if not co-existent, at anyrate in various combinations, expressing themselves in the detail of slums, want of drainage, want of conveniences, impure or imperfectly distributed water, overcrowding, personal and household dirt, &c., &c. The clue to sanitary work is to follow infectious disease into the houses of its victims, whether they live in the Wynd or the Crescent. It brings you not merely to the place where disinfection is wanted and isolation may be expedient, but to the place where the technical "nuisance" may be looked for. In the Crescent, infectious disease sharpens the senses and quickens the critical faculty of the householder; in the Wynd, it enables the sanitary inspector to elicit complaints of nuisance hitherto endured without murmur, and gives him the chance of discovering others undreamt of. In neither case does it matter whether the nuisance has anything or nothing to do with the particular disease. Etiology may be left to others to discuss. Sewer gas does no good, whether it causes diphtheria or not. The business of the medical officer is to get rid of it first, and afterwards to find out if he can what particular part it plays in the depreciation of health.

CHAPTER IV.

THE HISTORY OF HOSPITAL ACCOMMODATION FOR INFECTIOUS DISEASES IN GLASGOW.

(*a*) GENERAL. (*b*) THE POLICY AND PRACTICE OF GLASGOW IN THE MANAGEMENT OF EPIDEMIC DISEASES.

THE pages of "Evolution," in which the history of hospital provision for the treatment of infectious diseases is sketched, may form a prelude to the more detailed discussion of the subject, as presented to the Epidemiological Society of London in 1881.[1]

Practice, however, crystallises into policy only through a long period of experimental working along lines more or less tentative in character, and so we find in the Kennedy Street Hospital Reports recurring references to the functions of a fever hospital in relation primarily to the treatment of the infectious sick, but also, as affecting the spread of the particular disease under treatment. "The *prevention* of disease is the function of the Local Authority. Its *treatment* may devolve on various public bodies, according to accident or special circumstances. . . . It is quite possible *to treat* 'contagious' diseases in the most perfect way so far as the sick individual is concerned, and yet to fall short of perfect precautionary measures for the prevention of its spread."

The question was raised in an acute form at this time by a proposal of the Directors of the Royal Infirmary to the Board of Police to erect a Convalescent Home for Small-pox patients. The duty of the Infirmary to the patient ended when he could be discharged without injury to himself; whether he might still be capable of spreading disease to others was a question which did not primarily concern them as an institution maintained by public subscription for the specific purpose of treating disease only. The solution was ultimately to be found in

[1] "The Policy and Practice of Glasgow in the Management of Epidemic Disease." *Trans. of the Epidemiological Society*, New Series, vol. i., Session 1881-82.

unifying all the interests concerned with the repression of infectious disease by the Local Authority making provision for the care of the infectious sick during the entire period of his infectivity.—(ED.)

A CENTURY OF HOSPITAL HISTORY.[1]

Hospitals not only bear an important part in the prevention of infectious disease, but indirectly also in the education of local authorities. They give concrete expression to the costliness of slums and nuisances. I propose, therefore, to expand into more detail this department of the sanitary history of Glasgow.

The Royal Infirmary, opened in December, 1794, became at once the centre of all hospital treatment of Fever in Glasgow. It contained 150 beds, and even in the first five years of its existence 14 per cent. of the patients treated suffered from "Fever." In 1816 the beds were increased to 230, and the addition is reported in that year to have been "found of incalculable use as a receptacle for persons with low Fever, the multitudes of whom, flocking from the closes, and ill-aired alleys and lanes of the city, have of late exceeded all precedent." In 1818 no less than 60 per cent. of all the patients admitted had "Fever." A temporary Hospital with 200 beds was erected by public subscription at Spring Gardens, and kept open from March, 1818, to July, 1819, during which time 1929 patients were treated. This hospital was again opened for five months in 1827 at the expense of the Royal Infirmary. The directors resolved to proceed with the erection of a separate permanent "Fever House," because "in this large city Typhus Fever must be at all times liable to occur, and in the narrow and crowded Vennals and Wynds it must be frequently apt to break out with virulence, so as to endanger the whole town." Next year they were compelled to erect within the Infirmary grounds "a temporary wooden booth," which contained about 80 beds. In 1829 the Fever-house was half finished and 100 beds provided. In 1832 it was completed with 220 beds. In 1831 a "Board of Health" had been formed by the Magistrates, and a cotton mill in King Street, Mile-end, secured, and put under the managers as a Fever Hospital, with 135 beds. Next year they report that, after being supported for three months by the Board of Health, its funds were exhausted, and the managers had kept it open at their own cost. In 1837 the permanent Fever-house was overflowing, and the managers opened a temporary hospital, with 60 beds, in Albion Street, which was in use from March of that year until April of the following. They also

[1] From "The Evolution of the Function of Public Health Administration, etc."

bought a site to the E. of St. Andrew's Square, near the Green, but did not require to use it. In 1846 the Fever was rising. The Fever-house was full. In January, 1847, they arranged to get the use of the Lock-Hospital in Rottenrow, just finished. In a month the 70 beds were full, and patients were again being turned away. The managers resolved to build on the site acquired in 1837, but the neighbouring proprietors threatened the strongest opposition. They sold the ground and purchased a large new building in Dalmarnock Road. At once a proprietor applied for an interdict which they resolved to oppose, but meanwhile the Fever could not be interdicted, and, at their wits' end, the managers proceeded once more to erect temporary wooden sheds for 140 patients in their own grounds. These were opened on 24th June. In two days 80 cases were admitted, and in a few days more the sheds were full. By the Poor Law Act of 1854 important auxiliaries in dealing with popular sickness had been created. Hitherto the Parochial Boards of Glasgow had merely sent their patients to the Infirmary at £1 per head, but the City Parish, finding the resources of the Infirmary exhausted, resolved to secure the old Town's Hospital in Clyde Street which had been for some time out of use. It was opened on 7th July, when between 70 and 80 patients were admitted in one day, and so day by day until the 634 beds from time to time provided were full. On 5th August wooden sheds erected by the Barony Parochial Board in Anderston were opened, and their 250 beds likewise speedily filled. In this year the total beds provided in Glasgow was 1254, and the number of patients treated was 11,425, the maximum on record in both cases. Of the District Surgeons and hospital medical staff, 18 took Fever and 8 died; of the inspectors, matrons, nurses, and servants, 99 took Fever and 22 died. In 1848 the parishes closed their hospitals and resumed sending their cases to the Infirmary, but now at 15s. each!! The managers sold their ground and building in Bridgeton, their right to use which they had defended before the Sheriff-Substitute, the Sheriff-Principal, and the Court of Session, but only established when success was of no value except as a precedent. In the winter of 1851, the wooden sheds of 1847 were reopened, and again in 1852, notwithstanding which cases were refused and the parishes had to resume hospital treatment. Then Fever declined and continued at a moderate level until 1862. In 1863 the managers report that of 1852 cases of fever and small-pox treated half had been sent in by the Glasgow Parochial Boards; that they had been unable to accommodate all applicants, and that they raised their charge per case to £2. The newly-appointed Medical Officer of Health found this difficulty awaiting him and met it by stimu-

lating the Parochial Boards to provide accommodation for paupers, while the Police Board, through the "Magistrates' Committee," gave to others "lines" on the Infirmary. This resource soon failed. Numerous conferences were held between the Parishes, the Managers of the Infirmary, and the Authorities, in which the managers referred the latter to their powers under the 1862 Act, and the Police Board at last "arranged to provide temporary accommodation for such cases as do not fall within the province of the Parochial Boards to deal with, and which it is impossible for the Infirmary to take in."[1] An effort was made to get some existing building, which ended in the fiasco of the old mill, Nassau Court, Anderston, already recorded. Then "Parliamentary Road Hospital"[2] was projected and opened in April, 1865—*The first Municipal Fever Hospital.* Still it was, in accordance with the Act of 1862, a mere temporary provision made to meet an epidemic emergency. The legal difficulties with which its existence was threatened were overcome by the renewal of the emergency powers every six months until, with the passing of the 1866 Act, its tenure of life was made secure, and the maintenance of fever hospitals by Glasgow became a necessity.

