity in the pages of history should not be superficial and slight. It is to be lamented that as yet it has not been very deep, and a want of exactness, especially under political bias, is easily discerned.

The history of France offers fair opportunity for the comparison of family types, especially the dynasty of the Valois—so intelligent, so brilliant, yet unsound; that of the Bourbons, especially in the collateral branches, scarcely less informing. Not only the peculiarity of disposition belonging to the family, but even the cast of features carried through many generations are proofs of hereditary descent. The lip of the Austrian and nose of the Bourbon are proverbial, and have lasted through many generations. Whatever calculations may have been conjecturally made as to the average duration of noble stocks, we know that some of them, as the Guelph and Hohenzollern families, have lasted for centuries without impairment, and there are others which surpass them. The deservedly esteemed and great naturalist Darwin was accustomed to refer atavism to times so remote as passed credibility, but little doubt can exist that in the repeated evolutions from the germ, which carry on the chain of existence, the influence is felt of far off progenitors. All reasonings as to quantity or dilution of blood seems out of place. If the effects are not dynamical, we may at least avow they are not understood, and we may place the facts of heredity among those which we may garner and cherish, but cannot interpret or foretell.

The chief practical lesson to be derived from this class of study would be carefulness and circumscription in marriages in the interest of the children and family descent. So far as the writer can discern, with some drawbacks in this island, the Northern or Scandinavian stock, as naturalised among us, seems to offer the best guarantees, so far as race is concerned, and the colonial element is greatly to be shunned. No doubt his studies in the distribution of elephantiasis have contributed greatly to this prejudice, for in some parts of our empire it seems cautioned, to use a familiar phrase, every one has it, either latent or manifest. There is no doubt that the existence of this disease in the middle ages contributed much to that exclusiveness in alliances which afterwards became a subject of derision and rebuke. Equality seems not so much a law of nature as an artifice of civilisation; a man is said to belong to the age in which he lives—so he does in respect to its reactions; the influence of a social medium is not to be denied; but in a material or natural sense he belongs much more to his line of progenitors as to structure of body and mind, and to his line of descent in his obligations. A state of society where the contrary opinion

is held is quite possible; nay, in political convulsions of a neighbouring state, it has been held criminal to have had "ancestors;" but the truths of heredity will vindicate themselves.

The amount of instruction arising from the study of heredity cannot fail to be great, whether we regard it in a social or physiological view. A great extension has been given to this study by modern scientists, who make it so intrinsic a part of the whole great scheme of animate existence, that it would be impossible to exclude it from those questions which concern the origin and evolution of our race, and, indeed, of all organic being. So, with an improved physiology, we are likely to have a reformed psychology, in which synthesis is more relied on than analysis, and with embryology a doctrine of psychogeny in which the truths of heredity are largely involved.

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Dr. G. W. CHILD said that he had given a good deal of attention to the subject, and he thought that hereditary influence had been considerably underrated, as a factor in pathological phenomena. He thought that the author had dwelt rather too exclusively on the historical and biographical side of the question, and had not sufficiently considered the physiological bearing of the subject. If we look at the physiology of the brain and nervous system, we get quite another view of the question. The infant's imperfectly developed brain is gradually developed and moulded under the influence of sensations received through the nervous system, and it had its origin in a resultant of the mental peculiarities of the brains of its parents, and these had of course been developed under similar influences. By training during the development of an infant mind, you can make it a good or a bad specimen within the limits of its capacity, but you cannot make it anything outside these limits. A man's mind is the result of education and training working on the original constitution, and this original constitution plays a far more important part than the forces brought to bear upon it. He then gave instances of a lady who had a deformity in her hand which was said to be the result of early training, and her daughter, but none of her sons, exhibited the same peculiarity. Of a gentleman who had one eye seriously damaged, but not destroyed, and all his children had the corresponding eye smaller than the other. Of the entirely diverse impulses of different individuals in sudden emergencies, &c. He thought that there was some difficulty in reconciling the germ theory of disease with the statement made by the author that all diseases are hereditary, even the contagious; for if they are controlled by hereditary influences, what part does the germ theory play in their production? We have instances of certain families becoming victims to the same diseases at about the same age in different generations, and such instances appear

difficult to reconcile with the germ theory in some of its more recent developments.

