

Preventive medicine : statistics of small-pox and vaccination in the United Kingdom, and the necessity for a better system of vaccination in Ireland : read at the meeting of the British Association, (Section F) Aberdeen / by William Moore.

Contributors

Moore, William.
Royal College of Surgeons of England

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PREVENTIVE MEDICINE.

STATISTICS

OF

SMALL-POX AND VACCINATION

IN

THE UNITED KINGDOM,

AND THE NECESSITY FOR A BETTER SYSTEM OF VACCINATION
IN IRELAND.

[Read at the Meeting of the British Association,
(Section F) Aberdeen.]

BY WILLIAM MOORE A.B., M.B. T.C.D., M.R.I.A., &c.,

Physician to the Hospital for Diseases of Children.

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THE REVOLUTIONARY

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PREVENTIVE MEDICINE.

STATISTICS OF SMALL-POX AND VACCINATION IN THE UNITED KINGDOM—REGISTRATION OF BIRTHS, DEATHS, &C., INDISPENSABLE FOR A BETTER SYSTEM OF VACCINATION IN IRELAND.

Read before the Meeting of the British Association, Aberdeen, September, 1859.

BY WILLIAM MOORE, M.B., T.C.D, M.R.I.A.

PHYSICIAN TO THE HOSPITAL FOR THE DISEASES OF CHILDREN, DUBLIN, &C.

THE question of public health is gradually attaining the importance it deserves ; and, although the statistics daily put forward show a manifest improvement in sanitary measures at large, still, as yet, they go to prove, more, how much remains to be done than what has actually been accomplished. Till within the past few years, suggestions, the result of carefully-collected statistics and analyses on questions of social reform, passed comparatively unheeded ; but, by continued perseverance, the state has gradually recognised these inestimable labors, and we are now on the eve of a reform which bears no comparison with those of recent date, inasmuch as it tends to confer no privilege, luxury, or appanage, on any particular class or classes, but to diffuse the blessings of life, health, happiness, and prosperity, to all grades of the community. Public health.

With the various sources of information and observation within the reach of all, it must be self-evident what an excessive mortality is due and owing to measures entirely within the control of every member of society ; to the profession to which I have the honor to belong, is generally attributed, more particularly, the sphere of preserving the health and prolonging the lives of their fellow men ; hence they naturally regard the aversion of evils, sanitary and social, mental and physical, which

can be combated with science, their highest aim and most exalted attainment.

Annual
avoidable
mortality.

Although at the present season, and during the past year, we have been exempt from any violent epidemic visitation, still there is the insidious sapping evil which swells so fearfully in some districts our bills of mortality; 100,000 deaths are set down by the Registrar-General as preventable or removable, to be laid at the door of morbid products, which, if we were within reach of the hygienic goal, should have neither a place or name.

Medical sci-
ence, cura-
tive and
preventive.

These slow and insidious agencies are the more fatal in proportion to their latency. The appalling weekly or monthly returns of mortality during a prevailing epidemic may arouse public bodies and private individuals to increased temporary vigilance; but the steady weekly returns of deaths, though they may be habitually 20 per cent. in excess, attract no attention. Thus we find the waste of life from causes within our own control has not been duly appreciated; the "*salus populi*" should be the watchword of all civilized communities, for with it the philanthropy, intelligence, comforts, and enjoyments of life are inevitably interwoven. Assuming, with Dr. Barclay,* that diseases are the result equally of poisons which are indirect in their action, as of those which we can specifically point out, medical science, in its double capacity of curative and preventive, has to treat with the poison itself, so far as its nature is known, and with the mode of its transmission, as well as with the individual on whom it operates. In its former capacity it seeks for an antidote to the poison, and for means to render its effect less injurious—to rid the system of it, and to repair the injuries it may have inflicted. Preventive medicine, on the other hand, anticipates the origin of the mischief by attacking the very sources from whence it is derived, and thus preventing its being either generated or transmitted, at the same time fortifying the physical powers; so that in the event of disease occurring, its mischievous influences may be exerted with comparative impunity. With this latter division of the subject, and its application to zymotic disease in particular, I mean to direct your attention on the present occasion; and, as one of the most distinctive of this class, I shall take small-pox, for the prevention of which we are possessed of an antidote truly termed "specific."

Death rates
in England
and Wales.

