

It must be remembered, when we speak of the tendency towards confluence increasing with age in the vaccinated in greater proportion than in those who have the natural disease, that in the vaccinated we set out so to speak from a higher level, and therefore have farther to decline. The proportions of "rare," "copious," and "confluent" cases seen in the natural disease, in the first decennial period of age are exactly reversed in the vaccinated. Therefore this greater "drift" in the vaccinated is in reality the tendency of Small-pox to revert to its natural type. In short, the ultimate issue of this inquiry is to demonstrate, almost to express in exact terms, what I believe to be the fact, that *in the aggregate* the influence of vaccination is unstable. We cannot prove this by finding the proportion of the vaccinated living at each decennial period who, being equally exposed, will take Small-pox; but in those at each decennial period who have taken Small-pox we can find evidence that, as you recede from the point of vaccination, the disease tends to emancipate itself from the modifying power of the vaccination, and to revert to its original type. In other words, the constitutional susceptibility gradually fades. At the same time, it is of the greatest practical importance to remember *how very stable in its effects vaccination may be made by care in the performance of it.* While variola very speedily throws off the modifying influence of a "bad" vaccination, it remains subject to the influence of a "good" vaccination to the latest periods of life. We may be sure that the protective follows the same law as the modifying power. Still these facts, derived from averages, furnish no argument against the revaccination especially in the face of known exposure to contagion, even of those persons who present evidences of perfect primary vaccination. "It is very well for us to know that one person, under inspection, of a certain age, with certain marks, runs so much less risk of proving to be susceptible when exposed to Small-pox than this other person. But so long as we cannot say, you are the individual who will escape, we have no right to leave him even to this diminished risk."

CHAPTER IX.

STUDIES IN VITAL STATISTICS.

WITHOUT some method of measuring results progress in Science is impossible, and the elementary requirements of the science of Vital Statistics are a knowledge of the number of deaths occurring in a given period, and of the population among which they occur.

At an early period the Municipal authorities of Glasgow were keenly alive to the advantages of accurate records of the movements of its population, and there is an echo of still earlier efforts in this direction in Dr. Clelland's report on the plan of Enumeration of the inhabitants of the City and its connected suburbs, which was approved by the Magistrates and Council in 1819.

From this report some extracts may be taken, if only for the interest of the historical associations which they recall.

"There was no enumeration of the inhabitants of Glasgow, that can be relied upon, before the year 1610; but there are grounds for supposing, that, about the time of the Reformation, in 1560, the population might amount to 4500. This estimate of the number is rendered probable from the circumstance that, in 1581, during the ministry of the first Presbyterian clergyman who officiated in Glasgow, the Confession of Faith was subscribed by 2250 individuals; although at that time there were certainly not so many persons in the city who could write, yet they might assent, and even include their children in the number: and the struggle between the professors of the Roman Catholic and Reformed Religion was then so warmly contested that it is probable their numbers were nearly equal.

In 1610, the Episcopal mode of government having been resumed in the Church, Archbishop Spottiswoode directed the population of the city to be ascertained, when it was found to amount to 7644; although, during the plague which raged

in Glasgow in 1603, the number of its inhabitants must have been greatly reduced. . . .

In 1660, at the restoration of Charles II., the number of inhabitants amounted to 14,678. . . .

In 1688, at the Revolution the population was reduced to 11,948: the religious troubles, or what was called the Persecution, which took place at that period, has been assigned as the cause of this decrease.

In 1708, immediately after the Union between Scotland and England, the population amounted to 12,766. The Union having been vehemently opposed in Glasgow, the Magistrates directed that an enumeration of the people should be taken, to mark the decrease which they expected would follow.

In 1712, the population amounted to 13,832. This enumeration of the inhabitants was by order of the Convention of Royal Burghs, who had directed the respective burghs to make a return of their population, on oath.

In 1740, the population was ascertained by the Magistrates to be 17,034.

In 1755, the numbers had increased to 23,546; but in this enumeration the suburbs were partially included. . . .

In 1763, the population amounted to 28,300. . . .

In 1780, the numbers had increased to 42,832; but in this enumeration the whole of the suburbs were, for the first time, included.

In 1785, soon after the American War had ended, the Magistrates directed the population to be ascertained, and this amounted to 45,889.

In 1791, the population was ascertained for Sir John Sinclair's statistical work; at that time it amounted to 66,578, including 4633 being part of the suburbs which had been omitted in the return.

GLASGOW AND ITS SUBURBS, 1801.¹

Houses.			Occupations.			Persons.		
Inhabited.	By how many families occupied.	Uninhabited.	Families chiefly employed in Agriculture.	Families chiefly employed in Trades, Manufactories or Handicrafts.	All other families not comprised in the two preceding classes.	Males.	Females.	Total.
20,276	20,967	1,184	1,834	22,335	43,120	35,007	42,378	77,385

¹These returns were given for parishes, but the details are here omitted.—[Ed.]

Prior to 1801, the general results only of the different enumerations have been preserved; but in that year a Census of the Inhabitants of Great Britain was taken by order of Government.

But in this enumeration a part of the connected suburbs, the population of which amounted to 6384, had been omitted; and which, added to the numbers in the Government Table, makes the actual population of Glasgow at that time 83,769.

In 1811, there was another Government Census of the inhabitants of Great Britain, according to which the population of Glasgow at that time was as follows:—

GLASGOW AND ITS SUBURBS, 1811.¹

Houses.				Occupations.			Persons.		
Inhabited.	By how many families occupied.	Building.	Uninhabited.	Families chiefly employed in Agriculture.	Families chiefly employed in Trades, Manufactories or Handicrafts.	All other families not comprised in the two preceding classes.	Males.	Females.	Total.
17,543	23,567	72	706	544	17,669	53,544	45,275	55,474	100,749

¹These returns were given for parishes but the details are here omitted.—[Ed.]

But in like manner, a part of the connected suburbs had not been included in this enumeration, the population of which amounted to 9711; this number, therefore, added to the Government Table, made the population of the city at that period 110,460."

These repeated references to the population of the suburbs indicate the difficulty which exists of ascertaining the death-rates early in the century because the Bills of Mortality of the period were returns of the burials in the graveyards within the city, irrespective of the place of residence of the deceased persons.

In 1821, an area was agreed upon, including "Glasgow and Suburbs," to which these Bills were to be applied, and this practice continued until the Seventh Police and Extension Act of 1846 incorporated the burghs of Anderston, Gorbals, and Calton with the city, and partly removed the discrepancy. In 1854 the Registration Act was passed.

Hitherto the mortality returns applied to parishes; the Registration Act substituted Registration Districts, which were ten in number. These continued in use till Dr. Strang's

death, and in 1864 Dr. Gairdner, at the request of the Sanitary Committee, submitted his views on the future management of the Vital Statistics of the city.

In the Memorandum prepared in response to this request, Dr. Gairdner pointed out that the Registration Districts were too large adequately to reflect the local circumstances influencing health, and as a statistical unit he suggested the Census Enumeration Districts, containing from 70 to 120 families each. These were ultimately, in 1871, grouped into 24 statistical divisions, and in 1873 Dr. Russell, while retaining these divisions for statistical purposes, massed them into larger groups for comparative purposes.

These groups were made up of districts presenting general similarity in their sanitary features, and the comparisons established served to throw into relief the local conditions which were associated with excessive incidence of disease.

During the remaining years of the '70's decade the results were issued quarterly, supplemented by Detailed Annual Reports, till 1879. A Pathological Register also was begun, in which the deaths were classified by street and number for each district of the city. The lack of data, however, from which to accurately estimate the district populations from year to year during the intercensal period, was only partially overcome during this decade by the adoption of the annual return of Inhabited Houses, until the Census of 1881 disclosed the missing factor in the difference amounting to $1\frac{1}{2}$ per cent. between houses "inhabited" but not "occupied."

Hitherto the estimates of population had been in excess of the actual numbers, but the census of 1891 showed that greater accuracy was possible when the number of inhabited houses—subject to the deduction just noted—was used as a basis.

Meanwhile, in light of the facts disclosed by the 1881 Census, Dr. Russell revised the statistics of the preceding decade, and in 1885-6 issued three pamphlets on the Vital Statistics of Glasgow continuing the inquiry down to the year preceding their issue. Although the data on which these were constructed have now undergone considerable modification, many portions of those reports are still valuable as illustrating the practical uses to which local statistics may be applied, and those which appear to be of permanent value are here reproduced.

THE VITAL STATISTICS OF THE CITY OF GLASGOW.

Part I. contains a history of the efforts to establish a satisfactory system of general and district statistics in Glasgow, and the difficulties generally which threaten to impair the

value of efforts to estimate the district populations. The relation of town death-rates to density and house accommodation is considered, and the average size of house, the number of inmates, together with the proportion of the population occupying houses of different sizes, is reviewed in detail.

Part II. is devoted to a comparison of the causes of death in the several districts, reference being made to the percentage of uncertified deaths, and the assurance of child lives.

Further consideration is also given to the relationship of house accommodation to death-rates. The new house accommodation of Glasgow is considered, and the air space and height of ceiling in the rooms of the old and new houses are compared. Thereafter follows a description of the original groups of districts, with a comparison of their physical and vital statistics.

Part III. discusses the more general question of death-rates from certain groups of diseases; the bearing of Friendly Societies on uncertified deaths; and the certification of deaths in Glasgow in relation to the facilities for medical attendance.¹
—(ED.)

Part I. History of attempts to establish a satisfactory system of District Statistics in Glasgow.

In a Report on "The Decennial Census as a Basis for the Statistics of intervening years, illustrated by the case of Glasgow," I showed that the Registrar-General's estimate of the population as compared with the result of the Census, was 89,746 in excess, while my own was 26,608. The former estimate was calculated on the assumption that the rate of increase ascertained at the Census of 1871 for the preceding ten years had continued during the succeeding ten years. The latter was calculated on the assumption that the average number of inhabitants per inhabited house found at the Census of 1871 continued to be the average during the ten years following. Both assumptions were found at the Census of 1881 to have been wrong with the result stated, the error in the local estimate having been aggravated by a mistake in excess of the return of inhabited houses. I also proved that, both in England and Scotland, the Census had shown that the Registrar-General's estimates for the large towns had been more or less wrong. The inevitable inference was that a Decennial Census was insufficient for the purpose of securing a trustworthy basis for the vital statistics of towns in the intervening years.

¹An important pamphlet not here reproduced on "Uncertified Deaths in Glasgow" was issued in 1876. Copies are in the libraries of the Royal Phil. Society (Glasgow) and of the Faculty of Physicians and Surgeons. The subject is afterwards referred to in Pt. III. Vital Statistics.

The subject of my Report was taken up by the Registrar-General for Ireland, in a paper "On Some Important Relations between Census Statistics and Sanitary Statistics," read before the Academy of Medicine in Ireland. He repeated and confirmed my investigation of the estimates of the Registrars-General of England and Scotland, and extended his inquiry to Ireland, with the following result:—

"The conclusion which I arrive at from the foregoing considerations is, that none of the methods at present in use is sufficiently reliable for the purpose of health statistics, the least fallacious being the estimate founded on the average numbers of presumed occupants of inhabited houses. I have, therefore, arrived at the conclusion that, in order to keep death-rates absolutely accurate, it will be necessary to collect facts more frequently than is usually done, and each Sanitary Authority should ascertain for itself the number of residents within its district at intervals much more frequent than the decennial periods. I believe that each year an estimate might be founded on the known number of inhabited houses, and in alternate years, or at triennial periods, a simple enumeration of the population might be made, not such as is taken at the Census, but merely the few facts that are necessary for the striking of death-rates and for the estimation of water-supply, &c., which are so important to Sanitary Authorities."

DIFFICULTY IN OBTAINING TRUSTWORTHY ESTIMATES OF DISTRICT POPULATIONS.

Although I did not push my enquiry in 1881 into the trustworthiness of estimates of the population of districts or sub-divisions of towns, it was self-evident that if inter-census estimates of the populations of towns as a whole were wrong, that of any sub-division of them must also be wrong. Any variation between one Census and another in the rate of growth of a town, or in the proportion of the inhabitants to the houses which they occupy, is only the aggregate result of local variations within the town. In some districts there must have been a change by defect of growth or enlargement of the houses, in others a change in the opposite direction; the balance of all such changes being the aggregate change for the whole town. It seems equally obvious that the smaller the sub-divisions are, there is more likelihood of error. If we take the smallest possible division—viz. a single tenement of houses, this will be made most evident. It may be swept away altogether, in which case the population will be reduced to nothing. If a tenement of good middle-class houses, it may be sub-divided into houses of one or two apartments, in which case the

population will be greatly increased. In Scotch towns, built on the flatted system, demolitions for railway or general business purposes, or in the course of improvement schemes, must produce much greater local disturbances and redistributions of the inhabitants than in English towns, where the system of occupancy tends to make the inhabitants live more sparsely on the soil.

