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VACCINATION

John Marshall

CONSIDERED IN RELATION TO THE

PUBLIC HEALTH:

WITH INQUIRIES AND SUGGESTIONS THEREON.

A LETTER

ADDRESSED

TO THE RIGHT HONOURABLE

THE LORD VISCOUNT MORPETH,

First Commissioner of Her Majesty's Woods & Forests.

BY

JOHN MARSHALL, SURGEON,

MEMBER OF THE COMMITTEE OF THE HEALTH OF TOWNS ASSOCIATION.

"ORE TRAHIT QUODCUNQUE POTEST ATQUE ADDIT ACERVO."

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“ Of all the diseases to which human life is exposed, *natural small-pox* is not only the most fatal, but the most painful and loathsome. It is impossible to witness the misery it occasions, and not to admire the discoveries, and revere the exertions, by which the horrors of such a malady may be almost, if not altogether prevented.”—PROFESSOR J. THOMSON.



TO THE RIGHT HONOURABLE

THE LORD VISCOUNT MORPETH.

MY LORD,

THE official charge undertaken by your Lordship of the measures now before the Legislature for the promotion of the Public Health, and the interest manifested by you in everything relating to that important object, will, I hope, justify the liberty I take in addressing to your Lordship some considerations on the present state of vaccination in England and Wales, together with suggestions for extending and insuring its beneficial employment.

I. *On the Operation of the Vaccination Extension Act, and on the Evils still inflicted upon Society by Small-Pox.*

The Vaccination Extension Act, which was passed in 1840, affords to all classes of persons the opportunity of being vaccinated by a public officer at the public expense. It must be regarded not only as a formal recognition by the Legislature of the protective value of that practice against the ravages of small-pox, but also as a direct and permanent acknowledgment of the right and duty of state interference to promote by every possible means, consistently with the national habits and feelings, the extension of vaccination among the people.

Of the wisdom of such legislative interference, no doubt whatever can be entertained. Public hygiene had long demanded it, and, irrespective of other considerations, would even sanction the adoption of compulsory enactments.

The operation of this Act has been extended to Ireland also; but in the following remarks its application will be considered in reference to England and Wales only. In this part of the kingdom, about 2700 public vaccinators have been appointed in 580 poor-law unions or parishes, the total number of which is 590. The sum paid out of the poor's rates, on account of public vaccination, during each of the undermentioned years was as follows:—

1841.	1842.	1843.	1844.	1845.	Average of the Five Years.
£10,171	£33,104	£16,019	£16,694	£25,905	£20,340

The average annual expenditure has, therefore, been upwards of 20,000*l.*; and assuming, on the authority of the Report of the Poor-Law Commissioners, that 1*s.* 9*d.* is the sum paid for each successful case, the average number of persons effectually vaccinated in the year would be nearly 230,000. From the returns made by the public vaccinators in the years 1844 and 1845, the practice of vaccination appears to be decidedly on the increase—the numbers of successful cases being, in those years, 278,192 and 347,765. Now, the births registered in the corresponding unions and parishes were, in 1844, 452,235, and in 1845, 486,632; so that the ratio of successfully vaccinated persons to the births was, in 1844, 100 in 163, and in 1845, 100 in 140.

It appears, therefore, that the beneficial operation of this Act, carried into effect by local officers under the vigilant superintendence of the central poor-law authorities, has been progressively successful; and if, in addition to those annually vaccinated under its provisions, the numbers privately vaccinated be also taken into account, it would seem that the infant and juvenile population of the kingdom is, to a very large and increasing extent, protected by vaccination from the risk of small-pox.

Nevertheless, it may very properly be asked, whether vaccination is as generally practised as it might be, and whether its protective influence is as widely and evenly spread over the people as could be desired. So dreadful, indeed, are the ravages of unmitigated and unchecked small-pox, so loathsome is it in its nature, so disfiguring in its effects, so surely infectious in its character, and so fearfully fatal in its results, that, at any time, questions such as these possess a serious interest to a populous and town-dwelling community. But at the present period, when comprehensive measures relating to the public health have just been brought forward by the Government, they acquire peculiar claims for thoughtful re-consideration. Having entirely prohibited the practice of *inoculation*, the legislature has thereby very justly declared vaccination to be the only legal means of giving security against natural small-pox; and it therefore seems more than ever incumbent upon it to inquire, whether the present amount of state interference is adequate to accomplish all the good that can possibly be obtained from vaccination. Since, too, the appointment of officers of health forms a part of the enactments now in contemplation, it is not unwise to consider how far the services of such officers may be rendered available for supervising, extending, and maintaining this useful and indispensable practice.

The amount of evil still inflicted upon society by small-pox, in the shape of sickness, suffering, disfigurement, blindness, or death, and the heavy pecuniary losses connected therewith, may be estimated by ascertaining the mortality occasioned by that disease. A comparison of the number of deaths from this cause, occurring *before* and *since* the passing of the Vaccination Act, although it shows a large amount of benefit due in some measure to the operation of that Act, indicates with equal distinctness the serious mischief still entailed upon the community from the havoc committed by this frightful disorder.

The deaths registered in England and Wales, from small-pox, in the three years preceding the operation of the Vaccination Act were, in 1838, 16,268; in 1839, 9131; and in 1840, 10,434,—giving an annual average of nearly 12,000. In the two years succeeding the introduction of the measure, the

registered mortality was, in 1841, 6368; and in 1842, only 2715,—the average being nearly 4550.*

Again, in the metropolis only, in the year before the operation of the Act, viz., in 1840, the mortality was 1235; in the three succeeding years, viz., 1841, 1842, and 1843, it was 1053, 360, and 438—that is, on an average, 617 annually.

This very marked decrease in the mortality from small-pox observed in the metropolis, and also throughout England and Wales, subsequently to the year 1840, was described by Mr. Farr, (see Registrar-General's Sixth Report, p. 504,) as “probably the result, at least in part, of the Vaccination Act; which has not, however,” he adds, “effected all the good that may be anticipated, as an epidemic has since 1842 broken out in the metropolis, and proved fatal to great numbers.”

In fact, the mortality in the metropolis from this disease rose, in 1844, as high as 1804,—in 1845, it was still 909,—and in 1846, it fell down to 257,—the annual average being about 990.

The qualification expressed by Mr. Farr concerning the influence of the Vaccination Act has thus been sadly justified by the returns of 1844 and 1845; and there can be no doubt that there is another cause, coöperating with vaccination, (even though that practice were increased by a temporary feeling of alarm,) which serves to explain the remarkable diminution of deaths from small-pox, in the metropolis, during the years 1842 and 1843, and especially in 1846.

