

Address on public health : delivered at the meeting of the Association for the Encouragement of Social Science, held at Edinburgh in October 1863.

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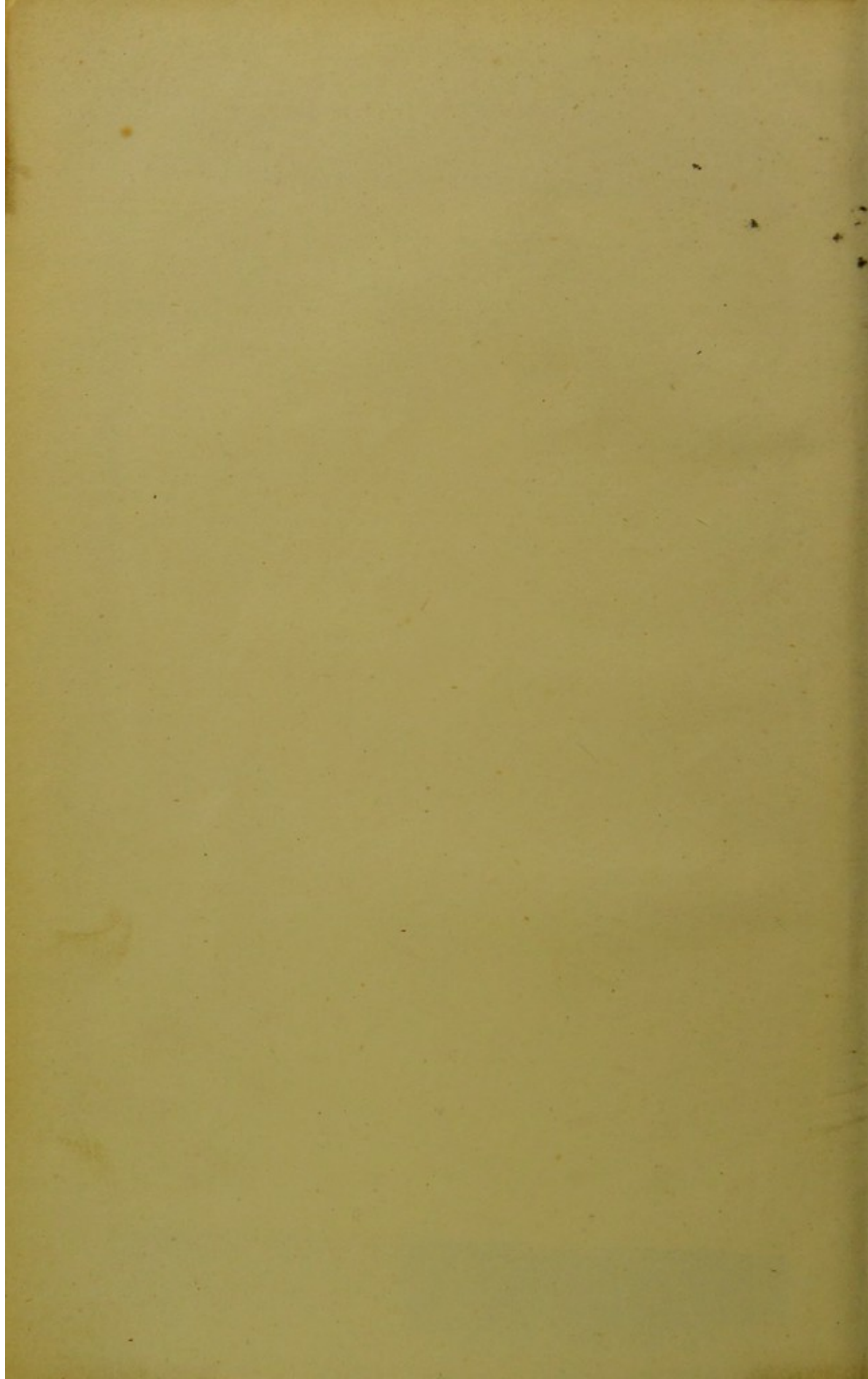
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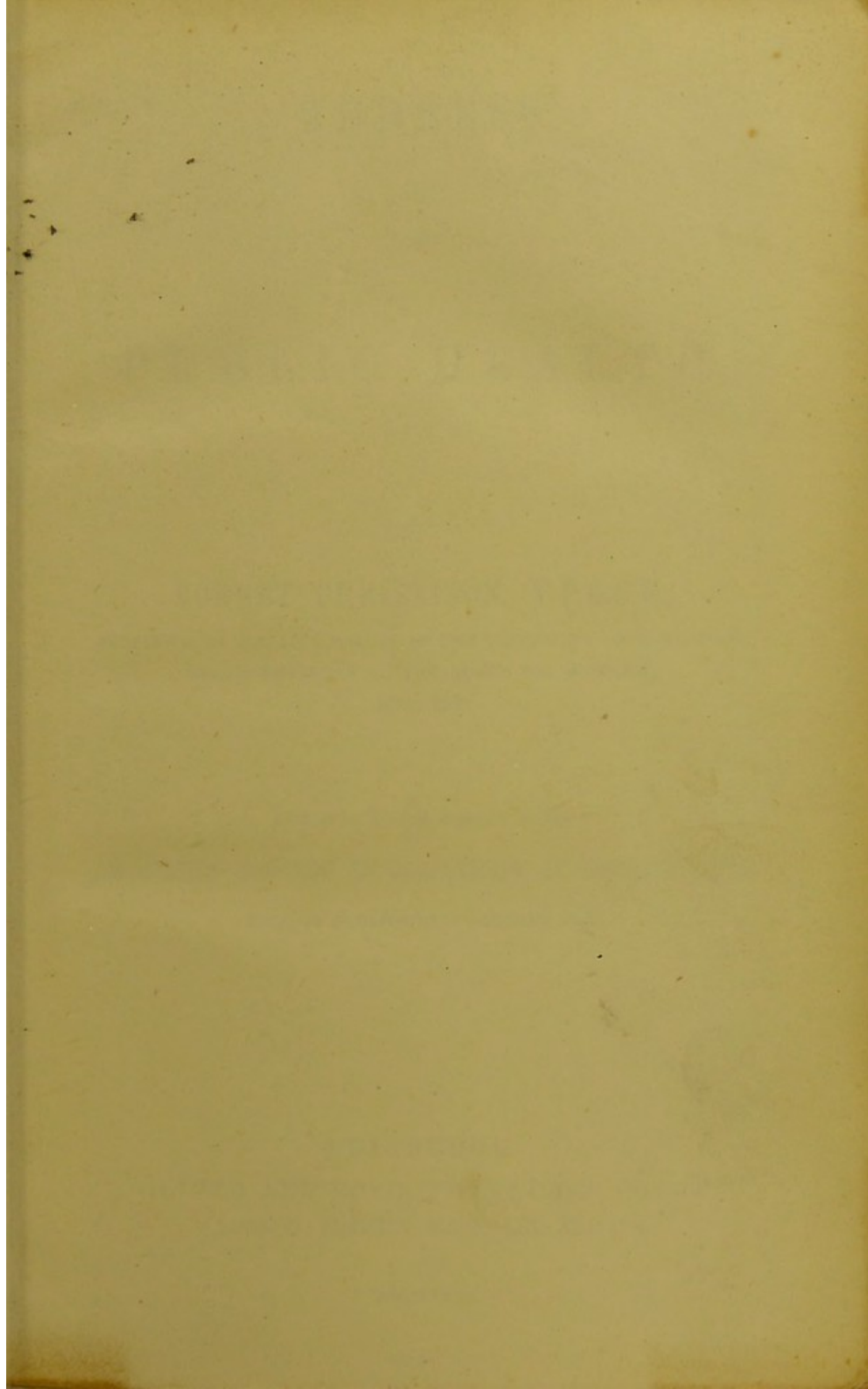
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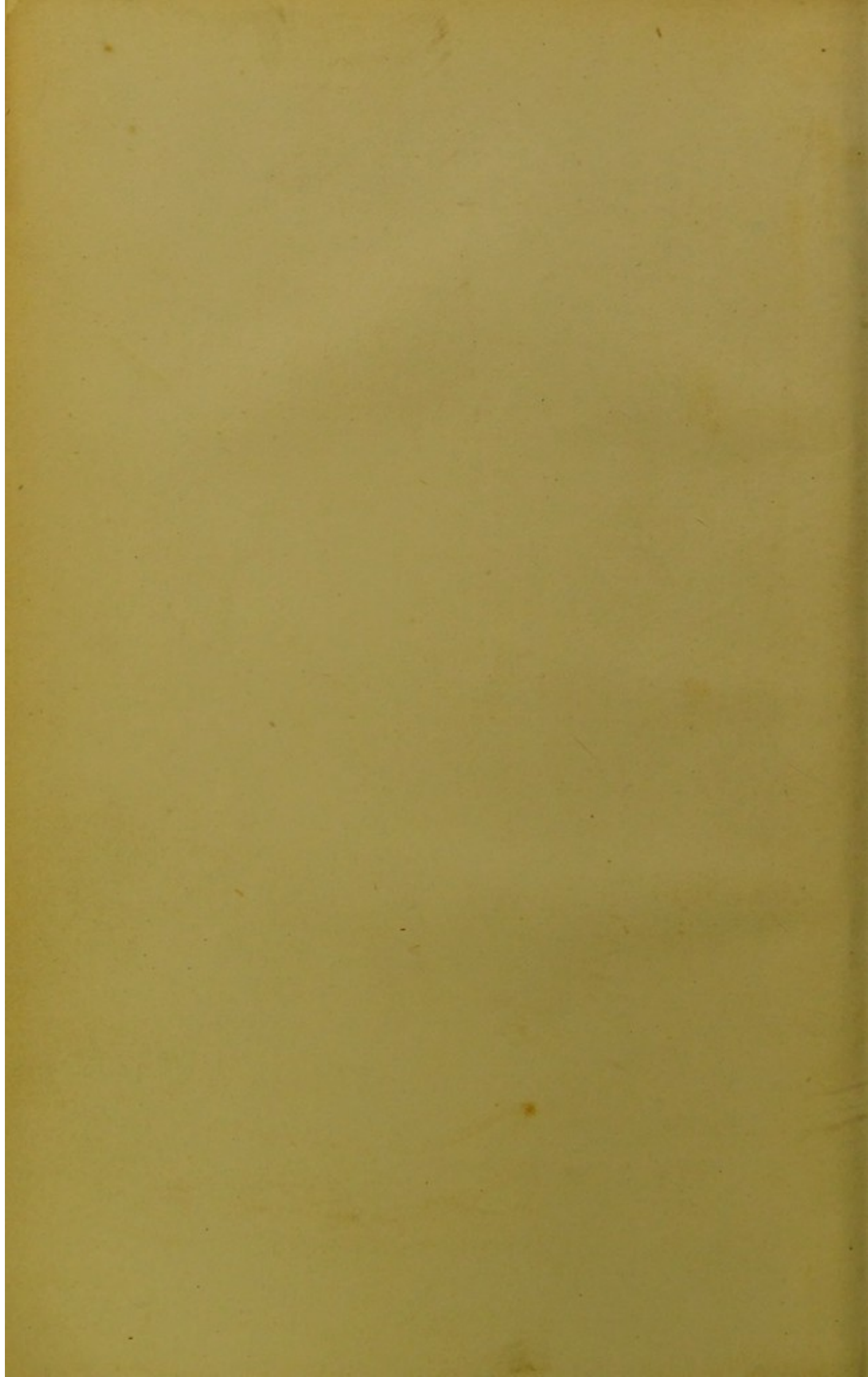
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ADDRESS