Mr. FRANCIS GALTON, F.R.S., said that he felt a difficulty in speaking on a subject that covered so wide a field, and on which so much more had been written than he had heard alluded to. He did not as yet find that sufficiently definite points had been raised to admit of being thoroughly discussed. He thought that the most important information on heredity that could be given at the present time would be such as should show the degree, if any, in which faculties acquired by the parent were inherited by the offspring. Much loose statement on the subject was afloat, while the fact seemed too much overlooked of the independence of the life of the ovum from that of the parent. It should not be forgotten that the ova of the parent had apparently a separate existence when that parent herself was a fœtus of a very few weeks old, and that they and the children derived from them had never the slightest nerve or vascular connection with the mother, but were nourished wholly by imbibition. It was difficult to see how, under these circumstances, any complex acquired habits could be transmitted hereditarily. The author of the paper had made many remarks upon one of his (Mr. Galton's) earlier writings, and considered that he had not accorded sufficient weight to reversion. Mr. Galton thought that the author was not aware of some of his more recent investigations on the subject of reversion which were described in 1877 under the title of "Typical Laws of Heredity," at a Friday Evening Lecture, given at the Royal Institution, and published in their Transactions. He there showed that the statistical similarity of successive generations, and the peculiar distribution of qualities among them so far as they conformed to the exponential law of deviation (as shown to be the fact in certain cases, especially in height, by Quételet) could not exist in the face of the tendency of faculties to deviate from the parental standard, unless reversion followed a certain definite and very simple law. He further tested this view experimentally on the sizes of seeds of plants, by growing on a large scale successive generations of sweet peas of carefully measured sizes, and he found, as a matter of fact, that in that case reversion did follow the law required by theory, which was simply this, that the greater the parental deviation from the average of the race, the greater the tendency of the offspring to revert towards that average. He could not follow the author in the very complex questions of family and race, each of which required a very thorough statement, and was open to much discussion.

Mr. W. WHITE, F.S.A., said that in the natural development of trees, seeds will never produce exactly the same fruit as the tree from which they are obtained; but if you graft a portion of the tree on to another stock, you may get the same fruit as the original, but with this peculiarity, that the tree apparently assumes the age and characteristics of the tree from which the graft was taken, rather than of the stock upon which it is grafted. Its exhaustion and decay take place contemporaneously with the original stock. He

thought that this phenomenon might have some analogy to the difference between the hereditary tendency of accidental or local blemishes and peculiarities, and the hereditary tendency of disease and constitution.

The Rev. E. WYATT EDGELL admitted that it was a difficult question how far the disposition was due to hereditary descent, and how far to the development effected by education and outward circumstances. But as for Lock's theory that the infant mind is like a blank sheet of paper, and its character formed entirely by education, he considered it to be quite inadmissible. He had had to do with education, and had come to the conclusion that its influence was *very much over estimated*. Two boys go to the same school, are trained by the same masters, go through the same course, not only of reading, but of recreation also, and yet they leave the school with dispositions as different as they entered it. For an illustration of this, he mentioned the case of Lord Byron and Sir Robert Peel, who were both educated at the same time at Harrow.

He considered that there was little doubt as to congenital peculiarities showing themselves in subsequent generations, but as to habits acquired by education, he believed that if they descended at all it was only in a very limited degree indeed.

Mr. WILLIAM SEDGWICK, M.R.C.S., referred to the great difficulty that there was in tracing hereditary diseases, as two or more diseases sometimes became associated together in succeeding generations. Then there were certain disturbing conditions to be taken into account, such as climate, which no doubt had a very material influence on the hereditary tendency of certain peculiarities and disease. Those peculiar individuals, who were liable to bleed to death from the slightest cut or wound, were confined almost entirely to certain latitudes. As an instance of a long transmitted peculiarity in muscular power, he said that he knew of the case of a French gentleman who had an unusual development of the muscles of the scalp so that he could throw a book from his scalp without moving his head. This peculiarity was exhibited by his father, uncle, grandfather, and all of his three children; and also by a cousin in the seventh degree, who resided in another part of France. The division of this family into two branches had occurred eight generations back.