At the date when the new hospital brought its 136 beds to the help of the fever-stricken community, each of the Parishes had fever-wards in its Poorhouse, viz.—City, 100 beds; Barony 120; and Govan 54, so that the total bed accommodation, including the Infirmary, was 610. From this time onwards a gradual absorption by the local authority of the treatment of infectious diseases in hospital took place. The Parishes in succession closed their fever-wards, the Infirmary cut down its accommodation, still giving a friendly arm to the local authority until the waves of epidemic had sunk quiet. In 1865, 1866 and 1869, the Police Board subsidized "the Royal." In 1870, "Parliamentary Road" was increased to 250 beds, and the same number was provided at Belvidere, but in hot haste under epidemic pressure and therefore much more temporary in material and workmanship than "Parliamentary Road," which is as useful to-day as it was 30 years ago. Hence, during the 17 years, 1870-1887, there was a constant process of substitution and extension going on at Belvidere, resulting in a permanent Fever Hospital of 390 beds. In 1878 a permanent Small-pox Hospital had been completed at Belvidere, and "Parliamentary Road" which had been reserved for Small-pox for some years was reduced to 120 beds, closed and held as an overflow for Scarlet Fever. The demands of that disease became so great

[1] Royal Infirmary Report for 1864.

[2] Also known as "Kennedy Street" Fever Hospital.

in 1893 that 80 beds were added to it and it was resolved to erect a hospital in the North-west of the city with 440 beds, on the completion of which the site of Parliamentary Road will be abandoned, leaving a net gain of 240 beds and increasing the total accommodation of the city to 980 beds.

DEVELOPMENT OF MUNICIPAL POLICY AS TO INFECTIOUS DISEASES.

It appears from this narrative that the local authority took to the hospital treatment of infectious disease in pursuance of no great policy, but as a mere temporary expedient. It was not proposed to treat all cases, but the surplus of the Parochial Boards and the Royal Infirmary and not to provide always for treatment but only so long as there was a surplus. It therefore recognized within the category of infected persons distinctions which conditioned their relation to the local authority —the pauper case, the case which had a "line of admission" to the Infirmary, and the balance who were not paupers and who either could get no line or who could get no value for their line, the Infirmary being full. If an epidemic inspector came across what seemed to him to be a pauper case, the inspector of poor was asked to remove it. He always inquired into the facts. He might dispute the pauperism. If not, still the course was not clear. The patient might be legally a pauper, but only under stress of the fever, and he might refuse to be pauperized. The patient might be actually on the poor-roll and still might refuse to go to hospital because of prejudice against "the house." If the patient had a line for the Infirmary some time had been spent in getting it, so that removal to the Poorhouse or to the Infirmary was always a slower process than removal to the civic hospital. If the patient, not being a pauper and not having a "line" for the Infirmary, seemed able to afford it or was a dependent of some one who could, a charge was made for treatment by the local authority. When the parishes gave up their fever-wards, the inspectors of poor sent their orders for the removal of paupers to the Sanitary Department and paid for their treatment. To obviate delay in dealing with cases apparently paupers which came first to the cognizance of the Sanitary Department, an agreement was made that they should be at once removed and coincidently a claim sent to the parish. When the managers of the Infirmary discovered that Small-pox spread among the patients in the general hospital and applied to the Local Authority to honour all their Small-pox lines, the Local Authority consented only on condition that for patients living within the municipal boundary one pound should be paid, for those living outside, two (1871).

Then the Local Authority discovered that Small-pox prevailed in the neighbourhood of their Small-pox Hospital to a suspicious extent and they declined to receive through the Infirmary persons who were not citizens and who might infect those who were. The managers thereupon (1872) refused to deal in any way with lines given to Small-pox cases and referred everyone to the Sanitary Department. In 1876 they adopted the same course with "Fever" recognising at last that it was impolitic to spend charitable funds upon persons suffering from diseases, the treatment of which was provided for by assessment. Still the Local Authority continued to complicate their otherwise simple function by maintaining a distinction between infection in paupers and infection in other people. The sanitary inspector kept ledger entries against the parishes for treating real or imaginary paupers, and rendered periodic accounts, of which a constantly increasing proportion consisted of the item "To amount of account rendered." Concurrently there flowed on correspondence, conferences, veiled threats of law, proposals of composition, payments for persons already on the pauper roll, as to others repudiation; until at last the absurdity of the whole situation became apparent and the Local Authority on 23rd April, 1881, cut the Gordian knot by resolving "*that all classes of the citizens suffering from infectious disease should be treated in hospital without any charge being made therefor.*" The fact was that in Glasgow no citizen suffering from infectious disease had been treated in a parochial hospital since 1872, or in a general hospital since 1876. What was now done was to municipalize the hospital treatment of infectious disease and so to dissociate it from all social depreciation whether of pauperization or of charity. This really carried with it the whole sanitary service of the city incidental to the control of infectious disease. In the Glasgow Police (Amendment) Act of 1890 (Section 6) the Glasgow Authorities bound themselves to this policy, which was developed from no social theory but from the observation that any condition attached to the isolation in hospital of a citizen, over and above that of being infectious, hindered isolation and therefore impeded prevention, and so with every public service associated with prevention.

The refusal of the Glasgow Authorities to admit cases of infectious disease from outside the city through Infirmary lines into the municipal hospital, and the recognition by the managers as dispensers of charity of their true relations to infectious disease had indirectly such important effects upon the policy of local authorities in the neighbourhood of Glasgow that a few lines must be devoted to this point. The Infirmary of Glasgow has been depicted as the centre of the hospital treatment of infectious disease only so far as the city was concerned, but it

really was so also to the suburban and neighbouring districts. The shutting of the Infirmary against Fever at once brought applications to Glasgow from two quarters (1) from persons living in these districts, (2) from the authorities of these districts. Gradually the true policy of the situation became clear. Private applicants were referred to the local authority within whose jurisdiction they lived. Local Authorities were assisted at a fixed rate so long as the requirements of the city permitted and on their undertaking to set about providing hospitals for themselves as soon as possible. In this way it may be said a salutary process of education was carried on around Glasgow both of constituents as to their rights, and of local authorities as to their duties, the fruits of which were soon manifest in their equipment. Many a rural ratepayer heard for the first time in the Sanitary Office of Glasgow of the duties imposed and the rights conferred by the Public Health (Scotland) Act on their representatives and themselves respectively.

STATISTICS OF THE GLASGOW FEVER HOSPITALS, 1865-94.

The gross number of patients treated in those 30 years was—

	Treated.	Died.
Parliamentary Road,	16,796	1,807
Belvidere (Fever),	56,320	6,195
Do. (Small-pox),	1,179	71
Grand total,	74,295	8,073

The principal diseases from which these patients suffered were—

	Treated.	Died.
Scarlet Fever,	22,982	2,080
Typhus,	11,255	1,417
Enteric Fever,	8,846	1,268
Measles,	8,356	717
Relapsing Fever,	4,901	102
Small-pox,	4,232	620
Whooping-cough,	3,210	618
Erysipelas,	1,447	120
Diphtheria,	617	261
Cholera,	21	13

THE POLICY AND PRACTICE OF GLASGOW IN THE MANAGEMENT OF EPIDEMIC DISEASES, WITH RESULTS.[1]

Differentiation of function is the characteristic feature of the growth and development of communities as it is of the evolution of animal life into higher forms. In the course of time, the various organisations essential to the existence of a community

[1] *Transactions of Epidemiological Society of London.* New Series, vol. i., Session 1881-2.

shape themselves out in response to the increasingly complex conditions of its life; but it is only after many trials and many failures that the various functions necessary to be performed are properly distributed and discharged. The care of the public health in a city is one of the most important of these functions. It concerns every class, in all circumstances. Yet it will be found, especially in old countries, where municipal development has followed internal local impulses through many centuries, that the proper differentiation of this function is more slowly attained than that of any other. The reason seems to be this, that there is something in public health, and the measures required for its conservation, more or less akin to the objects of several of the departmental organisations of a community which come into existence prior to the recognition of the public health as an imperious subject of administration. The tendency, therefore, naturally is to try each of these organisations in succession, as the organ of this new function, or to distribute the function among them, deriving a little service from each as occasion presents, or as their primary ends permit, in the hope that thus the entire area of public health requirements may be covered.