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ON

PUBLIC HEALTH,

BY

ROBERT CHRISTISON, V.P.R.S.E.,

PROFESSOR OF MATERIA MEDICA IN THE UNIVERSITY OF EDINBURGH;

SENIOR PHYSICIAN TO THE QUEEN FOR SCOTLAND,

ETC., ETC.

DELIVERED AT THE MEETING OF THE

ASSOCIATION FOR THE ENCOURAGEMENT OF SOCIAL SCIENCE,

HELD AT EDINBURGH IN OCTOBER 1863.

EDINBURGH:

OLIVER AND BOYD, TWEEDDALE COURT.

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MDCCCLXIII.

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ADDRESS ON PUBLIC HEALTH.

THE office whose duties I have had the honour of being appointed to discharge at these meetings has been filled in turn, since the birth of our Association in 1857, by men of no less mark than the Hon. Mr Cowper, Lord Shaftesbury, Lord Ebrington, Lord Stanley, Lord Talbot de Malahide, and Mr Fairbairn. When I made this discovery, I first became sensible that, in undertaking to deliver this address as their successor, I had incurred a greater responsibility than I was aware of in accepting it. As your president, I thought I could not repeat those general considerations which have been put before you so often and so ably by my predecessors, and which would, I feel, lead in my hands to little else than weariness on your part, and unprofitableness on mine. Turning next, among other suitable subjects, to the readiest which lay within my reach, the advancement made in our knowledge of public health since this Association last met a year ago, it appeared to me that the progress made in that time had not been in any way so remarkable, that the retrospect was likely to prove either a large enough or a pleasant enough theme. I have therefore been led to look for materials to the very opposite quarter. For some time past we have been told a good deal of what has been latterly done in this field. I propose rather to say something of what is still undone. An inquiry of that kind will be less flattering to our vanity, but it may turn out more serviceable, if we should succeed in discovering some well-defined desiderata for a better knowledge, and a better condition, of

the public health; and more especially if we can thus point out blanks in our knowledge, which may be filled up through means of encouragement held out by the Social Science Association.

I propose to look at my subject from a physician's point of view. I am inclined to think it is well that we should all sometimes look at public health from this direction. The branch of knowledge called public health is not essentially medical in all its details. It is far from indispensable that every inquiry concerning it be carried on by the physician alone. On the contrary, much has been done in this line, and well done too, by members of the Association, as well as by others, not belonging to the medical profession. But there are inquiries of great consequence to public health, which no one can fitly undertake without a wide acquaintance with medicine. Others, which may be carried on independently, may nevertheless require to be tested by reference to medical principles and medical experience. And, on the whole, the closer the bond of union is drawn between medicine and public health, the better will it be for the stability of the latter branch of knowledge. This truth seems to have been sometimes lost sight of lately; and perhaps it is on this account that some non-medical inquirers have arrived at conclusions which medical observation refuses to confirm.

Public health, in the simple acceptation of the term, means nothing more than the aggregate health of each individual in a community. But, as a branch of social science, public health deals as little as possible with individuals. Its principles rest on observations made on bodies of men. Inquiries into public health are carried on with reference to bodies of men, because in that way we escape the disturbing effect of collateral circumstances. For a reason somewhat analogous, such inquiries are best carried on, not by individuals, but rather by bodies of men, or by individuals acting under their authority, or liable to their check; because we are thus more likely to escape the bias arising from the prepossessions of individual minds. And further, when measures for raising the standard of public health are based on such inquiries, it is not left to individuals to carry them through. They generally require aid from the municipal powers, or the general government itself, of a country. Hence the importance of attaching the study of the public health to

this Association, as a department of social science. For inquiry will thus be encouraged; its conclusions will be tested by discussion in the hands of many well-qualified persons; and the resulting measures will go forth to the nation with the sanction of a public body, and with the aid of many who have either a share or an influence in legislation.

Public health, as a branch of social science, treats of the agents which influence, for better or for worse, the average bodily vigour, mental energy, healthiness, and length of life of the community. The main agents of this kind are the earth and its covering, the air, water and heat, food, drink, and exercise, occupation and habits, education, whether bodily or mental, and moral discipline. They act by favouring or engendering diseases, or, on the contrary, by circumscribing or extinguishing them. Very few diseases are exempt from the influence of one or more of these agents. But hitherto the researches of the inquirer into public health have been necessarily confined to certain great classes of diseases, and some special diseases of frequent occurrence.