THE CHAIRMAN (Dr. Alfred Carpenter) thought that there should be a very wide distinction made between the hereditary tendencies of the body in health and those which arise in disease. The one has reference to natural conditions connected with the first formation of man, the other has been acquired by degradation of form. That a concrete brain at its first formation in the Adamite contained a capacity to produce every human faculty in perfection, but that in future developments one nerve cell may get starved by the growth and crowding upon it of others which have become more prominent; and as a consequence some faculties have greater manifestation of existence

than others, which are simply non-developed: but the primordial atom upon which the faculty depends is still there if it could be brought into play and escape from the overshadowing influence of its neighbour. If we go back for seven generations we have 128 individuals who may each have had an effect on our present being, how impossible then it must be to trace each attribute of an individual to his immediate ancestors, for each of us may have been influenced by more than 100 persons, some of whom existed 200 years ago. So far, then, for natural attributes, as well as healthy tendencies, which have been dwarfed by means which have simply led to want of development. It has been stated that certain families are more susceptible to certain diseases than others, and certain alterations of form which are unnatural, continue to recur; but this is not difficult to understand if we look to analogy. A gardener can, by various means of culture and treatment, make plants exhibit certain alterations and peculiarities in the specimens under his immediate care. These are departures from the ordinary course of nature, which are set up by cultivation: they are caused by unnatural means, and if the plants are left to nature they revert to their original stock in the course of time. He thought that health, and all healthy faculties, were the natural portion of humanity, and that diseases and perverted functions were acquired by improper cultivation, but would be lost again if man was to follow the right course. He thought that there were hybrids in diseases just as there are hybrids in plants; these peculiarities would probably not be perpetuated, but would disappear in the succeeding generations, and the series would ultimately revert to their original form and original perfection. This told him that there were wide distinctions to be drawn between natural or healthy tendencies and those which were unnatural or unhealthy, which were acquired by cultivation, and which were in reality diseases. These would not continue if the conditions which set them up were altered and the individual became more natural. If we refer to history we find instances of brains of tremendous power occasionally cropping up (such as those of the men who wrote the books of Euclid or built the gigantic cities of the Babylonish Empire). They must have been far in advance in development of the ordinary brains of the present day; no men of the present day could do what Euclid did, or could now build such a city as Nineveh with the mechanical means then at the command of the architect. He thought that these minds had left their mark in the races of men upon the earth if they had left any progeny behind them, and that similar minds would now and then come to the surface. He referred to the Jews as a remarkable instance of heredity coming to the surface everywhere with traces of their original power, amid all the difficulties in which they live—retaining their distinctive peculiarities and superiority in the arts, in science, in commerce, and in music. He thought that the English nation contained crosses of all the best of those hereditary powers in their later stages of development as well unfortunately as some of the worst; in her nationality, he hoped that we should ever maintain our proud pre-eminence in what is good, and that the evil tendencies



produced by unnatural conditions would die out like the hybrids of the gardener, and only the healthy and natural attributes remain. Education would develop those which are inherent in man, if that education is directed aright, but it would bring out morbid tastes and morbid growths if they were directed on wrong principles and on wrong lines. The one direction is natural, and belongs to the divine power of our nature, the other is of mundane and of unhealthy production, and must be opposed by healthy actions and developments, so that it may be rooted out, and instead of the natural attributes of mind being starved, they will then overshadow the evils which otherwise would master them in their turn, and lead to national decay.

A vote of thanks to Mr. Gaskoin for his interesting paper was proposed by Mr. W. Horton Ellis.

DR. BARTLETT, after seconding the vote of thanks, said that he thought there was some difficulty in accepting the theory of any peculiarities being hereditary to an unlimited extent; for instance, we had had many ancestors, and would probably have many descendants. Now, if all the peculiarities of each of our ancestors are to be carried down to all our descendants along with each one's peculiarities, what a mass of combinations we entail on future generations. He thought that we ought to deal with the question of how much of any faculty or power can be taken up in one individual without further transmission, and thus loose, to a certain extent, its peculiar hereditary tendency. The author did not appear to have dealt with the question of how far muscle had been transmitted. Another point that he thought very interesting was the question of what effect food had upon heredity? We know that climate has an influence, and he thought it also probable that food materially affects the question. Although no doubt health is hereditary to a certain extent, he thought we had not sufficient data to form any definite opinion of the range of this hereditary tendency. He was convinced that the essay of which the author had just given them the abstract would form the first chapter, or rather the first volume, of a History of Heredity—which, as regards the study of man, is the History of History.

