

The story of the Gloucester epidemic of small-pox : showing how it arose, the facts which make it notable, and the lessons it teaches, ... / told by Francis T. Bond.

Contributors

Bond, Francis T.
London School of Hygiene and Tropical Medicine

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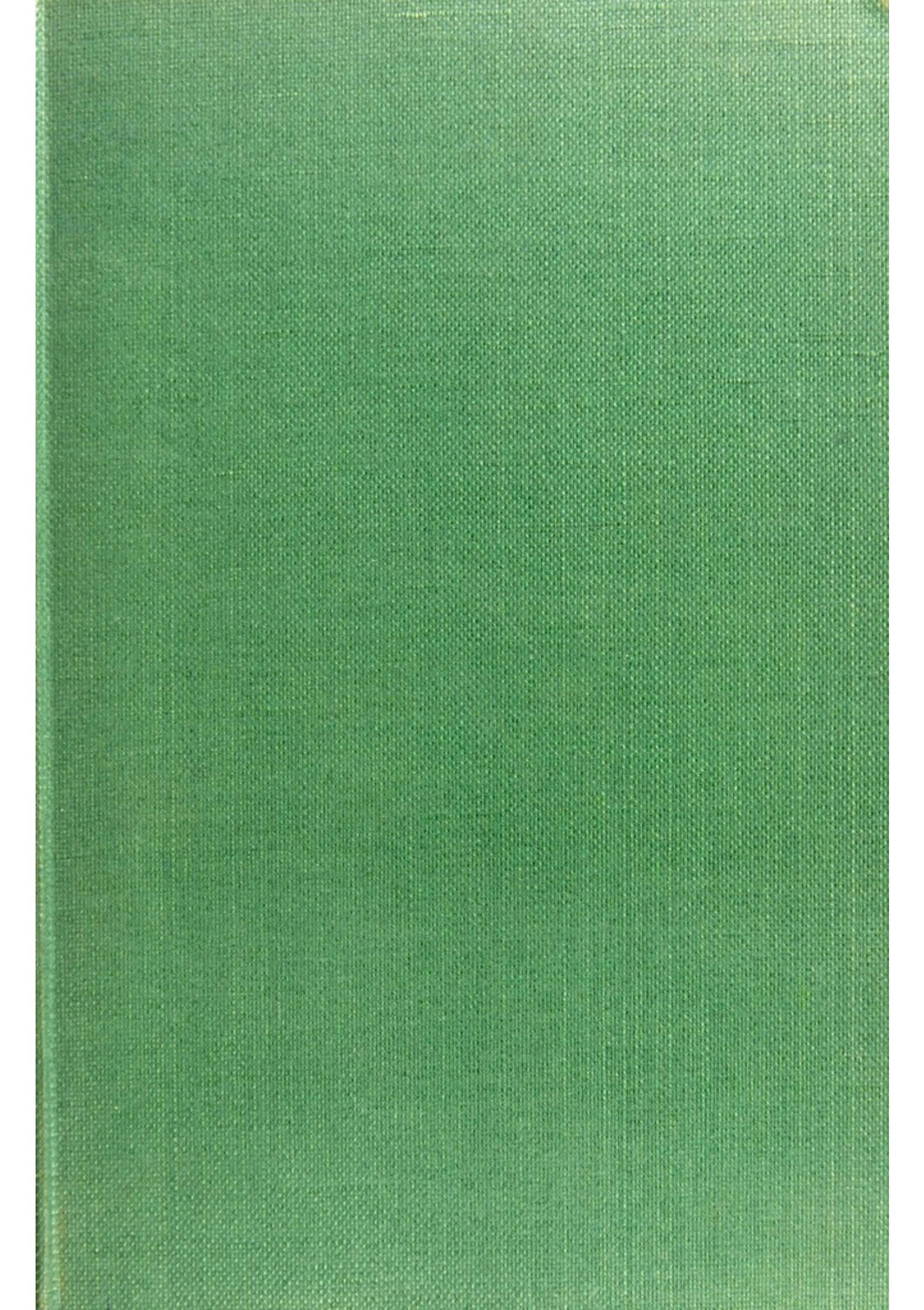
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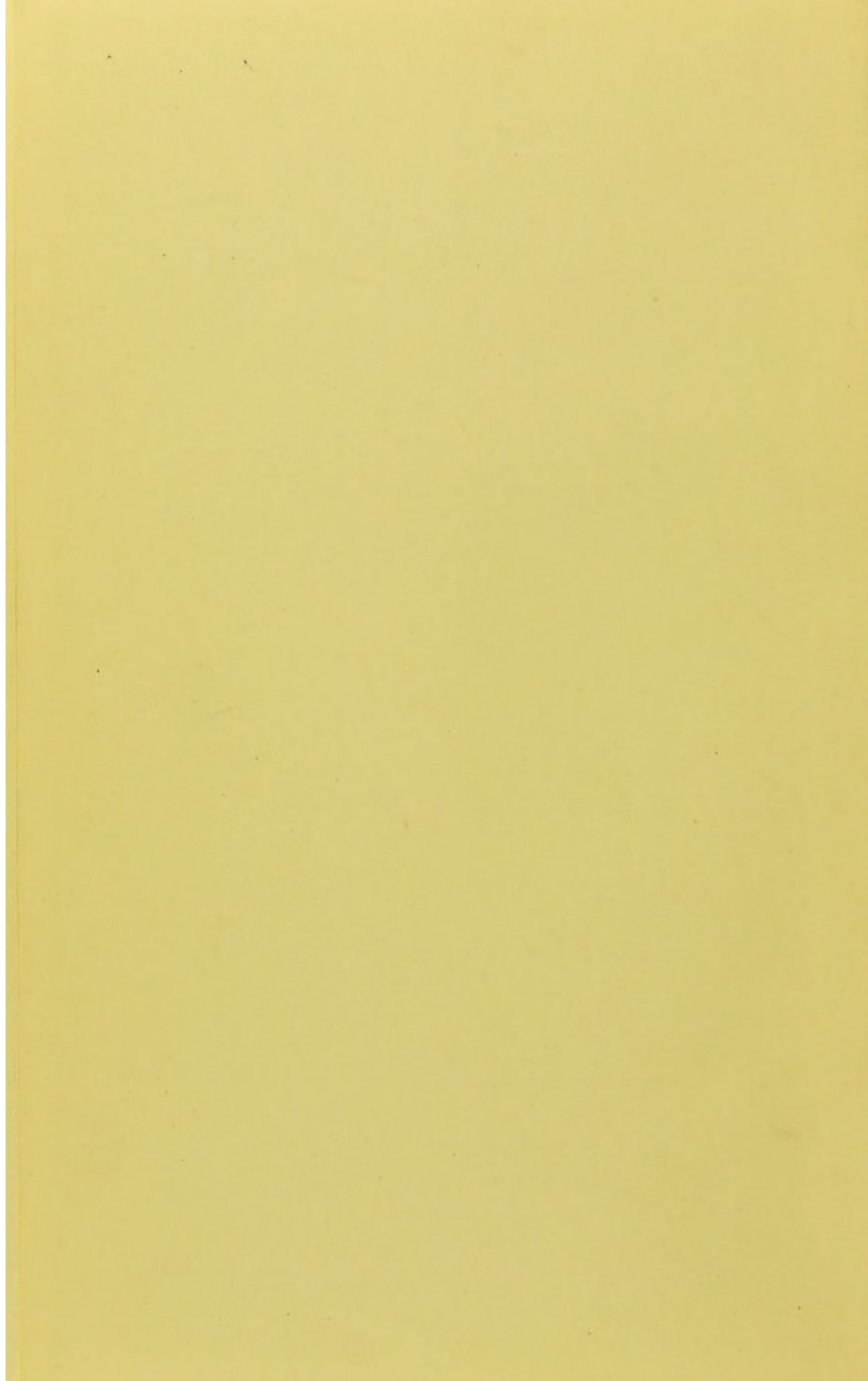