The population of England and Wales amounts to nearly 20,000,000. The calculation has been made, that if every person

* Dr. Barclay, "Preventive Medicine and Sanatory Measures." Cambridge, 1856.

lived to 80 years of age, the annual death rate in every 100,000 would be 1,250; the number actually dying are 2,266. Now, from Dr. Greenhow* and Mr. Simon's† valuable reports, we find that in some parts of England, at least 1,000,000 are living on such terms that their death-rate ranges from 1,500 to 1,700 annually. Assuming, therefore, that the difference between 1,250 per 100,000, and 1,700 per 100,000, the former the theoretical the latter the actual rate, represents the effects of non-preventible causes tending to shorten life, we must conclude that all deaths above 1,700 in 100,000 are due to causes which may be looked upon as artificial and removable.

In the year 1857, looking at the matter in this light, there was an avoidable loss of 91,856 lives, 420,019 persons having died in England and Wales, whereas, if the death-rate had stood uniformly at 1,700 per 100,000, the numbers would have been only 328,163. According to the Registrar-General's Report, December, 1858, the population of England and Wales in the middle of that year did not exceed 19,576,950, and at the rates of comparatively healthy districts (63) the deaths in the year should not have exceeded 349,398: the actual mortality amounted to 450,018, and the excess of 100,620 deaths is due chiefly to the fatal neglect of the sanitary arrangements which are required in every district, and are indispensable in cities. Of these 100,620 preventible deaths, about 69,730 happened in large town districts, and 30,890 in the rest of the kingdom. "This is a sad reckoning, but it is an under statement of the facts."

According to Dr. Greenhow's calculations the following annual local deaths are wholly preventible under good sanitary arrangements, viz. :—

Cholera, from	-	-	-	0 to 403.
Diarrhœa and dysentery, from	4	-	-	to 345.
Continued, fever from	-	-	21	to 209.
Small-pox, from	-	-	0	to 146.

Amongst the annual deaths from diseases in some degree inevitable but capable of diminution, and controllable by sanitary measures, are the following :—

Common infectious disorders of childhood, from	694	-	-	to 2,149
Convulsive disorders of infancy, from	280	-	-	to 3,832
Pulmonary affections in infancy, from	213	-	-	to 2,897

* On the sanitary state of the people of England, communicated to the General Board of Health by Dr. Edward Headlam Greenhow. London, 1858.

† Mr. Simon's prefatory report.

That able officer of the Board of Health, Mr. Simon, says, with regard to these statistics--“It can no longer seem so difficult to make a very large beginning towards striking off the annual 100,000 deaths, against which the Registrar-General protests as deaths of an artificial production.”

Alluding to preventible deaths from moral causes, we find 500 infants dying annually from congenital syphilis, traceable to intemperance and profligacy ; as the above-mentioned distinguished reviewer adds--“It is difficult to determine whether by their indirect co-operation the schoolmaster and the minister of religion do more for the bodily health, or the sanitary improver more for the progress of education and the lessening of crime.”

The mortality of children may be well termed appalling ; between 90 and 100,000 dying annually from nervous affections and respiratory diseases alone. Again, the variations of the mortality are more striking at this time of life.

Infectious disorders, from	-	-	694 to 2,149
Nervous disorders, from	-	-	280 to 3,832
Pulmonary diseases, from	-	-	213 to 2,897

Thus proving that local or personal arrangements within our control must influence and be chargeable with, to a great extent, excessive mortalities, diseases “per se,” not producing ten or twelve times as much havoc in one district as another, without the aid of local or social aggravations.

It is considerably more than half a century since that ever-to-be-remembered benefactor of his race, Dr. Jenner, first proved to the world the preventive properties of vaccination ; and yet the mode in which this discovery, the value of which it is impossible to estimate, is carried out at the present day in some parts of this enlightened country is easily seen, when we find the deaths in England and Wales, from small-pox, in nine years, from 1848 till 1856, killed 41,290 persons, or 4,587 every year. In Eaststonehouse, in 100,000 the deaths were 146 ; in Plymouth, 134 ; Penzance, 105. According to Dr. Farr,* during the year 1857 nearly 4,000 patients succumbed to the disgusting and clearly preventible pestilence known as variola or small-pox, an alarming increase of 1,659 upon the deaths of the preceding year. The imperfections of the Vaccination Act, and the want of a more compulsory system, are defects to be remedied if this

† Causes of death in England in 1857, in Appendix to Blue Book of the Registrar-General.