Mr. Gaskoin briefly replied to some of the points raised in the discussion. The proceedings then terminated.

## AN OBSTRUCTION BY THE LAW TO SEWAGE DISPOSAL,

BY HENRY C. STEPHENS, F.C.S.

*Read April 19th, 1882.*

### ABSTRACT.

Under the Public Health Act of 1875, owners and occupiers derive rights which prevent Local Sanitary Authorities from carrying out systems of Drainage, involving the separation of the rain-fall and surface-water from the Sewage. The Section of the Act bearing upon this question, will be discussed in this paper, but before doing so, the Author deems it convenient to bring forward some of the advantages which can be urged in favor of the separate system. Among the advantages claimed for it, it is asserted that—

I.—From their nature, the modes of disposal necessary for rain-fall and for sewage are opposed, and as the requirements for their drainage differ greatly, it can be shewn that in the majority of cases a system of employing carriers for excreta, and house waste of towns, apart from the carriers for surface drainage and storm water, is less costly than the system of employing the same carriers for both sewage and rain-fall.

II.—By completely separating rain-fall from sewage, drains of small size only would be necessary for the sewage, such drains from the material employed, and from their construction, can be rendered nearly or quite impermeable; thus greatly diminishing or entirely obviating one important cause of soil and water pollution.

III.—The pipes of relatively small size required for sewage only, can be effectually flushed by moderate quantities of water, and mechanical flushing at will of a frequency adequate to the demands of the season, and of the existing health conditions, must be more convenient and secure for sanitary purposes than the flushing which storm and surface-water (from the nature of its flow in sewers, and from its being dependent on the irregularities of rain-fall) can supply.

IV.—The carriers for sewage and rain-fall combined are

confessedly incompetent to carry off the water of a heavy storm. Overflows into the sea, or, in the case of inland towns and districts, into water courses or rivers have to be provided. The *overflows so provided to relieve the sewers* at times of sudden storm, can only be partially depended upon to prevent the flooding of dwellings by the backing up of Sewage in the sewers. At times of storm, the effects of the scour of the sewers ordinarily renders their contents at out-flow very foul.

V.—The mixing of rain-fall with sewage renders it necessary to provide a STORM OVERFLOW also at sewage disposal works, and the existence of such STORM OVERFLOW destroys the guarantee for constant and systematic treatment of sewage which might otherwise subsist, because, by the storm overflow, sewage can be allowed to escape without treatment, not only at times of storms, but whenever at the disposal works or irrigation farm it is convenient to discontinue the treatment of sewage. Thus generally it may be asserted that the existence of STORM OVERFLOWS in systems of sewerage, and at disposal and irrigation farms, have gone far to render much of the so-called sewage purification a costly pretence.

VI.—Modes of Sewage disposal, whether by chemical treatment or by land irrigation, necessitate manipulation of the Sewage by pumping, by storage in tanks, and in other ways. The cost of construction and maintenance of works and plant is much increased by the great scale upon which it is necessary to provide for the reception of the mixture of rain-fall and Sewage.

The author has found reason for believing that much of the difference in experience as to the results of irrigation and the retention of the manurial constituents of sewage by soil, is really attributable to an insufficient understanding of what may be described as the "conditions of retention," under which the soil absorbs manurial constituents when dissolved in water; it appears that

VII.—Soil possesses, with regard to its manurial constituents, a capacity of abstraction from their solution in water greater in proportion as the solution is more concentrated. Strong Sewage will yield to soil by percolation a very large proportion of the manurial constituents contained in it, while weak Sewage will yield only a very small proportion of its manurial constituents; the practical result, probably being, that strong Sewage can be easily and effectually purified by land irrigation, while, upon weak Sewage, land irrigation exerts little power of purification.

VIII.—If rain-fall were rigorously excluded from Sewage, its utilisation as a manure for the purposes of normal agriculture would become practicable, because, as its volume would be constant, and would not exceed the water supply in quantity,

such undiluted Sewage could be carried to areas of suitable land sufficient for the complete utilisation of its manurial value. Such Sewage utilisation is greatly to be preferred to the imperfect assimilation by plants of rapid growth, grown mainly with the object of destroying Sewage matter irrespective of demand and market value.