The study of public health may be taken up from the basis of the agents that influence it. The study may be undertaken also from the basis of the diseases whose sway is ruled by these influences. The physician naturally prefers the latter order of inquiry. The relations of diseases and groups of diseases to the various agents I have enumerated, is a very large subject—much too large to be exhausted on such an occasion as the present. I may be supposed, therefore, to have been inconsiderate in choosing such a topic for this address. But I have thought it might interest you more, and be more in keeping with my own pursuits, if, instead of the eloquent general views usually dealt with by those in my position, I should endeavour to offer you a sketch of the mode in which the principal diseases or groups of diseases are influenced by the agents which affect the public health, and attempt to illustrate, by a few apposite instances, what has been already done, and what remains to be done, for lessening the prevalence of such diseases, and the mortality, ill-health, and pecuniary loss arising from them.

In carrying out this design, I shall take for my guide, wherever I can, the Government Register of Deaths, which ought to be our

main text-book in all inquiries relative to public health on the large scale. I must deviate, however, from the Register in its classification of diseases, which will not suit my purpose altogether; for diseases are by no means always so grouped there as to bear relation to the agents which cause or favour them. Keeping that relation in view, we might comprise at least five-sixths of the deaths in the Register in the nine following groups:—1. Epidemic diseases; 2. Inflammatory diseases; 3. Diseases of the brain and spine; 4. Diseases of the heart and bloodvessels; 5. Diseases of the digestive organs, not included in the inflammatory groups; 6. Diseases of the uterine organs; 7. Diseases of the urinary organs; 8. Diseases of depraved constitution; 9. Death from violence. The remaining sixth of the Register consists mainly of deaths whose causes are so vaguely given in the returns, that they are incapable of being arranged with any defined group.

I propose to take the Scottish Register for my guide. I suppose it is generally as exact as the English Register, and, though on a less scale, yet quite large enough; and it has the advantage of supplying facts from large populations the most different we could well find in civilized society as to situation and manner of life.

When the Medical Registrar for Scotland, Dr Stark, drew up in 1861 the "First Detailed Annual Report of the Registrar-General for Scotland" for the year 1855, he found the average mortality to be lower than in any other kingdom in Europe—viz., one in forty-eight annually. He therefore properly added a *caveat*, that this particular year might not yield a true average. I am happy to say that ulterior experience exactly confirms the original result, the average for seven years ending with 1861 being also one in forty-eight. It would be most interesting to trace the diseases which occasion that relatively low mortality, compared with those which cause the higher rates of less favoured lands—Lower Austria, for example, where the deaths actually reach one in 27·4—and thus to see whether in this way the agents which produce, and the influences which extend, disease, can be discovered, and then possibly mitigated or removed. But there is an insuperable difficulty in the constitution of the Register itself. It may surprise you to learn that even in Scotland, which is supplied with medical men not inferior

in professional skill to those of any other country, more than a fourth part of the deaths are returned to the Registrar in a shape which renders them useless for such an inquiry as that now referred to. A tenth part of the deaths in 1855 are returned without a cause being stated at all. Of the remainder, about a fifth are returned in a nomenclature which admits of being interpreted in two or more ways, or in any way one likes. The deaths in 1855 were 62,000. Of these, 5732 were returned without any cause being assigned; 5725 were referred to such vague causes as lung disease, asthma, atrophy, sudden death, teething, and diseases of unascertained seat; and 5685 were referred to the gradual decay of old age. The English Register is not quite so defective as this. Nevertheless, the deaths unreturned, or faultily returned, amount to a fifth of the whole.

Let it be understood, however, that no blame attaches to the Registrars. But there was an error on the part of those who organized the list of names of diseases to be used by the certifiers of death. Lung disease is a term which positively invites a man to carelessness. It should be extinguished. I suspect most returns under it should be transferred to the category of pulmonary consumption; but it may correctly mean one or other of at least four well-defined diseases. The term asthma is not more fortunate. When it causes death, it may mean bronchitis, or emphysema of the lungs, or heart disease. Dropsy is even worse. It is not once in fifty times the disease, but a mere symptom of the disease; which may be diseased heart, or kidneys, or liver, or lungs, or pancreas, or peritoneum. Deaths from atrophy, sudden death, teething, 1767 in number, are little else than so many confessions of ignorance. The 5685 deaths from old age are nearly on the same footing. Few people really die through gradual failure of the functions of life. Even the oldest, like young people, die mostly of special diseases. Nine-tenths die of bronchitis, diseased heart, diseased liver, diseased bladder, diarrhoea, and a wearing senile fever, which is apt in old people to be the issue of an attack of almost any acute disease. An observant physician seldom sees his patient truly die of the gradual decay of old age. I can safely say that I have hitherto seen only one man die in that way.

These faulty returns, useless for all statistical purposes, amount in the Scottish Register to 17,142 of 62,004, or between a fourth and a third of the whole. The fact suggests a grave matter for our consideration here. We take into high favour the statistical method of investigation. In our prospectus inviting papers, we give an express preference to those based on statistics. But, in truth, in questions relative to public health, the statistical method of settling them may be quite as open to fallacy as any other. There are questions, indeed, as to which this method is positively more fallacious than any other,—for example, than general observation and experience,—if the statistical basis be so loose as to embrace only two-thirds of the facts which the questions have to deal with. Some time ago I was desirous of verifying statistically an important fact as to public health, stated to me on very good authority as the result of general observation in one of the large islands of Scotland. On applying to the Registrar-General's office, in the hope of testing this statement statistically, I was informed that at that time Government had not sanctioned the necessary additional outlay for summing up the details of the Register. At last came forth the "Detailed Report" in 1861; and there I find that almost one-half of the deaths in the islands, of which this is one, are referred in the certificates so loosely to their causes, that they must be left out as unserviceable. For my purpose on that occasion, a register so defective was good for very little,—for much less, certainly, than the general impressions of an acute physician, which it was my aim to test. I have been repeatedly arrested in the same way in attempting to arrive at results for illustrating this address.

The insufficiency of the Register amounts to more than a simple defect. It may be thought, and it has been said of such defects generally, that a register is good for so much as the correct returns amount to,—in the Scottish Register, therefore, for nearly three-fourths of the population. For it is assumed that the faulty returns may be rectified by distributing them among the sound ones in proportional rates. This may be true for some purposes. If the inaccuracies might be safely held to bear upon all diseases according to their actual proportion in causing mortality, or in the correct

returns, the loss of even a third in so large a number as 62,000 deaths, might prove unimportant for most objects. But unfortunately we cannot safely make that assumption. Defects and errors in a national register with such a nomenclature as our own bear much more on some diseases than on others. The deaths from diseases so easily recognised, even by unprofessional persons, as smallpox, measles, scarlatina, erysipelas, cholera, croup, apoplexy, palsy, dysentery, hooping-cough, and even pure fevers, are far more likely to be returned correctly, and also entirely, than those from bronchitis, pneumonia, pleurisy, diseases of the heart, liver, and kidneys, tabes, and malignant diseases, as to which unprofessional persons are very dubious authorities on almost any occasion, and professional people evidently often careless or not well-informed. The former set may with reason be assumed as all returned, and nearly all correctly returned. On the contrary, the latter set are apt to be returned incompletely and incorrectly. They form, in fact, the great mass of deaths concealed under the heads of atrophy, asthma, lung disease, diseases of unascertained seat, sudden death, and old age; nor has the registrar any guide to a correct distribution of these loose returns among the exact ones.

I hope I may not be thought to have been wrong in bringing this matter forward on the present occasion. The Legislature has supplied us with a complex, costly, and, to the members of my own profession, troublesome machine, which, for want of a little repair and extra outlay, has hitherto put out only an inferior article. Such a state of things, in regard to what must be the fundamental basis of most exact inquiries into public health, ought not to exist in a country like our own. I submit that the Register ought to be put to rights, if possible, and that this Association may usefully lend its influence and aid for the purpose.

It must not be inferred from what has been said that the Scottish Register may not be applied with security to many statistical inquiries into the public health. On the contrary, it is a sound source of information for the very next topic which I propose to bring under your notice.