Variations
in infantile
mortality.

Preventive
properties of
vaccination.

Mortality
from small
pox in Eng-
land.

foul disease is not to gain ground. Speaking of the prevalence of epidemics, he says that "small-pox was extremely prevalent, and fatal in several districts, in South Staffordshire, and in contiguous parts of Worcestershire; it caused 276 deaths in Wolverhampton; 69 in Walsall; 171 in West Bromwich; 251 in Dudley; in Liverpool and West Derby, 188; in Manchester and Salford, 113. In Cardiff, where there is efficient drainage, and the mortality from other epidemic diseases was light, 215 deaths were caused by small-pox."

The Registrar-General's Returns for the three months ending March 31st, 1858, showed that in certain districts in England the deaths from small-pox amounted to a fourth part of the entire district, and from the same returns, for the week ending the 20th of August last, I find 20 persons, including 14 unhappy children under 5 years of age, died, in London, of small-pox; such a fact, occurring in the greatest centre of civilization, requires no comment. To continental countries, who borrowed this prophylactic from us, it must seem somewhat unaccountable that we continue to lose hundreds for their units from this pestilence.

According to the Register-General's Report for the year ending December, 1858, the Registrars received 376,798 vaccination certificates, although they registered the births of 655,627 children. Persons vaccinated are not always children, and the children vaccinated are often born in previous years. But this consideration may probably be left out of account, and it may be hence inferred that the Registrars will not receive more than 376,798 certificates relative to the vaccination of these 655,627 children. A certain number of children die before they can be vaccinated. If these are represented by the deaths in the first three months, they will not exceed 8 per cent. or about 52,400; there will remain 226,429 certificates unaccounted for. A certain proportion of the children must, in spite of the law, have remained unvaccinated; and, in reference to another portion, actually vaccinated, the medical practitioners must have neglected to forward the duplicate certificates to the registrars. In the year ending September 29th, 1858, by the returns made to the Poor-Law Board, 455,004 were successfully vaccinated by public vaccinators alone. Dr. Whitehead,* writing of the prophylactic virtue of vaccination, states that of 1,435 children who had been successfully vaccinated, only 7, less than $\frac{1}{2}$ per cent.

Vaccination
returns,
England.

Prophylactic
properties of
vaccination.

* Third Report of Clinical Hospital, Manchester, 1859.

had small-pox afterwards, and many of these had already attained the age of from 6 to 13 years. One of these seven was, shortly after the attack, very superficially marked, but so slightly, that the spots will probably disappear; the other six were not marked at all. He goes on to state that the susceptibility to small-pox in those who have not been vaccinated, having escaped the disease in infancy, increases as life advances to the age of 20 or 30 years, and the deformity and delicacy of constitution thereby entailed are generally greater after infancy and childhood, whilst those who have been successfully vaccinated in infancy, enjoy, for a number of years at least, total immunity. Mr. Marson's statements* are corroborated by the above, as also are those of Dr. Balfour,† published some years since, who proves that amongst persons protected by vaccination, of all ages, soldiers, sailors, and boys in England, the deaths are only about 1 in 5,400 annually. Sailors are the least exposed to contact with unvaccinated persons, and the mortality among them, specially, was found to be only 1 in about 20,000.

Annual mortality from small-pox, England and Wales.

Now, let us put down the deaths in England and Wales from small-pox annually at 4,000—a low estimate—and assuming that these cases had been all carefully vaccinated, and that say even 5 per cent. caught variola, 200 in all, and of these 200 that 5 per cent. died, viz., ten, by this calculation, which is giving a wide latitude for mortality, we could save 3,990 cases out of the 4,000 to this community. And thus we would be attaining the status of immunity from small-pox enjoyed by some of our continental neighbours, instance Denmark, where this disease has not shown itself for fifteen years continuously; and, when it did re-appear, its virus was so blunted as to excite comparatively little uneasiness.

Small-pox mortality in Scotland.

From Dr. Seaton's notes‡ on the present small-pox mortality of Scotland, I find in the eight principal towns—Glasgow, Edinburgh, Dundee, Aberdeen, Paisley, Greenock, Leith, and Perth—the total mortality from small-pox in 1856 was 645, and of epidemic diseases this was the fifth in the order of prevalence. The total mortality from all causes being 22,248; the deaths from small-pox constituted 2·8 per cent., which is double the average of London for the last ten years, or of England and Wales for the last seven, and fourteenfold the average of Bohemia or Lombardy.