In Glasgow we have for many years aspired to exhibit the local variations in our vital statistics in sub-divisions more elaborate than have been attempted for any urban community in this country. Previous to 1855, when the Scotch Registration Act came into operation, the mortality returns were treated in parishes; for many years subsequently to that date in the ten Registration Districts. These were too large to possess any sanitary value, being, in fact, determined not for any such application, but with regard to the convenience of the inhabitants fulfilling their duties under the Act, and primarily, so as to be adequate for the support of the Registrars by affording as near as possible equal emoluments from the tariff of remuneration paid by the municipality. After the death of Dr. Strang, Dr. Gairdner was requested to submit his views to the Sanitary Committee on the future management of the Vital Statistics of the City. This he did, under date 19th January, 1864, in a memorandum appended to his Monthly Report. He pointed out that the Registration Districts, embracing populations of 30,000 to 40,000 were too large, and suggested that the 960 Enumeration Districts, formed for the purpose of the Census of 1861, might be taken as the basis for the presentment of the statistics of the city. On further consideration, this minute system of sub-division was found to be too complex, and with the assistance of Dr MacGill, these Enumeration Districts were carefully grouped so as to form 54 Sanitary Districts, each homogeneous in the social position and sanitary circumstances of its population. These were all named, numbered, and carefully laid down upon a map, which was lithographed and submitted to the Board of Police, with a descriptive memorandum by Dr. Gairdner, in October, 1865. The Vital Statistics were arranged in accordance with this scheme, and some use was made of them for various important inquiries, especially in a valuable investigation into the relation of Fever to Overcrowding, in March, 1866, and in a "Report on the Health of Glasgow for the First Quarter of 1869, with Special Reference to the Unusually High Rate of Mortality in March, 1869." But the want of any determination of the population of these districts not only gave as evident indefiniteness to those special official attempts to turn laborious and expensive returns to practical use, but led to premature

and illusory calculations of death-rates on the basis of the 1861 population by amateur statisticians, which brought the whole scheme to discredit, and led ultimately to its abandonment. Dr. Gairdner's experience in this praiseworthy endeavour to establish a system of District Mortality Returns are so instructive and so valuable in their bearing upon my present purpose, that I shall quote his own account of them from the Report on the First Quarter of 1869 (p. 4), viz. :—

"I must also give another caution, which observations made at the Board of Police have shown not to be unneeded—viz., that the death-rates for each separate district cannot, in the present state of our information, be deduced from the figures now presented, without much special knowledge, and, after all, at considerable risk of error. Statements have been made, as if upon data furnished by me, in which the unknown increase and the decrease of the population in the different districts since 1861 had been altogether disregarded. Such statements, especially when made upon the narrow basis of a single month's returns, I must characterise as simply illusory: and the repeated quotation in the newspapers and elsewhere, of such utterly untrustworthy death-rates, as if upon good authority, obliges me thus formally to disclaim all responsibility in connection with them. It is necessary, accordingly, that I should explain that the population of the different Sanitary Districts can at present only be made the subject of a very rough calculation: so rough, indeed, that I have not thought proper to insert it in the returns, even as an estimate. Some of the districts, there is reason to think, have increased their population by a third, some by two-thirds, while a few have probably nearly doubled since 1861; and, on the other hand, several districts, owing to the construction of warehouses and shops, or the operations of the City Union Railway and other city improvements, have declined by one-fifth, one-fourth, or even perhaps one-third."

In spite of an appeal to continue the system until the impending Census should afford some trustworthy information as to the population, it was abandoned. In Dr. Gairdner's Annual Report for 1870, the mortality returns were re-arranged in accordance with the five Police Districts of the city, a subdivision which had nothing to recommend it except the fact that the Sanitary Department had been organised for administrative purposes on the same local basis as the Police.

In February, 1871, an important paper was read before the Philosophical Society of Glasgow, by Mr. MacFadyen, a fellow of the Faculty of Actuaries in Scotland on "The Theory of the Death-rate, with Measurements of the Comparative Forces of Mortality in Glasgow and other Cities,"¹ in which he

¹ *Proceedings of the Phil. Society of Glasgow, 1870-71, p. 437.*

pointed out the uselessness of Registration Districts for such investigations, and advocated the necessity of "what on the Continent is called a Cadaster . . . a minute sub-division of the City, the population to each part, their occupations, ages, birth and death-rates, and all those particulars that students of the public health so much desiderate, but which they so very seldom obtain." Probably stimulated by this paper, the idea of a local sub-division of the City for statistical purposes was revised by the Committee of Health. Dr. Gairdner tried the ten Registration Districts for a few months, but the Committee soon came to the opinion, always held by their Medical Officer, that these were too large and varied in their sanitary and social constitution to afford any information as to the local incidence of disease. Ultimately 24 sub-districts were formed from the Registration Districts; and from 1871 onward these have been maintained. In 1872 I added a re-arrangement of these 24 sub-divisions into four "Groups of Sub-divisions," representing four grades of hygienic and social circumstance. There has thus been recorded from year to year, at the cost of much labour, a mass of facts as to the local distribution of disease in Glasgow such as is not possessed by any other community. The question of their value depends very much upon the accuracy with which the population of each sub-district has been determined in the inter-census years.

METHOD OF OBTAINING DISTRICT ESTIMATES.

These district estimates are based upon returns of the inhabited houses, which I showed in my Census Report¹ were liable to error generally in excess of the truth. But the population is calculated by multiplying the inhabited houses by the average number of inhabitants per house as ascertained at the preceding Census; so that to the possible error in the multiplicand we have added a possible error in the multiplier, for it is quite certain that one element in the local changes which take place from year to year in a city is a change in the character as well as in the number of the houses. This is proved for the whole city in my Census Report, and just as the aggregate increase in the population of the whole city covers enormous local increases and decreases, so the change in the average number of inmates per house, disclosed in successive decennial periods, covers annual local changes of greater amplitude and in different directions.

This investigation has settled the question of the value of any calculations of the birth or death-rates of these districts as a correct basis of comparison of one with another. The

¹ 1881.

actual number of births and deaths, and the proportion of deaths from various causes to the total number remain as certainties, but all calculations on the basis of population must be confessed to be of but little value as hitherto published. That there are enormous differences in the local death-rates remains indisputable as a general conclusion, but the exact amount of those differences cannot be determined from the data as they presently stand and have hitherto been employed.

AGES OF THE DISTRICT POPULATION.

Even if the difficulties in the way of correctly estimating the total population of the districts could be surmounted, how are we to ascertain the number living at various periods of age? The only method of doing so is to assume that the proportion living at those periods at one Census continues unchanged through each year intervening between that and the next. In my Census¹ Report (p. 22), I discussed this question as regards the total population of the City, and proved that even for it such an assumption would be entirely opposed to the experience of every Census for which we have the necessary data. A comparison of the age results of each Census since 1821 led to the conclusion "that, on the whole, the discrepancy between the last Census and the previous has been less than between any preceding pair of enumerations—i.e. the population has been more stable in its composition as to age, the chief change being a smaller proportion of children and a larger proportion of aged people" (p. 24.) Still, when we apply the 1871 proportion to the 1881 population, and compare the number actually enumerated at each period with the number so estimated, we find an error in the population under 1 year of 8.7 per cent. in excess; 1 and under 5 years, of 2.3 per cent. in defect (under 5 years, an excess of 0.42 per cent.); 5 and under 20 years of 0.33 per cent. in excess; 20 and under 60 years, of 0.2 in excess; and 60 and upwards, of 5.5 per cent. in defect. The gravity of these errors is shown by contrasting the respective death-rates for 1881 which these populations would yield. Thus:—

	Under 1.	1 and under 5.	Under 5.	5 and under 20	20 and under 60	60 and upwards
True Death Rate, -	174	48.5	77	8.8	16	76
Estimated Death Rate, -	158.5	49.6	76.7	8.8	15.9	80

¹1881.

Even if we had the means of accurately estimating the aggregate population of these districts, we cannot derive therefrom the number living at different periods of age. I have already proved that we cannot thus estimate even the aggregate district populations. Therefore it is utterly impossible from a Decennial Census to construct any trustworthy estimates either of the aggregate or age population of the districts of the City for the intervening years. The only way to obtain a continuous record of district statistics is to have more frequent enumerations of the population.

[Elsewhere it is suggested that this might take the form of a bi- or tri-ennial enumeration, by which the "population factor" of the Inhabited House return might be revised.—ED.]

THE FUTURE STATISTICS OF GLASGOW.

The method to be followed in presenting the Vital Statistics of Glasgow in the future has given me much concern. It must be quite evident, from the preceding remarks, that with a Decennial Census it is useless to continue, at the cost of much labour, to publish district statistics in the form hitherto adopted. The arrangement of the mere numbers of births and deaths in their districts may be kept up, but the application to them of current estimates of district populations from year to year would be unsatisfactory. This must be deferred until another Census proves whether it is possible to go back upon the tabulated returns on the basis of revised populations. As I shall subsequently show it will, at least at each Census, be possible on the secure basis of the Census, at intervals of 10 years, to take soundings, so to speak, and ascertain the comparative position of each district as shown by the mean death-rate and the chief contributory causes of death in three years—viz., the Census year with the years preceding and following it.

ARGUMENT FOR LOCAL STATISTICS.

Before proceeding with this inquiry, it will be instructive to consider the question—Why is it necessary to compile local statistics? The Registrar-General publishes periodical reports regarding the large towns. Why cannot each town extract from those reports the weekly, monthly, quarterly, and annual statistics referring to itself?

The Registration area has since 1875 been coincident with the Municipal area. Since the national and local statistics now refer to precisely the same population, what necessity is there for local returns at all? The principal reason is this,

that the weekly returns of deaths, while they give accurately the number registered, give their *causes* very imperfectly. The Scotch Registration Act permits the registration of deaths without the production of a medical certificate of their cause. Those certificates came in from time to time so slowly that, for three months subsequent to registration, changes are being made by the District Registrars in the diseases originally reported by the parties who registered.

No notice is taken by the Registrar-General of those changes until the Detailed Annual Report is published, *several years* after the Annual summaries, which are issued early in the following year. The current, Monthly, Quarterly, and Annual Summary are derived from the imperfect weekly reports, merely adjusted to the natural months, quarters, and years. Take the present position of our national returns as an illustration. The Detailed Annual for 1881 was published in September 1884, for 1882 in July, 1885. Up to those dates the only information accessible in the national records was the imperfect current reports. The number of deaths in 1881 in Glasgow, according to those reports was 12,904, of which 2599 were uncertified, or 20 per cent. The number of deaths according to the Detailed Annual, published three years subsequently, was 12,916, of which 1190 were uncertified, or 9 per cent. The changes in the distribution of the deaths, arising from the certification in the Detailed Annual Report of 11 per cent. of deaths which were uncertified when the Summary was compiled, are serious, as will appear from the following comparison of the deaths per 100,000 persons living from certain orders of disease, as given in those Reports for 1881:—

	Annual Summary.	Detailed Annual Report.
Miasmatic Diseases,	382	379
Tubercular	443	450
Brain	238	243
Heart	131	142
Respiratory Organs,	675	666
Digestive	140	140
Developmental Diseases of Children,	98	97
Old Age,	67	61
Violent Deaths,	83	85

This is a sufficient sample of the sort of changes which a comparison discloses throughout the whole category of the classification of diseases. They are obviously such as to deprive the Annual Summary of all statistical value. Yet unless the local health officials go through the enormous labour of classifying from the Registrars' books the deaths in the special districts, they can have no trustworthy information until three or four years after, when the Detailed Annual Reports are

issued, and the information has ceased to have any practical value.

At any rate, it cannot be applied to the immediate purposes for which it is required. In England, from the more stringent laws as to registration, the classification of diseases made from week to week is for all practical purposes identical with that published in the Detailed Reports, which are also issued more promptly. In Scotland, even with a less stringent Registration Act, it is not necessary to wait, at any rate so far as the chief towns are concerned, for three or four years. In as many months the causes of death have been certified *finally*, though imperfectly. Consequently a classification can be made up as complete by the middle of the year following the year reported upon, as it can be three or four years later. From this aspect, therefore, viz., to obtain the earliest possible information, local returns must be made up by the local officials of the large towns, and indeed of every local authority desirous of promptly and accurately gauging the health of their district.

CORRECTION FOR INSTITUTIONAL DEATHS.