The first group of diseases I will notice is the first in the Register, viz., that of Zymotic diseases. They are so called, from the Greek

noun, ζυμη, signifying ferment, on account of a rather fanciful resemblance between their origin and the process of fermentation. They might have been equally called by the familiar term epidemic diseases—*i.e.*, diseases which tend to spread at times widely among the people; because, although this word has a more restricted meaning in professional nomenclature, it is used in common speech to include all diseases which ought to be comprised in the zymotic class. They are chiefly simple fevers, eruptive fevers, influenza, puerperal fever, diphtheria, croup, cholera, whooping-cough, dysentery, and others of less note. Of all groups of diseases they are considered the most important in respect of the public health; for, in the first place, they account for 24·1 per cent., or almost a fourth part, of the mortality of the country. Nor is there any mistake here; because the Register is not likely to be far wrong through faulty returns in regard to diseases so easily recognised even by unprofessional people; and, secondly, according to all recent experience, general no less than statistical, it is certain that much may be done, under the will of Providence, by human wisdom and human means, to lessen their ravages, and, above all, to put down their epidemic visitations.

This is a large subject, so large that I must be content with touching on a few salient points only.

Simple fevers include ague and marsh-remittent fever, inflammatory fever, typhus, enteric fever, and gastric fever. The four last-mentioned are classed in the Register under the single head of typhus. They account jointly for almost a fifth of the deaths from epidemic diseases, and for 4·47 of the total mortality.

The first point I shall ask you to note under this head is, that Ague is not accountable for a single death in Scotland. There are 107 heads in the Register, and that for ague is the only one which stands blank. Hydrophobia, which accounts for a single death, is nearest to it. But the entry under ague, which takes in also the more deadly marsh-remittent, is *nil*. And more than that, there is no ague in Scotland. I have asked many of my country brethren if they ever saw a true ague,—an unequivocal intermittent fever,—of home growth; but no one has been able to assure me that he has seen any in Scotland except such as I have myself seen—*viz.*,

caught abroad, or in the fenny parts of England. But ague was at one time very common indeed in many parts of Scotland. My father, a Berwickshire man, often told me that in his young days, probably about 1775, ague was so common among the farm labourers of that famous agricultural county, that a prudent farmer always set off on account of it a certain proportion of no-work days for his men in spring and autumn. The same was the state about the same time of the neighbouring county of Roxburgh. To Dr Mackenzie of Kelso I am indebted for information, unique and satisfactory, as to the dates of the prevalence and disappearance of ague in that part of Roxburghshire. There are dispensary records extant there for one of the oldest dispensaries in Scotland, beginning, in fact, with 1777.

The annexed table has been extracted from these records, showing the agues for every year successively from 1777 till 1806, after which ague disappears from the dispensary books:—

Year.	Total admitted.	Ague.	Year.	Total admitted.	Ague.
1777	... 302	... 17	1792	... 570	... 16
1778	... 306	... 33	1793	... 666	... 19
1779	... 460	... 70	1794	... 447	... 9
1780	... 675	... 161	1795	... 513	... 23
1781	... 510	... 103	1796	... 355	... 12
1782	... 440	... 61	1797	... 318	... 9
1783	... 510	... 73	1798	... 415	... 7
1784	... 459	... 40	1799	... 558	... 2
1785	... 573	... 62	1800	... 665	... 4
1786	... 563	... 48	1801	... 433	... 9
1787	... 525	... 24	1802	... 377	... 5
1788	... 577	... 25	1803	... 308	... 2
1789	... 546	... 48	1804	... 422	... 5
1790	... 640	... 18	1805	... 469	... 0
1791	... 715	... 13	1806	... 318	... 1

From this table it appears that the number of agues rose in 1780 to 161; by which time the total applicants for all diseases was nearly 700. Then it sank gradually to 18 in 640 applicants in the year 1790; and afterwards it went on fluctuating, but still on the whole diminishing, till in 1800 there were only 4 agues in 665 patients, none in 1805, and 1 in 1806; since which year no case of ague appears on the dispensary books. What, then, has been the cause of this striking improvement in the public health of Scotland? In what change of circumstances did it take place? This much is clear. We do

not owe the blessing either to the Government of the country or to the College of Physicians,—no, nor to Social Science. We owe it to incidental causes ruled to their end by another Power. In fact, it has been allowed to fall upon the country everywhere without having been even publicly noticed anywhere at the time,—an omission of which we certainly should not have had to complain had any man, or body of men, been able to claim credit for it. The real cause it may now be difficult to recover at so distant a date from the event; but this Association may lend its help. I can scarcely think that the great mass of old family records and remnants of old farm-books in Scotland should all be silent on such a subject; and surely an appeal from this Association should call forth the information.

I may be told that the disappearance of ague in Scotland is generally ascribed to the drainage of the country in the march of agricultural improvement, which began in the Border counties about the period referred to above. This is a tradition; but there are grounds for calling it in question. For example, I was assured, I think about 1820, by a well-qualified friend,—the late Mr Walker-Arnot of Arlary, father of the present Professor of Botany in the University of Glasgow, an able agriculturist and well-informed gentleman, who farmed his own property in Kinross-shire,—that he had been positively assured by the surgeon of his district,—a man much his senior in years,—that ague had all but disappeared from that county before the introduction of improved drainage; and that this gentleman ascribed the change rather to improved living among the farm labourers. Then we know that a long time elapsed before the practice of extensive drainage extended from the Border counties to other parts of Scotland, where, nevertheless, there is at present reason to believe that ague disappeared about the same time as farther south. And, moreover, there are still marshes in some parts of Scotland, but there is no ague. Three sorts exist,—peat-marshes, irrigated meadows with pure water for the liquid, and irrigations with foul water. But all are alike ague-free. The last sort might with reason be strongly suspected; for, as managed in the immediate neighbourhood of Edinburgh, they present that frequent alternation of considerable moisture and approach to dryness, that rankness of

vegetation, and that abundance of decaying organic matter, which are thought, when combined, eminently to foment intermittent and remittent fevers in countries liable to these diseases. But if there be any doubt as to the general salubrity of the now famous marshes of Craigentenny, as to which I shall have a word to say by and by, there is none at least as to the total absence of ague among their inhabitants.

There is good ground, then, for an inquiry, in which this Association could lend its aid, into the circumstances which have led to the disappearance of ague from Scotland. Dr Mackenzie has supplied one half of the test. Since getting his table I have not had it in my power to satisfy myself about the other half. Dr Douglas, writing his "Agriculture of Roxburghshire and Selkirkshire" in 1796, speaks of extensive draining having been effected in the former county by that time; but he also mentions incidentally in many places "marshes," "marshy lands," "a great deal of fenny land," and "a deficiency of drains." I hope the history of agriculture may yet supply more positive evidence. The results may be of great consequence. Many of our colonies are now overrun with ague and its sister remittent fever. It can scarcely be that a successful inquiry into the agencies by means of which ague has been extirpated from Scotland should fail to be of service to our countrymen towards freeing also from that scourge the lands of their adoption.

Scotland is very far from having attained the same happy deliverance from Continued Fevers as from those of the intermittent type. But there are some very remarkable facts in their recent history, which point to the possibility of such an event, and at any rate to the fruitfulness of further inquiry on the subject.

Four different forms of continued fever have been recognised by various authorities—inflammatory fever, typhus, enteric fever, and gastric fever. The Registers of England and Scotland recognise only typhus. I presume they do not necessarily hold that all four are of one kind. The general doctrine—which some doubt, however—regards them as all distinct, and I do not mean to call that doctrine into question at present.

The first is in every circumstance the most singular of all fevers—whether, for example, we look to its nature and form, or to its strict bearings on public health. It has been variously called synocha, inflammatory fever, simple fever, and relapsing fever. The last name, which it has of late generally borne, is nevertheless a misnomer. It no more deserves the name than ague deserves to be called relapsing fever. It is a fever of tolerably definite duration, extending mostly to seventeen days; but with the singular peculiarity that there is an interruption in the middle of it, varying from seven to ten of these days. It is far from being a deadly fever; but it causes great suffering, and debility so lasting, that it makes a working man unfit for labour for two months, first and last. Strange to say, in this city at least, where it has been better studied than anywhere else, it is never seen but as an epidemic. I have known four such visitations of it—in 1817–20, 1827–28, 1841–42, and 1847–48; but I never saw it in the intervals, nor has any of my Edinburgh brethren. Hence, at every fresh appearance, it is at first taken for a new fever. It occurs only at periods when work is scarce, wages low, provisions dear, and the labouring classes consequently in unusual distress. In accordance with this fact, it is met with in the labouring population alone—never in the easy ranks of society, unless through very decided exposure to infection. For, in the next place, it is an infectious fever. Of this I have produced elsewhere proof which has never been controverted.* But the infection is not a virulent one, and the progress of this fever by infection may be utterly extinguished.