The returns for the several years, from 1840 to 1846 inclusive, are, as already stated—1235, 1053; 360, 438; 1804, 909; and 257; so that they exhibit alternate periods of high and low mortality, consisting of two years each. Now, the victims of any particular epidemic visitation of small-pox are, as is well known, principally, nay, almost entirely, drawn from that portion of the population in which vaccination has never been performed. Each fatal case of this kind must be understood (according to the computed rate of mortality amongst the *unvaccinated*, viz., one in four) to represent at least three other

* The numbers for the later years have not been abstracted by the Registrar-General. The probability is, that they would show a much higher rate of mortality; but in the ensuing calculations, the number 4550 has been adopted.

cases of small-pox, occurring also in the unvaccinated class, but terminating favourably. For every 1000 deaths (of unvaccinated persons) in such an epidemic, about 4000 in all must, therefore, have suffered from the disease; and as the survivors are henceforth as effectually protected from the further invasion of small-pox as if they had been originally vaccinated, it is clear that the 1000 supposed deaths are an index of an actual diminution of the hitherto unprotected part of the population, to the amount of 4000 persons.

Hence, during the two years of high mortality, 1840 and 1841, the deaths in the metropolis, from small-pox, being 2288, it may be estimated that at least 8000 persons were removed, by small-pox ending in death or recovery, from the previously unprotected class. The numbers of persons open to the contagion of small-pox being thus diminished, the mortality in the next two years, 1842-3, materially decreased, reaching only to 798. In time, however, the neglect or procrastination of parents in regard to newly-born children, (and probably, to some extent, the importation of unvaccinated persons from the country,) again swells the ranks of the unprotected; and should atmospheric or other causes combine to give increased energy to the virus of small-pox, the mortality from it once more ascends, as was really the case during the years 1844-5, when it rose to 2713. At this period, therefore, the unprotected class again experienced a diminution of at least 9600 victims of suffering or death. Concurrently with the protection afforded by continual and occasionally improved vaccination, there is the periodical and irregular protection bestowed by small-pox itself. Can it be wondered at, then, that in 1846, the mortality again capriciously fell to the unusually low number of 257.

If to these views it be objected that the numbers of the unprotected could hardly be renovated so rapidly as in these biennial periods, it will be sufficient to answer that during the years 1842-3, 120,000 births took place in the metropolis. It must also be remarked, as corroborative evidence of the probability, if not the truth, of the preceding explanation, that in 1844, the first year of a high mortality, *more than one-half*

(1035 out of 1804) of the deaths from small-pox took place in infants who were under *three* years of age—i. e., in children born into the world since the preceding epidemic.

The fluctuating character of the annual mortality from small-pox appearing, therefore, to be, to a great extent, independent of the influence of vaccination, it follows that the state of the metropolis under the operation of the Act can only be estimated by taking the average mortality since the period at which it was passed. From 1841 to 1846 inclusive, this has been about 800 deaths per annum.

Assuming, on the experience of the years 1841-2, that the present annual mortality from small-pox throughout the whole country is 4550, (and that number is probably much too low,) and further supposing that 4000 of these deaths occur among the unvaccinated, then the total* cases of sickness in that class must be at least 16,000; and in the metropolis only these would be about 3000.

Each of these 16,000 annual cases of sickness continues about four weeks. Debility, disfigurement, concurrent or excited diseases, and partial or total, temporary or permanent blindness, may each or all result from the attack. The blind population of Great Britain and Ireland is computed to number 24,000; and of these, it is believed that at least one-third, or 8000 might have had their eyesight saved by proper precautionary measures. (Sixth Report of Registrar-General, p. 504.)

In spite, then, of the indisputable advantages of the Vaccination Act, the mischief still afflicting or threatening society is sufficiently serious to arrest the attention of the philanthropist, and demand the practical interference of the statesman. The exertions of both might be usefully quickened, by reflecting on the pecuniary loss necessarily attending so large a yearly amount of sickness, mortality, and deprivation.

But even were the total evils inflicted by small-pox only half what they really are, the duty of attempting by all possible

* This is a very low calculation; and is independent of the sickness among the vaccinated, which is no doubt indirectly maintained by contagion from the unvaccinated.

means to mitigate or check them, rests on another and a most peculiar ground ; for, in the instance of this most infectious of all known diseases, ever so small a number of cases continuing to exist constitute a perpetual succession of poisonous foci, from which fresh and wide-spreading mischief may arise. They form, as it were, latent elements of evil and of death, lurking in the bosom of the unprotected portion of society, and threatening, at the instant of relaxation, to burst out again with as much destructive energy as ever.

II. *On the present inadequate state of Vaccination amongst the People.*

It is a truth now universally admitted that the most effectual and indeed the only remedy for these residual though diminished evils is vaccination. It is of the highest consequence, however, never to forget, that in order to hold small-pox thoroughly in check, to reduce the amount of mischief arising from it to zero, and to keep it there, a *constant* state of antagonism to it, by means of vaccination, must be preserved.

For the complete realization of the benefits of this great preventive remedy, it should be *universally employed, regularly applied, and so permanently maintained* in use. But the first and second of these conditions are at present unfulfilled, and there is, accordingly, no guarantee that the third can be strictly accomplished for the future.

(A.) *Vaccination is not now universally employed.*—However desirable it might be to determine with precision the proportion of vaccinated to unvaccinated persons in the population, or, in other words, to arrive with certainty at the degree of approximation now made to universal vaccination, it is impossible to do so with only the existing means of information at our command. A mere comparison of the vaccination returns with the registered births gives no accurate result. The registration of births is itself incomplete, apparently to the extent of 5 per cent. (Returns for 1841-2-3, Seventh Report of Registrar-General, p. 8.) Again, on the first introduction of the Vaccina-

tion Act, many children several years old came under its operation; vaccination is now frequently delayed till more than a year after birth; it is often even performed in adults; cases of re-vaccination are continually occurring; and lastly, there are no means of estimating the numbers vaccinated privately or at large public institutions. The total cases of vaccination and the total births are therefore unknown quantities.

On comparing the known cases of successful public vaccination with the known births in any given year, or short series of years, the process must be restricted to the cases of vaccination amongst children born during the same period; otherwise it would be impossible to ascertain the ultimate relation likely to exist between the protected and the unprotected class.

In the years 1844 and 1845 together, the cases of public vaccination *thus discriminated* were found to be only 32 per cent. on the registered births in 580 poor-law unions and parishes.

Now, since nearly nine per cent. of the children born will die before the age of three months, *i.e.*, before they are likely to be vaccinated,—41 per cent. (32 + 9) may be deducted from the ratio of known births, which will leave 59 per cent. not vaccinated. By the end of the year, six per cent. more will have died, and supposing these *all* to be drawn from the unvaccinated class, there would still be a surplus, at the expiration of the twelve months, of 53 per cent. unprotected by public vaccination. If, further, for the sake of argument, we allow that for every 32 children vaccinated under the Act, as many as 48 cases of private or gratuitous vaccination occur, there will finally remain five children (already one year old) to every 100 *known* births, who never get vaccinated at all.