* Petition on the Vaccination Bill, 1856.

† *Med. Chirur. Transac.*, vol. xxxv.

‡ Papers relating to the History and Practice of Vaccination, presented to both Houses of Parliament, by command of her Majesty, 1857.

The Registrar-General of Scotland, speaking of the mortality from small-pox in Dundee, containing 80,027 inhabitants, observes :—“The deaths from this single disease constituted not less than 30 per cent. of the total mortality—a mortality which has been exceeded by no single disease during the last ten years, with the exception of epidemic typhus, in the month of November, 1847, when the deaths therefrom numbered 108, and the fatal cholera epidemic of 1849, when the deaths from that disease during the months of July, August, and September numbered respectively 209, 420, and 159. But, taking the mortality of this town from small-pox for the entire year, it was proportionally more than three times greater than the highest mortality which has taken place in London for the last ten years, viz., that in 1848, when the deaths amounted to 1,617, which is above double the average annual mortality of the metropolis ; but, had the deaths taken place in the same proportion to population as in Dundee in 1856, they would have amounted to upwards of 5,000.”

Speaking of the protective properties of vaccination, the Registrar of Bonhill, in Dumbarton, observes :—“Since the Registration Act came into operation, in every case of small-pox that proved fatal the party invariably had not been vaccinated.” And the Registrar of Kirkmichael, in Ayr, says :—“In the village of Kirkmichael, with a population of about 600, there have been upwards of 100 cases of small-pox, and it is worthy of remark that no child under five years of age who had been vaccinated was affected.” This valuable report goes on to say :—“Bearing in mind that in no country in Europe which furnished returns to the Epidemiological Society is the average mortality from small-pox so high as in London, or in England and Wales generally, in either of which it constitutes about 1½ per cent. of the mortality from all causes ; bearing in mind that the proportional mortality in London has never, during the last ten years, attained 3 per cent., we read, with amazement and regret, that in Aberdeen, in July, 1856, small-pox caused 10 per cent., in Edinburgh 5½ per cent., and in Paisley 5 per cent. of the total mortality. The deaths in Paisley, in October, constituted 7 per cent. ; in December, 11 per cent. ; in January, 1857, 8·9 per cent. ; and in February, upwards of 13 per cent. of the total mortality : while in Leith the deaths in January and February were no fewer than 28·3. From the most recent return of the Registrar-General for Scotland,* I find :—“In a few

Vaccination
Scotland.

Relative
mortality
from small
pox betwe
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England.

* Quarterly return of the Registrar-General for Scotland, August, 1859.

localities small-pox assumed an epidemic form, which had been fatal in many cases ; but in one case only in which the deceased child had been ascertained to be vaccinated."

vaccination,
Ireland.

Vaccination in Ireland must necessarily be imperfectly carried out in the absence of a measure for the registration of births, deaths, and marriages. This long-desired boon has been frequently promised, but as yet remains unaccomplished. The importance of this measure has been urged by the Registrar-General of England in the strongest manner, from time to time, and a bill for carrying it into effect was introduced by the late Chief Secretary and Attorney-General for Ireland (Lord Naas and Mr. Whiteside), but was lost owing to the political crisis ; however, from the deep interest which our present Viceroy, the Earl of Carlisle, has always evinced for the sanitary and social improvement of these kingdoms in general, and Ireland in particular, coupled with the fact that such a measure is about to be again brought before parliament by Lord Naas, early next session, I think we need have little fear of the result. In the conclusion of a report presented to the Dublin Statistical Society,* on the registration of births, deaths, and marriages, I find the following : —“ We cannot conclude without adding that births, deaths, and marriages are now registered not only in England and Scotland, but, with the single exception of Ireland, in all the civilized states of Europe, whether Roman Catholic or Protestant ; and we beg finally to report, that we consider the subject to be one of extreme importance, and that a uniform registration of marriages, births, and deaths is required as an essential condition for many sanitary reforms affecting the welfare of the population, and as an additional protection to the moral and material interests of society.” Our sister kingdoms are alive to the blessings entailed by well-tabulated bills of births and deaths, and they will, no doubt, be ready to lend their aid for the furtherance of so good a cause to Ireland. Census returns are a great base, but in an immediate sanitary view are comparatively valueless. We find the weekly returns of mortality of the Registrar-General, even during epidemics, barely sufficient to arouse public bodies or private individuals to carry out due sanitary precautions ; but where national statistics are furnished only every tenth year, such a country may be truly said “ only to progress by decades.”