This is the main fact to which I desire to draw your attention as social reformers. Healthy persons in communication with fevers of this kind accumulated in an hospital ward, or lying in less numbers in their own small unventilated chambers, are seized almost certainly if they remain long enough, and are not shielded by a previous attack. But from a single case of this fever, in a middle-sized, well-aired room, it is never communicated to the healthy. With these facts before us, of which I could furnish pointed proof, were there time, it is evident theoretically how such a fever is to

* See Dr Tweedie's Library of Medicine, vol. i. 154. 1840.

be extinguished. The favourite panacea of the present day for the prevention of all fevers—thorough drainage—is not the remedy. The best drainage leaves untouched the real foundation of the disease—viz., penury pent up in airless dwellings. But provide work for the unemployed, obtain from them in return due ventilation and cleanliness, and the epidemic will soon vanish. First, the new condition of things will make its infectious power harmless, and ere long it will cease to arise by spontaneous generation.

The carrying out of this theory into practice is, however, a formidable difficulty. How is work to be obtained in hard times for the unemployed? And, still more, how are the labouring classes to be taught the habit of ventilating their apartments? Success must depend on the resources, faith, and energy of a sympathizing community, and upon the convictions of its suffering portion. But, at all events, we have a fundamental principle of social economy firmly established—that no epidemic of inflammatory fever can long withstand employment of the workman and fresh air in his house.

Typhus, simple typhus, nervous fever, low fever, putrid fever—a disease so familiar as to need no description here, though very different in form from the last—presents many agreements in those characters which give them both interest in the eyes of the cultivator of social science. It has its epidemic visitations; and fearful ones we have seen all over Britain, especially in this city, where there have been no fewer than five during the last forty-five years—the last and worst having occurred between 1847 and 1849. It puts on the epidemic shape only at periods of want among the labouring classes. Howsoever it may arise in the first instance, it spreads by infection; but its infection is not intense, hence adequate space and ventilation make it innocuous in that way, in so great a degree as to have misled good observers, and made them doubt its infectious property. So far typhus agrees with inflammatory fever. But, *firstly*, it is far more deadly, one in ten being the probable average of deaths from it. *Secondly*, it occurs at all times, and not merely at epidemic seasons. Seldom does a week pass in a large town like Edinburgh, without one or more deaths from typhus appearing on the Register. *Thirdly*, in these non-epidemic

periods it is met with among the rich as well as the poor, and perhaps in as great a proportion to their relative numbers.

Nothing is known of the origin of typhus in non-epidemic periods. Infection will not explain the occurrence of such fevers—not those, at least, which show themselves in the easy ranks of life. With the most ordinary care, cases of it in that circle do not reproduce it in the exposed; whence, then, could it reach themselves by communication, who had not had any exposure to it within their knowledge? Neither does it originate, at least generally, in faulty drainage, or other sources of foul air. In the metropolis, indeed, it is at present a prevailing opinion—much in favour also, as I understand, in this Association—that the sources of foul air are likewise the sources of typhus; but such a rule will not apply in Edinburgh. Foul air undoubtedly favours the spread of both typhus and inflammatory fevers in their epidemic visitations; for, setting aside its possible operation in other less ascertained ways, it implies confined air, want of ventilation, and therefore concentrated infection. I do not mean to deny that foul air of some kinds may sometimes simply cause typhus; but there must be better proofs than now exist, before this can be admitted as the constant or even general fact. Foul air will not account for the origin of the scattered (sporadic) cases of typhus in non-epidemic times. As little will air, merely foul, account for either the rise or the fall of epidemics. Every physician of experience in this city has repeatedly seen in a family a solitary case of well-marked typhus, which no skill could trace to foul air in any shape, or from any source. No one ever heard here of the spread of typhus in the epidemic form being referable to an increase of foul air, apart from the resulting concentration of infectious effluvia from those ill with the disease. We have had within the last few years an instance of the fall of a great epidemic, the worst on record, without any commensurate amelioration of air, drainage, or other branch of cleanliness. This incident is so remarkable in its circumstances as to deserve careful consideration.

The annexed table shows the variations of fever in Edinburgh year by year since the century began, as derived from the records of the Royal Infirmary:—

12 mon. to Dec. 31, 1800,	329	12 mon. to Dec. 31, 1832,	1394
... .. 1801,	161 1833,	878
... .. 1802,	156 1834,	690
... .. 1803,	232 1835,	826
... .. 1804,	323 1836,	652
... .. 1805,	175 1837,	1224
... .. 1806,	95 1838,	2244
... .. 1807,	110 1839,	1235
... .. 1808,	111 1840,	782
... .. 1809,	186 1841,	1372
... .. 1810,	143 1842,	842
... .. 1811,	96 1843,	2080
... .. 1812,	103	9 mon. to Oct. 1, 1844,	3339
... .. 1813,	75	12 mon. to Oct. 1, 1845,	683
... .. 1814,	87 1846,	693
... .. 1815,	96 1847,	3688
... .. 1816,	105 1848,	4693
... .. 1817,	485 1849,	726
... .. 1818,	1546 1850,	520
... .. 1819,	1088 1851,	959
... .. 1820,	638 1852,	691
... .. 1821,	327 1853,	574
... .. 1822,	355 1854,	168
... .. 1823,	102 1855,	201
... .. 1824,	177 1856,	180
... .. 1825,	341 1857,	132
9 mon. to Oct. 1, 1826,	450 1858,	111
12 mon. to Dec. 31, 1827,	1875 1859,	183
... .. 1828,	2013 1860,	152
... .. 1829,	771 1861,	122
... .. 1830,	346 1862,	136
... .. 1831,	758 1863,	196

From this table it appears that after 1816, for a period of thirty-six years, the continued fevers of Edinburgh, of which typhus formed the largest proportion, seldom fell short in the Edinburgh Infirmary alone of 500 in any one year. In 1818 and 1819, the annual average reached 1300; in 1827 and 1828, nearly 2000; in 1837, 1838, and 1839, nearly 1600; in 1843 and 1844, above 2700; and in 1847 and 1848, 4200. It then suddenly fell next year to about 700, and kept that average for five years. But in 1854 it sank again abruptly to 170; since then the annual fevers have never exceeded 200. The average for the last ten years has been 158. Last year there were only 136; and this year, which ends for the hospital statistics on 1st October, there were 196. Until 1860, the statistics of the Infirmary did not distinguish the several forms of fever from one another. In 1847 and 1848, however, the annual average of typhus could not have fallen short of 2500; and after that it must have been between 400 and 500 until the year

1854. But in 1860 the number was accurately ascertained to be 67; in 1861, it was 50; in 1862, 14; and in 1863, 74. I am further indebted to the medical officer of the city, Dr Littlejohn, for the fact that the deaths from typhus for the whole town, registered in nine months since 1st January, have been 18. According to the average mortality of typhus, this number indicates 240 cases of typhus for the present year.

Now, about the period of this decrease, the drainage of that part of the city where the chief nests of fever always lay was improved. But the decrease began decidedly before the commencement of that reform. I am informed by our superintendent of drainage, that the works for improved drainage of the worst part of the city—the Grassmarket, Cowgate, Canongate, High Street, and the closes communicating with these—were only begun in 1854, were far advanced only in 1858, and are now all but finished. Neither can the rapid decrease of fever be ascribed to any satisfactory improvement in the cleaning of the lanes and houses of the working classes. I believe that long prior to the decrease, our police had done as much for the cleansing of the fever districts as the impracticable structure of the streets or lanes there, and the incorrigible habits of their occupants, would allow. And as for the home habits of these people, no such improvement of them has taken place in my time as will explain any other change of circumstances in their social economy.