Returns which I have obtained from a poor-law union in an agricultural district, showing the statistics of vaccination during the six years since the passing of the Act, lead to or justify a similar conclusion. The total cases of vaccination in that period were 2412, and the registered births 4784. Setting aside the numbers vaccinated during the first three months of the operation of the Act (755), inasmuch as they would be nearly all children born at various dates previously, and deducting also, for the sake of fairness, the births in the same period (217), the

residue of births is 4567, and of cases of public vaccination, 1657, or about 36 per cent.

Making allowances for deaths and for the numbers privately vaccinated, it may be safely assumed that, here also, five per cent. at least remain unprotected by vaccination.

Assuming, then, that five per cent. ultimately escaped vaccination, a total of 27,000 unprotected children would be thrown upon society, at the expiration of each year, the natural prey of small-pox,—the number of registered births in England and Wales being now above 540,000 per annum. But the annual mortality from this disease has been already stated to be about 4550 since the passing of the Vaccination Act; and, supposing 4000 of the deaths to have occurred among the unvaccinated class, it follows, that the total annual sickness (at the computed rate of four deaths for one) would be 16,000,—to supply which, as above calculated, 27,000 unvaccinated children (already a year old) would be annually rising up within the community.

The steps of these calculations are of course more or less liable to error; but at any rate, they serve to show how *dangerous* a proportion is even five per cent. upon the births to be left unprotected from the risk of having small-pox.

I have recently endeavoured, by actual observation, to throw light upon this interesting question. Inspections have been made by myself in the metropolis, and by several medical friends, at my request, in the country, of children attending at 43 schools. The returns embrace a total number of 4191 children, belonging to the lower classes of society; and there is no reason to consider them other than fair *examples* of the general condition of those classes throughout the kingdom. Tables founded on these returns are given hereafter; but it may be stated here, as one general result, that of the 4191 children, who varied in age from 3 to 14 years, 783, or upwards of 18 *per cent.* were found to be unvaccinated. On distinguishing those born since the passing of the Vaccination Act, (but above three years old) the proportion of unvaccinated, even then, is above 17 per cent.; and, further, on abstracting from the general results, the cases of 670 Jewish children, who present a remarkable and highly creditable exception to the rest, the ratio of the

unvaccinated among those born before and those born since the operation of the Act, is in both classes above 21 per cent.

The schools examined were National, British, Infant schools belonging to different denominations, workhouse schools, and ragged schools. Supposing that the children found in such places of education,* together with those who get no education at all, form only *one*-half of the population, whilst the other half are educated privately, or at the higher schools; and assuming, moreover, that the latter are *entirely* protected by vaccination, it would follow, that $10\frac{1}{2}$ per cent. of the juvenile population, at any particular moment of examination, may be found belonging to the unvaccinated class. The same ratio was observed to exist even among the children born since the passing of the Vaccination Act; and as the average age of these may be taken at $4\frac{1}{2}$ years (3 to 6), it is known that for every 100 of such children, 133 must have been born. The proportion of unvaccinated to these births (admitting even the chances of mortality amongst the vaccinated and unvaccinated to be equal) would be a trifle higher than it becomes at the age of $4\frac{1}{2}$; it would be at least 11 per cent.

From actual inspection, then, (errors deducted,) the ratio of unvaccinated to the births, appears to be *double* what it has previously been estimated at, from a comparison of the registered births and the returns under the Vaccination Act. Instead of five per cent. it would seem to be at least 10; which on the births in England and Wales in 1844, would yield 54,000 unprotected persons annually, to supply the 16,000 cases of sickness and the 4000 deaths from small-pox, known to take place in the same period.

But there are data furnished by the examination of the 4191 children already alluded to, which will enable us, so far as they may be relied on as expressions of the general state of the population, to trace, as it were, the *fate* of the annual supply of unprotected persons.

Of the 4191 children examined, 783 had never been vaccinated; and of these 400 had had small-pox. On adding 100 to

* Including *factory* schools, of which I have no example in my list.

each of the two latter sums, to represent the mortality corresponding to the 400 cases of survival, there result 500 cases of sickness from small-pox occurring in 883 unvaccinated persons, before they have reached an average age of eight years (3 to 14 years). Hence, of 54,000 unprotected persons, at least *one half*, or 27,000, may be expected, sometime before they have attained an average age of eight years, to suffer from small-pox; and of their number one in four, or 6750, will die. But, as already shown, the 54,000 is an *annual* supply, which will therefore be continually yielding its yearly victims; and will more than account for the actual sickness and mortality from small-pox in England and Wales, already estimated amongst the unvaccinated at 16,000 and 4000.

(B.) *Vaccination is not regularly and evenly applied.*—Another defect in the present state of vaccination in the country depends on the irregularity of its use, in reference both to *locality* and to *time*.

(A.) As to *locality*.—In the poor-law union from which I obtained returns, there are three parishes having a nearly equal population of rather more than 2100. In one of these, the cases of vaccination, during the operation of the Act to Christmas 1846, were 393; in another, 165; and in the third, only 85. In a fourth larger parish, with a population of 4600, 386 persons had been vaccinated; and lastly, in a small village, containing only 500 inhabitants, the cases of vaccination in the six years were 82.

Amongst the school-children already referred to, the proportion of unvaccinated, born since the passing of the Act, is 12 per cent. in the metropolis, and 31 per cent. in the country; and among the different towns and villages from which the country returns were obtained, the ratio of unvaccinated varies from 12 to 61 per cent.!

Again, the vaccination returns for the year ended September 29th, 1845, show that in Dorset, Durham, and Oxfordshire, the registered births were respectively 4320, 4738, and 4220, whilst the vaccination cases were 953, 7228! and 488; and further, if those cases of vaccination only be considered that

were performed within the first year after birth, their proportion to the total births registered is seen to vary in different counties from 10 to 50 per cent., and in the case of Durham to 100 per cent.

Instead, therefore, of the protective influence of vaccination being equally distributed over the whole population,—which would certainly be the most efficacious condition for the prevention of small-pox,—the irregularity in its present application to different localities is so great, that whereas one portion of the people may be well guarded, others are left fearfully unprotected. The *average* ratio of protection, however apparently good, may conceal within its specious figures a sad amount of local insecurity. In one country-school, the proportion of unvaccinated was, be it remembered, 61 per cent. !

(B.) As to *time*.—In this respect the same irregularity may be observed. The poor-law union to which reference has been made before, contained in 1841 a population of nearly 20,000. During the first three months of the operation of the Vaccination Act, 755 persons were vaccinated,—the births being only 217. Supposing the excess of vaccination cases here found, viz., 538, to have exhausted the previously unprotected, how did the Act continue to affect the population? In the next half-year, there were vaccinated 258, and the births were 406. During the succeeding two years and three-quarters, the cases of vaccination were only 74, and the births 2135! This deficiency appears never to have been made up; for, though in the following year and a half the births were 1174 and the vaccinations 1187, in the last twelve months there were 854 births and only 138 cases of vaccination. In individual parishes these occasional relaxations in the practice of vaccination are yet more striking. A renewed activity observed in all about the middle of the fourth year was cotemporaneous with an increased remuneration to the public vaccinators. The effect of this stimulus appears, however, to have been transitory.