There are thus recognisable in the history of cities distinct stages in the evolution of a policy in public health administration. My object now is to illustrate these stages from the history of Glasgow. It is only with that department of public health administration which relates to the management of epidemic diseases that I propose to deal. But it is notorious that the fiery heart of all the energy ever thrown by cities or nations into sanitary work is the epidemic. At first, this energy is only a spurt put on to pull the boat past threatening annihilation; but, gradually, the steady, quiet swing of daily work makes those spasms of excited exertion unnecessary. Not only is epidemic disease always, and in all places, at the centre of sanitary activities of all kinds, but of all the objects of sanitary administration, the control and repression of epidemic disease depends most for a successful issue upon proper differentiation of function. But there must be no conflict of interests, no diversity of dealing with classes in the community, no division of the community into separate jurisdictions, or distribution of sanitary functions through independent departments, otherwise, failure is the inevitable result. As regards the detail of practice in the management of epidemics—isolation, disinfection, the special items of practice adapted to combat the special conditions which promote individual epidemics—there is a tolerably uniform level of attainment of knowledge everywhere. Nay, more. On these matters, it is startling to note how, in the main, the great movements and operations in the battle against

infectious disease have been understood and intermittently practised in times of supreme danger, for generations, if not centuries. In the practice we have not much to learn, but in the policy a great deal—in the concentration of the function, in the guidance of the practice, so that there may be uniform and united action over the entire area of what ought to be in reality, as in name, the community. All the weapons of the sanitary armament ought to be stored in one armoury, and wielded under one command.

The first glimpses of the dealings of the authorities of Glasgow with epidemics are obtained in the sixteenth century. The population then averaged 5000, and the Magistrates and Town Council administered the comparatively simple affairs of this small community with but little official assistance. From 1350 they had been provided, by private beneficence, with a Leper Hospital, to which patients were regularly sent by the magistrates; but the plague, which invaded the inhabitants at frequent intervals from a very early date, first tested their capacity for coping with epidemics. In anticipation of its appearance in 1574, the Burgh Court drew up a series of ordinances, which were subsequently revised from time to time, and which were marked by considerable intelligence. Their main substance is a rigid system of quarantine, extending both to persons and goods. Wardens of the ports of the city were appointed for that purpose. Other items in the ordinance were more akin to our modern practice. No lodgers were to be received by any one who had not a "licence" to do so from the magistrates. The duty of immediately reporting cases of sickness was imposed upon all householders, under pain of banishment. "Searchers" were appointed to specified districts, whose business it was to go round their district morning and evening to discover any who might be seized with the disease —an anticipation of the house-to-house visitation of the present day, which I have heard claimed as a practice originated during the first invasions of cholera at the beginning of this century. There was, even at this early date, a foreshadowing of the sweeping operations of our Improvement Trust in the last item of the ordinance:—"Ordains the School-house Wynd and all the Vennals to be simpliciter condemned and steekit up." Nothing is said as to medical aid for the infected, but probably this was not neglected, as, three years after, the Burgh records show that a surgeon was retained for the service of the town, at a yearly salary of ten merks. There are numerous subsequent references to this official, which show that the magistrates always had in their service, at an annual salary, or retained by special fee, a practitioner for attendance upon the sick poor. The ordinary wants of the poor were provided for

by the Kirk Sessions, who derived their funds, first from church door collection, and, when these were insufficient, by levying an assessment (1595). The incorporated crafts and the merchants' guild also maintained their poor members, but, down to the eighteenth century, the only provision for medical attendance and medicine for the sick poor seems to have been made by the magistrates from the funds of the Burgh.

In 1646, when the population had almost trebled its numbers, there was another outbreak of the plague, against which more elaborate and advanced measures were adopted by the Town Council. Wooden huts were erected on the Town's Muir at a considerable distance from the town, to which the infected were transported, and where they received medical attendance, and were maintained at the charge of the Burgh funds. A superintendent was appointed, with special instructions to "take notice of the graves." A staff of men was engaged to clean infected houses; they were provided with horses and carts to remove the infected clothing to the muir, there to be "cleanged." A "close cart" was obtained to transport infected filth beyond the bounds; all these measures showing an advance in the understanding of the circumstances which promote the spread of infectious disease, beyond the mere quarantine regulations adopted in former visitations. Rich and poor seem, at the height of the epidemic, to have been isolated and assisted, free of charge, at the cost of the common funds, as, at the end of next year, the bailies determine to exact payment for the services of the "cleangers" from those householders who were in a position to pay. But the point which is of special interest to us at present is this—that all the measures deemed necessary for the suppression of the epidemic were adopted and carried out by the Magistrates and Town Council as representing the community. Councillors were appointed in rotation, whose business it was to visit and inspect the huts on the muir twice or thrice a week, and every Saturday to give in a list of the inmates and of those who had died. Of course, this unity of policy and practice was natural in those simple times, when those fathers of the people personally cared for the infected just as they personally exercised the functions of police, and otherwise governed the citizens very much as a father exercises rule over his own household. Still we have here a principle which we shall see was abandoned in the more complicated circumstances of a larger population, provided with other organisations which were useful and necessary in their own sphere, but which divided the responsibility in reference to epidemic disease—a principle, moreover, which has only in recent times been recognised and again put in practice.

In 1818, Glasgow found itself in the middle of its first great

epidemic of typhus fever. It was now a manufacturing city of about 145,000 inhabitants. Of this population, one-half lived beyond the Burgh boundaries, under separate jurisdictions, so that whatever might be the nature of the measures adopted to cope with the epidemic within the jurisdiction of the Burgh magistrates, the territorial unity of the community was destroyed. Beyond those limits they had no administrative authority, and thus one great element of success in dealing with epidemic disease, which existed in the case of the plague, was now impossible of attainment. In other respects the community was more favourably placed. The Royal Infirmary had been opened in 1774 and enlarged in 1816, so that there was now accessible a general hospital with two hundred and thirty beds. But this was the public hospital, not only of the Burgh and more immediate suburbs, but of villages and country parishes for many miles around. Liberal donations towards its erection had been received from the corporate bodies, parochial authorities, and private individuals over an enormous area. Annual subscriptions were contributed from the same sources, so that the managers of the hospital found themselves besieged by fever-patients from all quarters. Within the city, and provided exclusively for the use of the poor of the city, a building called the Town's Hospital had been erected in 1773 at the joint cost of the magistrates, the kirk sessions, the trades' house, and the merchants' house, the bodies upon whom still rested the care of the poor. An assessment was levied upon property by a joint board representing these bodies. This institution was not, however, for the treatment of the sick, but for the reception of permanent poor and the education of orphaned or deserted children. The casual sick were attended at home by district surgeons, or sent to the Royal Infirmary for treatment, at the cost of the corporate bodies mentioned. The immediate result of this arrangement was that the accommodation was, as the epidemic extended, more and more absorbed by cases of fever. From 1795 to 1814, it appears that 13 per cent. of all patients admitted suffered from fever. This proportion rose in the next three years to 40 per cent., and in 1818, at the height of the epidemic, it actually reached 60 per cent.; and this although the managers were compelled for a time to shut their doors. The same tragic drama was now enacted as was witnessed on the occasion of every subsequent epidemic up to quite recent times. A Fever Committee of citizens was appointed, public subscriptions were collected, and, while the epidemic raged and finally burned out, efforts were made to get sites for fever-hospitals, which were thwarted by the opposition of the neighbourhood. The final outcome of these efforts at this time was thirty-two additional beds, obtained by adapting

a private residence—a result the practical advantages of which are correctly estimated by the saying of a physician of the day: "It is like extinguishing a conflagration with a single bucket."