There is yet another reason why local returns are necessary, which exists both in England and Scotland from a defect inherent in all national registration statistics. These show with perfect accuracy the number of births and deaths in each Registration District, regarded as the place where the birth or death actually took place. But for all the purposes of vital statistics, the births and deaths must be attributed to the locality in which the woman who gave birth to the child and the person who died usually resided. This can only be done by distributing the births and deaths in Institutions and the casual births and deaths occurring away from the usual domicile. A certain number, therefore, of the births and deaths registered within a city such as Glasgow, for example, will be *excluded* by reference to districts outwith the city; a larger number will be referred to other districts within the city. On the other hand, a certain number registered outwith the city will be *included* by reference to districts within the city. The manipulations of the facts as registered chiefly concern births and deaths in Institutions, and are most extensive and important in the case of large towns, where such Institutions are found in greatest number. In Glasgow, in 1881, about 13 per cent. of all the deaths registered took place in Institutions such as Hospitals and the City Poorhouse. Besides, there are the Poorhouses of the Barony, and the Govan Combination Parishes, which are situated beyond the municipal boundary, but a large proportion of the births and deaths occurring in

which really belong to Glasgow, and must be included in the Glasgow returns. The net result of all these adjustments, as shown in the total births and deaths finally allotted to the city, does not very seriously disturb the original Registration returns so far as the mere aggregate of births and deaths is concerned. The inclusions and the exclusions to some extent balance one another. The births are generally increased and the deaths diminished. The following shows the actual results for the 4 years with which I shall presently deal:—

	Births.		Deaths.	
	Registrar-General.	Local.	Registrar-General.	Local.
1880	18,912	19,056	13,304	13,303
1881	19,106	19,143	12,916	12,909
1882	19,735	19,792	13,046	12,985
1883	19,869	19,858	14,562	14,476

The Registrar-General's statements for 1880, 1881, and 1882 are taken from the Detailed Annual Reports, those for 1883 from the Annual Summary, but in no case does the difference seriously affect birth and death-rates calculated on the same population. The proportion of illegitimate births in the whole City is slightly increased by the local returns. The classification of deaths according to their causes is of course entirely dislocated in the two statements; so also are their age and distribution. But the most important difference between the two returns is this, that the local returns alone give the true birth and death-rates, the true proportion of illegitimate births, and the true incidence of disease in the different districts of the City.

RELATION OF TOWN DEATH-RATES TO DENSITY AND HOUSE ACCOMMODATION.

Comparison of local statistics is the most fruitful purpose to which they can be applied. Let us take the revised death-rates of the Eight Principal Towns of Scotland for the 10 years, 1871-80, and compare their relative position; and then place alongside of those mean death-rates the facts of the Scotch Census Tables, which express so much of the physical circumstances of their respective populations as can be displayed in figures. It is undeniable that the inhabitants of towns differ in the physical conditions of health which they enjoy. It is but fair to take those differences into account in comparing

their vital statistics. We should never think of any comparison of the agricultural results of two farms of any value unless we had accurate information as to the comparative nature of their soil, the amount and nutritive value of the manure employed, the climate, the method of planting and sowing, the amount of labour expended upon each, and so on. So with towns. When we are asked to estimate the relative import of their death-rates, we must know what we are contrasting. With this knowledge, it is possible that a higher death-rate may be proved in certain circumstances more creditable to one community than a lower death-rate is to another community in certain quite different circumstances.

In the following Table the towns are there arranged in the order of their mean death-rate in the 10 years 1871-80, from the lowest to the highest, and alongside and opposite each town is placed (1) its density per acre; (2) the average number of rooms per house; (3) the average number of persons per inhabited room in 1881; (4) the percentage proportion of the whole population found living in houses of 1 apartment in 1881; (5) the average number of inmates in each 1 apartment house; (6) the percentage proportion of the whole population found living in houses of 5 apartments and upwards; and (7) the average number of inmates in those large houses.

TABLE SHOWING RELATION OF DEATH-RATE TO HOUSE ACCOMMODATION IN EIGHT PRINCIPAL TOWNS OF SCOTLAND.

Town.	Death-rate, 1871-1880.	Density (persons per acre), 1881.	Rooms per house.	Persons per room.	Per cent. of population living in 1 apartment houses.	Average number of persons per 1 apartment house.	Per cent. of population living in 5 apartments and upwards.	Average number of persons in 5 apartments & upwards.
Aberdeen	21.7	18	3.42	1.511	13.6	2.4	18.7	6.9
Leith -	22.5	43	2.98	1.671	14.2	3.0	15.2	6.3
Perth -	22.6	7	4.96	1.312	10.0	2.3	25.7	6.8
Edinburgh	23.2	55	4.19	1.320	16.8	2.7	27.3	6.6
Dundee -	25.7	42	2.85	1.870	16.9	2.7	14.1	11.2
Greenock	27.4	46	2.64	1.907	15.4	3.2	12.0	7.0
Paisley -	27.8	16	2.42	1.984	23.0	3.4	11.4	7.5
Glasgow -	28.6	84	2.34	2.054	24.7	3.1	8.5	7.8

1. *Density*.—Glasgow is the most densely populated of the eight towns, and also the most unhealthy; but when we compare the density and death-rate of the other towns, the relationship is lost. The most sparsely populated town is

Perth, and though among the healthiest, it is not the healthiest. Paisley has a death-rate but little below that of Glasgow, yet in density it is slightly below Aberdeen, which is the healthiest town in Scotland. Edinburgh is among the healthiest of the eight towns, yet in density it comes next to Glasgow, though with a long interval. As to the general relationship of a high density to a high death-rate there can be no doubt. Liverpool is the only town in this country the density of which is greater than Glasgow, and it is the most unhealthy town in Great Britain. The size of a town makes a high density tell more severely on the conditions of health. One acre inhabited by 81 people is not so grave a physical fact as 6000 acres inhabited at the same rate. Again, local knowledge is required to enable us to estimate the exact value of the density as a true expression of the proportion of the inhabitants to the area which is continuously inhabited. Every community has open country around its circumference. If the *whole community* is embraced in a town, then it will always be possible, by taking in within the boundaries of the town sufficient unbuilt space, to reduce the *apparent* density to a proportion only limited in sparseness by the extent of unbuilt space included. If the *whole* community is not embraced in a town, then we are dealing with a *district of a community*, a part of a town, and the density truly represents the amount of earth-space and super-imposed air-space which the inhabitants share. This space truly exhibits the area in which they live and which can contribute to their health and comfort, being streets, squares, open-spaces, distributed over the area upon which their actual dwelling places are distributed. I leave the application of the general principles to the other Scotch towns, so as to estimate the real value of their densities, to those who know their local circumstances as well as I know those of Glasgow. Glasgow, as the term is used for statistical purposes, means a city which is the third in the empire as regards population, and yet it represents only a central district of a community which is more than a fourth larger. The division of the population by the area therefore yields a true density, and a density which is the average of a large area, and therefore develops the gravest importance of density as a physical fact.

2. *The comparative House-Room of the Eight Scotch Towns.*

—If we could ascertain the cubic contents of every dwelling-house or room, we should get to the heart of this element of density in the physical circumstances of the inhabitants of towns. This we cannot do, but the Scotch Census includes the number of apartments in each house, and the number of inhabitants found living in each house. Unfortunately, while the English Census gives the number of inhabited houses, it

does not give the number of inhabited rooms in each house. As the definition of a "house" in the nomenclature of the English Census corresponds to what in Scotland is called a tenement, embracing many "houses," in the Scotch acceptance of the term, the average number of inmates per house in English towns is deprived of all social and statistical value. We cannot, therefore, extend to England this investigation into the comparative house-room of urban populations. The facts contained in the table on page 495 are unique in character, and are of supreme social and vital importance.

(a) *The average Size of House.*—This is largest in Perth and Edinburgh, where there are 4.96 and 4.19 rooms per house, and smallest in Glasgow, where there are 2.34 rooms. The towns fall, in reference to death-rate and size of house, into two well-marked sets of four—viz., Aberdeen, Leith, Perth, and Edinburgh, with death-rates below 24, and houses of 3 to 5 rooms: and Dundee, Greenock, Paisley, and Glasgow, with death-rates above 25 and houses below 3 rooms. In this group the death-rate rises *pari passu* with the diminution in size of the average house.

(b) *Average number of Inmates or Persons per Inhabited Room.*—This follows the average mortality very closely. As a rule, the towns in which the inhabitants are most crowded in their dwelling apartments are the most unhealthy. The four towns which have the highest death-rates are Glasgow, Paisley, Greenock, and Dundee, and these are the four towns whose inhabitants are most crowded in their houses. The crowding and the death-rate increase *pari passu*. The number of persons per inhabited room rises thus—Dundee, 1.870; Greenock, 1.907; Paisley, 1.984; Glasgow, 2.054; and the death-rates rise thus in the same order—25.7, 27.4, 27.8, 28.6 per 1000 of the population. It will be observed that this aspect of density explains the apparent anomaly of Paisley with a density of only 16 per acre, while the death-rate is 27.8. While the other four towns have all much less crowding of the inhabitants in their houses and much lower death-rates than the four specified, Perth and Edinburgh are exceptional, as having less crowding than Aberdeen and Leith, but higher death-rates. Still they form a group by themselves, having, as compared with the other group, much less crowding and a much lower mortality. If we exclude Perth and Edinburgh, it is the fact that in the remaining six towns of Scotland the mortality rises *pari passu* with the number of persons per inhabited room.

(c) *Percentage of Population living in Houses of One Apartment.*—This is a social fact of great importance. That the four walls of a single room, whatever the size, is the common space in which all the functions of family life are to be

performed, in which life is begun and ended, cannot but have a grave relation to the moral tone of the family. It has evidently also a close relation to physical health. A general survey of the columns of mortality and percentage of population occupying houses of one apartment, proves clearly the general proposition that the higher death-rates are associated with populations having the largest proportion so housed. Putting aside Perth, which has the smallest proportion of small houses, we find at one end of the scale Aberdeen with 13.6 per cent. of its inhabitants living in one room and the lowest death-rate; at the other end, Glasgow with the enormous proportion of 24.7 per cent. and the highest death-rate. The gradation between those extremes may be said to be unbroken. The mortality rises *pari passu* with the percentage of the population in small houses. In another column the average number of individuals living in each one-apartment house is given. Here also there is a general relation between the crowding of one-apartment houses and a higher mortality. The most crowded small houses—viz., those with between 3 and 4 inmates, are found in the most unhealthy towns—viz., Greenock, Paisley, and Glasgow. Aberdeen and Perth, which are the healthiest towns, have absolutely the fewest inmates in their small houses, viz., between 2 and 3. Paisley, which has a death-rate closely running Glasgow for the highest position, has absolutely the most crowded small houses—viz., an average of 3.4 inmates.

(d) *Percentage of Population living in Houses of Five Apartments and Upwards.*—This also is a social fact of great importance. It represents physical conditions of life exactly the reverse of those of the percentage living in one room. The two percentages are the complements one of the other. As the proportion of the population living in small houses decreases, the proportion of those living in larger houses increases, and *vice versa*: and we have a parallel measurement of the average physical and moral conditions of life in the community. A general survey and comparison of the columns in the table shows this clearly in the close association of high death-rates with a low proportion of the population living in spacious houses, and of low death-rates with a high proportion. The four unhealthiest towns have the four lowest percentages of their inhabitants spaciouly housed; the four healthiest towns have the four highest percentages spaciouly housed. Edinburgh has absolutely the highest proportion of its population living in houses of 5 apartments and upwards—viz., 27.3 per cent., and it has a mean death-rate of 23.2 per 1000; while Glasgow has absolutely the lowest proportion—viz., 8.5 per cent., and it has a mean death-rate of 28.6 per 1000. Perth has a proportion but little below Edinburgh—viz., 25.7 per

cent., and the death-rate is only a little higher—viz., 22.6 per 1000. In another column the average number of inmates in these large houses is given, and the same relation between crowding of large houses and high death-rates is apparent, as in the case of small houses. The most crowded large houses are found in Dundee, viz., over 11 inmates per house, and it is in the unhealthy group of towns, though not prominently so. Glasgow has, with the exception of Dundee, the most crowded large houses—viz., 7.8 inmates. In general, it is the fact that the most crowded houses, both large and small, are associated with the highest mortality, and the least crowded with the lowest. Although this is but following into the detail of houses of different sizes, the relation of inmates to house which is summed up and expressed for each town in the average number of persons per inhabited room, it develops a new fact in the association of a high mortality with a high average. A large proportion of large houses lowers the average per room, and a large proportion of small houses raises the average; but in towns which have the highest averages and the highest mortality the overcrowding arises from some cause which influences all grades of the population to minimise their house-room. That cause may be *res angusta domi*; straitness of circumstance, which imposes this tendency upon the inhabitants, or it may be a low estimate of the moral and physical importance of house-room which leads them to sacrifice the desire for fresh air and decency to the gratification of lower appetites, such as drink or dress. Whatever the cause may be, its influence is shown not only in selecting small houses, but in crowding houses of all sizes.