The local and periodical relaxations of vigilance, implied in these fitful and varying statistics, are fraught with the greatest hazard. No subsequent efforts can compensate entirely for them. They permanently lay open a large mass of the people

to the risk of misery and death; and but too frequently the mischief sooner or later creeps in.

In the state of Denmark, this really happened to a fearful extent. Compulsory vaccination had for a time *banished* small-pox from the community; but the carelessness engendered by its absence, and the consequent neglect of vaccination, aided by unlucky chances, led to the reëstablishment of that disease in a very active and virulent epidemic form.

Local examples of the same kind, but on a smaller scale, can be quoted by every one who has had experience in this subject. The prevalence of small-pox in any town or district is sure to create a demand for vaccination; but the epidemic having subsided, a state of apathy ensues, vaccination is again unheeded, the people are once more in a relatively unprotected condition, and in time another epidemic reveals and punishes their neglect. The same series of fluctuations occur again and again; but the public mind soon throws off a feeling of apprehension, and gains no lasting wisdom from a temporary alarm. It has been declared by one authority, that “nothing but the terror of small-pox can maintain the habit of vaccination; and that if the former were altogether to cease for a time, the latter would soon fall into disuse.”

(C.) *Vaccination has not, under existing arrangements, a promise of being a permanent habit among the whole people.*—The inquiries instituted by the poor-law authorities into the causes of any marked relaxation in the practice of vaccination, in particular districts, tend greatly to give it a more steady and uniform character. But the recommendations which they issue are operative only for a time, and under the influence of ever-recurring or existing causes of indolence and relaxed effort, as they have already failed in giving completeness and constancy to the practice of vaccination, so they cannot be expected to bestow upon it that permanence which is so much to be desired.

The imperfect and inconstant character of vaccination, at present, in comparison with what it is desirable to accomplish, sufficiently accounts for the serious ills still inflicted upon us by small-pox. Nor can it be a matter of surprise to discover, that

whilst in the five years ending in 1842, the average annual deaths in England from this disease had been as many as 562, and in the three years ending at the same date, 406 in the million, the proportionate deaths in Austria had been only 220!—and that, whilst during the year 1842, the deaths in France from the same cause were only 91 to a million of the population, in England, in the same period, the mortality, though only one-third of what it had been in the three preceding years, was 170 to the same number of people.—(Farr. Sixth Report, p. 504.)

III. *The remedies proposed, their character, mode of application, and anticipated results.*

The present inadequate performance of vaccination for the full preservation of the public health, and the necessity for exciting still further attention to the subject, are not to be imputed as faults to the devisers or managers of the Vaccination Extension Act. By itself, that measure has realized much good. The limitation of its usefulness arises not from any defect in its own provisions, but rather from the feeling and conduct of those for whose benefit it was contrived. Its operations cannot be impeded by ignorance of its existence, for a six years' duration must have rendered it universally known; nor by the too common cry of expense to the individual, for it costs the individual nothing. Want of constant energy on the part of the public vaccinators is, to some extent, a reason for its imperfect action. But the careless apathy of some among the people, the procrastinating indolence of others, the prejudice of this parent, and the positive refusal of that, are the principal obstacles to the complete realization of its ends.

To amend the Act itself seems unnecessary, and to interfere directly with its officers or operations is undesirable. Neither is it advisable to introduce a compulsory system of vaccination. Amongst the military and some other classes, this has been allowed; but as a general measure, it is opposed to our strong though often prejudicial love of individual freedom. State medicine might advise, but state policy will not sanction, the universal adoption of compulsion in these matters.

There are, however, two measures, my Lord, which, jointly, would exercise a more or less direct influence upon all classes of society, and at the same time apply a constant stimulus to the zeal of both public and private vaccinators. The proposals are these:

1. To make it a condition, (by an Order of the Committee of the Privy Council on Education or otherwise,) on the part of *all schools which do or shall hereafter receive a grant* from the Government education funds, that a regulation be immediately adopted and enforced by them, to the following effect—viz., that no child shall be received into or continue at such school, unless it shall previously have been vaccinated or have had small-pox; or unless it be submitted to vaccination within ONE MONTH from the date of its admission into the school.
2. To require and empower the officers of health to be appointed under the Towns Improvement Clauses Act, or the Health of Towns Act, (by the introduction of words or of a special clause to that effect,) to visit and inspect, on due notice given, *all schools and seminaries* whatsoever, for the purpose of examining the children, and of ascertaining and reporting on their condition, in reference to vaccination and previous illness from small-pox.

The following considerations will, I trust, convince your Lordship that these two proposals are practicable, opportune, and justifiable in principle, and that they would realize highly important benefits, at comparatively little, indeed at almost no intrinsic cost.

The first proposition relates, it will be seen, to *such schools only* as receive Government grants of money. The second, conferring the powers of medical inspection, includes *all schools*. The motives for this distinction will be soon explained.

(A.) *The Compulsory Condition as to Vaccination.*—It is evident that those schools which are in receipt of pecuniary aid from the Government stand in a peculiar position. There are distinct grounds for subjecting them to certain conditions. To

several, which concern the intellectual and religious culture of the children educated within them, they are already required to submit; and there can be no reason given, why another condition, so beneficial in its tendency and confined entirely to the preservation of individual and public health, should not also be imposed upon them.

The present occasion of an increased grant happens to be peculiarly favourable for the issuing of such an Order; and it is scarcely possible to conceive that any friends of education would take offence thereat, or that any would refuse pecuniary assistance accompanied by so reasonable a condition.

It is especially by those classes of society who avail themselves of the schools receiving Government aid, that vaccination is the most neglected, so that, with them, the proposed interference of the State is equally necessary and just; whereas, with other schools, as it would be less reasonable, so it is less needed.

In some public schools, as, for example, those connected with the army and navy departments, in workhouse schools, and penitentiaries, the power exists to enact such a regulation concerning vaccination, and it is generally understood to be in force. Even in many private and foundation schools a similar rule has been introduced, and the Poor Law Commissioners, as long back as 1841, say they will “consider of the measures which may be recommended for promoting the general extension of this security.” (P. 152.) Nothing, however, has since been accomplished.

The announcement of the proposed regulation by the Committee of the Council on Education, in regard to one very large class of schools, recognising its importance and necessity, would speedily be followed by its general adoption in all. An absolute condition would be imposed on the former, and the force of a good example acting through public and private opinion be brought to bear upon the latter.