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1896

The Story

OF THE

Gloucester Epidemic

OF SMALL-POX.

SIXPENCE.



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For the Objects of the Society see 3rd page of cover.

THE STORY
OF THE
GLOUCESTER EPIDEMIC
OF SMALL-POX:

Showing how it arose, the facts which make
it notable, and the lessons it teaches,

WITH FULL STATISTICS, DIAGRAMS, &c. :

TOLD BY

FRANCIS T. BOND, M.D., B.A., LOND : F.R.S.ED :

Medical Officer of Health, Gloucestershire Combined District ;

Hon. Secretary, Jenner Society.

WITH WHICH IS INCORPORATED

AN ABSTRACT OF THE REPORT OF THE VACCINATION COMMITTEE

OF THE

GLOUCESTER BOARD OF GUARDIANS.



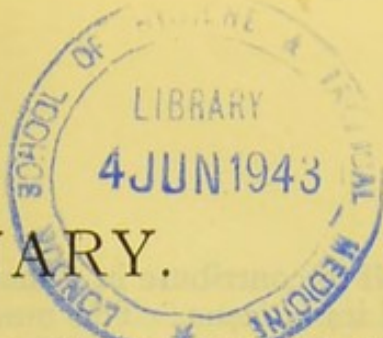
THE JENNER SOCIETY,
GLOUCESTER.

1896.

N.B.—An abstract of the historical portion of this Story appeared in the *Times* of August 25th last, under the head of "The Small-pox Epidemic at Gloucester."

CORRIGENDA.

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PRELIMINARY.

In a commanding position, on the winding banks of the River Severn, which here formerly divided into two branches, inclosing the historic Isle of Alney, has grown up, during the course of more than two thousand years, a town which, under its ancient names of "Caer Glowe" and "Glevum," has from earliest times been recognised as "a faire citie." The manifest advantages which its site offered in controlling the passage of the river by the wild tribes who then occupied Wales, commended it to the Roman conquerors of Britain as a suitable spot for the location of a fortified camp, which, judging from the remains of stately buildings that have been from time to time excavated amongst its foundations, grew at length to be a town of no small importance as the key to the military occupation of this portion of the country.

Nor, in later times, when the settlement of this as well as of other parts of the Kingdom had been effected by the Norman conquerors of England, and intercourse between the different races of the country had become established, did the position which the city occupied, within a convenient distance of the broad estuary of the Severn, and at a point where the river can be most readily crossed, less commend it to the chapmen of the middle ages as a centre of commerce.

It is not surprising, therefore, that the earliest records of Gloucester show it to have been a place of importance in the history of the English people. As one of the three cities in which the national parliament was at one time held, it became indelibly associated with the feudal tenure of the country in the great survey of Domesday, which was decreed at one of the sessions held within it.

Its growing prosperity and well-constructed fortifications as a walled city, whose burghers showed themselves to be well able to hold their own against the various attacks to which they were exposed, still further increased its importance during the troubled times of the civil wars. After the conversion of its first conquerors, Gloucester became the centre of powerful ecclesiastical organizations, the remains of whose monasteries can still be seen standing in striking contrast to the more modern buildings by which they are surrounded. At the dissolution of the monasteries, the city was not unnaturally chosen as the seat of a bishopric and the site of a cathedral, which, though not vying in size with some of the more massive English fanes, yields to none in interest as a record of the history of gothic church architecture.

Nor did the natural amenities of the situation of Gloucester

fail to contribute in a material way to the health and comfort of its citizens. The numerous beds of glacial gravel which here happen to overlie the lias and alluvial clays through which the Severn in this portion of its course meanders, provided an unfailing supply of excellent water for the wells by which the ancient city was supplied. And in later times, when the requirements of an advancing prosperity called for a more abundant provision of water for manufacturing and sanitary, as well as for domestic and other purposes, it was obtained without difficulty from reservoirs, to the construction of which the valleys in the neighbouring Cotswold Hills lent themselves. At no time in its past history is there any record that Gloucester has been without an abundant supply of good water, free from any suspicion of contamination, except on two or three occasions during the last four years, when, in consequence of protracted droughts, recourse has been necessary, for very short periods, to the waters of the Gloucester and Berkeley Canal and of the River Severn, taken at some distance above the city, for the purpose of supplementing its regular supply. The occurrence of these incidents, and the rapid growth of the city in recent years, have compelled the City Council to consider the necessity of providing a permanent addition to the previous storage, which has now been obtained from a source that removes all fear of having to resort, even in such rare emergencies, to supplies that were not altogether above suspicion.*

In regard to other sanitary conditions, Gloucester has been equally fortunate. Its nearness to a large river, whose abundant and rapid flow would carry with it to the broad estuary into which it opens, the sewage of a far larger city, without danger or offence to the sparse population that occupies its lower banks, has enabled the problem of providing a suitable outfall for its drainage to be easily and cheaply solved. The sewers of the older portion of the city, though exhibiting defects such as are to be found in all towns which, like Gloucester, have grown up under the conflicting jurisdiction and interests of different local authorities acting for a common area of drainage, are certainly no worse than those of most other towns of the same size and character, and are in some respects decidedly better. There is a sufficient answer to the misrepresentations as to the defects of the Gloucester sewerage, which have been persistently reiterated by anti-vaccinators, after they have been repeatedly shown on trustworthy evidence to be untrue, in the remarkable freedom which the city has for some years past enjoyed, from out-

* For information on this and other points connected with the Sanitary condition of Gloucester, see special section hereafter.

breaks of typhoid fever—a disease which is admitted by all competent authorities to be the best test of such deficiencies as anti-vaccinators alone have alleged against it.