3. Let us endeavour to sum up the facts in the preceding pages in the form of *an apology for Glasgow*. It is, no doubt, still the unhealthiest town in Scotland; but there is no town in Scotland with which we can fitly compare it. The population of Glasgow is nearly two and a quarter that of Edinburgh, and considerably larger than that of the other six towns added together. In England, we have, excluding London, only Liverpool above it in population and in density. Liverpool, Glasgow, and Manchester are the three most densely populated towns in the country, and Glasgow is in recent years the healthiest of the three.

Let us now confine our remarks to the eight Scotch towns with which comparisons are naturally made as their relative death-rates are published from time to time. Glasgow is, as I have said, enormously the largest of the eight. It is also enormously the densest. At the Census Glasgow had a population of 511,532, living on an area of 6111 acres; Edinburgh a population of 228,190, living on an area of 4180; and the

other six towns a population of 462,970, living on an area of 20,097 acres! Not only are the inhabitants of Glasgow more crowded upon the soil than in any other Scotch town, but they are the most crowded in their houses. Glasgow has the largest population living in one-room houses, and the smallest, very much the smallest, living in houses of the largest size. Let us make a precise comparison between Glasgow and Edinburgh as to house room. In Glasgow there are 2.054 persons on an average living in each inhabited room, in Edinburgh 1.320; in Glasgow 25 per cent. of the population live in houses of one apartment, in Edinburgh 17 per cent.; in Glasgow 8½ per cent. of the population live in houses of five apartments and upwards, in Edinburgh above 27 per cent.; in Glasgow there is an average of 3.1 inmates in each one apartment house, and 7.8 in each house of five apartments and upwards; in Edinburgh 2.7 and 6.6. It is impossible to exaggerate the difference in the physical, moral, and social circumstances of the populations of Glasgow and Edinburgh. In 1881 there were in Glasgow 126,264 persons living in houses of one apartment, and 228,629 living in houses of two apartments, while the whole population of Edinburgh was only 228,326. We may well ask—Is it to be wondered at that the mean death-rate of Glasgow was 28.6 and of Edinburgh 23.2?

Part II. The Districts of Glasgow.

The opening pages of this Part are devoted to a discussion of the District Statistics of Glasgow on the basis of the mean results of the three years, 1880-1-2; these years being selected because the central year of the period, being a census year, afforded a true mean population. Thereafter their physical contrasts are considered in detail.—(Ed.)

We began this survey of the Districts of Glasgow with "Blythswood," which was remarkable as having the lowest proportion of inmates per inhabited room, the largest proportion of large-sized houses, the lowest death-rate, the lowest birth-rate, the lowest mortality under 5 years, the lowest proportion of deaths under 1 year per 1000 born, and the lowest proportion of Irish-born. We end it with "Bridgegate and Wynds," which has the largest proportion of inmates per inhabited room, the largest proportion, save one, of 1 apartment houses, the highest death-rate over all, the highest death-rate under 5 years, the largest proportion of deaths under 1 year per 1000 born, and the highest percentage of Irish-born inhabitants.

This District lies between Stockwell Street and Saltmarket on the west and east, and Trongate and Clyde on the north and

south. The Union Railway occupies the very centre. Between the clearances necessary to its formation and the operations of the Improvement Trust, this District has been, so to speak, disembowelled. Still, in those portions which remain, we find a population the like of which for social and moral degradation is not to be found in the city. Their houses, though much has been done for them, are radically bad, and total demolition and reconstruction is the only remedy. To enumerate those plague spots would simply mean to catalogue all the wynds, narrow, noisome streets and closes of this unhappy area, and to bring once more into public notice names which have been the heartbreak of successive generations of Glasgow philanthropists.¹

COMPARATIVE DISTRICT MORTALITY.

[A Table not reproduced brought together the death-rates of the Districts at all ages, and under 5 years, in the periods 1871-2 and 1880-1-2.]

The comparison shows that *in all the* Districts the general death-rate was much lower in the latter period than in the former; and that in all the Districts, except Cowcaddens, the death-rate under 5 years was also much lower in the latter period than in the former. This result is important, as proving that the displacement of the inhabitants of the central parts of the city has not deteriorated the health of the Districts into which they have removed. It was proved by special investigation that the people whose wretched houses were demolished by the Improvement Trust distributed themselves over the city.² It is often said that the habits of these people are such that, go where they please, they will not be better of the change. It is evident, however, that they found physical conditions so much more conducive to health, that whether or not their habits have been improved, undoubtedly their health has been, in their new residences. The moral is to persevere in the destruction or improvement of the houses of the people. The certain result is to improve their health.

The Districts which had the *lowest* death-rate in 1880-1-2 had the *lowest* also in 1871-2, viz., Blythswood and Kelvinhaugh and Sandyford; while the District which had the highest death-rate in 1871-2—viz. High Street and Closes (W.), was lower than six other districts in 1880-1-2, Bridgegate and Wynds having then the absolute *highest* death-rate, and having been next to High Street and Closes (W.) in 1871-2. As to

¹The 1897 Improvement Act included all the remaining portions of this district.

²See Chapter V.

the death-rate under 5 years, the same two Districts which were *lowest* in general death-rate in both periods were also lowest in infantile mortality in both periods—viz., Blythswood and Kelvinhaugh and Sandyford. In both periods the same District held the unhappy position of being the *highest* in infantile mortality—viz., Bridgegate and Wynds.

[A similar contrast is then shown in (a) Diseases of the Lungs, (b) Consumption, and (c) Infectious Disease.]

DISTRICT PERCENTAGE OF DEATHS UNCERTIFIED.

The large proportion of the total deaths in Glasgow, the causes of which are not certified by any Medical Attendant, is a fact of serious moment, to which attention has frequently been directed. Of all the deaths in the city in the three years 1880-1-2, there were 9 per cent. uncertified. When we compare the Districts as to certification, the gravity of the facts disclosed cannot be overestimated. In Kelvinhaugh and Sandyford, and in Kingston, only 3 per cent. of the total deaths were uncertified, while in the Bridgegate and Wynds no less than 25 per cent. were uncertified. The same districts are highest and lowest in the proportion uncertified below 5 years of age. In Kelvinhaugh and Sandyford only 5 per cent., in Kingston only 4 per cent. of the deaths under 5 years were uncertified, while in Bridgegate and Wynds the proportion was no less than 40 per cent! Above 5 years of age Kelvinhaugh and Sandyford only 1 per cent., in Kingston and Laurieston only 2 per cent. were uncertified, while in Bridgegate and Wynds and Brownfield 15 per cent., and in St. Enoch Square 16 per cent. were uncertified. Taking infantile deaths, we find that in Kelvinhaugh and Sandyford 8 per cent. were uncertified, and in Bridgegate and Wynds no less than 57 per cent! These facts mean (1) *that to the extent of these percentages we have actually no accurate knowledge of the causes of the mortality in those Districts*, and (2) *that to the extent of these percentages fatal cases of sickness in these Districts have no effectual medical attendance*. The first inference stands absolutely without qualification or possibility of question. The second may be slightly modified, because it can be shown from the statements made to the Registrars by relatives, that while the greater number of persons whose deaths were not certified had "no medical attendance," a certain proportion were said to have been so attended, although the alleged attendant would not certify when asked, and a larger proportion were stated to have been seen by someone in their last illness at a Dispensary, whether private or public. Still, let us take Bridgegate and Wynds, and calculate the proportion of those

who died in this District who were admitted to have had no medical attendance in their last illness, and the following are the facts:—There were 884 deaths in 1880-1-2 in this District, of which 175, or 20 per cent. occurred *without medical attendance*. Dividing these according to the age of the deceased, below 5 years and 5 years and upwards, we find that below 5 years there were 364 deaths, of which 112, or 31 per cent., occurred *without medical attendance*; while at five years and upwards there were 520 deaths, of which 63, or 12 per cent., occurred *without medical attendance*.

DISTRICT CERTIFICATION OF CHILD LIFE AND ILLEGITIMACY.

If we follow these facts into the comparative non-certification of Legitimate and Illegitimate children, their suggestiveness becomes dark and dismal. The proportion of illegitimate children is *lowest* in Kelvinhaugh and Sandyford, St. Rollox and Springburn and Maryhill, in each of which it is only 5 per cent. of the total births, the city mean being 8. It is *highest* in that District conspicuous for everything that is bad—viz., Bridgegate and Wynds, 22 per cent. In the whole city 32 per cent. of the *Illegitimate* children who died before the end of their first year were uncertified, against 18 per cent. of the *legitimate* children. In the whole city 22 per cent. of the *illegitimate* who died between their first and fifth year were uncertified, against 8 per cent. of the *legitimate* children. When the total numbers for the city are distributed into Districts they become too small to yield trustworthy calculations at any rate in the smaller Districts. Still we find in the best District, Kelvinhaugh and Sandyford, this contrast under 1 year—uncertified *illegitimate* 11 per cent., *legitimate* 8 per cent.; and in the worst District, Bridgegate and Wynds, *illegitimate* uncertified 61 per cent., *legitimate* 55 per cent. In the most populous District, Hutcheson Square, where the numbers are amply adequate as a basis for calculations, the contrast is very striking. Under 1 year, *illegitimate* uncertified 26 per cent., *legitimate* 11 per cent. Above 1 year and under 5 years, *illegitimate* uncertified 21 per cent., *legitimate* 6 per cent.

DISTRICT INSURANCE OF LIVES IN FRIENDLY SOCIETIES.

The prevalence of Insurance of Lives in Friendly Societies in Glasgow is remarkable. In the whole city 45 per cent. of all who died were so insured. Under 5 years the proportion was 40 per cent., and above 5 years 49 per cent. The practice

is most common in the working class Districts. In St. Rollox the *highest* portion is found—viz., 58 per cent. In Springburn and Maryhill the proportion was 57 per cent., in Greenhead and London Road 56. The *lowest* proportion was 29 per cent. in St. Enoch Square. In Kelvinhaugh and Sandyford there was 35 per cent., and in Bridgegate and Wynds 32 per cent., showing, as we might expect, that providence is not one of the virtues of that unhappy district. The proportion insured below and above 5 years of age points to the same conclusion. The *highest* under 5 years was 51 per cent. in St. Rollox, and 50 per cent. in Springburn and Maryhill; the *lowest* was 26 per cent. in Blythswood, and 28 per cent. in Bridgegate and Wynds. The *highest* above 5 years was 70 per cent. in Port-Dundas, 64 per cent. in St. Rollox, and in Springburn and Maryhill; the *lowest* was 30 per cent. in St. Enoch Square, and 35 per cent. in Bridgegate and Wynds.

HOW DISTRICT DATA AS TO SIZE OF HOUSE AND OCCUPANCY ARE OBTAINED—THEIR IMPERFECTIONS.

Some explanation is necessary as to the method of calculating the data of which I propose to make so much use, as a gauge of the circumstances of the District populations as to the cardinal element of air space—viz., the mean number of rooms per house and of persons per room. In Part I. of this Report I showed how closely the mean death-rates of the Eight Principal Towns of Scotland, for the 10 years 1871-80, followed these data. In comparing towns, it is necessary to make the calculations from the total population, the total number of inhabited houses, and the total number of rooms in those houses, including under the designation "house," all institutions and other inhabited buildings. This is necessary, because no distinction of dwelling-houses, properly so-called, from institutions, is made in the aggregate statistics of towns. It is also statistically sound, because all towns, in their entirety, may be taken to have the same relative admixture of such institutions. But when we come to divide towns into districts, the case is different. In some districts there are institutions, in others none; all the inhabitants are dwellers in private houses. Unfortunately, though we can exclude the larger institutions, we cannot exclude the smaller. For this reason, the District data as to mean size of house and occupancy are in many instances vitiated as pure expressions of the house accommodation of the private householders. This is especially true of all the more central Districts. The Registrar-General classified as "Institutions," those only which were inhabited or

anticipated to be inhabited, by over 200 inmates, in 1881.¹ In some cases the inmates were found to be at the date of the census, somewhat below the anticipated number; but with these exceptions, *all institutions having under 200 inmates were classed as "houses."* There are still other vitiating elements in the calculation of these important data as regards the districts of towns. All hotels, common lodging and boarding-houses are included as private houses. These also are most numerous in the more central districts. All these qualifications of the purity of our data as representing the facts as to private dwellings only must be taken into account. The "institutions," as artificially defined are excluded, with their rooms and inmates, also ships and their crews; but there remain, of varying proportion in the Districts, all institutions having below 200 inmates, all hotels, boarding and common lodging-houses. Some Districts, especially the circumferential, are practically free from these disturbing elements; but in others they must seriously tell, and the smaller the District the more seriously—*e.g.* (12) St. Enoch Square, and (10) St. Andrew's Square. In both there are large hotels, lodging-houses, and some minor institutions, with a residential poor population; and hence we have a death-rate which seems abnormally high when we look at the relatively favourable position of those Districts as to mean size of house and occupancy.

RELATION OF SIZE OF HOUSE TO OCCUPANCY OR PERSONS PER ROOM.