It is in one sense humiliating, though in another a legitimate cause of pride, to read the medical pamphlet literature of the day, and recognise the intelligent completeness of the advice tendered at this crisis by the profession in Glasgow to the authorities. It is no exaggeration to say that in these pamphlets may be found a perfect exposition both of the policy and practice which alone can be successful in dealing with epidemics. I do not include in the scope of this paper the routine work of sanitation which would prevent epidemics—enforcement of cleanliness within and without the house, suppression of overcrowding, regulation of lodging-houses, demolition of unhealthy tenements, opening up of densely-populated districts; but all that was pressed upon the attention of the public, and nothing of that was done, until it became apparent, fifty years later, that existence was impossible without such measures. As to the procedures immediately bearing upon the suppression of a present epidemic, the advice given was quite as pointed and perfect. Erect fever-hospitals, in anticipation of future necessity, organise a staff of fumigators or disinfectors; lime-wash the houses; disinfect the clothing; burn the infected and supply new bedding; provide ambulances instead of allowing the public sedan-chairs to be employed to transport fever-patients to the Infirmary; fix the proper number of inmates for the smaller houses, and employ the police to enforce the regulations. Yet even in respect of such a simple measure as disinfection of the houses from which cases of fever had been removed to the Infirmary, we read, six years afterwards, in the annual report of that institution: "Measures have at the same time been taken to have the houses the patients left cleansed and fumigated. The Directors have thus, they hope, done all in their power for staying the contagion." That is to say, the so-called public authorities did nothing but send into this charitable institution the fever which was bred in physical conditions which they ought to have removed, there to be treated at a loss to the funds; and not only so, but they permitted the managers still further to deplete these funds by disinfecting the miserable houses from which their patients were removed.

The injustice and inefficiency of this method of using the charitable organisation of the Infirmary as an instrument for the suppression of epidemics, as a matter of public policy, was amply dwelt upon, both in the reports of the Infirmary and in the medical literature of the day. It was unjust, because the magistrates of Glasgow were absorbing the accommodation and

devouring the funds provided by the suburbs and rural districts. The Infirmary was a sort of co-partnery for charitable purposes; and yet a few of the partners were monopolising the whole benefit, or, at any rate, a greatly disproportionate share of it. It was also pointed out that the system of patronage necessarily attached to the method of maintenance by subscription, and the consequent limitation of access to the institution to the channels opened up by subscription, was fatal to the utility of the hospital as an agent in the prevention of fever by isolation. One of the physicians to the Infirmary wrote: "There must be no patronage of individuals; there must be no roundabout application necessary to the magistrates, governors, clergymen, or elders." In short, the only passport must be a certificate of fever from a medical practitioner. That must procure immediate entrance into any fever hospital which is to be of real service to the community. The same gentleman illustrated, with equal force, the absurdity of territorial limitation of the right of admission, when all came from one community. He wrote: "Is fever to be deterred by the barrier of a few Royalty stones, dropped in its passage, though each be regularly numbered, and each have the letter R, as if it were a talismanic character, engraved upon it?" This remark was drawn forth by the resolution of the Glasgow Fever Committee to exclude from their Special Fever Hospital all suburban cases, after having crammed the Infirmary, and so cut off its resources also from the suburbs. Later on, I shall return to the question of policy raised by this proposal. Meanwhile, it is enough to point out that it is impossible to combine two methods of dealing with epidemics—the one by having recourse to the charity of a community, the other by assessment, whether statutory or voluntary, of a section of that community. To attempt this is both to be unjust and inefficient.

We have now obtained a fairly accurate idea of what continued to be the policy and practice of Glasgow in reference to epidemics for well nigh fifty years, the population, meanwhile, increasing *annually* from 2 to 4 per cent. in successive decades, with an influx of Irish, so that their proportion averaged 17 per cent. actually Irish-born. Throughout this period, through all the vicissitudes of trade and popular distress to which a great manufacturing population is exposed, through epidemics of typhus, cholera, relapsing fever, and small-pox, the Royal Infirmary of Glasgow continued to provide hospital accommodation for these diseases, and its managers to perform the unenviable task of extracting the funds necessary for this purpose from the harassed public and the unwilling and stingy authorities, both municipal and parochial, by alternations of coaxing, reasoning, and threatening, as seemed best to suit the

immediate circumstances. In 1829, they built a permanent Fever-house, which was enlarged in 1832, and then contained 220 beds. From time to time they erected temporary wooden booths, or "fever-sheds," on their own grounds, or took charge of temporary district hospitals in the city and suburbs, erected either by themselves or by the magistrates. They had even to oppose, at their own cost (and to appeal, happily with success, to the highest courts of law), an application for interdict, raised by the neighbourhood, against the use of one of these hospitals. As may be anticipated, these spasmodic provisions were never made until disease had outrun the accommodation, which was, therefore, never at any time adequate to meet the emergency. In the five years, 1827 to 1832, only one-fourth of the ascertained cases were treated in hospital. Dr. Cowan tells us that, from 1827 to 1840, there were 9665 patients treated *at home* for fever by the district surgeons. Dr. Perry states that in 1843 there were 12,937 cases of relapsing fever attended by the district surgeons, of which only 4½ per cent. were sent to the Infirmary; and still, with a philosophy worthy of Mark Tapley, these gentlemen extract this consolation out of this suicidal policy, that, but for the *liberality* of the Directors of the Town's Hospital in allowing a distribution of money to the sick at home, at least one-third of the 12,397 cases treated at home would have been necessarily sent into the Royal Infirmary at 15s. each, costing £3074 instead of £284, the amount which they distributed! This miserable subsidy of 15s. a piece for the treatment of a case of fever is a fair illustration of the huxtering policy which the Directors of the Infirmary had to encounter in their numerous attempts to extract from the public authorities a charge for the maintenance of the patients with whom they burdened the institution. Year after year they were compelled to urge, under the pressure of their dire necessities, those inconsistent and mutually destructive arguments. To the managers of the Local Poor-Rate and to the magistrates of the Burgh they said:—"You are throwing upon our voluntary subscribers burdens which you ought to bear; you are saving your public funds by consuming our capital, which is derived from legacies and donations, the interest of which was intended to eke out our expenditure for the relief of general sickness." To the public they said:—"A contribution is fairly due from every one, as a *premium*, for the protection and security afforded" (1832). "Our Institution is not merely an Infirmary for the treatment of the diseased poor; it has become *an establishment of Medical Police—a Lazaretto for the seclusion of an infectious disease*" (1833). This inconsistency of argument is another proof of the injustice and inefficiency of endeavouring to treat

infectious diseases from private charity instead of from public assessment.

These dismal facts in the experience of Glasgow and other large Scotch towns were not passing unobserved by men capable of extracting a healing medicine from their bitter fruit. Drs. Cowan and Perry in Glasgow, and Alison in Edinburgh, were such, and their names will always deserve honourable mention in the records of a philanthropic and philosophic public policy. Three suggestions of measures of primary importance for the public health and general social wellbeing were derived from the condition of affairs which I have described, and which were urged with the greatest ability and perseverance, by every channel which could reach the intelligence of the public and the legislature, until they ultimately passed into definite enactments.

As Dr. Alison pointed out, "The Statute Law of Scotland *requires* the heritors, ministers and elders of parishes, and the magistrates of boroughs, to make provision for the needful sustentation of all aged poor and impotent persons, to enable them to live unbeggared, and to tax and stint the inhabitants, when necessary, for this purpose" (1840). We have seen that this was done in Glasgow. It was also done in Edinburgh and the chief towns of Scotland; but in the rural districts the law was either neglected, or, for selfish purposes, so administered that "the charities, legal and voluntary, of large towns were burdened by persons from other parts of the country." Dr. Cowan found that, of 178 inmates of the Royal Infirmary, in April, 1840, only 38 were natives of Glasgow, and 98 had not passed the prime of life there. Dr. Perry found that not more than 15 per cent. of the fever patients admitted under his care were natives, and 25 per cent. had not been three years resident; that 30 per cent. were natives of Ireland, and 40 per cent. from the Highlands and agricultural districts of Scotland. In 1840, Dr. Cowan states that "no effective measures have yet been taken to place the indigent poor of the suburbs [of Glasgow] under a system of medical superintendence similar to that within the borough." In 1845, all this was remedied by the passing of the Scottish Poor-Law Act, which gave to Scotland the benefit of an organisation which England had enjoyed since the reign of Queen Elizabeth. This created, for the first time, a class in the community for whose sickness, whether from infectious or ordinary diseases, statutory provision was made and a statutory mission imposed upon a new social organisation to support this provision out of public assessments. As in the case of the charitable aid of the Royal Infirmary, this was, in its time, great blessing to society; but it complicated the development of an adequate public policy

in the unification of the management of infectious disease, which is incompatible with the acknowledgment of any class in society, whether pauper or beneficiary.