Two other reasons may be offered in support of this proposed interference by the State, with reference to vaccination; first, its application to children, not adults; and secondly, its limitation to children attending at schools. (*a.*) If the vaccination of

children be a duty, not only to them, but to the entire community, it cannot be wholly beyond the supervising authority of the State to see to its actual performance. The period of childhood is that at which such authority can be most advantageously exercised, because, in this particular instance, the earlier it is carried into effect the better. It is then, also, that it can be most easily applied, because none of those difficulties and obstructions exist which would surround every attempt to impose such a condition upon adults, as, for example, public officers, domestic servants, &c. (b.) The limitation of this interference to the case of children attending at schools affords another strong ground of justification. Even within his own home, and amidst his own family, it should perhaps hardly be permitted to any one to deny his children the benefit of being protected from small-pox ; but when the latter are sent out to associate with others, no plea can justify their being allowed to remain apt receptacles for poison, living vehicles of probable contagion, which may go on to endanger the health or lives of all. Nothing can be more painfully disastrous or unpardonably cruel than to suffer a child to be the victim of neglected precaution, or an innocent transmitter of disease or disfigurement to its perhaps alike unprotected playmates. With all possible respect for private independence, a man's liberty of doing a public wrong may be justly restrained. So reasonable indeed is this interference, in regard to vaccination among children attending at schools, and so desirous are parents of sending them there, that none are at all likely to be deprived of the benefits of education in consequence of any permanent scruples or prejudices about vaccination.

Lastly, no hardship would be created in the shape of expense, for the public vaccinator is always at hand to perform his functions at the public cost.

(B.) *The Medical Inspection.*—This, it is proposed, should be applied to *all schools* whatsoever, or at least should be capable of such application. No limitation, no distinction, should be recognised by the State, whatever latitude might be sanctioned in the officer of health himself.

To the inspection itself no possible objection can be urged,

by any class of the community, on general grounds. In special cases, as in the instance of the higher schools, especially for females, the information sought for might, if objections arose, be obtained on the authority of the master or mistress; discretionary powers being left, in this matter, to the officer of health. With some simple precautions, a *general*, not a partial, power of inspection, having the character and recommendation of perfect fairness, would be the more welcome, and therefore the more efficacious measure.

In the case of schools receiving Government support, the inspection would, of course, ensure the due fulfilment of the required condition concerning vaccination. Besides this, however, statistical information of the highest interest concerning small-pox and vaccination would certainly be obtained. To render this truthful and complete, returns from other schools would also be required. Eton and Rugby, Westminster and Christ Church, will yield their quota of facts, as well as Pye-street or Palace-yard.

The visits of the inspecting officer, useful as they would be to such private schools as had *no* rule about vaccination, would serve, where such a rule actually existed, to encourage its due execution. Even though recorded upon the books, there is no guarantee, but in occasional inspections, that it would be properly obeyed. Two instances in point were met with in the case of country schools, in one of which five children out of 167, and in the other eight in 52, were entirely unprotected either by vaccination or previous small-pox, in spite of the written rules slumbering in the master's desk.

To judge from the experience obtained from the examination of 43 schools, no opposition to a properly conducted inquiry would be made; and no doubt can exist as to its perfect practicability.

The duties of the contemplated officers of health will require them to visit school-rooms, for the purpose of examining into and suggesting the best means of securing good ventilation. The inspection of the room and that of the children may be conjointly and easily performed. The visits of the inspectors will thus be doubly useful. A careful inquiry having been

once made, the trouble in subsequent visitations (monthly or quarterly, as the case might be) would be limited to examining the newly-entered scholars. Returns relating to such children as might possibly have entered and left a school between the periods of inspection, might be required or requested of the authorized superior; and in the case of evening or Sunday schools, suitable modifications of the time and method of inspection could readily be devised.

Printed notices of intended visits, forms and books for the statistical returns, certificates of vaccination and orders to be vaccinated, would include nearly all the required materials to be employed. Both trouble and expense would be amply repaid.

Such being the grounds on which the two proposals may be shown to be just, practicable, opportune, and economical, it may be well to develop briefly the results to be anticipated from their joint operation.

For the attainment of any full and lasting benefit, both propositions must be carried out. Vaccination being required or suggested by the one, its actual performance is continually ensured by the other. The powers granted in the second can alone maintain the strict fulfilment of the first.

It has been estimated that one-fourth of the population of this country are between the ages of 3 and 15, — extremes which may be said to embrace the school-educational career. There are upwards of four millions of such children in England and Wales; but of these, owing to illness, occupation, want of means, or other causes, all are not at school at one time.

Too many never reach a school at all; but it is sincerely to be hoped, when such strenuous efforts are being made in the cause of education, and when schools are open even for the poor, the friendless, and the ragged, that the time is approaching rapidly when all who are not educated privately, will at some time or another be found at school.

Schools may be regarded, indeed, as social *toll-gates*, through which, along the highway of life, almost the whole of the youthful population must defile. *Here*, it is proposed that the

passport of vaccination shall be demanded of them ; and since this condition would be required at the *outset* of their educational course,—which, among the poor especially, begins at a very early age, with attendance at an Infant-school,—it follows that the means so taken to ensure the fact of vaccination, would operate, not only on the school-population, but on the *infant*-population of the kingdom. So much the greater benefit would accrue to themselves and to the community.

At its commencement, the inspection would, of course, embrace a class of children much older than it would subsequently supervise.

The unavoidable necessity for vaccination, as a condition of a child's being hereafter admitted into a school, would have a retrospective effect in removing the prejudices and quickening the assent of the parent to the early performance of that operation.

By those direct inspections which I have ventured to advocate, the relatively protected or unprotected state of the *school*-population in each locality would at once be revealed, with all its individual details. The very persons who were still unprotected by vaccination or by small-pox would be singled out and rendered accessible : none could escape :—the finger of preservation could be laid upon them :—the evil would be exposed at its root ; and society would thus be enabled to attain and perpetuate a state of security, which, under existing arrangements, it is utterly impossible to reach.

It is gratifying to be able to quote, in illustration of the efficacy and utility of the inspections here advised, the result of the comparatively partial inquiries originated or conducted by myself. As many as 383 entirely unprotected children were detected in an examination of 4191, in 43 different schools. Nearly all will be forthwith vaccinated in consequence of those inquiries. Without them, it may perhaps be asserted that before another seven years had gone by, at least 100 would have had small-pox, of whom 30 would have *died* from that disease !

But, independent of this direct good, the collateral benefits of inspection would be great. The periodical visits of the officers of health being heard of everywhere, and spoken of by

everybody, would maintain a continual and wholesome interest on the subject of vaccination, which, at present, is only excited by the temporary alarm created by wayward visitations of small-pox. The stimulus of contact with the officer of health would be more direct, more special, and perhaps also less likely to produce casual opposition in the public mind, than any which can be applied by the poor-law authorities. The two sets of functionaries, however, would coöperate, not interfere, with each other; the one, by arousing the activity of the public vaccinators, the other, by influencing the public themselves.

It is perhaps unnecessary to advert to another advantage incidental to these visits of an officer of health. Under circumstances of danger, and in seasons of affliction from epidemic or contagious disease, domiciliary visits on his part are much needed for the preservation of individual and public health; and, in this particular instance of vaccination, the motive and reasonableness of his inquiry would be so evident, as at once to establish a favourable impression concerning the utility and benevolence of the duties to be performed by him.