The mean number of rooms per house in the city in 1881 was 2.322, and the mean number of persons per room 2.040.² To get rid of fractions we may say that in 1000 average houses there were 2322 Rooms, and in 1000 of these Rooms 2040 inhabitants. The former we shall designate the "Standard House," and the latter the "Standard of Occupancy."

First let us consider the *Relation of Size of House to Occupancy or Persons per Room*. There are 8 Districts which have houses the mean size of which is *above* the size of the "Standard House," and that the same 8 Districts have rooms *below* the "Standard of Occupancy." There are also 16 Districts which have houses the mean size of which is *below* the "standard House," and the same 16 Districts have rooms *above* the "Standard of Occupancy."

¹See p. 3 of my *Census Report* (1881) for explanation and criticism of variable meaning of "Institutions" in Census nomenclature.

²These figures are also exclusive of "Institutions."

From these facts we deduce the following :—

STANDARD OF OCCUPANCY.

That the smaller the house, the greater the number of inhabitants per room; or, in other words, the smaller the house the less cubic space per inmate. *Vice versa*, therefore, the larger the house the fewer the number of inhabitants; or, in other words, the greater the cubic space per inmate per room.

Density.—In describing the Districts we pointed out that the density was, as a rule, fictitious from such causes as the area devoted to public parks, the extent of as yet unbuilt ground, and the presence of railway stations, large public works, &c., &c. No one, however, will dispute the fact, that the larger the houses the lower the true density, and the smaller the houses the higher the true density. This is a recognised fact in the economics of house provision, but it is practically impossible to calculate the true density of small areas of towns. We call the fact to remembrance here because it intensifies the hygienic gravity of the "law of occupancy."

We have therefore two sets of Districts, the one of which has *Houses* the mean size of which is *above* the size of the "Standard House," and Rooms which are inhabited *below* the "Standard of Occupancy"; the other of which has houses and rooms, which as to size and occupancy, are the reverse. The following are the names and numbers of those two sets of Districts.

1. Eight Districts having houses *above* the standard house as to size, and below the standard as to occupancy—viz. (in the order from *lowest* upwards of persons per 1000 rooms, Table p. 57) Blythswood; 17, or Kelvinhaugh and Sandyford; 12, or St. Enoch Square; 1, or Exchange; 9, or Monteith Row; 15, or Woodside; 19, or Kingston; 10, or St. Andrew's Square.

2. Sixteen Districts having houses *below* the standard house as to size, and *above* the standard as to occupancy—viz. (in the order from the lowest upwards of persons per 1000 rooms, Table p. 57) 5, or Bellgrove and Dennistoun; 21, or Hutcheson Square; 22, or Gorbals; 13, or Brownsfield; 18, or Anderston Proper; 4, or St. Rollox; 20, or Laurieston; 11, or Calton Proper; 3, or High Street and Closes (W.); Springburn and Maryhill; 8, or Barrowfield; 7, or Greenhead and London Road; 6, or High Street and Closes (E.); 16, or Cowcaddens; 2, or Port-Dundas; 14, or Bridgegate and Wynds. We shall now contrast these two sets of Districts as to their Vital Statistics.

RELATION OF DISTRICT DEATH-RATES TO HOUSE ACCOMMODATION.

The mean death-rate of the City was 25.2 per 1000 inhabitants. We shall call this the "standard death-rate."

Of the 8 Districts having houses *above* the standard house as to size, and *below* the standard of occupancy, *all except one* had a death-rate *below* the standard death-rate.

The exception was District 10, or St. Andrew's Square, which had the smallest houses and the highest number of occupants per room in this group of districts, and a death-rate of 28.7. We have already suggested an explanation of this exception.

Of the 16 Districts having houses *below* the standard house as to size, and *above* the standard of occupancy, *all except four* had a death-rate above the standard death-rate. The exceptions were Districts 5, or Bellgrove and Dennistoun; 21, or Hutcheson Square; 4, or St. Rollox; and Springburn and Maryhill. We shall defer our observations on these exceptions until we have completed our survey of the relation of various other items in the Vital Statistics of the Districts to house accommodation.

RELATION OF DISTRICT DEATH-RATES FROM ACUTE DISEASES OF THE LUNGS TO HOUSE ACCOMMODATION.

The mean Death-rate of the City from *acute diseases of the lungs* was 579 per 100,000 inhabitants (5.79 per 1000). We shall call this the "standard death-rate from acute diseases of the lungs."

Of the 8 Districts having houses *above* the standard house as to size, and below the standard of occupancy, *all except one* had a death-rate from acute diseases of the lungs *below* the standard death-rate. The exception was again District 10, or St. Andrew's Square, which had the smallest houses, and the highest number of occupants per room in this group of districts, and a death-rate of 748 from acute diseases of the lungs.

Of the 16 Districts having houses *below* the standard house and *above* the standard as to occupancy, *all except four* had a death-rate from acute diseases of the lungs above the standard death-rate. The exceptions were Districts 5, or Bellgrove and Dennistoun; 4, or St. Rollox; Springburn and Maryhill; and 7, or Greenhead and London Road.

RELATION OF DISTRICT DEATH-RATES FROM CONSUMPTION TO HOUSE ACCOMMODATION.

The mean death-rate of the City from *consumption* was 301 per 100,000 inhabitants (3.01 per 1000). We shall call this the "standard death-rate from consumption."

Of the 8 Districts having houses *above* the standard house as to size, and *below* the standard of occupancy, *all except one* had a death-rate from consumption *below* the standard death-rate. The exception was again District 10, or St. Andrew's Square, which had a death-rate of 343 from consumption.

Of the 16 Districts having houses *below* the standard house as to size, and *above* the standard of occupancy, *all except six* had a death-rate from consumption above the standard death-rate. The exceptions were Districts 5, or Bellgrove and Dennistoun; 22, or Gorbals; 4, or St. Rollox; 20, or Laurieston; Springburn and Maryhill; and 2, or Port-Dundas.

RELATION OF DISTRICT DEATH-RATES FROM ACUTE DISEASES OF THE LUNGS AND CONSUMPTION TOGETHER TO HOUSE ACCOMMODATION.

The mean death-rate of the City from *acute diseases of the lungs* and consumption was 880 per 100,000 inhabitants (8.8 per 1000). We shall call this the "standard death-rate from acute diseases of the lungs and consumption."

Of the 8 Districts having houses *above* the standard house as to size, and *below* the standard of occupancy, *all except one* had a death-rate from acute diseases of the lungs and consumption *below* the standard death-rate. The exception was District 10, or St. Andrew's Square, which had a death-rate of 1091 from these diseases.

Of the 16 Districts having houses *below* the standard house as to size, and *above* the standard of occupancy, *all except four* had a death-rate from acute diseases of the lungs and consumption *above* the standard death-rate. The exceptions were Districts 5, or Bellgrove and Dennistoun; 4, or St. Rollox; Springburn and Maryhill; and 7, or Greenhead and London Road.

RELATION OF DISTRICT DEATH-RATES FROM INFECTIOUS DISEASES TO HOUSE ACCOMMODATION.

The infectious diseases are fever (typhus, enteric, undefined), small-pox, scarlet fever, measles, whooping-cough, croup, and diphtheria. The mean death-rate of the City from these diseases was 343 per 100,000 inhabitants (3.43 per 1000). We shall call this the "standard death-rate from infectious diseases."

Of the 8 Districts having houses *above* the standard house as to size, and *below* the standard of occupancy, *all* had a death-rate from infectious diseases *below* the standard death-rate.

Of the 16 Districts having houses *below* the standard house as to size, and *above* the standard of occupancy, *all except four* had a death-rate from infectious diseases *above* the standard

death-rate. The exceptions were 5, or Bellgrove and Dennistoun; 4, or St. Rollox; 3, or High Street and Closes (W.); and Springburn and Maryhill.

RELATION OF DISTRICT BIRTH-RATES TO HOUSE ACCOMMODATION.

The mean birth-rate of the City was 37.3 per 1000 inhabitants. We shall call this the "standard birth-rate."

Of the 8 Districts having houses *above* the standard house as to size, and *below* the standard of occupancy, *all except one* had a birth-rate *below* the standard birth-rate. The exception was 15, or Woodside, which had a birth-rate of 39.4.

Of the 16 Districts having houses *below* the standard house as to size, and *above* the standard of occupancy, *all except five* had a birth-rate above the standard birth-rate. The exceptions were 22, or Gorbals; 13, or Brownfield; 20, or Laurieston; 3, or High Street and Closes (W.); and 14, or Bridgegate and Wynds. Of these, however, Districts 22 and 20 had a birth-rate only 0.1 and District 14 only 0.2 *below* the standard birth-rate. Of the 11 Districts above the standard birth-rate, District 8, or Barrowfield, was only 0.1 above it. These four Districts may, therefore, be said to have had the standard birth-rate. The 16 Districts may therefore be classified thus: 10 *above*, 2 *below*, and 4 *at* standard birth-rate. A high birth-rate clearly goes with small houses and crowded rooms, but the exceptions require elucidation, which we shall defer at present.

RELATION BETWEEN DEATH-RATE UNDER ONE YEAR PER 1000 BORN AND HOUSE ACCOMMODATION.

The death-rate under 1 year, calculated per 1000 born, is one of the most accurate and delicate tests of health and social well-being. It is the most accurate because both the deaths and births, to the standard of which the deaths are reduced, are correctly ascertained. The enumeration of the population, in which error is always possible, does not enter into the calculation. It is the most delicate, both because the successful nurture of children through their first year of life implies the highest social virtues, and because at that tender age vitality is acutely sensitive to the physical conditions surrounding the infant.

The mean death-rate of the City per 1000 children born was 148. We shall call this the "standard infantile death-rate."

Of the 8 Districts having houses *above* the standard house as to size, and *below* the standard of occupancy, *all but three* had an infantile death-rate *below* the standard.

The exceptions were Districts 9, or Monteith Row; 1, or

Exchange, and 10, or St. Andrew's Square. As District 9 had an infantile death-rate of 149, it may be said to be *at* the standard.

Of the 16 Districts having houses *below* the standard house as to size, and *above* the standard of occupancy, *all but four* had an infantile death-rate *above* the standard. The exceptions were Districts 5, or Bellgrove and Dennistoun; 21, or Hutcheson Square; 4, or St. Rollox; and Springburn and Maryhill.

RELATION BETWEEN DEATH-RATE UNDER 5 YEARS AND HOUSE ACCOMMODATION.

The mean death-rate of the City under 5 years per 1000 living under that age was 82.1. We shall call this the "standard child death-rate."

Of the 8 Districts having houses *above* the standard house as to size, and *below* the standard as to occupancy, *all but two* had a child death-rate below the standard. The exceptions were Districts 12, or St. Enoch Square, and 10, or St. Andrew's Square.

Of the 16 Districts having houses *below* the standard house as to size, and *above* the standard of occupancy, *all but four* had a child death-rate above the standard. The exceptions were Districts 5, or Bellgrove and Dennistoun; 21, or Hutcheson Square; 4, or St. Rollox; and Springburn and Maryhill.

RELATION BETWEEN ILLEGITIMACY AND HOUSE ACCOMMODATION.

The number of illegitimate children among every 100 born in the City was 8. We shall call this the "standard of illegitimacy."

Of the 8 Districts having houses *above* the standard house as to size, and *below* the standard of occupancy, there were *four* Districts below the standard of illegitimacy—viz., 17, or Kelvinhaugh and Sandyford; 9, or Monteith Row; 15, or Woodside; and 19, or Kingston; one District—viz., 1, or Exchange, was *at* the standard; and three Districts were *above* the standard—viz., Blythswood; 12, or St. Enoch Square; and 10, or St. Andrew's Square.

Of the 16 Districts having houses *below* the standard house as to size, and *above* the standard of occupancy, *all but six* were *above* the standard of illegitimacy. The exceptions were Districts 5, or Bellgrove and Dennistoun; 21, or Hutcheson Square; 4, or St. Rollox; Springburn and Maryhill; 7, or Greenhead and London Road; and 2, or Port-Dundas.

THE NEW HOUSE ACCOMMODATION OF GLASGOW.

In Part I. of this Report I said:—"If we could ascertain the cubic contents of every dwelling-house or room, we should get to the heart of this element of density in the physical circumstances of the inhabitants of towns:—In the preceding inquiry into the relation of the vital statistics of the Districts of Glasgow to the mean number of persons per room in the houses of each District, I have been endeavouring to work out from this datum the relation of space in the house to the health of the inmates. We have found that in certain Districts the general relation seems to be lost.

In general it is the fact that a District which has houses occupied *above* the standard number of persons per room (*i.e.* above the mean number of the whole city), has a general death-rate *above* the standard death-rate of the city, an infantile death-rate of the city, and especially that the fatality of those diseases which are directly related to overcrowding or deficiency of breathing space—viz., Diseases of the Lungs and Infectious Diseases, is in excess in those Districts. But there are exceptions to this law, and I propose to devote some careful consideration to these exceptions in the hope of proving that they really support the law.