Another measure was one which had for its object the union, under one municipal government, of the community of Glasgow, which had by its extension become territorially divided under separate and independent local administrations. We have seen that while there were district surgeons within the Burgh, there were none in the suburbs. In 1840, Dr. Cowan sums up the whole position thus :—"Over the city and suburbs there are four independent magistracies and boards of police, four assessments for the poor's rates, and four modes of administering the poor's funds, equally independent of one another." You will remember that in 1818, the impotence of boundary stones to control the movements of fevers in a continuously inhabited area was graphically pointed out. In 1841, the entire community numbered 279,000 inhabitants, of whom 37 per cent. were under three jurisdictions distinct from Glasgow proper. Yet, for Parliamentary purposes, this population had been made one by the Scotch Reform Act of 1832. The enormous social and sanitary disadvantages of this territorial subdivision and antagonism were forcibly and fully pointed out by Mr. Charles Baird in 1841, in a "Report on the Legal Provisions Available in Glasgow for the Removal of Nuisances," made to the English Poor-Law Commissioners, who embraced Scotland in the scope of a Parliamentary inquiry. All these facts resulted in the consolidation of the entire Parliamentary area under one municipal government by the amended Glasgow Police Act of 1846. It contained general sanitary provisions of an important kind, including the regulation of lodging-houses, and the reporting of infectious disease among their inmates, with permissive powers to cleanse and disinfect houses and clothes. It is right to say that these sanitary clauses existed in the Police Act of 1843, and were now only extended in their operation over the entire community. Thus, for the time, another element of confusion in the application of a uniform policy in the management of epidemic diseases was removed, viz., division of jurisdiction in the community; but only for a time. We shall shortly have to point out how, by the progressive growth of the city, the territorial unity was again destroyed, and to state how this difficulty has been circumvented, if not removed, in so far as it affected the control of infectious diseases.

The third, and, in its ultimate issue, the most important measure which was suggested by the difficulties of Glasgow and other towns in coping with epidemic disease was the vesting of responsibility for their entire management in public

bodies, having powers of assessment for this purpose, and general jurisdiction over areas determined as far as possible by their natural adaptation to the attainment of the ends in view. This was effected locally by the Glasgow Police Act of 1862, confirmed and amended in 1866, and generally for the whole country by the Scotch Public Health Act of 1867, both of which are to this day the local and general Acts in force in Glasgow and Scotland respectively.

It is necessary to hark back a little, in order to show, in its proper historic relation, the policy of the new Poor-Law organisation in reference to epidemics. Being sectional in the legal obligations which it bore to those attacked by epidemic disease, obviously it would afford only sectional aid in dealing with an epidemic. But parochial boards were empowered by the Act to subscribe from their funds to any public hospital or dispensary, and, therefore, they still looked to the Royal Infirmary for the accommodation of such of their sick as seemed to require hospital treatment. The effects of this policy were soon made apparent. In 1845, typhus was at the lowest ebb ever known in Glasgow. This was but a lull before the storm; and, in 1847, the city was overwhelmed with the most extensive epidemic in its history. In the previous year, more than half the cases admitted to the Infirmary were sent in by the parishes. At its close the accommodation was exhausted. Then followed the usual provision of temporary accommodation at the cost of the Infirmary, and, at last, when the rejected applicants for admission numbered hundreds, the parishes set vigorously to work, and, by the adaptation of the old Town's Hospital wholly for a fever-house, and the erection of wooden sheds, 1024 additional beds were provided, raising the entire number in the city to 1254. By these means, in 1847, no less than 11,425 cases of typhus received hospital accommodation. This was practically all that was done to stay the pestilence. Only when it was dying out was any disinfection of the houses or washing of the bedding attempted. Next year, the Infirmary managers report that the parishes had closed their hospitals, and prevailed upon them to reduce their charge for fever cases from £1 to 15s., a sum, they state, "by no means adequate to cover the average expenditure on each case, but of which, co-operating as they were with the authorities for the public good, they still felt it their duty to accept" (1848).

With similar local assistance, the city encountered subsequent revivals of typhus and epidemics of cholera and small-pox, until, in 1862, the new Glasgow Police Act brought the municipal authorities upon the scene, or, rather, conferred upon them powers which were not exercised, so far as hospital

accommodation is concerned, until 1864, when the managers of the Infirmary again found themselves unable to cope with epidemic typhus. They held "numerous conferences" with the Parochial Boards and the Police Board, and wisely stated that "it appeared to them that it lay more properly within the province of the Police Board, under the powers conferred upon the Board by the Glasgow Police Act, to make provision, in times of epidemic, for the treatment of disease" (1864). Thus, by a gentle impulse the municipal authorities were made to enter upon the task of providing hospitals for themselves. But here I must interrupt the current of my narrative to say that Dr. Gairdner was appointed the first Medical Officer of Health possessed by Glasgow early in 1863, and immediately began the herculean task of laying the foundation of the entire sanitary service of the city. As I have already said, it is only the treatment and general management of existing epidemic disease I am at present discussing, but I need scarcely say here that the roots of epidemics can be reached only by an efficient sanitary department, fully organised in all branches of its work. The hard labour, the slow education of public opinion, the reasoning down of opposition, the conciliation of angry interests —all this fell to the lot of Dr. Gairdner, and no one feels more grateful to him than the present writer, whose happy fortune it was to be preceded by such a man, and thus, in a measure, to reap the fruits of his labour. It must, therefore, be remembered in all I have now to say that, contemporary with the various movements in the development of the present policy in regard to epidemic disease, there was very slowly, but still steadily, coming into operation all the departmental work which is essentially necessary to the ultimate success of any policy whatever in that regard.

The 1862 Act was tentative in some of its provisions, especially with reference to dealings with epidemic disease, and showed that the mind of its framers was not clearly made up as to the policy to be pursued. Wisely, therefore, it was provided it should remain in force only for five years. As it happened, during those five years the municipal authorities learned many things. Having been taught all that was known of sanitary practice, its method, and the occasion for its use, under the lash of epidemic disease, it is not surprising that the legislature should have, in such a school, learned a system of spasmodic sanitation. Such was the method of applying Privy Council orders—legal instruments, under the authority of which affrighted authorities proceeded to administer, in drastic doses, that which they ought to have, from day to day, exhibited as a mild tonic to keep the body of the community in constant health. This evil method was introduced into Scotland in the

Nuisance Removal Acts, various editions of which were passed from 1846 to 1856. They conferred no effective powers for ordinary times, no medical officer, and only in extremity of epidemic pressure, by Orders in Council, duly published in the *Gazette*, and for specified devoted localities, brought into operation house-to-house visitation, suppression of overcrowding, special cleansing, power to dispense medicine, and provide medical attendance and hospital accommodation. As was natural, and, indeed, unavoidable, in their first Local Act, the Glasgow authorities followed the general Act, merely instituting a minor grade of treatment by proclamation of "districts, streets, or courts" within the city, advertised in the local newspapers, holding in reserve the Privy Council and the *Gazette* for the direst extremities. These special powers were invoked upon the report of the medical officer "that epidemic, endemic, or contagious disease prevails or exists and threatens to prevail." He was, therefore, placed in the position of a fire-master, who had instructions to watch the progress of a fire until it had assumed, or threatened to assume, the dimensions of a conflagration, at which supreme moment he was required to shout for the fire-engines. Then the fire-engines had to be made, for it was carefully pointed out by the legal advisers of the authorities that they had no power to expend their moneys upon permanent structures. The clauses in the Police Act had strict reference to emergency; and, in fact, their powers must be renewed every six months, with due form of advertisement or proclamation in the *Gazette*. Dr. Gairdner had, in the first place, to choose between the risk of crying "fire," and incurring the ridicule of the public who turned out to see a good blaze and could perceive nothing but smoke (not to speak of the anger of the proprietor, whose property had been unnecessarily made notorious), and the recriminations of the same public if, by misjudged delay, half the city had been wrapt in flames. When the supreme moment did arrive, which was in the winter of 1864-5, he was told that "building of any kind was in that season possible only under great disadvantages, and building of stone or brick absolutely impossible." He, therefore, looked around for a building which might be quickly adapted; and, after many rebuffs, obtained the offer of a large disused mill. No sooner did this project get wind, than a perfect storm of indignant remonstrance gathered in the neighbourhood, burst upon the Medical Officer, and swept his temporary fever hospital at once into the Limbo of vanities. There was nothing for it but to build, and, as every one was now convinced of the necessity of making hospitals a permanent possession of the community, lawyers notwithstanding, a site in the northern quarter of the city