Finally, as already stated, the intrinsic cost of the inspections would be almost nothing. One item of public expenditure, however, must not be overlooked—viz., the additional demand upon the poor rates for the extra cases of vaccination performed; but if this amounted to 10,000*l.* or even 15,000*l.* per annum, it should, as compared with the present loss and infliction from small-pox, be welcomed as an actual gain to the community.

IV. *Analysis of facts collected from the Inspection of Poor Children in 43 separate Schools.*

An analysis of the facts collected in the inquiries instituted by myself, will serve to exhibit in the strongest light the importance of the information to be derived from similar investigations conducted on a larger scale.

These inquiries extended over 43 schools, of which 23 were situated in the country and 20 in the metropolis, containing a grand total of 4191 children. The data collected concerning

each child were, *its age*, the fact of its having been *vaccinated or not*, and, in either case, the fact of its having *had small-pox or not*. In doubtful instances, application was made, where practicable, to the parents or friends, for correct information; and when this was not or could not be accomplished, they were reported as doubtful, but are *recorded* amongst the cases of vaccination, so as to avoid any overstatement of the proportion of unprotected.

The following Table shows the actual results of the inquiry, in the Country, Metropolitan, and Jews' schools. The facts relating to the Jewish children (the poorest of their class) are separately stated, on account of their peculiar character. The table contains three divisions; in the first are included all the children examined, their ages varying between three and 14; in the second are the children above six, and in the third those under six years of age, the former having been born previously, and the latter subsequently, to the passing of the Vaccination Act.

TABLE I.
*General Results.**

DESCRIPTION and NUMBER of SCHOOLS.	TOTAL CHILDREN, aged from 3 to 14 Years.							CHILDREN above 6 to 14 Years.							CHILDREN aged from 3 to 6 Years.									
	Vaccinated.			Unvaccinated				GrandTotal	Vaccinated.			Unvaccinated				GrandTotal	Vaccinated.			Unvaccinated				GrandTotal
	Total	S.	NS.	Total	S.	NS.	Total		S.	NS.	Total	S.	NS.	Total	S.		NS.	Total	S.	NS.	Total	S.	NS.	
Country..... 23	1710	106	1604	562	258	304	2272	1401	98	1303	417	241	176	1818	309	8	301	145	17	128	454			
Metropolitan 17	1065	35	1030	184	109	75	1249	605	27	578	117	84	33	722	460	8	452	67	25	42	527			
Jews..... 3	633	7	626	37	33	4	670	401	2	399	33	31	2	434	232	5	227	4	2	2	236			
Total Schools 43	3408	148	3260	783	400	383	4191	2407	127	2280	567	356	211	2974	1001	21	980	216	44	172	1217			
Exclusive of Jews } 40	2775	141	2634	746	367	379	3521	2006	125	1881	534	325	209	2540	769	16	653	212	42	170	981			

Of the total number of children examined, viz. 4191, 3408 had been vaccinated; but 783 had never experienced the benefit

* In reading this Table, observe that *S.* stands for *Small-pox*, and *NS.* for *No Small-pox*.

of that practice, or about $18\frac{1}{2}$ per cent. Of the 3408 vaccinated, 148 had had small-pox since, and 3260 had escaped, the proportion of sufferers being only $4\frac{1}{3}$ per cent.; whereas of the 783 unvaccinated, no less than 400 had had small-pox, or 51 per cent.! Lastly, the residue of unprotected is 383 children, or $9\frac{1}{10}$ per cent.!

Such being the general results, it will further be seen that the facts admit of deductions, relating to four different subjects.

(A.) The relative efficiency with which vaccination has been performed amongst the different classes of children.

(B.) The subsequent effects of small-pox upon them.

(C.) Their present relatively protected or unprotected condition.

(D.) The total sickness and mortality that must at some previous time have prevailed amongst them, from small-pox.

(A.) *Relative Extent of Vaccination.*

Annexed is a tabular view of the proportion per cent. of unvaccinated children in each set of schools. The children are classified, as before, according to their ages.

TABLE II.*

Proportion of Unvaccinated per Cent.

SCHOOLS.	Total Children aged 3 to 14 Years.	Children above 6 to 14 Years.	Children aged 3 to 6 Years.
Country	24·7	22·3	31·9
Metropolitan	14·7	16·2	12·7
Jews.....	5·5	7·5	1·7
Total Schools	18·7	19·	17·8
Exclusive of Jews	21·2	21·	21·5

* To avoid overstating the case, the calculations per cent. are based, in this Table, and also in Table III., on the numbers of children *living*. It is obvious, however, that to arrive at the real extent of neglected vaccination, and the actual effects of small-pox, it would be necessary to include the cases of computed deaths from that disease, which would, in each case, raise the per centage; but for comparative purposes, showing the amount and benefit of vaccination in different schools, this is unnecessary.

The first striking fact revealed in the table is this; that the proportion of unvaccinated amongst all the children both of town and country (the Jews being specially excluded) is 21 per cent.!

Secondly, the ratio of unvaccinated in the Metropolis is 14 per cent., and in the country schools, 24 per cent.; so that vaccination is more carefully attended to in the former.

Thirdly, among the Jewish children, vaccination is performed with a completeness far surpassing the Country or Metropolitan schools taken generally, the proportion unvaccinated among them being only $5\frac{1}{2}$ per cent. The peculiar care which, it seems, even the humblest of that ancient people bestow upon the practice of vaccination, is a highly interesting fact. The well known tendency of the Mosaic legislation to the preservation of individual and public health, has, in this instance, wisely been allowed to prevail over the presumed disposition of the Jews to restrict themselves to the letter of its injunctions.

The benefit arising from this extreme care amongst them, is shown in the tables III. and V., which relate to the amount of small-pox, and to the consequent sickness and mortality amongst the different schools. The very fact, however, is in itself an illustration of the possibility of a more complete observance of vaccination by all classes of the people; and it was satisfactory to find, as if in support of the proposed enforcement of a condition as to vaccination in the case of certain schools, that such a regulation is actually contained in the printed Rules of the Jews' Infant School.

Fourthly, it appears, on comparing the second and third divisions of the preceding table, that, whilst in the metropolis there is a comparative decrease in the proportion of unvaccinated since the passing of the Vaccination Act, this is not so in the country schools. In this respect, too, it will also be observed, that a greater improvement has been effected amongst the Jews than in the Christian schools. The unvaccinated children amongst their very poorest (!) population, born since 1840, being only $1\frac{3}{4}$ per cent.! Why should not all the kingdom be equally well protected!

(B.) *Effects of Small-Pox.*

The next table illustrates the effects produced by small-pox upon the same children. The proportion per cent. affected by that disease amongst the vaccinated class is given in the first column; that amongst the unvaccinated, in the second; and the total proportion of cases of small-pox in the whole numbers of children, in the third. A classification of the children according to their ages would, in this instance, have been useless, as the numbers in each class are then insufficient to allow of those corrections being made which are necessary to get rid of the influence of *lapse of time*, in increasing the risk of having small-pox, which affects the older class of children:—

TABLE III.
Proportion of Small-Pox Cases per Cent.