IX.—It is claimed that:—

1. The separate system is of greater economy in drainage, and allows greater impermeability in the construction of sewers.
2. That it admits of greater efficiency in flushing.
3. That it prevents flooding by sewage.
4. That it affords better prospect of a remunerative return from works of utilization.
5. That it allows a far greater absolute purification.
6. That it greatly diminishes the possible extent of water contamination.

But these advantages are at present practically denied to the community owing to drainage rights acquired by owners and occupiers in their relation with the Local and Sanitary Authorities of their districts under the 15th and 21st Clauses of the Public Health Act. By the 15th Section Local Sanitary Authorities must cause to be made, and must keep in repair such sewers as may be necessary for effectually draining their district, and by the 21st Section "the owner or occupier of any premises within the district of a local authority, is entitled to cause his drains to enter into the sewers of that authority, on condition of his giving such notice as may be required by that authority of his intention so to do, and of complying with the regulations of that authority in respect of the mode in which the communications between such drains and sewers are to be made, and subject to the control of any person who may be appointed by that authority to superintend the making of such communication".

By the definitions of the Act, "premises" includes messuages, buildings, lands, easements, and hereditaments of any tenure; and "drain" means "any drain of, and used for the drainage of one building only, or premises within the same curtilage and made merely for the purpose of communicating therefrom with a cesspool or other like receptacle for drainage, or with a sewer into which the drainage of two or more buildings or premises occupied by different persons is conveyed." Thus the power of local authorities only extends to the regulation of *modes of communication* between the drains of owners and occupiers and the public sewers.

X.—Though under the 24th section of the Public Health

Act it is competent for Local Authorities, at the expense of the Ratepayers, to alter or construct anew the drainage of houses if such drainage is not adapted to the general sewage system of the district, there is, notwithstanding, no power in the Public Health Act or elsewhere enabling Local Authorities to decline to approve plans, by which excreta and house waste with the rain-fall are shewn to be received into carriers common to all, or by which the house drainage is shewn to be connected with any surface water drain or drains belonging to the same premises. "Premises" are not brought under the powers of this Section, though the drains from "Premises" contribute more rain-water to the Sewers than the drains from Houses.

XI.—Consequently the sanitary measure of greatest urgency and importance for the health of the community—the conversion of the waste products of life into matter innocuous to health—is rendered costly and almost impracticable from rights arising under the Public Health Act of 1875, such rights by their operation creating "An Obstruction by the Law to Sewage Disposal."

Mr. E. C. ROBINS, F.S.A., agreed with the author that there were a great many objections to the combined system for the disposal of sewage. Before the Fire of London there was no combined system, but from after that date this system had been adopted and perfected, and laws formed for carrying out its requirements, on the supposition that it was the best method for disposing of sewage. He thought that Mr. Stephens had proved conclusively the desirability of the separate system, but had not fully shown how to dispose of the storm water, which is a great plague in either system, and wherever a separate system was adopted it would be necessary to provide for both surface and subsoil drainage.

Mr. G. J. SYMONS, F.R.S., with regard to the difficulty which Mr. Robins had mentioned as to the disposal of the storm water in the separate system, said that there would be numerous outlets and water courses into which drains carrying simply rain and storm water, could be diverted, but the sewage would all have to be taken to one place where it could be properly disposed of. The storm water was, he thought, one of the greatest difficulties in any scheme for the disposal of sewage where the combined system was adopted; for where pumping was necessary the pumping power had to be far beyond the ordinary requirements to deal at all effectively with the water carried down the sewers during a heavy rain. In any precipitation or irrigation scheme it also upset calculations as to the amount of sewage to be disposed of.