Report of
Statistical
Society, Dub-
lin, on the
Value of a
Bill for the
Registration
of Births,
Deaths, &c.,
Ireland.

* Report of a Committee on the Registration of Births, Deaths, and Marriages in Ireland, presented to the Dublin Statistical Society, 1858.—Signed, Francis Codd, Chairman ; J. Moncrieff Wilson, Secretary.

The following are the returns* of vaccination performed by the dispensary medical officers in Ireland annually for the last six years, ended September 30th, 1858 :—

		number of cases vaccinated,	43,332
Year ended 30th Sept.	{	1853,	52,844
		1854,	46,711
		1855,	84,131
		1856,	47,855
		1857,	54,984
		1858,	

The number of dispensary vaccinations for 1858, though exceeding that of the preceding year by 7,000, is still very far below what it ought to be. In the medical charities report for 1857 we have given reasons for believing that the complete vaccination of the children born within the year, the condition of whose parents is such as fairly to entitle them to apply for gratuitous vaccination, would demand about 140,000 vaccinations annually, not very much under three times the number vaccinated last year.

A small increase appears for 1858 in the number of cases of small-pox returned : 565 for this year against 498 for 1857, but as the figures in the table for the last quarter of 1858 are, in some measure, founded on estimates, the medical officers' returns for this quarter not being yet complete, these statistics are not in every respect reliable.

The last annual report† of that valuable establishment, the Cow-pock Institution, Dublin, shows that during the year ending the 31st March, 1859, there have been 3,194 cases vaccinated at this institution. These numbers may be seen by a comparison to exceed those of the previous year by 1,248. This increase is attributed to greater facilities for vaccination afforded to the inhabitants of the south side of the city, from the establishment of an auxiliary branch in York-street. The directors go on to state that they believe they are correct in stating that Ireland is the only country in Europe in which the people are left entirely to themselves, as to vaccination, and are permitted either to neglect or subject their children to the process, as they please. The directors are of opinion that until an act can be introduced into Ireland similar to that in England and Scotland, there cannot be carried out any efficient system of punishing, by fine or penalty, those parents or guardians who have neglected to have

Report of
Cow-pock
Institution
Dublin.

* Seventh annual report of the Commissioners of Irish Poor Law Medical Charities Ireland, 1859, page 11.

† Annual Report of Cow Pock Institution, 45, Upper Sackville-street, Dublin, year ending 31st March, 1859.

their children properly vaccinated at an early period ; and in the absence of the power of inflicting some penalty, they fear that rules and regulations will have but partial effect. In anticipation of a compulsory vaccination act, the directors go on to recommend "that the government would use their influence with the Commissioners of the National Education Board, that they should require the parents and guardians of all children obtaining the advantages of the national education to produce a certificate, stating that such children have been duly vaccinated, a regulation which, even on sanitary grounds and for the good of those attending the schools, seems necessary."

The number of fatal cases of small-pox in Ireland during the ten years from 1841 to 1851, according to the last census, amounted to 38,275. Now, allowing an annual loss of 3,750 for each year, we find the mortality from small-pox in Ireland, with reference to England and Wales (with three times the population, and registering 4,500 deaths from small-pox annually), to be double that of London, nearly three times that of the rest of England, and ten or fifteen times greater than that of many continental countries.

The act of August 2nd, 1858, † "To make further provision for the practice of vaccination in Ireland," subdivides the dispensary districts into vaccination districts, and gives 20s. remuneration to the medical officer for every 20 cases. Now, from personal experience of the working of vaccination, the extent of dispensary districts, and the apathy, or, I may add, the repugnance, in many instances, of the recipients to avail themselves of this boon, I fear this amended act cannot work satisfactorily ; besides, the remuneration to the medical officer is inadequate to stimulate him to any special zeal, cumbered as he is with the onerous duties of a dispensary district. No doubt the measure is an expedient one, all things considered, but till we obtain a base of operation in the shape of a registration of births, deaths, &c. bill, we must be said to be legislating from the wrong direction—in short, building a superstructure without a foundation. As regards the mode of obtaining vaccination returns by capital remuneration for individual cases, I need not enter on the subject on the present occasion ; suffice to say, that many and grave objections can be urged against such a system.