SCHOOLS.	Previously Vaccinated.	Never Vaccinated.	Both classes together.
Country	6·2	44·	16·
Metropolitan	3·2	60·	11·5
Jews	1·1	89·	6·
Total Schools	4·3	51·	13·
Exclusive of Jews	5·	47·	14·4

A comparison of the first and second columns of this table clearly shows the protective value of vaccination, and the evil attendant upon its neglect; for whilst, omitting the Jewish children, the cases of small-pox in the unvaccinated amount to 47 per cent., they are only 5 per cent. amongst those who had been protected by vaccination.

Secondly, it appears, on examining the figures in the first column, that small-pox occurring after vaccination is more frequent in the country than in London, and is least frequent amongst the Jewish children—the ratio in each case respectively being $6\frac{1}{5}$, $3\frac{1}{5}$, and $1\frac{1}{10}$ per cent. But, thirdly, it is shown by the figures in the succeeding column, that, in regard to the proportion of cases of small-pox occurring in the unvaccinated, the

relative position of the metropolis and the country is reversed, and that in this respect the Jews suffer most of all. The percentage of cases of this kind amongst the Jews is 89, being double what it reaches in the country, viz., 44, and one-half more than it is in the remaining metropolitan schools, viz., 60.

Now, this increased liability to small pox, experienced by the *unprotected* in London generally, and especially, it would seem, in Houndsditch, is unquestionably due to the overcrowding of the population, the pernicious effects of which are hereby incidentally illustrated. It is a very remarkable fact, however, that with regard to the *protected* class, this condensation of abode has not an equally injurious influence, — nay, seems to be accompanied by a greater security. But the mischief *inevitably* inflicted on the unvaccinated of a densely crowded neighbourhood or a town, is a genuine and unmixed result, whereas the apparent security of the vaccinated, under like circumstances, may be owing to a combination of causes. The most obvious, and, I believe, the true cause, is the greater efficiency with which *individual* vaccination is performed in a town, as compared with the country. The progress and results of cases are more carefully watched, and failure in the operation is more likely to lead to its repetition, amongst a crowded than amongst a scattered population. Imperfect cases (which are often set down as perfect in the mind of a parent) are accordingly more rare. In the instance of the Jewish children, it was observed at the time of examination, that the cicatrices upon the arms were unusually perfect and distinct, as if the operation had always been carefully performed. The aggravated powers of small-pox in over-crowded quarters, which must, in former times, have been especially felt by the Jews, may, in part, supply an explanation of their present intelligent care. At any rate, it forcibly suggests the necessity for exertions to vaccinate *all* who reside in towns; whilst the apparent insecurity in the country from imperfections in the operation itself, demands additional *care* in its actual performance.

Lastly, it is interesting to find, on comparing the figures in the third column, which show the proportion of all the cases of small-pox (occurring in the protected and unprotected classes together) to the whole number of children, that the balance of

general security is again restored to the Jews, and also to the metropolis as compared with the country;—in other words, to those amongst whom vaccination is the most extensively and most carefully performed, the total cases of small-pox being in the country in the proportion of 16, in the metropolis $11\frac{1}{2}$, and among the Jews 6 per cent. upon the children examined.

(C.) *State as to Protection.*

In this Table is noted the proportion of unprotected children actually detected in the different schools; *i. e.* of those who had neither been vaccinated nor had small-pox. The children are classified according to age, as before.

TABLE IV.
Proportion of Unprotected per Cent.

SCHOOLS.	Total Children aged 3 to 14 Years.	Children above 6 to 14 Years.	Children aged 3 to 6 Years.
Country	13·4	9·6	28·2
Metropolitan	5·2	4·5	8·
Jews	·6	·45	·85
Total Schools ...	9·1	7·1	14·1
Exclusive of Jews	10·7	8·2	17·

Here, again, the maximum of benefit, in the shape of present protection, is with the Jewish children,—the minimum is in the Country schools,—and the medium in the Metropolitan schools generally. In the country $13\frac{1}{2}$ per cent., in London $5\frac{1}{5}$, and amongst the Jews only $\frac{3}{5}$ per cent.—not one per cent.—were found unprotected.

Excluding the Jewish population, the proportion of unprotected was $10\frac{3}{4}$ per cent.!

On comparing the second and third columns, it is seen, that there is a larger proportion of unprotected amongst the children born *since* the passing of the Vaccination Act, than in those born before that period. In the case of country schools, this may in part be owing to the increased proportion of unvaccinated amongst the younger class of children (see Table II.); but in

the metropolis and among the Jews, vaccination has apparently been better performed since the passing of the Act. How, then, does the proportion of unprotected amongst them happen to be larger in the younger children than in the older?

The explanation is an easy, but a most seriously important one. The truth is, there are always two protective agencies against small-pox at work within the population. The one is vaccination, the other is small-pox itself. If the one be not artificially, the other sooner or later is spontaneously performed; and thus the older children, though originally very incompletely vaccinated, are often found to be well protected from small-pox. The condition of the boys in the Industrial School, Old Pye-street, Westminster, sufficiently illustrates this fact. Of 56 boys, varying in age from six to 14 years, 19 have never been vaccinated (34 per cent.!), but—and here is the point—not *one* is now unprotected, for the whole 19 have had the small-pox! According to the estimated rate of mortality, six others must have perished from the disease. Where, too, are the female children, the sisters of these boys? In that miserably-crowded neighbourhood, perhaps all the unvaccinated have small-pox at an early period of their existence. It would seem impossible indeed for them to reach the age of 14 years, and escape that terrible scourge!—Shall we quote another illustration drawn from the Jewish children of corresponding age. Amongst them, of 33 unvaccinated, 31 were found to have had small-pox; and ten others must have died. Such are the facts!

In densely peopled districts, then, the question to be decided is, how shall protection be effected;—artificially and intentionally, by a simple, mild, and perfectly harmless operation, at the cost of 1s. 9d. per head; or, through neglect and fate, by a repulsive, disfiguring, and dangerous disease, which, besides a most serious pecuniary demand, *will* have its quarter-tribute of human lives?*

* Vaccination is not only a preservative against an *attack* of small-pox; but, in cases where it fails to do that, it diminishes the risk of *death* from that disease, even more effectually than small-pox itself. At least so speak facts. The mortality in small-pox after vaccination is 3·3 per cent., after small-pox itself, 15·7 per cent. (Stark, Edin. Med. and Surg. Journal, July, 1845, p. 137.)

(D.) *Computed Sickness and Mortality from Small-Pox.*

The total amount of previous sickness and mortality from small-pox only, which would leave a residue of 4191 children in the condition displayed in Table I., may be thus estimated:

Cases of small-pox after vaccination	148		Total cases living	4191
Add for deaths at 3·3 on 100.	5		Ditto dead.....	138
Cases of small-pox in the unvaccinated.....	400			
Add for deaths 33· on 100 (or 1 in 4).....	133		Total children	4329
	686			
Total cases of sickness ...	686			

By a similar method, the sickness and the mortality endured in the separate classes of children have been also calculated; and the subjoined table includes the results. In the first column are the actual numbers of children examined; in the second are the numbers increased by adding the calculated deaths. The next division shows the actual sickness and mortality; and the last indicates the per centage of sickness and mortality, computed on the numbers of children, including the supposed deaths. This per centage is of course not assumed to be absolutely true, but is intended to show, by comparison merely, the mortality and sickness in different classes of children.