Here, then, is a discovery which remains to be made in social science. Why is it that typhus, which had been almost a perpetual pestilence in Edinburgh for a third of a century, has been of late wearing itself out, and last year almost flattering us with its extinction? The cause has certainly not yet been discovered. My own strong impression is, that the secret will be found to be connected with the theory which has been much canvassed in the present day, the successive changes of type or constitution of epidemic diseases. But as this is a favourite theory of my own,¹ I shall not here insist on it further than by warning all inquirers into the origin of zymotic diseases in foul miasms, that they run great risk of ascribing to these, and the removal of these, fluctua-

¹ See Edinburgh Medical Journal, 1857-58, iii. 578.

tions in the prevalence of such diseases which are often far more probably owing to a more-recondite cause—a change in epidemic constitution. In the meantime, the experience of the physicians of Edinburgh presents us with the precept, also derived from the experience of other great towns, though, perhaps, nowhere else so categorically, that typhus never can prevail in the epidemic form in face of employment for the working classes and ventilation of their dwellings.

In the present line of inquiry, there is no occasion for noticing any other fever than enteric fever. Gastric fever, the only other sort arranged under the head of continued fevers, is not generally acknowledged at present by systematic authors. If it be a separate fever, it is one which, according to my own observation, occurs chiefly in the easy and wealthy ranks of life, and owes its origin mainly to high living and over-indulgence in the excitements of society, whether of the nature of business, study, or amusement. We have little to do with it therefore. Enteric fever is very differently circumstanced.

This disease, variously called dothi-enteritis, entero-mesenteric fever, enteric typhus, typhoid fever, but most conveniently Enteric (bowel) fever, is the most deadly of all forms of continued fever. It was first distinguished from others in Germany in 1763, and was first accurately described in France by Bretonneau in 1812. It began to be distinguished from others in London about the close of the first quarter of the present century, and first of all by Dr Bright in 1827. A little later, a few cases occurring in hospital here attracted great attention. It has since increased in both cities, as well as in Britain at large. In London it has been common for many years, and is sometimes the commonest of all forms of fever. In Edinburgh its course has been very singular, and deserves careful attention with reference to English opinion as to its cause, and the sanitary conclusions to which that opinion leads.

For many years after Bright wrote about it as a frequent fever in London, we saw it seldom here—never in the proper inhabitants of the city, but only in persons brought ill with it from Linlithgowshire or Fife, or who had quite recently left these counties. It began to be studied here with great care on its being

recognised in the Infirmary in 1847, in a German lad only six months from his "Vaterland," on which occasion it was believed that no case had occurred in the hospital for a period of five years. By-and-by it became not uncommon. For some years past every practitioner meets with it. It occurs among old residents and natives of the city. Within a few years it is encountered even among people in easy circumstances, and in the best houses of the town. In our Infirmary statistics, it was not taken account of separately from other fevers till 1860. In that year, according to a table supplied to me by Mr Macdougall, superintendent of the hospital, there were 41 cases of enteric fever; in 1861, 35; in 1862, 79; and in 1863, 67; during which period the fevers of all kinds did not exceed 150 in any single year till the present, when they reached 196. These are no great numbers, and yet sufficient to show a decided tendency to increase during the last fifteen years. Further, Dr Littlejohn, medical health officer for the city, informs me there have been seventeen deaths from enteric fever reported to the registrar since the 1st of January last, which will correspond with about 120 cases in twelve months, if the average mortality be taken at one in five.

Of all forms of fever none has been more confidently ascribed than this, by London writers, medical and non-medical, to faulty drainage and faulty provision of water-closets. If we are to believe what some have advanced on the subject, there is no case which may not be traced to foul air, derived mainly from one of these sources. Were this a well-established principle in social science, the extinction of so deadly a fever should be no very difficult matter. Through the publicity given to the discovery by this Association, and the influence of its members, we might hope to see protection established far and wide against the pestilence.

But I am sorry I cannot call on you to assent to this theory, and carry out its consequences; for there are insurmountable facts in its way. During the period that this scourge has been alternately growing and diminishing in London, has London become alternately worse and better drained, or have the habits of its working classes been alternately less and more cleanly? Does the disease generally appear where drainage is bad, or water-closets wanting or faultily

constructed? Does it attack workmen who live in the London drains, as well as those over them, near them, or far from them? I believe all these queries must be answered in the negative. And what is the case here? Our street drains in the Old Town have been much improved during the very period that enteric fevers have been increasing. The habits of the working classes in regard to cleanliness admit of reform undoubtedly, but certainly they have not been growing worse. Besides, the individual cases which have occurred here have been made the subject of careful inquiry, and in many of them it has been impossible to discover any peculiar source of foul air—anything different from what may be met with in thousands of dwellings where this fever has never shown itself. Of the seventeen deaths hitherto this year, nine occurred in localities to which no objection could be found. And what are we to say of its appearance among people of easy circumstances? In this sphere I have myself known several deaths from it during the last few years, and no fewer than three during the last twelve months. In the first place, why has it occurred in that class of society only of late? Surely not from any general increase in defective drainage, defective water-closets, or other sources of uncleanness. As to the history of individual cases, I have been content to ascribe the disease, in obedience to the theory of London writers, in one instance to gross disregard of ventilation, and in another to a faulty water-closet. But in the last three I have seen no fault could be found anywhere. Further, this fever does not by any means generally break out where the streets are ill-drained, water-closets wanting, and habits filthy. In countless places of that sort in Edinburgh it is unknown. It may be worth while adding, in reference to an independent question likely to be discussed in this section, that enteric fever is not known in or near the “foul meadows” of Craigentenny.

I suspect, then, it must be allowed of this disease, as in respect to most other epidemic diseases, that we do not yet know its cause—that foul air merely favours its invasion; but that its true cause is something much more specific—some ζυμη, or ferment, which has hitherto eluded our search. In that case, while we shall do well to encourage better drains, more and better water-closets, and better

ventilation of dwellings, still we must not count upon thus extirpating enteric fever.

As I am anxious to bring under view some part of a very different subject—the class of diseases originating in a depraved state of the bodily constitution—I regret that I must here quit the subject of epidemic diseases, of which there remain many for consideration—such as cholera, dysentery, diphtheria, smallpox, measles, and scarlatina. Smallpox especially might have been aptly discussed this season before the Association, both on account of its increased prevalence last year, and because of the hints recently conveyed to the public that the English Vaccination Act is to prove a failure, as well as because a similar act is about to come into force in Scotland. But time will not allow of so extensive an inquiry as is necessary to complete the whole subject of zymotic diseases; and I must be satisfied with a brief allusion to only one more of them—Diphtheria—which happens to be connected with a sanitary question of strong local interest in Edinburgh.

This terrible disease is far from common in Edinburgh. I am glad to say I have seen but one instance of it originating in town, and that was many years ago, before it had begun to be much talked of in any part of Britain. No epidemic disease has been by many late writers in England more confidently referred to foul exhalations as its cause, and even its only cause. I shall not take up that question here, however. My own observation gives me little help in forming an opinion. Let me merely say that, as I, in the single case I have seen in Edinburgh, so likewise many of my professional brethren, in the course of their observation, have failed to trace diphtheria to any source of foul air. But it is remarkable that it seems to have shown a slight attachment to our irrigated meadows to the east of the city. An intelligent practitioner in Leith, Dr Paterson, informs me he saw, last year, five cases at a place on the borders of the district.

I scarcely think, however, that, taken along with the negative evidence I have received from others who practise among the natives of these marshes, these cases, which may have had a more local cause still, can be held singly to convict the irrigated meadows.

For I wish to add the information, that I have recently been making careful inquiry respecting this famous and somewhat unsavoury institution ; that many years ago my own prejudices were all against the meadows ; that I have been compelled to surrender them ; that I am satisfied neither typhus, nor enteric fever, nor dysentery, nor cholera, is to be encountered in or around them, whether in epidemic or non-epidemic seasons, more than in any other agricultural district of the neighbourhood. About twenty-five years ago it was stated that the cavalry soldiers at Piershill Barracks, which are situated very near them, were unusually liable to the zymotic diseases caused or promoted by foul emanations, and also that meat could not be kept in the officers' larder on account of the absorption of foulness and quickly following decay. Either, however, there was some mistake committed through prepossession, or the meadows are now worked on a better system. But, at all events, I have the assurance of Mr Lockwood, surgeon of the Scots Greys, that, during their late occupation of Piershill Barracks for two years, the messman of the regiment never observed the meat to be injured, nor did he himself observe among the men anything but remarkable freedom from diseases at large. I think it right, in reference to the late introduction of the Craigentenny system of irrigation into the vicinity of other large towns, that these precise facts should be known.