Mr. ROGERS FIELD, M.I.C.E., thought that Mr. Stephens' paper was very valuable, as it called attention to a matter that was not generally understood. He must state at the outset that he could not agree with those who said that the separate system ought to be adopted everywhere. This sweeping assertion, which was known to be wrong by engineers, had brought the separate system into discredit. In some cases the combined system was no doubt the best; in London, for instance, it would probably be impossible to adopt the separate system. In smaller towns, however, it often happened that by adopting the separate system you could dispose of the sewage at a moderate cost, whereas if you adopted the combined system the quantity of sewage would be increased to such an extent that it would be impossible to deal with it except at an outlay quite out of proportion to the means of the district. The separate system did not necessarily require two separate and distinct systems of drains, as the storm water could be carried off by surface flow, and you would find a dozen outlets for pure water where you would only have one for sewage. The fact that the Public Health Act, did not give power to the sanitary authority to compel householders to separate the rain water from the sewage, and to turn them into different drains was a serious obstacle to the adoption of the separate system. If the only surface water which could be excluded from the sewers was that from the public roads, and if the rainfall on the roofs, yards, and gardens had to be admitted to the sewers comparatively little advantage was gained from the separation. He had acted as consulting engineer to a town that wanted to insert a clause in their bye-laws compelling the householder to carry their roof and yard water under the footway into the gullies, and to turn only the house drainage into the sewers; but on applying to the Local Government Board they were informed that they could not insert it as a compulsory clause, but could only recommend it. In comparing the separate and combined systems it should be borne in mind that the combined system, as carried out in this country, was generally only a compromise. In a perfect combined system the sewers ought to be large enough to carry off the heaviest rainfall, but in hardly any place was this the case, certainly not in London, where the sewers were calculated to carry off only a  $\frac{1}{4}$  of an inch of rainfall in 24 hours, or about  $\frac{1}{100}$  inch per hour, whereas a fall of as much as 3 inches in an hour had been known to take place, and 1 inch in an hour was certain to occur sooner or later. In America it was usual to provide for a fall of 1 inch in an hour in calculating the size of sewers for the combined systems.

Mr. DAVID CHADWICK, F.S.S., did not fully agree with the views advanced by Mr. Stephens, and thought that the speakers had not adduced many arguments of importance in favour of the separate system. The idea of small sewers had been brought forward by Mr. Edwin Chadwick more than twenty years ago. What was wanted to prove the utility of the separate system, as advocated by Mr. Stephens, was a practical test where the system had been tried. The City of New York was not a fair example, as it was practically an Island.

He thought that sewage ought not to be considered as an article of value, but as a thing to be got rid of,—worth something in the right place, but it was nearly always in the wrong place. In his opinion, to attach any value to sewage was a delusion, and he instanced the results obtained at Leicester and other places. It would be very difficult to carry out Mr. Stephens' suggestions, as nearly all old towns had now adopted some system which could not be altered without a large amount of trouble and expense. Although not agreeing in the present practicability of carrying out on a large scale Mr. Stephens' suggestions, they were no doubt valuable as pointing to a standard of Sanitary completeness and excellence, to which the efforts of Municipal Authorities might with great advantage be directed.

Mr. R. B. GRANTHAM, M.I.C.E., thought that the Institute was very much indebted to Mr. Stephens for bringing the subject forward. The question of the combined or separate system for sewage had been discussed at the Institute of Civil Engineers, and the general opinion of the speakers was that the separate system was the most advantageous. In some cases with which he had had to deal, he had found no difficulty in separating to a great extent the rainfall and the sewage for precipitation and gravitation schemes. In any arrangement for sewage disposal, it is almost impossible to provide for the storm water when it is combined with the sewage, but he did not think that it mattered much if the rain water from roofs and paved yards was admitted into the sewers.

W. C. FOOKS, jun., thought it was hardly fair for Mr. Chadwick to say that sewage was utterly valueless, and all schemes for separating the storm water were quite impracticable, and then to call on Mr. Stephens to show where the plan he suggested had been successfully carried out. Some towns have been so convinced of the advantages of the separate system, that they have taken the trouble to obtain private acts to overcome the difficulties placed in the way by the sections of the Public Health Act. Before the passing of the Public Health Act, sanitary authorities had no power to compel the separation of rain water from sewage, and after the passing of the act they were practically in the same position. He thought that the question was one in which the householders were largely concerned, and he wanted to hear what would be the probable expense to householders of adopting the separate system, as (assuming that for the purposes of drainage the separate system was preferable) that was a matter which would, probably, have quite as much weight as the desirability of the scheme considered with reference to the value of the sewage.