was purchased, and, in less than three months, a substantial pavilion hospital, partly brick, partly wood, was erected, furnished, and opened, with one hundred and thirty-six beds, on 25th April, 1865. Premises had been obtained elsewhere for washing and disinfecting clothing in 1864; and a staff for fumigating and lime-washing houses had been organised. While these efforts to acquire hospital accommodation of their own were being made, the municipal authorities had provided for cases in the Parochial and Infirmary fever wards; but they at once discovered that there were many persons attacked who ought, for public safety, to be isolated, but who were not paupers, whom the parishes would not receive, and whom, in fact, it would have been little less than a social outrage to force into the pauper ranks. These were sent to the Infirmary, but could not always be received. Even among those who were brought by fever within the legal definition of a pauper, I found, while in charge of the largest of the parochial hospitals, that only five per cent. had ever before been within the walls of a poor-house. Here, therefore, was a system of pauper manufacture which, for social as well as sanitary reasons, it was of the utmost importance to terminate. When, therefore, the 1862 Act fell to be revised in 1866, the Police Board bound the community to maintain their hospital and washing-house, and took powers to enlarge the same or erect others, as occasion required. The spasmodic system of sanitation was so modified as to permit of the routine use of every known method of preserving health and controlling epidemics in their rudiments. In reference to infectious disease in lodging-houses, the power of compelling removal to the municipal hospital was substituted for that of compelling the Poor Law Inspector to give medical attendance. The general Public Health (Scotland) Act, passed next year, enlarged the power of compulsory removal so as to compass all cases of persons living in circumstances of special individual necessity, or of special public danger; and otherwise, between the Local and the General Acts, the municipal authorities found themselves vested with power to do anything and everything for the prevention and control of infectious disease under their own hand, out of the assessment levied upon the community for sanitary purposes—an assessment which, in the seventeen years during which it has been imposed, has been for eleven years one penny in the pound of rental of houses valued below £10, and twopence in the pound of houses valued at £10 and upwards; for three years, half these rates; for one year, double; for one year a half, and for one a fourth more than those rates.[1]

[1] Several paragraphs in the original paper are here omitted. They describe (1) the sanitary establishment of the period which is now much extended, and (2) the history of the negotiations with the Parochial Boards and General Hospitals regarding the provision of accommodation for the treatment of infectious diseases which have been already treated in a previous section of this chapter.—[Ed.].

I have still to explain the policy with which this organisation is administered; because, as I have already said, you may have in a community the most perfect organisation, and yet, if it is not worked so as to secure territorial and functional unity in dealing with infectious disease, it will be shorn of half its efficiency. It is curious and instructive, now that we have surmounted all difficulties and disabused ourselves and others of all prejudices and preconceptions, and finally worked out our policy, to look back upon the incidents, sometimes accidents, which have at times co-operated with our design, at times even prevented us from pursuing courses which were inconsistent with it. The disinfecting and cleansing of houses and clothing soon came to be accepted as a duty to be performed by us within the area of the rates, without special charge in any case. So, with reference to domestic servants or other members or dependants of the better classes, we used to exact payment for treatment, but this also was soon abandoned.

We have thus secured unity of policy within the municipal boundary; but what about our territorial unity? We have seen how, at the end of last century and the beginning of this, our territorial unity was destroyed by the outgrowth of the population and the development of separate jurisdictions, and how it was restored in 1846 by the amalgamation of those jurisdictions into one municipality. Since that date, Glasgow has continued to overflow her boundaries until, at the census of last year, the community was found to number 681,000 persons, of whom 25 per cent. are under the jurisdiction of no less than nine independent Burghs, which have from time to time been constituted during the last thirty years. This is a fact of serious importance in a community which is essentially one; and that it is a growing evil will be apparent when I state that during the last ten years, while Glasgow added only 4 per cent. to its population, the suburbs added 19 per cent. I shall not enter into any discussion of the general disadvantages attending this condition of territorial subdivision and antagonism, but confine myself to its relations to the subject in hand. The sanitary disadvantages are no doubt the greatest. At many points of the municipal boundary, there is no natural division whatever between us and our neighbours. Houses are cut in two, streets are cut across, and everywhere you pass by a step into another jurisdiction. In my experience, epidemics never cover the whole area of the community at their first incidence. They begin in one district, and if not checked, eat their way through the mass, while if they are vigorously attacked they

may be stamped out in that district. If they begin within the municipal limits, the whole repressive force of the municipality is directed upon the spot. If they begin outside those limits, the appliances of the petty Burgh, even at their best, cannot command adequate resources; and we can only stand by to quench such sparks as may be projected into our premises. Still, as regards infectious disease, we have been able to exercise a wholesome influence not only upon our immediate neighbours, but upon the rural authorities for many miles around. The Public Health (Scotland) Act enables the Board of Supervision (the Central Board of Control in Scotch health matters) to compel all local authorities to appoint a Medical Officer and Sanitary Inspector, and whenever we found our interests at stake, and that those officials did not exist, we have directed the attention of the Board to the fact, and procured their appointment. As regards hospital accommodation, the Royal Infirmary was the key of the position. Upon it, as we have seen, not only Glasgow, but the suburban and rural authorities for miles around, depended for fever accommodation. So soon, therefore, as we had provided for ourselves, we set to work to compel all those local authorities to erect hospitals of their own, under the permissive powers of the Public Health Act. The first effect of drafting infectious disease from the wards of the Infirmary to our own was to place more ample accommodation at the disposal of those authorities, or of subscribers living within their jurisdiction. The result of this in the case of small-pox was especially aggravating. It spread in the wards of the Infirmary and infected the city. The recognition of this fact speedily led, as we have seen, to its total exclusion. Before the managers adopted the same course with regard to fever, the proportion of the total cases received into the Infirmary from beyond the municipal bounds, through subscribers and local authorities, had risen, from year to year, until in 1876 it reached 16 per cent. from the immediate suburbs, and no less than 44 per cent. from the surrounding country. Having finally got into our own hands all the hospital accommodation for infectious disease in the city, it is obvious that in such circumstances we had a very important part to play. We were beset with applications for assistance from authorities and private parties. To the former we said—we shall afford it at a certain rate of charge, provided you undertake immediately to procure hospitals of your own. The latter, we for several years accommodated by private agreement; but we soon found that the local authorities under whom these persons lived were circumventing us in this way. We, therefore, resolved to refer all private applicants to their own authority, with whom alone we would deal. We

acted in the same way with requests for the assistance of our disinfecting staff and our washing establishment. Some difficulty was experienced in the case of certain local institutions, such as Reformatories and the Deaf and Dumb Asylum. Their managers argued that they were Glasgow institutions, and this argument was for some time listened to by our authority. Now, however, we refer them all to the authority within whose bounds they stand. So with two of our Poor-houses. In their case the argument was: They are mostly Glasgow paupers, and our parishes, though they extend landward beyond the municipal bounds, are assessed uniformly, and you are robbing Peter to pay Paul if you refuse us or even make us pay as highly as mere foreigners. But we replied: The case is not so. You are the local authority for such parts of your parish as are not burghal. We treat your paupers free of charge so far as your parish lies within our Burgh. Apply to the other Burghs for similar offices; and where you yourself are the local authority, you have distinct powers of assessment as such over that area, and ought to debit yourself in that capacity. As to paupers in your poor-house, as persons suffering from infectious disease, they are chargeable in the place where they presently lie, not to that from which they have been removed. The aggregate result of all these negotiations has been that two suburban hospitals have been erected by the combination of five of the neighbouring Burghs; that the remaining four send their cases to us at a charge of £8 each; that one of our parishes sends its landward paupers to these hospitals and the other to us at the same charge; that several hospitals have been erected in rural districts; and that in general, when a case of infectious disease occurs, everybody knows where to look for immediate assistance. If a case is found within our bounds, whether resident or peripatetic, we take it at once; if an application is made regarding a person living outside, we refer it to the proper authority, certain that it will be immediately cared for, or, at any rate, that the responsibility is formally brought home to the responsible authority.