Whether as yet we are ripe for a compulsory vaccination act, or whether it is not deemed sufficiently criminal on our part to

† CAP. XLIV. "An act to make further provision for the practice of vaccination in Ireland." 2nd August, 1858.

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throw overboard the preventive and sanitary means at our disposal, I must leave for others to determine ; but, in the meantime, till some such happy consummations are attained, let us set about putting our house in order.

By the Amended Vaccination Act (England), 14th June, 1858, Application of the Amended Vaccination Act of England to Ireland.

“ The Registrar-General shall transmit from time to time to the registrar of births, deaths, &c., in every district, such books and forms as may be requisite for the medical officers appointed as in said act mentioned, and other duly qualified medical practitioners in such districts.”

Now, let us apply this to Ireland. First, let an act be passed for the registration of births, deaths, and marriages. Secondly, on this, as a base of operation, found vaccination ; dis sever it “ in toto ” from the poor-law system. Vaccination is an institution of far too great importance to be tacked to the tail of any establishment, least of all to one already too cumbrous. There can be no insuperable difficulties in carrying out the details of this measure. Let the kingdom be divided into vaccination districts, over which the most active surveillance and inspection should be kept by men of the highest professional acquirements, and, ere long, I have no doubt this pestilence would be reckoned among the “ things that were,” and we would attain a status of immunity second to no civilized state in Europe. Such we might regard as an outline of the official view of the question, which, in the absence of a compulsory act, could be negatively and socially backed up, so to speak, not only by the authorities, but by every individual member of society. Thus, let all candidates for public appointments, to the very lowest grade, produce proof of having been duly vaccinated, as a *sine qua non* for their candidature ; let all large employers and private individuals make such bye-laws in their several establishments, so that vaccination must be indispensable for entering on apprenticeships and services of various kinds ; and thus, with every facility afforded, in an independent manner, by the state, I should not fear that this *temporal* would become as familiar, and duly enforced, as that of baptism, or other *spiritual* injunctions.

I have now thus briefly and imperfectly glanced down one of the innumerable vistas with which the field of sanitary science abounds. On a previous occasion the question of excessive mortality in early life* came, and continues to come, so forcibly under my notice, that I was induced to consider some sources of

Increased attention should be given to excessive mortality in early life.

* Infantile mortality and the establishment of hospitals for sick children. Dublin, 1859,

mitigation for it; and I am happy to see that additional attention has been, and is about to be, further called to this all-important subject. Despite of all the compensating powers of mechanical science and art, I doubt if, at any era, the physical force of this country was ever at a higher premium than at the present moment; consequently it behoves us, individually and collectively, to foster and husband it, as far as in us lies. Now, taking 90,000 as the mortality from small-pox in England, Ireland, and Scotland, every ten years (a low estimate), think what an army of men, women, and children, exclusive of the natural progenic increase, might be preserved to these realms every decade, through the preventive medium alone, of a duly-carried out system of vaccination. And now, in conclusion, viewing a bill for the registration of births, deaths, and marriages in a sanitary light, which is more particularly my province, I must express an earnest hope, that all public bodies and influential individuals will lend their aid for the extension of this measure to Ireland, the value of which, whether regarded in a mental, physical, social, or sanitary light, it is impossible to over-estimate. It far exceeds, in importance, measures which are daily receiving the attention of the executive, inasmuch as it is the base of prosperity to the state; as a source of happiness it has no equal, entailing as it does increased health, long life, and consequent contentment to all classes of society. That such desirable consummations will be realized for this country, and that at no very distant day, I venture confidently to anticipate.

Colonel Sykes, M.P., president of the section, spoke of the value of statistics as shown by the above paper, referring more particularly to the melancholy mortality from small-pox in the towns of Dundee and Aberdeen.

The Right Honorable Joseph Napier dilated at some length on the importance of extending registration, and a better system of vaccination to Ireland.

Mr. Tite, M.P., had given the subject of vaccination considerable attention, when it was brought before the House of Commons; he considered the suasive and moral system more conducive to the extension of vaccination than compulsory legislation.

Dr. Strang believed that in Glasgow there was a steady increase of vaccination and consequent diminution of small-pox, irrespective of legislation. After some further discussion, a cordial vote of thanks was tendered to Dr. Moore for his valuable communication.

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