A glance at the exceptional Districts shows that there are 5 which, in all our comparisons of Vital Statistics and mean number of inmates per room, appear among the exceptions to the general law. These are

- Springburn and Maryhill.
- (4) St. Rollox.
- (5) Bellgrove and Dennistoun.
- (7) Greenhead and London Road.
- (21) Hutcheson Square.

These Districts have one common characteristic—they bare the *growing* working class districts. All but one are circumferential. Comparing their populations in 1871 and 1881, the following are the Districts which had increased, with the percentage of increase:—

(15)	{ Springburn and Maryhill, ¹	-	-	-	75 per cent.
	{ Woodside,	-	-	-	66 "
(7)	Greenhead and London Road,	-	-	-	47 "
(21)	Hutcheson Square,	-	-	-	41 "
(5)	Bellgrove and Dennistoun,	-	-	-	32 "
(17)	Kelvinhaugh and Sandyford,	-	-	-	22 "
(4)	St. Rollox,	-	-	-	10 "
(9)	Monteith Row,	-	-	-	9 "
(13)	Brownfield,	-	-	-	3 "
(19)	Kingston,	-	-	-	3 "

¹This district was extended by the Municipal Extension Act of 1872, but the population added was trifling.

As the Districts were not created until 1871, we cannot ascertain their population in 1861, but as they are all subdivisions of the old 10 Registration Districts which were displaced by the rearrangement in 14 Registration Districts on 1st January, 1875, we can reconstruct the old Registration Districts and compare their population in 1861 and 1881 as follows:—

Old Registration District.	Present Statistical District.	Population.		Increase or Decrease.	
		1861.	1881.	Amount.	Percentage.
1. Central -	(1) Exchange,	49,678	49,631	-47	...
	(2) Port-Dundas,				
	(3) High Street and Closes (W.),				
2. High Church,	(4) St. Rollox, -	48,119	61,940	+13,821	+29
	(5) Bellgrove and Dennistoun,				
3. Bridgeton,	(6) High Street & Closes (E.),	45,485	73,602	+28,117	+62
	(7) Greenhead & London Rd.				
4. Calton, -	(8) Barrowfield, -	36,625	31,159	-5,466	-15
	(9) Monteith Row, -				
	(10) St. Andrew's Square, -				
5. Clyde, -	(11) Calton proper,	29,975	15,284	-14,691	-49
	(12) St. Enoch Square, -				
	(13) Brownfield, -				
6. Blythswood, -	(14) Bridgegate & Wynds, -	28,697	26,789	-1,908	-7
	Blythswood, -				
7. Milton, -	(15) Woodside, -	33,360	60,313	+26,953	+81
	(19) Cowcaddens, -				
8. Anderston,	(17) Kelvinhaugh and Sandyford, -	40,945	55,659	+14,714	+36
	(18) Anderston proper,				
9. Tradeston,	(19) Kingston, -	38,600	47,066	+8,466	+22
	(20) Laurieston, -				
10. Hutchesontown,	(21) Hutcheson Square, -	44,019	67,860	+23,841	+54
	(22) Gorbals, -				
Total,	-	395,503	489,303	+93,800	+24

"Springburn and Maryhill" was not included in the old Registration Districts, so that we cannot state its growth between 1861 and 1881, but we have only to look at a map of Glasgow for 1861 to convince ourselves that it is practically the product of the last 20 years. Indeed, as already stated, is a statistical fact that the population of this District has

increased 75 per cent. in the last 10 years. The old Registration Districts were, as a rule, decided so as to constitute the old and stagnant or retrograding part into a distinct District from the growing part, so that when we find *High Church* credited with a growth of 29 per cent. in 20 years, and observe that it is divided into Bellgrove and Dennistoun, and High Street and Closes (E.), we know that this growth was wholly in the former, and that this 29 per cent. increase is only the balance left after deducting the depopulation of the latter. Similarly, *Bridgeton* added 62 per cent. to its population in 20 years, but we observe that it is divided into Greenhead and London Road and Barrowfield, and we know that this growth was almost wholly in the former. *Milton* added 81 per cent. in 20 years, but we are sure that this enormous development was concentrated in Woodside because Cowcaddens has been stagnant. *Anderston* gained 36 per cent. in 20 years, but this growth has been in Kelvinhaugh and Sandyford, and has been partially neutralized by depopulation in Anderston proper. *Tradeston* gained 22 per cent. in 20 years, but Laurieston, we know, has been retrograding, so that more than all this increase belongs to Kingston. The small growth of Kingston during the last 10 years (only 3 per cent.) shows that the extension was chiefly the work of the previous decade. In fact, it grew towards the western boundary, which was soon crossed, and Kinning Park Burgh represents the more recent development of the district. *Hutchesontown* added 54 per cent. in 20 years, but this is merely the balance of the depopulation of Gorbals and the growth of Hutcheson Square, which we may safely conclude has doubled its population.

We obtain some conception of the size and social composition of this New Glasgow from a statement which I have compiled, from materials furnished by the Master of Works, of the number of dwelling-houses, classified according to size, for the erection of which authority was granted by the Dean of Guild Court in each year since 1866. That is the date of the present Police Act, under the building regulations of which this New Glasgow has been erected. . . . The following is a summary of the facts for the 15 years, 1866-80:—

Size of House.	No. of Houses.	Population.
1 Apartment,	10,439	32,361
2 Apartments,	22,960	112,504
3 Do.,	8,671	45,956
4 Do.,	2,383	12,630
5 Do.,	1,183	9,227
Total,	45,636	212,678

The population inhabiting these new houses is estimated from the average number of inmates per house of each size found at the census, as given in Table V. Appendix to Part I of this Report. What does this statement show? That in the 15 years 1866-80, we built, under the improved conditions imposed by the Glasgow Police Act, a city of 212,700 inhabitants, of whom 15 per cent. occupy houses of 1 apartment; 53 per cent. houses of 2 apartments; 21½ per cent. houses of 3 apartments; 6 per cent. houses of 4 apartments; and 4½ per cent. houses of 5 apartments and upwards. This is 42 per cent. of the whole population in 1881.

AIR-SPACE OF A "ROOM" IN NEW AND IN OLD GLASGOW.

We have taken the number of persons per room as the best available representation of the comparative position of the inhabitants of the Districts as to air space. But it is evident that a "room" in a tenement built within the last 10 or 20 years must represent conditions of space very much better than a "room" in a tenement in "Bridgeway and Wynds," or in "Gorbals" or in "Laurieston." *Externally*, we have, fronting the modern tenement, comparatively broad, well aerated streets, and houses generally occupied as originally designed, and opening directly on the common stair; while in the old tenements we have back lands, narrow streets and alleys, and, above all, "made-down houses"—*i.e.* houses occupied as one, two, or three apartment dwellings, which were originally the kitchen, parlour, and bed-rooms of large houses, access to which is obtained by long, ill-ventilated L and T lobbies. *Internally*, we have in the modern tenements, loftier ceilings, and more liberal dimensions generally, giving more cubic space per room than in the old tenements.

This is a matter of too much interest and importance to be trusted to generalities. I have therefore obtained some measurements of the dimensions of small houses of old and of modern construction, which I have classified as follows:—

1. CUBIC CONTENTS OF OLDEST HOUSES, MOSTLY 'TICKETED.'

Size of House.	No. of Houses.	Mean Cubic Space per House.	Mean Cubic Space per Room.
1 Apartment,	646	1,163	1,163
2 Apartments,	327	1,860	930
3 Do.,	18	2,780	927

There are 991 houses in this group, of which 426 are in High Street, Saltmarket, Bridgeway, King Street, Stockwell and

vicinity, the remainder in the oldest portions of the other districts of the city.

2. CUBIC CONTENTS OF MORE RECENT, BUT STILL OLD HOUSES IN TRADESTON.

Size of House.	No. of Houses.	Mean Cubic Space per House.	Mean Cubic Space per Room.
1 Apartment,	100	1,607	1,007
2 Apartments,	104	2,077	1,038
3 Do.,	110	3,656	1,219

There are 314 houses in this group, all in Tradeston, which was feued by the Trades' House at the end of last century.

3. CUBIC CONTENTS OF NEW HOUSES IN DISTRICT 15, OR WOODSIDE.

Size of House.	No. of Houses.	Mean Cubic Space per House.	Mean Cubic Space per Room.
1 Apartment,	100	1,268	1,268
2 Apartments,	100	2,498	1,249
3 Do.,	23	3,722	1,240

These 223 houses are nearly all in recently built tenements in Hopehill Road, and fairly represent the ordinary run of artizans' dwellings erected by private enterprise under the usual conditions of the Glasgow Police Act, 1866.

4. CUBIC CONTENTS OF NEW HOUSES—OATLANDS AND OVERNEWTON.

Size of House.	No. of Houses.	Mean Cubic Space per House.	Mean Cubic Space per Room.
1 Apartment,	116	1,344	1,344
2 Apartments,	137	2,637	1,318
3 Do.,	101	3,999	1,333

These 354 houses are all situated on the lands of Oatlands and Overnewton, which were purchased by the Improvement Trust, and feued in accordance with a plan carefully laid out by the Master of Works, reserving in each case a central square as breathing space. They represent the best class of modern artizans' dwellings in the city.

The general effect of these measurements is to establish our contention that the unit "room" represents increased internal

air space in tenements of recent construction as compared with those of old date. Of 1 apartment houses the mean air space is, in old houses, 1163 cubic feet, in the Tradeston houses 1007, in ordinary builders' tenements 1268, and in the Improvement Trust feus 1344 cubic feet. It is only in the case of one apartment houses that the old tenements have any advantage. They are larger than in the tenements of Tradeston. These commodious single rooms are almost entirely confined to the Central District, and are found in the old houses of the early Glasgow gentry. Some of them contain over 2000 cubic feet. Still this *internal* air space is deprived of its utility by the deficiency of the *external* air space, and the fact that they are occupied by the lowest classes in the community, among whom overcrowding is only kept down to the legal limit of 300 cubic feet per adult by constant night visitation and prosecution. In 2 apartment houses the increase of air space per room is unbroken. Of the old houses the mean air space per room was only 930 cubic feet, of the Tradeston houses 1038, in ordinary modern builders' tenements, 1249, and in the Improvement Trust feus 1318. In 3 apartment houses the same progressive increase is evident. Of the old houses, the mean air space per room was only 927 cubic feet, of the Tradeston houses 1219 in the ordinary builders' tenements 1240, and in the Improvement Trust feus 1333. If we calculate the mean air space of all those houses of 1, 2, or 3 apartments in the four groups, we find that in the old houses it was 1007 feet per room, in the Tradeston houses 1088, in the ordinary builders' houses 1252, and in the Improvement Trust feus 1322.

HEIGHT OF CEILING OF "ROOM" OF OLD AND NEW GLASGOW.

I have classified the houses in these groups above according to the height of the ceiling, with interesting results, which are collected into the following Table:—

Height of Ceiling.	No. of Houses in each Group.				Percentage at each height.			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
6 ft. and under 7 ft.,	64	2	6.4	0.6
7 " " 8 "	277	47	1	...	28.0	15.0	0.5	...
8 " " 9 "	356	117	27	...	36.0	37.0	12.0	...
9 " " 10 "	232	90	133	133	23.4	29.0	59.6	37.5
10 " upwards,	62	58	62	221	6.2	18.4	28.0	62.5
Total,	- 991	314	223	354				

These figures prove that there has been a progressive increase in the height of ceiling of artizans' dwelling. In the oldest houses we find above 6 per cent. with ceilings 10 feet and upwards, because even in those ancient times the gentry realised the advantages of lofty ceilings, and 10 to 11 feet was their limit, just as 12 to 14 feet is the choice of the West-End successors. But in those times a large proportion of the working class tenements had ceilings as low as 6 feet and under 7 feet or 7 feet and under 8 feet. These figures gradually disappear as we come to modern tenements, until the old genteel limits have become the rule in the modern artizans' dwellings of Glasgow. In the ordinary builders' tenements scarcely any houses have ceilings below 8 feet, nearly 60 per cent. are 9 feet and under 10 feet, and 28 per cent. 10 feet and upwards, while in the Improvement Trust feus there are no ceilings below 9 feet, and nearly 63 per cent. have ceilings of 10 feet and upwards in height.

VITAL STATISTICS OF FOUR GROUPS OF DISTRICTS.