Allow me now to give some brief details of the practice which is pursued upon these principles. We have no local system of compulsory reporting of infectious disease. We have long felt this to be a serious defect, but we would prefer that some such system should be instituted by imperial legislation for the whole country. We have always cultivated the friendship of the medical profession, and have been fortunate in securing it hitherto. Although we entertain strong opinions as to compulsory reporting, we choose to avoid, if possible, that local irritation which is so apt to attend its local adoption. The

sources of our information at present are: the registers of deaths, transcripts of which are obtained weekly by payment of three halfpence for each entry, but which are also open to the daily scrutiny of our inspectors; the voluntary reporting of practitioners, who are all furnished with printed forms and stamped and addressed envelopes for their transmission; the School Board officers, who also are provided with forms; the private information of neighbours and others. But 49 per cent. of all the cases known to the department are discovered by house-to-house visitation. Whenever a case has come to our knowledge through any channel, every house in the immediate vicinity is visited, and all houses known to be infected are kept under daily surveillance until a fortnight has elapsed since the occurrence of the last case. If, in the course of his visitation, an inspector finds a person ill, the nature of the disease not being apparent or being denied, and especially if no practitioner is in attendance, he is provided with a book of blank orders, one of which he fills up, and delivers to the householder, or directly to some medical man, by preference to the district parochial surgeon, requesting him to visit and sign the attached certificate. For this service, a fee of half-a-crown, which covers any number of cases found in one family at one time, is paid by the Town Council. In any case where removal to hospital is thought to be necessary, and no opposition is offered, the inspector goes to the nearest district police station. These are all in telegraphic communication with the sanitary office. He transmits the requisite message, and from thence the order for the ambulance is wired to the hospital to which the patient is to be removed.

In the evening, the epidemic inspector returns to the office with the particulars of each case, entered in due form in his memorandum-book, with the measures adopted. These are submitted individually to the Medical Officer, who sees at a glance the sanitary facts, consults and advises as to special features, and makes a short private note of the cases, so as to keep the leading points in continuous relation clearly before his mind from day to day. Before leaving the office, each inspector adopts the measures requisite to have the routine procedures, and any special instructions, carried out. He orders washing of clothes and disinfection of houses; communicates instances of overcrowding, or of nuisance noted, to the proper officers; directs removal to the reception-house of any infected families to whom it has been thought necessary to offer such accommodation for a fourteen days' quarantine, and who have agreed to accept it; and fills in School Board notices. These have for their object (1) the intimation to teachers and to the Board of the existence of infectious disease

in families from which children are attending school; (2) intimation that families previously reported are now free of infection. The washing of clothing and the disinfection and lime-washing or size-colouring of houses is deemed to be of supreme importance. The filthiness of the bedding and clothing of the lower orders of Glasgow is simply indescribable. This, taken in connection with facts established regarding the inherent vitality of the contagia, leads us to regard these articles as perennial sources of disease. The germs of infection acquired from one outbreak are stored up from year to year, perpetually springing into renewed activity in the persons of the susceptible, acquiring epidemic virulence under general intermittent conditions which are little understood, and thus perpetually restored; so that, unless the stock is cut short by a thorough washing, there comes no natural end to their lineal propagation. Our experience gives us confidence in the disinfecting efficiency of thorough washing, with boiling, by the injection of steam, without the use of any substance or process commonly called disinfecting, where such washing is applicable. All our washing is carried out in common in one establishment (which has for some time not been commodious enough, but which we are about to rebuild on a much larger scale), and yet we have never known a single instance even of suspicion of the introduction of a new disease into any house, or of the revival of the old. Against old mattresses and pillows we wage perpetual war. Fortunately, the materials chiefly used in Scotland by the working classes are such that they can be burned and replaced at small cost. They are mostly straw and chaff, or wool-flock of a very inferior quality. For all these reasons it has come to be recognised as a standing order of the department, wherever a dirty house is associated with *any form of infectious disease* which can be made a legal excuse for the expenditure of the rates in such operations, to seize that excuse and start the inmates afresh in life with a thorough purification.

There are some special points in the management of individual epidemic diseases which merit a short reference. There is Small-pox, of which you have considerable experience in London. The prime point of preventive practice is, of course, vaccination. By one of those unfortunate divisions of responsibility, which are inevitable in the course of piece-meal legislation, before the vision is enlarged so as to take in the whole horizon of the object which ought to be in view; the practical enforcement of the Scotch Vaccination Act is entrusted to the Parochial Boards. I early learned that it is impossible to induce persons to submit to re-vaccination except in presence of small-pox; but it has always been a standing order to the sanitary staff to be on the outlook for those who had escaped

primary vaccination, with whom we could deal not wholly by favour or persuasion on the ground of personal advantage. In 1875, I discovered that fully 3 per cent. of all the children born in Glasgow were returned as unvaccinated; so that in seven years we had produced between four and five thousand who, so far as known, were unprotected—a fact of serious importance, not only for us but for the country at large. I found, on investigation, that while all the statutory forms were duly observed by the Inspectors of Poor, there was no special effort, certainly no thorough method of personal search, instituted for the discovery of defaulters. I therefore made a private arrangement with the inspector of our largest parish, in which the work seemed to receive most attention, to have transmitted to me monthly a list of the children who had been reported by the registrars, and of whom the parochial officials had been satisfied they could find no trace. I distributed those names among the district sanitary inspectors, with this result: that they successfully followed up and found fully 26 per cent. of those children. The majority were found to have been already vaccinated, although the certificate had not been lodged; but 6 per cent. of those reported to me, and who were found, had not been vaccinated. This gratifying result induced me to ask the Town Council to authorise me to make this a permanent branch of our work, and so, by voluntary effort, to remedy the division of responsibility created by law. The permission asked was at once granted; and we now obtain weekly transcripts of the vaccination register from the registrars. The natural unity of this service with general sanitary work, is demonstrated by the fact that we overtake it without adding a single man to our staff. There is no such thing in Scotland, to the credit of our national intelligence, as an organised obstruction to the operations of the Vaccination Act. Among the defaulters, I have only encountered two persons in six years who had objections to the use of humanised lymph; and for these I at once obtained vaccine lymph, as I am prepared to do in any case where that will remove any difficulty. The defaulters belong, with hardly an exception, to that class of the population who are negligent of all duties, whether legal or moral, who are vicious, irregular, ignorant, or, at the least, thoughtless and unfortunate; 26 per cent. of the children involved were illegitimate. It is among that class our staff is constantly moving, and with them they are in constant relation, so that, in the course of their ordinary house-to-house visits, they take up this with their other duties.

As to re-vaccination, as already stated, it is no use endeavouring to persuade the poor to be rational, and submit to this operation as a routine practice, in anticipation of risks

which they cannot discover. In presence of small-pox they will submit, but only if the operation can be effected at once. At first we acted in this way. On visiting, for the first time, a case of small-pox, the inspector was instructed to examine all those in the house and neighbourhood, and secure the names of those who seemed to require protection. A medical man was then sent to the locality with this list; but our invariable experience was that, in the interval, there had been a general laying of heads together, and consequent consolidation of all prejudices and old wives' fables, so that scarcely anybody would submit. Here was a practical difficulty to be overcome; and the common-sense view of the dangers to be avoided was this. Provided the lymph is carefully selected by a competent medical vaccinator, any intelligent layman instructed by this vaccinator is as well able to perform the mere operation of re-vaccination, and to judge, according to easily defined rules, on whom it ought to be performed, as any medical man can be. Therefore, I had each epidemic officer put through a short course of instruction in the operation. We have always had a station for primary vaccination, managed by a medical vaccinator. He selected the lymph and was responsible for its purity. Tubes were charged by him, and each collection numbered, so that its origin and its pedigree were known. The inspectors always carried a stock of this lymph about with them. Whenever one of them went into an infected house, he said, "Now, you know, you must all be re-vaccinated." Arms were bared and the thing was done before they had time to think about it. I do not mean to say that no recalcitrants were encountered, but I do say that a degree of success was obtained in this way which would not have been possible in any other way. Where the parties had a private medical attendant, the inspector advised them to go to him, told the doctor of the circumstances, gave him lymph if he required it, and did not lose sight of the family until the operation was done. Primary vaccinations were not done by the inspectors, but a note was made of unprotected children, and the mothers either took them to the station or the medical vaccinator went to them. As to cases of small-pox, we enforced removal to hospital with much more sternness than in the case of any other infectious disease. We had no hesitation in applying for magisterial warrants when persuasion failed, but after executing one in a locality it was seldom necessary again to appeal to force. In the ten years 1871-80, we performed 12,718 primary, and 9,614 secondary vaccinations. I believe the latter are understated, as under pressure the men were more careful to get as many protected as possible than to record their cases. The practical result may be summed up thus. Small-pox was epidemic during the

four years 1871-2-3-4, during which time 4,328 cases were known to exist, of which 74 per cent. were treated in hospital, and 8,730 re-vaccinations were recorded as done by our own staff, or an average of fully two persons for each case. The total deaths in three years numbered 786, of which 67 per cent. occurred in hospital. The death-rate was never higher than 4.3 per 10,000 of our population, and averaged 3.8.