Of all the diseases in our civilized and modern condition that human flesh is heir to, none have a larger share in causing mortality, and none are more fruitful still in inquiry, reflection, and warning, than the great group of diseases classed as dependent on deteriorated or depraved states of the constitution of the body. One tribe of these, the most numerous of them all, comprises Scrofula, Tabes, Consumption, and Water in the Head, which are usually classed together as tubercular diseases. The next in point of frequency, called Malignant diseases, because they creep from organ to organ, and lead surely to death, embrace scirrhus, fungus, and other forms of cancer. Gouty and Rheumatic diseases form a third tribe, and Diabetes a fourth ; but all these are insignificant in their ravages compared with the others. All diseases of the class agree in apparently requiring for their development a depraved condition of

the blood, or of some other component of the human organism ; and from other diseases partaking of that character, they differ in being prone to descend from father to son, and increase in that respect by concentration through marriage. With the exception of gout and rheumatism, which medicine can do much to eradicate, they generally make sure of their victim at last. But they are slow to finish their work ; and while it is doing, they are the most grievous of all maladies to bear. They are most grievous not only to the victim himself, but likewise to all who have to minister to him in his sufferings. It is a crowning misery, but too little adverted to, that the tending and comforting him, as it falls to the lot of his affectionate family, becomes the duty of those who by similarity of constitution are least fitted to undergo safely so hard an ordeal. Add to all this, that these diseases are the main source of the deterioration of the human race in all physical attributes among such civilized communities as our own, and the Association cannot fail to discover ample inducement to study their influence upon public health.

The Scottish Register in its present form does not fully meet the student's wants in this branch of inquiry. But a useful step or two may be taken with its help, as it stands, in tracing the influence of Consumption, which may probably be held to exemplify and stand for all the rest. The entire class account for no less than 20 per cent. of the total mortality in all Scotland—for 4100 deaths annually in every hundred thousand of the population. Consumption alone accounts for more than half of this proportion,—viz., 11·5 per cent. of the total mortality, and 237 deaths in a hundred thousand of the population. It has been known for some time that the proportion falls under this average in country districts, and exceeds it in large towns, and Dr Stark's summary of the Register of 1855 shows that these differences are by no means small. I am not aware whether it has yet been noted, that the difference to the prejudice of the great towns of Scotland is much greater than their notorious difference in general mortality ; or, putting the case differently, that the advantage in favour of the country seems conversely to increase in a greater ratio than the diminution of the general mortality, and, *cæteris paribus*, always in an increasing ratio according to the

degree of rurality, if I may use the word, of the country district. These important facts can be made out so satisfactorily from the Register, that I do not hesitate to offer you some proofs in illustration.

Taking the population of Scotland in 1855 at three millions, and assuming that the deaths from consumption were nearly all specified, or at least uniformly so, which is probable, the total mortality in a hundred thousand was 2080, and that from consumption 237. Dividing the mainland into large towns of 10,000 people and upwards, and the rural mainland, comprising all smaller towns with the pure country, it appears that the mortality from all diseases for the rural mainland in 1855 is 1800, and in the towns 2580—or in the ratio of about 4 to 3 against the latter. But the mortality from consumption in a hundred thousand people was in the rural mainland 186, and in the great towns 333, or not much short of double.

But let us look into the facts more narrowly, and the real difference will be found vastly greater. In Glasgow, whose population in 1855 amounted to 356,000, and where all town causes of mortality greatly abound, so that the annual deaths reach 2890 in a hundred thousand, or almost one in 38 persons, those from consumption are so high as 385. Edinburgh and Leith, with a population of 206,000, present a mortality not much inferior,—viz., 2380 in a hundred thousand, or one in 42; but there is a greater difference in the deaths from consumption, which are 283. Contrast, however, with even the latter proportions the data derived from the very rural counties of Caithness, Sutherland, Ross, Cromarty, and Inverness, comprising a population of 240,000, and we find that the general mortality falls to 1617 in every hundred thousand, and that from consumption to 179. The consumptive mortality is already less than half of that of Glasgow. But these Celtic mountainous counties are not so favourably circumstanced as other rural counties with respect to other sanitary influences—such as climate, food, and medical aid. Turn then to the agricultural Lowlands of Scotland. In the fine agricultural counties of Roxburgh, Peebles, Selkirk, and Haddington, if we exclude two small towns, Haddington and Hawick, which, though under the town standard of the Register (10,000), own to the high mortality of one in forty,

there is a population of 97,000, in which the total mortality sinks to one in 65, or 1546 in a hundred thousand, and the deaths from consumption to 138. In Fife, deducting 25,000 inhabitants of two unfavourably circumstanced towns, Dunfermline and Kirkcaldy, the population amounts to 130,000; and here the general mortality is 1750 in a hundred thousand, or one in 57, and the deaths from consumption 125—only a third of the proportion in Glasgow. But neither in Fife, nor in the four counties south of the Forth which I have grouped together, even when the unhealthy towns are excluded, is the population so free from the disturbing influences of mining and manufactures as may be desirable for a perfect contrast. In the county of Berwick, however, we have the most perfect example in Scotland of a population combining the richest agriculture with freedom from the deteriorating influences of mining, manufactures, and large towns. None of its towns contains above 3500 inhabitants; there is, I think, only one large factory in it, a paper manufactory; and there are no mines. Here, accordingly, the total deaths in a hundred thousand fall to 1410, or 1 in 70, and the deaths from consumption to 104. The general mortality is nearly one-half of that of Glasgow, and the share contributed by consumption is as nearly one-fourth of the proportion in that city.

	Mortality 1 in	Consumption in 100,000
Glasgow,	38	385
Edinburgh and Leith,	42	283
The North Highland counties,	62	179
Four Lowland agricultural counties, excluding two towns, }	65	138
Fife, excluding two towns,	57	125
Berwickshire,	70	104

It will be objected to these results, as the basis of evident deductions, that, as I began by rating the general authority of the Register low, its trustworthiness in the particulars now made use of must be proved. This is easily done. The data for the North Highlands may be insecure; but in all other respects it so happens that I have used the Register where it is most worthy of confidence. The returns for Glasgow, Edinburgh, and Leith, and the Lowland agricultural counties, are very nearly complete; and in all these parts consumption has so well understood a meaning, that, in using

the term, the errors must be few, and at all events pretty equable. Others may object that I am limited to the statistics of a single year. True. That may affect the general mortality and certain diseases; but there is no ground for supposing consumption to be one of the diseases whose range varies one year with another. The basis in the case of Berwickshire is narrow, for the population in 1855 did not exceed 36,500. Still, until Government shall favour us with a larger basis, by enabling the Registrar to publish several years of "detailed reports," it is in the meantime a remarkable fact, supplied by every part of the Register for 1855, which can be aptly and fairly used for this inquiry, that wherever great towns, manufactures, and mining concentrate and confine great bodies of the people, there will consumption be found to spread its ravages in a much greater ratio than the increase of the general mortality; and, conversely, that the more the influence of these deteriorating agents can be excluded, the more does consumption progressively decrease, and in a much greater ratio than the decrease in the deaths from disease at large.

This general rule applies also, and even with greater force, to the three other diseases of the tubercular class—scrofula proper, tabes, and hydrocephalus. The certificates sent to the Registrar cannot be so much relied on here for accuracy as in the case of consumption. But the errors must be nearly equable for such parts of the Register as I require to use for the main facts. The proportion of deaths caused in all Scotland by scrofula, tabes, and hydrocephalus together, is, for every hundred thousand persons, 96, being a little more than $4\frac{1}{2}$ per cent. of the total mortality. But the inequality of the distribution of these deaths between town and country is extreme. In Glasgow, for example, the proportion in one hundred thousand is 177; in Edinburgh, 96; in the six Lowland agricultural counties, 32; in Berwickshire, singly, 21. Where a pure and rich agriculture predominates, the havoc caused by these disasters is reduced almost to a sixth of what it is in a great town, such as Glasgow; and in the purest of rich agricultural districts it is brought down even to a ninth.