On the basis of these facts we may now arrange the 24 Districts of Glasgow into 4 Groups, which represent a gradation of the physical conditions of health, especially as to air space, in and around the dwellings of their inhabitants. In all my periodical reports a similar classification has been adopted, but it must be carefully noted that the present Groups differ slightly in their composition from the former. District 15, or Woodside, which formerly appeared in Group 11, is now transferred to Group I. as being by its modern growth more nearly allied to it. District 16, or Cowcaddens, has been transferred from Group III. to Group IV. Otherwise the Groups have the same component parts. The Districts are, as must be apparent to any careful reader of the detailed description of the social and sanitary conditions of each which has been given in preceding pages, so heterogeneous individually that no method of grouping them is possible so as to bring out in perfection the contrasts of those conditions and their attendant and consequent vital results. For example, no District is purely inhabited by the upper classes, no District is wholly of recent growth, so that its inhabitants can be said to illustrate the vital results of the most modern artizan dwellings. No arrangement of those Districts can be adopted which will show the best or the worst possible results upon health, which may be expected from any set of physical circumstances which in the main they may illustrate.

Still having given this warning, the fact remains that we shall be able to amply illustrate the law that the comparative

healthiness of sections of population, whether they be territorially separated and known by name as distinct communities, or are merely artificial divisions of the same community, is determined by the air-space within and without their dwellings. We can classify the inhabitants of one city so as to produce four cities, which, though standing on the same soil and exposed to the same sun and air and general influences of nature, present contrasts in general mortality, liability to certain diseases, and other social and moral particulars capable of statistical expression, which are related to physical differences, especially as to air-space, which seem to be as effective for good and evil as separation by many degrees of latitude and longitude.

DESCRIPTION OF THE FOUR GROUPS OF DISTRICTS:

Group I. comprises the 5 Districts which had the lowest death-rates, and is the nearest approach to a selection of the better classes of the city which we can provide. We cannot give the statistics of the West-End alone, but this group comprises all the West-End, with a large admixture of the middle class and best of our working class population. Still, while Edinburgh has 4.19 rooms per house and 1.32 persons per room, this Group has 3.295 rooms per house and 1.521 persons per room; so that *even this artificially selected Glasgow* does not enjoy the same physical basis of health as the whole city of Edinburgh. Their populations are almost exactly the same, and their death-rates in the three years, 1880-1-2, were 19.2 and 20.5. The five districts are:—Blythswood; (1) Exchange; (9) Monteith Row; (15) Woodside; and Kelvinhaugh and Sandyford.

Group II. contains 6 Districts—viz., Springburn and Maryhill; (4) St. Rollox; (5) Bellgrove and Dennistoun; (7) Greenhead and London Road; (19) Kingston; and (21) Hutcheson Square. This Group includes all the circumferential Districts, excepting the two West-End Districts placed in the preceding Group. *It, therefore, contains the great mass of the recently erected industrial tenements in the city, and may be called the New Glasgow, built under the Police Act of 1866.* Still, this is only true as a general description, because we have in this Group both a small admixture of the better class represented by the villas and large flatted houses of Dennistoun and Greenhead, and several samples, such as Middleton Place, of the poorest class of small houses. In 1871, 35 per cent., and in 1881, 45 per cent. of the whole population of the city lived in this Group of Districts.

Group III. contains 5 Districts—viz. (2) Port-Dundas; (8)

Barrowfield; (12) St. Enoch Square; (18) Anderston Proper; and (20) Laurieston. This Group comprises some of the old village centres, which are now absorbed in Glasgow, and some of the first growth of the city at the end of last and the beginning of the present century. The houses in Tradeston, of which the measurements were given above, are fair samples of the accommodation. Only a small proportion of the houses in this Group are occupied as they were originally designed to be occupied.

Group IV. embraces the remaining 8 Districts—viz. (3) High Street and Closes (W.); (6) High Street and Closes (E.); (10) St. Andrew's Square; (11) Calton Proper; (13) Brownfield; (14) Bridgegate and Wynds; (16) Cowcaddens; and (22) Gorbals. These will be at once recognised as the worst districts of Glasgow, both morally and physically. They comprise almost the entire area of the operations of the Improvement Trust.

THE VITAL STATISTICS OF THE COMMUNITY OF GLASGOW, INCLUDING THE NINE SUBURBAN BURGHS.

A complete presentment of the Vital Statistics of the *whole community of Glasgow* in accordance with correct statistical principles, has never been attempted, and is, indeed, beyond the power of private effort to accomplish. A community is a vital unit, and must be treated as such for all purposes of Vital Statistics. It may be cut up into sections for administrative purposes, but this does not destroy the vital connection of those sections, and to secure the expression of this vital unity for statistical purposes—whether we wish to deal with the community as a whole, or still more, if we wish to deal with its administrative parts—the whole statistics must be massed in one central bureau, and there studied and re-arranged. The careful and intricate statistical operations which we have described as necessary for the production of the District Statistics of Glasgow proper, serve well to illustrate what ought to be done for each of the administrative subdivisions of the community known as the nine Suburban Burghs. (1) There are institutions in Glasgow proper in which births and deaths occur which must be referred to the locality in which the person who died, or the mother of the child born, usually resided. If this locality was within Glasgow proper the birth or death is reckoned in that District. If it was within any one of those Burghs or elsewhere, the birth or death is not taken account of in any way. (2) There are institutions outside of Glasgow, especially Barnhill and Govan Combination Poor-Houses, in which births and deaths

occur which belong to Glasgow proper, and are distributed therein in their proper Districts. No notice is taken of births and deaths belonging to those Burghs, which occur in these poor-houses, any more than of those which occur in the institutions of Glasgow proper. It so happens that neither of these poor-houses is situated within a Burgh, although all the Burghs except Crosshill are within one or other of the Parishes to which these poor-houses belong. It is obvious, therefore, that the births and deaths actually registered within the Burghs do not accurately represent the vital events of those Burghs. In the case of one important class of diseases—the infectious—the correctness of the death returns of the Burghs is still further vitiated by their local arrangements. In Glasgow proper all the infectious disease treated in hospital is treated in hospitals situated within the bounds of Glasgow proper. The two hospitals provided by the Burghs of Maryhill, Hillhead, Partick, Govan, and Kinning Park, and used by all, are both extra-burghal.¹ Consequently all deaths occurring in these Hospitals are registered outwith the Burghs, and do not appear against them in the Registrar-General's returns, nor are they included in the special Burghal returns. Before the erection of local hospitals the case was still worse for comparative purposes, as all the suburban infectious disease was treated in Glasgow, and all the consequent deaths were placed against Glasgow in the national returns. These facts suffice to prove that we have no accurate knowledge at present of the Vital Statistics of Glasgow as a community, or of those sub-divisions of Glasgow which are suburban and are for the purposes of local administration separated from the community. It will also be obvious that so long as this diversity of administration prevails we shall continue to be ignorant of the true local incidence of births, deaths, and disease over the whole community, unless the Registrar-General—who alone has the whole facts in his possession—undertakes to re-arrange those facts, distributing over Glasgow and the suburban Burghs the births and deaths registered in those various Institutions. This is now regularly done by the Registrar-General of England for London and its various administrative sub-divisions.

The Scotch Registrar-General could apply the resources of his office to no more important and useful work than to do the same for Glasgow and its administrative sub-divisions.²

¹In 1880-1-2, the Govan Hospital was *within* the Burgh, but a new Hospital has since been erected *outside* the Burgh.

It may be supposed that the system of "Transcripts" ought, so far as births are concerned, to restore to the Districts of Local Authorities the births in Institutions which properly belong to them as the domicile of the mother. But this is not the case. "Transcripts" of births are sent to the Registration

Seeing that it is impossible for me to compile the Vital Statistics of the Community of Glasgow in the full and perfectly accurate way described above, I have thought that the next best thing to do would be to collect from the Registrars and the suburban local authorities the births and deaths in 1880-1-2 as registered in each of the suburban Burghs, to mass them with the births and deaths as registered in Glasgow proper, and to calculate the respective birth and death-rates of each, and of the whole community on the basis of the population in 1881, adding calculations as to density, house accommodation, and room space on the same basis. We have seen that for Glasgow proper, taken as a whole, it makes no serious difference in the general rates of births and deaths, whether we take the births and deaths as registered, or as adjusted by a process of inclusion and exclusion. It is in comparisons that these rates become misleading.

One death more or less in a population of 500,000 makes no difference; but in a population of 5,000 it makes a serious difference. In the case of the Burghs adjustment would certainly add to the death-rate and birth-rate, especially in such Burghs as Maryhill, Partick, Govan, Govanhill, and Kinning Park, which are largely inhabited by the working classes. There is in their case no counterbalancing exclusion. But we must be satisfied with pointing out this defect and take our returns as we can get them.

The aggregated returns will be found in Table XIII. in the Appendix¹ the title of which fully shows its contents—viz., "Table showing population, acreage, and the number of inhabited houses and rooms (Census 1881), with births and deaths in 1880-1-2, of the nine Suburban Burghs, and Glasgow." This Table contains the whole numbers. The following Table contains the calculations based thereon, the Burghs being arranged according to the number of persons per room, beginning with the lowest.

District in which the mother had her domicile, if the Institution in which the child was born was not situated within that Registration District. But if we take the case of an Institution which is in the same Registration District as that in which the mother usually resided, but the domicile is in the Burghal, and the Institution in the "Landward" part of the Registration District—i.e. beyond the Burgh, then no "Transcript" is entered within the Burgh. Govan Combination Poor House is an illustration. It is situated in the Landward part of Govan Church Registration District, part of which is in the Burgh of Govan; and consequently no "Transcripts" are made within the Burghal portion of the Registration District. The births of children whose mothers usually resided in Govan must be specially selected from the Registrar's books by the officials of the Burgh. This is not done. The Burghs do not avail themselves of "Transcripts" even when the rules under which these are made put this adjustment of births within their reach. But even although they did, special arrangements are required to make their birth returns correct in the sense in which the Glasgow official returns are so.

¹Not reproduced here.

TABLE SHOWING RELATION OF DEATH-RATE TO HOUSE ACCOMMODATION IN GLASGOW SUBURBAN BURGHS AND GLASGOW, 1880-1-2.

Name of Burgh, etc.	Persons per Room.	Rooms per House.	Density, 1881.	Birth-rate, 1880-1-2.	Death-rate, 1880-1-2.
Pollokshields, -	0.627	11.170	13	16.2	10.1
Hillhead, - -	0.830	6.429	51	22.7	10.5
Crosshill, - -	0.929	5.749	37	27.4	12.1
Pollokshields, E.,	1.071	5.177	50	34.2	13.8
Govanhill, - -	1.711	2.847	86	45.9	17.5
Partick, - - -	1.782	2.822	27	42.6	20.2
Maryhill, - - -	1.834	3.126	11	40.1	20.1
Govan, - - - -	2.203	2.231	44	45.9	23.3
Kinning Park, -	2.446	1.973	108	47.7	23.3
Total of Burghs,	1.720	2.953	32	42.2	20.4
Glasgow, - - -	2.054	2.346	84	37.6	25.6
Burghs & Glasgow,	1.977	2.462	63	38.6	24.6

N.B.—As more fully explained in the text, the numbers of persons per room and of rooms per house are in this table calculated inclusive of Institutions. The Glasgow data differ from the "Whole City" data in previous tables in this part of Report. They are the same as those opposite "Glasgow" in Table III., Part I., p. 46, and for the same reason—to secure comparability. In like manner, the Glasgow Birth and Death Rates differ from the adjusted rates of the "Whole City," in preceding tables, there being no possibility of similarly adjusting the burghal rates as subdivisions of one community.

The Census population of the Burghs was 127,000, that of Glasgow proper 511,415, so that the whole community numbered 638,415, living on an area of 10,078 acres. The mean number of persons per room was in the Burghs 1.720, in Glasgow proper 2.054, in the whole community 1.977. The mean number of rooms per house was in the Burghs 2.953, in Glasgow proper 2.346, in the whole community 2.462. In the same order the density was 32, 84, and 63 persons per acre; the birth-rate 42.2, 37.6, and 38.6 per 1000, and the death-rate 20.4, 25.6, and 24.6 per 1000.

COMPARATIVE AIR-SPACE AND DEATH-RATE IN THE SUBURBAN BURGHS.

In tracing the relation of air space as indicated by the mean number of persons per room in the Districts of Glasgow, we

found that the uniformity of the relation was somewhat vitiated by such District variations in the unit-room as these— increase in size of houses of recent construction, better external physical conditions, &c., &c. In the Districts which seemed to be exceptions to the general law, we found that a large proportion of the houses were of recent date. They were growing circumferential districts. In the suburban Burghs we get rid of these elements of incomparability in the cubic space of the rooms and external conditions. They are all of purely modern growth. Their houses are practically all of recent construction. There are also certain minor circumstances which render the mean size of house and mean number of persons per room more closely true as representing the physical conditions of the private dwelling-house in the suburbs, than in the central City or its Districts. The Suburbs are purely residential. They contain no hotels or large boarding-houses, and scarcely any institutions having below 200 inmates, all of which are classed as ordinary houses in the census returns. In the case of Maryhill, the Military Barracks are a vitiating element, the effect of which will be subsequently apparent.