Typhus.—Overcrowding of inmates in dwelling-houses, with the personal filthiness which almost invariably accompanies overcrowding, are especially favourable to the development of epidemic typhus. Thirty per cent. of the dwellings in Glasgow consist of only single apartments, 44 per cent. of two, and 15 per cent. of three apartments. There are special clauses in our local Police Act enabling us to measure the cubic contents of all such dwellings, and to affix upon them a ticket stating the number of inmates allowed, on the very moderate scale of 300 cubic feet for each adult, two children under eight being reckoned as one. We propose to raise this standard to 400 cubic feet in our new Police Act. This ticketing is accompanied with the right of night-inspection, for the purpose of counting the inmates; overcrowding subjecting the householder to a penalty. We regard the constant exercise of this right of supervision as our main protection against typhus. At first it was carried out by the police, but in that and other respects we soon cut our connection with the police. Night after night, all the year round, our inspectors are out in some part of the city. Their inspections have averaged over 41,000 a year for the last ten years, in only 4 per cent. of which was overcrowding discovered. In 1856, when typhus was epidemic, Dr. Gairdner found that 8 per cent. of the houses visited were overcrowded, and that the epidemic incidence varied in different districts almost in exact proportion to the overcrowding discovered. Previous to 1873, typhus was not distinguished in the registers of deaths from other "fevers," so that I cannot contrast its fatality over the same periods as that of small-pox. But in the five years, 1876-80, there were only 258 deaths from typhus, or a death-rate of barely 1 per 10,000 of the population (.99 exactly). In 1881 it was only .82 per 10,000. The deaths ascribed to "fever" in those years of epidemic prevalence, to which reference has been made in the course of this paper, were undoubtedly almost entirely caused by typhus; but, to make the comparison quite unimpeachable, I may state that in 1871, the death-rate from all "fevers" was 16 per 10,000; that it has fallen year by year, with only one slight break in 1880, caused by an epidemic of enteric fever, introduced through the medium of milk sent in from a farm twenty miles distant, and that in 1881 it was only 4¼ (4.34) per 10,000. In

the ten years, 1871-80, we have a mean death-rate of only 7 per 10,000, against a mean of 20¼ (20.24) in the ten years immediately preceding. In the great epidemic of 1837, it was estimated that the death-rate was 86 per 10,000 from "fever," and in the five years, 1837-41, it maintained a mean of no less than 44½. In the last ten years, we have treated in our hospitals 3,378 cases of typhus; while in 1837, the city having only half its present population, and the cases isolated forming only a moiety of those which existed, there were 5,387 cases treated in the Infirmary.

The infectious diseases which chiefly affect children form a large and very fatal class, which, amid all the advances of modern sanitation, still rival in their epidemic outbursts those infectious diseases of adults whose periodic ravages have almost become events of the past. The great obstacle in their preventive treatment is the fact that they do affect children chiefly. The feelings of the parents will always stand in the way of isolation. I believe, however, that our systematic application of washing and disinfection of the houses has been eminently beneficial, removing from the household those perennial sources of infection revived in the persons of successive susceptible generations of children. We have also endeavoured gently and persistently to familiarise parents with hospital treatment. The admission of mothers along with children of tender years has been a great inducement. Very frequently, after remaining a few days, they acquire confidence in the management of the nurses, and leave the patients voluntarily to their care. The benefit to be derived from isolation varies in the different diseases. In scarlet fever it is at its maximum. During the dangerous period of convalescence a control is exercised which is impossible at the hands of parents, except in rare circumstances. We find that an average residence of about eight weeks is requisite; but with every precaution, there is no contagium which is so adhesive, and so apt to linger in unexpected corners of the person and clothing, as that of scarlet fever. We find that the dismission of patients is very difficult to arrange, so as to clearly cut off the infection and leave it behind. Parents send in clothing, or the disinfected clothing is got out of store. They promise to call on a certain day at a certain hour, and the child is dressed in anticipation. They do not come, and then mischief is very likely to ensue. We are endeavouring to overcome these difficulties by something which might be called a convalescent clearing-house, but it is not easy to cover all eventualities even then. Hospital treatment of measles is of minimum use, except as saving life by the superior care and medical skill bestowed upon the patients admitted. The infection is scattered abroad before the child

is removed. Therefore, we pay especial attention to the exclusion from schools of children who belong to infected families. Whooping-cough occupies much the same position. It is an interminable disease, tapering off at both ends into a condition not recognisable except by relation to the condition which supervenes or precedes. The child is on the whole vigorous, except in the youngest cases. I believe, therefore, that the benefit of treatment to the individual case is almost all that can be claimed for the hospital treatment of whooping-cough. In Glasgow, where pulmonary diseases are so rife and so fatal, it is a fearful scourge. In 1872, it caused a death-rate of 21 per 10,000 of the entire population. In 1874, scarlet fever produced a death-rate of 33 per 10,000, and measles, in 1871, of 18. Still, contrasting the ten years, 1861-70, with the ten years, 1871-80, we find in all these diseases substantial evidence of improvement—in the case of scarlet fever, a fall from a death-rate of 13 per 10,000 to one of 10; in measles, from 8 to 7; in whooping-cough, from 15 to 12½.

I wish, in conclusion, merely to point out that during the ten years to which I have appealed for the results of the policy and practice of Glasgow in the management of epidemic disease, both the policy and the practice were only being matured and developed; more especially, the policy did not reach its full proportions until the last years of the decade. I think, therefore, it is pretty safe to anticipate that whoever may sum up the results of the ten years which now lie immediately in the future of Glasgow will have some facts to put in evidence which will tell still more strongly and decidedly in favour of the policy and practice which I have ventured to bring before the Epidemiological Society of London.

CHAPTER V.

THE IMMEDIATE RESULTS OF DISPLACEMENTS FROM INSANITARY DWELLINGS.

THE OPERATIONS OF THE CITY IMPROVEMENT TRUST.

We have already seen (p. 57) that the area originally scheduled under the Improvement Act extended to 88 acres, which were situated chiefly in the Central District of the City, but also in Gorbals and Calton. The inhabitants of these areas numbered over 51,000 persons, and between 1870-77 extensive clearances were effected. In May, 1874 and 1875, and again in 1877, an investigation was conducted regarding the rehousing of 2270 families, comprising 5870 persons, and the conditions before and after displacement compared with regard to size of house and number of occupants, rental, and sanitary conveniences.

The situation of both, with reference to the centre of displacement, is also shown, and in the corresponding enquiry of 1877 the analysis was extended to include the effect of displacement on the individual members of households with regard to place of employment.

Details of the first and second displacements were submitted to the Philosophical Society of Glasgow, and are now reproduced together with extracts from the third Report, which refers to the displacement of 1877.

As a general result, these enquiries showed that the crest of the outward wave of displacement was reached about three-quarters of a mile from the centre, and that the majority of the displaced families went into houses better adapted to their numerical requirments. The rents increased, but so also did the accommodation supplied.

In an address, as President of the Section of Public Medicine, at the annual meeting of the British Medical Association at Sheffield, 1876, the combined results of the first two displace-