Mr. J. WALLACE PEGGS said that there could be no doubt that from an engineering point of view, the separate system of sewerage would be more economical than the combined system: especially was this the case where old existing sewers could be utilised for the storm

waters. In cases where all the sewage had to be lifted by pumping power, the separate system was shown to great advantage, as the engine-power required was reduced to a known quantity, and the engines could be economically designed and worked. The success of the sewerage scheme of Memphis had shewn what may be accomplished on a large scale with the separate system. The advantage of the separate system of sewers was very great when you came to study the question of the ventilation of sewers. In the combined system you have great variation in the flow, and consequently surfaces stained with sewage are exposed at times, and large quantities of air would be required to travel through the sewers to maintain anything like a proper condition. With the separate system the ventilation becomes much more simple. The question of adapting the sewers of Paris to receive the excreta as well as the storm and slop waters will, no doubt, come prominently forward at an early date. The evil effects of the system of excreta disposal by the *fosse mobile* and the *fosse fixe*, are now fully recognised; and the question to decide will be whether the excreta shall go direct into the large sewers, which have flat gradients, or whether it is not possible to arrange a system of cast-iron mains inside the large sewers or tunnels, with good falls, to convey the sewage proper separate from the storm waters.

Mr. W. RUSS, M.I.C.E., stated that he had carried out a number of sewerage works on a modification of the separate system, and the nearer that they approached to the true separate system the greater was the success. In the town of Ware, under his advice, the separate system was carried out in its entirety. The sewage was dealt with without difficulty, and the value of the farm on which it was employed in irrigation considerably increased. Where the separate system was adopted it was found that the sewage was almost exactly equal to the water supply, which fact made it very easy to calculate the amount to be disposed of in any sewage works. When required for sewage purposes the price of land was always enormously increased, which made it very desirable that the amount of sewage to be disposed of by irrigation or other methods requiring land, should be decreased as much as possible.

Mr. STEPHENS in reply, said he was well satisfied with the result of the discussion, and he hoped it would not be long before practical steps were commenced by the Institute to procure a modification of the existing law. Mr. FIELD had said that the separate system could not be adopted everywhere, and that might be the case; but it would be of great service to have the conditions which would prevent the application of the separate system clearly set forth. Engineers too often consider the matter almost wholly with the object of getting rid of the nuisance so far as a particular district is concerned, whereas the removal of sewage should not be considered apart from its re-conversion into material, if possible, possessing value, but at any rate harmless so far as health is concerned. It was impossible to over-estimate the importance of the fact to which he had particularly called

attention that evening, for if, as he asserted, land possessed but slight capacity for the purification of weak sewage, it became clear that by compelling an unwieldy dilution of the sewage, the Public Health Act itself, in an enormous degree, prevented the utilization and purification of sewage.

Prof. W. H. CORFIELD, M.D., in proposing a vote of thanks to the author, said that he felt sure they would all agree that Mr. Stephens had proved the desirability of an amendment being made in the clauses of the Public Health Act, to which he had called attention in his paper. He (Prof. Corfield) thought that the question of the adaptability of the separate system was very simple; in towns where the combined system had been in use, the old sewers could be used for the rain and storm water, and new pipe sewers laid for the sewage, in new towns or districts where a regular system of sewerage was adopted for the first time, there would of course, be no difficulty, Mr. Stephens had, he thought proved, that the separate system was theoretically the best, and we ought therefore, to aim at adopting it wherever possible. The clauses under discussion, had no doubt, been copied from one act to another, like many clauses in other Acts of Parliament, and therefore, did not represent such an advanced state of knowledge as the rest of the act. He might mention that there was another way over the difficulty than by going to the expense of a local act for the purpose, viz., by a sort of "back-stairs" legislation, as where a town inserts in the middle, or at the end of a local act, a special clause for a purpose quite different from the rest of the act; for instance, a town in applying for a local gas or water act, inserts a clause making the registration of cases of infectious diseases, compulsory; nobody interested in infectious diseases is likely to go carefully into a gas or water act, so the clause passes without being objected to. Similarly a town might insert a clause in a highway act, or any other act, giving it compulsory powers to adopt the separate system of sewerage.

The vote of thanks was seconded by Mr. Rogers Field, and after a few remarks by the chairman the proceedings terminated.

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