If, then, we compare the number of persons per room in each Burgh with the corresponding death-rate, we find that from Pollokshields, with 0.627 persons per room and a death-rate of 10.1 per 1000, the death-rate advances almost *pari passu* with the number of persons per room to Kinning Park, with a death-rate of 23.3 per 1000 and 2.446 persons per room. Absolutely the only deviation is in the case of Maryhill, which had a death-rate 0.1 lower than Partick, although the number of persons per room was 0.052 higher. The inclusion of the Military Barracks accounts for this exception. *I have no doubt that if the death-rates of these Burghs were adjusted to their proper figures, by the distribution of the deaths in institutions and otherwise, in accordance with sound statistical principles, the relation of the air space per room to those true death-rates would be strictly proportional.* As the returns stand, it is in the working class Burghs, from which institutions derive their inmates in the largest proportion, that this *proportional* relation is lost. It will be observed that the birth-rate also keeps pace with the size of house and mode of occupancy, though not so closely as the death-rate. The *lowest* birth-rate is in Pollokshields, which has the largest houses and the smallest number of occupants per room. The *highest* birth-rate is in Kinning Park, which has the smallest houses and the largest number of occupants per room.

THE STANDARD OF OCCUPANCY AS ILLUSTRATED BY THE SUBURBAN BURGHS.

From the facts of the Glasgow Districts we deduced the following law of occupancy:—"That the smaller the house the greater the number of inmates per room, or, in other words, the smaller the house the less cubic space per inmates." As might be expected from the purely residential character of the Suburban Burghs, this law holds even more closely in them than in the Glasgow Districts. Maryhill is the only exception, which is accounted for by the Military Barracks being included as a "house" or "houses." Otherwise the movement is coincident and unbroken from Pollokshields with a mean size of 11.17 rooms per house and 0.627 persons per room, to Kinning Park, with a mean size of only 1.973 rooms per house and 2.446 persons per room.

Part III.—[The earlier portions of Part III. reviewed the changes in the death-rate for the 15 years ending 1885, but their reproduction here is now unnecessary. All the main features have been embodied in Chapter III.—(ED.)]

CERTIFICATION OF DEATHS IN GLASGOW.¹

The determination of the cause of every death occurring in a community is of prime importance for the saving of life.

In detailed Tables [which were appended, but are not here reproduced] the deaths are classified with reference to medical attendance and certification. Under "Certified" are placed all deaths, the cause of which was medically certified; under "Not Certified" are placed the deaths of persons who were said to have had medical attendance, but regarding which no certificate could be obtained from the medical man named, the meaning of which is that he had not seen the person sufficiently recently to feel justified in certifying; under "No Medical Attendance," are placed the deaths of persons regarding whom it was admitted that they had not been seen in their fatal illness by a doctor; under "Dispensary" are placed the deaths of persons who were alleged to have been taken to a Public Dispensary or "Doctor's Shop," but regarding the cause of whose death no medical certificate could be obtained, generally because the prescribing physician could not identify the case. These facts have two aspects—(1) the scientific; (2) the humanitarian or social. As to the scientific aspect, the cause assigned for a death in the public register has no value or validity, unless it is testified by a medical certificate. Therefore, the proportions of the total deaths certified and

¹ See footnote p. 485.

uncertified are the only data which it is of scientific importance to know. From a humanitarian and social point of view, the other details as to medical attendance, and the character of it as effective treatment of sickness are of interest and importance.

It is satisfactory to observe that the proportion of uncertified deaths is diminishing overhead, and below 5 years of age, as well as above it. In 1880,¹ 10.5 per cent. of the total deaths were uncertified, and this proportion fell continuously in each to below 7 per cent. in 1885. The proportion uncertified below 5 years fell in the same way, from 16 per cent. to below 11 per cent.; while above 5 years, it fell from a little below 6 per cent. to below 4 per cent. It will be observed that in 1885, as compared with the preceding year, there has been a slight retrogression.

The humanitarian or social aspect of the certification of deaths in Glasgow is not so satisfactory. Every uncertified death on the register implies blame somewhere, either on the guardians of the deceased, the community, or the State. If from any circumstance whatever the cause of death cannot be certified from observations made during life, then the machinery of the State ought to be such that it will without fail ascertain the cause after death. This *post-mortem* inquiry is of no value to the individual deceased, so far as his life is concerned; but it is of supreme importance to every person who may in the future be exposed to loss of life in the same circumstances. In this aspect every uncertified death, unless death followed upon accident or disease so suddenly as to afford no opportunity for the intervention of medical aid, implies neglect during the last sickness. Whether this neglect lies at the door of the guardian of the deceased; or of the public from want of provision for medical aid to the poor, it is culpable, if not criminal; and the fault or crime will never be brought home either to the natural guardians of the sick or to the public unless by systematic inquiry into every uncertified death. I have only singled out the proportion of the uncertified deaths in which it was frankly admitted that the deceased received no medical attendance whatever. I might safely assert that medical attendance at dispensary, public or private, or otherwise, which fails to enable the attendant to identify the individual and certify distinctly to the nature of the disease which resulted in death, does not satisfy the humanitarian any more than the statistician. But I set aside such cases, and simply point out as a social scandal the number of persons who die in Glasgow without medical attendance, even in this limited sense. It is satisfactory to find that the proportion fell from 5.6 per

¹In recent years the proportion of deaths uncertified has not reached 3 per cent.—[ED.]

cent. of the total deaths in 1880 to 3.4 per cent. in 1884. Still, to that extent, the scandal remains, and it becomes all the more grave when we observe that just where life is most helpless and insecure the proportion is greatest, and where life has more selfish interests tending towards its preservation, the proportion is least. The proportion of children under 5 years of age who died without medical attendance ranged from 7.8 per cent. in 1880 to 5.2 per cent. in 1884, while the proportion of persons above 5 years of age who died without medical aid ranged from 3.6 per cent. in 1880 to 1.8 per cent. in 1881. In 1885 it will be observed that this improvement was checked. The proportion both of deaths uncertified and of deaths without medical attendance was slightly greater than in 1884.

COMPARATIVE CERTIFICATION OF LEGITIMATE AND ILLEGITIMATE CHILDREN.

The sinister aspects of this question of Certification in Glasgow are still further developed, by showing the Comparative Certification of Legitimate and Illegitimate Children in infancy and childhood. (Table omitted.)

I shall not occupy space by writing out in words the eloquent speech of the following facts:—While the cause of death of 20 falling to 14 per cent. of the *Legitimate* children who died before the end of their first year of life was uncertified, the cause of death of 35 falling to 24 per cent. of the *Illegitimate* infants was uncertified. While the cause of death of 10 falling to a little over 5 per cent. of the *Legitimate* children who died between their first and fifth year of life was uncertified, the cause of death of 26 falling to 11 per cent. of the *Illegitimate* children who died at the same age was uncertified.

INSURANCE OF LIVES IN FRIENDLY SOCIETIES, WITH COMPARISON OF INSURANCE OF LEGITIMATE AND ILLEGITIMATE CHILDREN IN GLASGOW—1880-1885.

Prior to 1876 the proportion of Uncertified Deaths in Glasgow was always about 22 per cent., a fact which is scarcely credible concerning the vital statistics of a civilised community. Since then it has steadily fallen, so that, as we have seen, in 1884 it reached the lowest point—viz., below 7 per cent., there being a very slight increase in 1885. This has come about through the "Friendly Societies' Act," which came into force in 1876. By Section 14 of that Act "no society shall pay any sum of money on the death of a member" unless on the production of a certificate of registration; and by Section 28 it is enacted in reference to children under 10 years of age that "no such certificate shall be granted unless the cause of death

has been previously entered in the register of deaths on the certificate of a coroner, or of a registered medical practitioner who attended such deceased child during its last illness, or except upon the production of a certificate of the probable cause of death under the hand of a registered medical practitioner, or of other satisfactory evidence of the same."

The immediate effect of these enactments was to improve the certification of deaths, especially among children. There can be no doubt that the progressive increase in the proportion of certified deaths since 1876 is not merely due to the enforcement of the provisions of the "Friendly Societies' Act" in the case of persons already enrolled in Friendly Societies, but also to the gradual extension among the population of the practice of Insurance in such Societies. . . .

There was in 1876 only 36 per cent. of the persons who died in Glasgow enrolled in Friendly Societies, and the proportion has risen year by year, without interruption, until in 1885 there was over 52 per cent. This is gratifying, both scientifically, as securing much more accurate information as to the incidence of disease, and socially, as showing the spread of providence among the population. But my main purpose here is to direct attention to the extent to which the insurance of children prevails, and especially to the growing proportion of illegitimate children who are enrolled in Friendly Societies. Under 1 year the proportion of Legitimate children who died insured has advanced from 21 per cent. in 1876 to 37 per cent. in 1885; and the proportion of Illegitimates from 4 per cent. to 12½ per cent. in 1884. This is an increase of two-thirds in the case of Legitimate children, while that of Illegitimate children is threefold. Between 1 and 5 years the proportion of Legitimate children who died insured has risen from 47 per cent. in 1876 to more than 64 per cent. in 1885, while that of Illegitimates has risen from 22 per cent. to nearly 37 per cent. In the face of these facts, and from a close observation of the working of the Friendly Societies' Act in reference to Registration, I have no hesitation in saying that it requires the attention of the Legislature. In my Report for the quarter ending 31st March, 1878, I made the following observations on this subject, and I reproduce them now, emphasised by the extended experience of subsequent years:—

"A considerable number of the certificates are simply an expression of the opinion of a doctor called in after death to view the body, the doctor being summoned only when the parents find that without a certificate the money cannot be got. There may be cases of death under circumstances which prevent medical attendance being obtained in life, or at any rate may excuse the want of it; but it is undeniable that in

the majority of such cases a medical man both assumes a very serious responsibility and shows practical sympathy with persons whose position merits nothing but reprobation and exposure, when from an external examination and on an *ex parte* statement he ventures to certify, *on the form drawn up for the use of a regular medical attendant*, to the cause of death of the deceased, especially if a child. In the case of a child whose death brings a few pounds to its guardian, and who during life receives no medical attention, so that there is a difficulty in reaping the advantages of its death, all our sympathies ought to go with the child; and for the sake of other children no one ought to interfere to remove this difficulty. At the best the conditions of the Friendly Societies' Act interpose but a frail barrier between the cupidity of the beneficiary and the life of the child. The facility with which post-mortem certificates can be obtained goes far to remove this barrier entirely.

"On the other hand, in the civil aspects of the Registration Act a certificate so granted contributes worse than nothing to our knowledge of the cause of death. The question of criminality may be settled by the wide and safe verdict of a 'natural cause,' but in the majority of cases, when a medical man sets himself, without a *sectio cadaveris*, and without a particle of knowledge from personal observation of the symptoms during life, to certify to the precise 'natural cause' which issued in death, he might as well determine his opinion by writing a few names on bits of paper and drawing one out at random. In a case which recently fell under my notice of the death of a child aged 6 months, *without medical attendance*, the cause of death was registered as 'debility,' subsequently altered to '*Tabes mesenterica*' as the opinion of the Registrar, based on the statement of the parents. For certain reasons I reported the death to the Sheriff's Fiscal. To prevent the necessity of a *post-mortem*, the parents referred to one practitioner who was prepared to certify that the cause of death was 'convulsions,' and produced a certificate from another to the effect that the child died from 'acute pneumonia.' The Sheriff, however, issued his warrant for a post-mortem examination, the result of which was to prove that the precise cause of death was 'tubercular meningitis!'"

CHAPTER X.

ON THE PREVENTION OF TUBERCULOSIS.¹

INTRODUCTORY.

In December, 1891, the Medico-Chirurgical Society of Glasgow, after a discussion, came to the following resolution: "That a Memorial be presented to the Town Council of Glasgow calling their attention to the fact that tuberculosis is now fully recognised as an infectious disease, and asking them to take the matter into their serious consideration, with a view to the protection of the community from the infection." A Memorial² was accordingly drawn up and submitted to the Committee on Health in January, 1892. It was remitted to me for consideration and report.

The signatures appended to this Memorial are sufficient to secure for it respectful consideration. They guarantee that whatever it contains of positive statement as to the nature of tuberculosis is accurate, and that whatever of suggestion it makes as to practical measures is judicious. Still, the attitude of the administrative mind towards the contributions of science to the stock of knowledge and towards their executive application and effect is different. We receive implicitly and with gratitude the results of the laboratory and the study; we apply our own judgment to executive proposals. We are bound to consider their bearing on general policy, and to determine their expediency from a forecast of the advantages and disadvantages likely to follow their adoption. This distinction was clearly present to the minds of the Memorialists. No representation relative to the duties of the Local authority could have been made with greater tact and discretion. It is a distinction which is very well illustrated in the history of the subject of the Memorial. Koch's paper on "The Etiology of

¹ A Report issued October, 1895.

² See p. 568.