TABLE V.

Relative computed Sickness and Mortality.

SCHOOLS.	Actual numbers of Children living.	Numbers after adding the computed deaths.	Aggregate Sickness and Mortality.		Proportion per Cent.	
			Cases of Sickness.	Deaths.	Cases of Sickness.	Deaths.
Country	2272	2362	454	90	19·2	3·8
Metropolitan	1249	1286	181	37	14·	2·8
Jews	670	681	51	11	7·5	1·6
Total Schools ...	4191	4329	686	138	15·8	3·2
Old Pye Street ...	86	94	36	8	38·4	8·5
Old and New Pye Street, children under 6 years }	131	134	12	3	8·9	2·2
Jewish children under 6 years }	236	237	8	1	3·3	·4

Admitting the conclusions arrived at to have a general application, it appears that, for every 4191 children living between the ages of 3 and 14, belonging to the lower classes of society in London and the country together, 686 cases of sickness from small-pox and 138 deaths must at some time or other have occurred, the per centage of sickness being $15\frac{3}{4}$, and of deaths $3\frac{1}{5}$ in the whole number of children increased by adding the deaths.

The Jews of Houndsditch and the Gentiles of Tothill-fields form a correct and instructive case for comparison. They alike reside in crowded houses and apartments, and alike belong to the lowest ranks of their respective denominations. The former, however, have only $5\frac{1}{2}$ per cent. of their children unvaccinated, whilst the latter have as many as 30 per cent. The proportionate risk in the case of the two is, therefore, as one to five,—and, on consulting the table above, it will be found that the Jewish children of the East have suffered by sickness and mortality from small pox, as compared with their less carefully protected brethren of the West, exactly in the same proportion of one to five.

Again, if the comparison be limited to those children living in these two opposite quarters of the same metropolis, which have been born since the passing of the Vaccination Act, the security from sickness and from death is also greater amongst the Hebrew population.

Lastly, the sickness and the mortality amongst the Jewish children at all ages,— $7\frac{1}{2}$ and $1\frac{1}{2}$ per cent., are just *half* what are suffered by all the rest of the metropolitan children examined—viz., 14 and nearly three per cent.

OTHER conclusions of a more or less interesting character are faintly indicated by the facts collected in even this limited inquiry. A larger field of observation would yield fresh and valuable truths. Enough has been quoted to establish the usefulness and necessity of such investigations. In the mutual actions and reactions of cow-pox and small-pox, and in the power

of the former over the latter, many points still require elucidation. Science cannot stir without accurate data, and in such inspections as are now recommended she would find much that would supply her wants. Science, however, is not alone in her claims. The public welfare *demand*s them. As already shown, they would confer a lasting benefit on society; further control would be thereby exercised over a most calamitous disease; and the requirements of public economy would not be infringed.

Happily, the attention of the legislature is now fairly directed to questions relating to the public health; and it is at length to be largely recognised, that the State may legislate for the prevention of physical evils among the people. The gravity of other avoidable mischief endured by society, in comparison with the inflictions of small-pox, may be readily granted; and the greater skill and firmness required in dealing with its many causes must at once be conceded. But the smaller evil, if shown to be *preventible*, should be arrested as well as the larger. Small-pox is perhaps the most surely and easily *prevented* or checked of all known diseases. There is a direct and special controlling power over it, supplied to us by Providence; and the mysterious influence of the vaccine over the variolous disease—to the present day, a *solitary fact* in science—is the astonishment and admiration of all who reflect upon it.

The public, moreover, is already familiarized with the subject, and with legislation upon it. To Jenner, a reward of 30,000*l.* was granted; National Vaccine Boards have since been appointed; and an annual expenditure of more than 20,000*l.* is now incurred, to perpetuate the practice he discovered.

No reasonable and practicable suggestions, especially with justice and economy in their favour, should be left *untried*, to give completeness to the acknowledged aims and expensively prosecuted plans of the legislature.

Let the standard of vaccination at present reached by the Jews be attained by all other classes, and the sickness and mortality from small-pox would decrease at least *one-half*; and there can be no reason why, in all our towns' population, a much more perfect state of protection should not be realized. That the efficacy of *universal* vaccination is no visionary good,

but that it is accompanied by advantages which we, in the country of Jenner, do not yet possess, may be learned from the condition of France and Austria, as already quoted. To be able to compare with either kingdom, our annual deaths from this cause must be reduced at least *one-half!*

In her Majesty's dragoon guards and dragoon regiments,—which, be it remembered, are, with the rest of the army, under the influence of both a *rule* and an *inspection* as to the practice of vaccination,—the deaths from small-pox, during a period of $7\frac{1}{4}$ years, in an average annual strength of 6165 men, were only THREE;—a proportion which would represent an annual mortality of 1 in 14,900 adult persons! Such are the benefits of vaccination rigidly and systematically employed. Surely what might be, ought to be attempted to extend them to the entire community.

Earnestly hoping that the facts and proposals detailed in the preceding pages will be deemed of sufficient importance to command your Lordship's attention,

I have the honour to be,

Your Lordship's obedient, humble servant,

JOHN MARSHALL.

CRESCENT PLACE, MORNINGTON CRESCENT,

May, 1847.

APPENDIX.

THE INSPECTION.

THE leading facts to be ascertained in an inspection are the following :—

1. The sex and age of the individual.
2. The fact of having been *vaccinated or not*.
3. The fact of having had *small-pox or not*, distinguishing between casual and inoculated cases.
4. The *date* of either or both events, as the case may be. This would, of course, be specially required in regard to the attack of small-pox.
5. The occurrence of a *second* attack of small-pox; and whether this was after *vaccination, inoculation, or natural small-pox*; also the date of these events.
6. The fact of *re-vaccination*, and the date.

Of course remarks on special cases might be made, as to disfigurement, blindness, &c. The social condition and district residence of individuals would also be recorded.

PROPOSALS CONCERNING THE CENSUS.

There is one other suggestion which may be here adverted to. The census of England and Wales will be taken again in a few years. The last, in 1841, cost the country 57,110*l.*, independently of the subsequent expenses of analyzing the returns. Would it be possible, in this portion of the United Kingdom at least, to obtain in the census papers for 1851 returns under the 2nd, 3rd, and 4th of the above-mentioned heads? The other points would render the subject complicated.

The information, including, as it would, the condition of the ADULT population, would be of extreme value, as illustrating the operation of small-pox and vaccination upon THEM; it would throw light on the interesting question of RE-vaccination, and it does not seem impossible to collect it.

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