The tribe of malignant diseases are supposed by some to take the place after middle life of hydrocephalus, tabes, and consump-

tion, whose season is from infancy to confirmed manhood; and therefore the former have been considered to belong, like the latter, to the developments of the scrofulous or tubercular habit of body. In that case it might be expected of them that they should follow the law of prevalence, which rules tubercular diseases proper. The Register unfortunately cannot be used to test this conclusion closely. The greater part of malignant diseases are concealed in the Register under the head of other diseases. Cancer, the only heading for them, accounts almost exactly for $1\frac{1}{2}$ per cent. of the mortality. But at least as much lurks under the heads of chronic diseases of the stomach, liver, bladder, kidneys, and womb; another set, at least as numerous, are returned under old age, atrophy, and dropsy; and, on the whole, the entire tribe cannot be reckoned under 6 per cent. of the general mortality. For estimating their comparative prevalence in different circumstances, the only returns which can be safely used are those under the head of cancer. The result is quite at variance with the law for tubercular diseases. Town and country seem to share alike in the inflictions of this grim visiter. But the details are so contradictory to one another, that the data appear unsafe. Thus, in a hundred thousand people the number for all Scotland is 29; for the six Lowland agricultural counties, 35; for the six largest towns, 29; for the four last of these—Aberdeen, Dundee, Paisley, and Greenock, 26; for Edinburgh, 54; for Glasgow, 18. On the whole, it would appear that town life cannot be charged with the evil of fostering malignant diseases; and their causes, whether original or accessory, still remain to be discovered. But it is very different with the much more numerous tribe of tubercular diseases. In a first-class town, such as Glasgow, tubercular diseases account for 20 per cent. of the total mortality; in an agricultural county like Berwick, for 8 per cent. only. In a given number of townspeople at least four die of tubercular disease for one in the same number of countrymen. Nor is this all the evil which life in a great city must lay at its own door. Tubercular diseases mainly are at once the cause and the test of the deterioration of a race in physical excellence. This mishap, though a more hidden consequence than an increased death-rate, is one no less sure to follow; and it is in the long run even worse for the wellbeing of a nation.

Philanthropists and legislators, in dealing with the unhealthiness of towns, have, until lately, had chiefly to do with epidemic diseases as their main source of excessive mortality. But it is apparent that tubercular diseases are a still more serious source of destruction. It is also most probable that the abatement of their ravages will need a different description of measures from those which have been proved to be serviceable against diseases of the epidemic class. The discovery of the necessary measures is a duty which it peculiarly becomes this Association to press upon the Government of the country, and also upon the great, the wealthy, and especially those whose business of life it is to amass wealth through the labour of the working classes, and whose requirements have occasioned the concentration of the people in overgrown towns, with all its concomitant evils.

On considering the whole circumstances attending the development or the circumscription of tubercular diseases, as brought out by a scrutiny of the Scottish Register, and adding the reflections drawn from long professional experience, I cannot at present see any more probable source of the fearful growth of these diseases in great towns than the want of open-air exercise. Several excellent inquiries have been published, which point to certain trades as greatly contributing to develop tubercular diseases. A systematic general inquiry of the same kind might bring to light the fact that it is only a few trades which have to account for the high town mortality; and then our course would be clear and simple. But I confess I have no hope of so simple a solution of the problem. All special inquiries hitherto made, except in the instance of one or two trades which have a special evil of their own to contend with, point in the same direction for the cause of concentration of tubercular disease in great towns—viz., a conjunction of defective exercise and exclusion from the open air. If this prove, on a more extended inquiry, to be the great or universal cause of evil, there is no remedy within reach except the spreading out of a city, the finding lungs for it in the shape of parks and gardens, the surrender to the working classes, and, above all, to the sedentary trades, of a proportion daily of that time which is now too entirely demanded of them for the toils of their craft, and the creation among them of a taste for the

active exercises which were the pastimes of their ancestors. Something has been doing lately in this direction by philanthropists, who have felt a necessity for action through a species of instinct, or through general observation of the present fitness and unfitness of things; and every now and then we have to record the generosity of an individual thinker and actor in this field. But we have now before us, from sundry quarters, such precise and concurring evidence of the enormous extent of evil arising from the present mode of town life among the working classes, that, looking especially to the still increasing growth of our already overgrown great towns, and the stationary or rather retrograding numbers of our rural population, there is loud call indeed for public, systematic, extensive, though it may even be costly, ameliorations.

I am very unwilling to quit the deeply interesting subject of constitutional diseases, with which I propose to conclude my remarks, without adverting shortly to a most remarkable fact which has been lately made a matter of controversy relative to the circumstances which influence the dominancy of the most important of them all, consumption. I will therefore crave your attention for a very short time longer, because I have it in my power to throw a little light upon the question.

In 1848, an intelligent young practitioner of the Island of Lewis, when he graduated at Edinburgh, wrote a thesis on the medical topography of the island, for which he was awarded one of the University medals of the year. In this thesis the author, Dr Macrae, mentioned that in his experience he had never met with the disease, pulmonary consumption, in any islander. The statement excited great surprise at the time, but was lost sight of soon by most people, though never by myself, to whose share the thesis fell for examination. As soon as the Scottish Register was established, I asked Dr Stark, the Medical Registrar, to look into the matter; but an insufficient staff prevented him from doing so till the "Detailed Report" for 1855 was undertaken and published so lately as 1861. Dr Stark there takes up the question; speaks of a "tradition" prevailing in the Western Isles as to their exemption from pulmonary consumption; notices the fact that one medical gentleman had confirmed the tradition; but says that the Register does not bear out the proposition; at the

same time acknowledges that the returns are so incomplete, and the term consumption so vaguely used in the Isles, as to render the Register an unsafe guide; and, after all, thinks he can make out, after proper allowance for errors, that consumption is very decidedly less frequent in the Isles than in Scotland at large. I find, however, that the Register itself positively proves consumption to be still less frequent in the rich agricultural lowlands of Scotland than Dr Stark has made it out to be, with allowance for errors, in the Western Islands. But the truth is, the returns to the Registrar from these islands are so very faulty, that, after looking carefully into the subject, it appears to me they are wholly unfit for use in such a question.

I therefore referred again the other day to Dr Macrae, begging to know his ulterior observation upon a much larger experience than in 1848. He replies, that he continues to obtain the same result; that consumption in Lewis is almost entirely confined to strangers temporarily resident there, and to natives who have resided and contracted the disease elsewhere, chiefly as domestic servants in the southern towns of the mainland; and that natives who stick to the island are exempt from the disease, except in a few rare instances, where it had been brought on under long privation of food and exposure to cold. Adverting to the defects in the Register, and the jumbled mode of using the term consumption in the returns, he adds, that he investigated the reported cases for the last three years in the Stornoway district, which contains a population of 8500 inhabitants; that the total deaths were 444, or 1 in 61; that 24 deaths from consumption were registered; that every case had been seen at one period or another of its course by a medical man, so that he could trace it out accurately; that 8 of the 24 proved to have been bronchitis—a common mistake; 2 tabes, and 1 dropsy; that of the 13 true consumptions 5 were residents from the mainland, and 4 native servants who had returned ill of the disease from service in Glasgow. Thus we have only 4 cases in three years among the true resident natives of the island, or 16 only in 100,000. I have similar testimony from a very able authority in another island, Dr M'Coll, of Mull, who brings the experience of thirty-three years to the inquiry. He informs me that in his island, which

contains 12,000 inhabitants, he has scarcely ever known consumption occur, except among immigrants bringing with them the constitution of the mainland, or natives who had gone thither early to contract it, but returned to die on the soil of their birth.

I do not know a more interesting fact in the whole statistics and pathology of this melancholy disease than the apparent exemption of our western islanders from it. Nor is there any limited statistical inquiry more worthy of being encouraged by our Association, and satisfactorily cleared up as to its amount and causes, than this wonderful immunity, which is now no mere "tradition."

I feel that I must apologize to this meeting for having detained it so long with a somewhat excursive inquiry. More especially ought I to do so, because I do not claim to have brought before you anything positively new, at least of the nature of general principles. My purpose was to revive some old principles concerning public health, which have been latterly kept rather in the shade, to illustrate them and others by placing them before you in a new and stronger point of view, and to confirm prior observations by my own. I shall be content if I may be thought to have succeeded in some measure in these objects.