In the matter of house accommodation, also, Gloucester can present at least as good a record as any other town in the Kingdom. During the last twenty years the whole expanse of open ground on the southern side of the city has been rapidly covered with well built streets, and with rows of detached and semi-detached houses, occupied largely by the numerous clerks, commercial travellers, and others who have been attracted to the city by its increasing industrial activity, as well as by the better class of artisans and labourers who have migrated to them from the older portions of the city, the previously overcrowded condition of which has thus been effectually relieved. A stranger who might be led to perambulate this newer portion could hardly fail to recognise in the well laid out streets, neatly built houses, surrounded in many cases by gardens, with all the aspects of well-being about them, amidst which three large Board Schools rear their heads, and the public Park and Spa grounds are conspicuous, the indications of a thriving, comfortable, and, to all appearance, healthy population.

ADVENT OF THE CALAMITY.

To this city, blessed as it has thus been with all that nature and man can well do to promote its prosperity, has lately come a calamity such as no other English town has experienced within the memory of living man. During a period of more than six months a ban has been set by the rest of the Kingdom upon the city, its people, and its wares, and even upon those who have been, accidentally or incidentally, in any way connected with it, which has rivalled in its severity the papal interdicts of the middle ages. The two great railway companies, which at other times compete for its traffic, were for once unanimous in doing their best, by withdrawing the facilities which they usually offer for intercourse with it, to maintain its effectual isolation. It was of no use for its unfortunate citizens to point out to those who thus comprehensively damned them as social lepers, that the terror by which they were actuated was as unreasoning as that which has often dominated an ignorant mob within, rather than without, a plague-stricken city. It was in vain that those of them who might claim to speak with some authority urged that the "outlanders" who were enforcing this grievous excommunication had at their command an effective protection against any risk to which they might think themselves exposed in their intercourse with the city. Panic is never logical, and

the inhabitants of Gloucester had to learn by bitter experience that nothing is more utterly selfish and unreasonable than a thoroughly frightened and demoralized community. Moreover, the "outlander" could, unfortunately, retort on the unhappy citizen that it was to the neglect of Gloucester itself to invest itself with this protection that all its troubles were due. In no case could the advice of "physician, heal thyself," have been more telling or less palatable.

WHY THE STORY IS WORTH TELLING.

The story of how this calamity came about, and how it was arrested with a rapidity as great as that with which it arose, is sufficiently interesting, especially to the dwellers in other towns who have been following in this matter the example of Gloucester, to make it worth telling. For, next to profiting by our own blunders, the best amends we can make for committing them is to enable others to learn wisdom by our experience, even though it be at our own expense.

Indeed, the story is the more worth telling, for circumstances invest it with a special interest. The origin of Christianity in Palestine surrounds that land with a halo of associations which have, from the earliest times, made it, even to the eye of the infidel, an object of respectful attention. And, though Gloucestershire can offer no such claim to world-wide interest as this, it can present some title to the regard of all who desire to rescue humanity from one of the direst scourges to which it is exposed. For, was it not in the little town of Berkeley—within fourteen miles, as the crow flies, from its county town—that Edward Jenner, just a century ago, perfected a discovery which has been the means of saving millions of human lives? By the common consent of all competent and unprejudiced authorities, the practical and convincing demonstration which Jenner gave of the protective power exercised by vaccination over small-pox, places him in the front rank of the true saviours of society. That his own county should be proud of having been the scene of his labours, and that it should have been strong in its faith in their value, might have been reasonably expected. But that its chief town should, after more than ninety years of unwavering confidence in vaccination, have gradually appeared to lose its faith in Jenner, and have thrown his discovery to the winds, is one of those curious episodes in the history of modern civilization which not only deserves a record, but demands an explanation.

There is, moreover, still another reason which invests the story with additional interest at the present time. For, at

length, after seven years of attentive and patient investigation of all the evidence that could, by any ingenuity, be raked up against vaccination, a Royal Commission has now emphatically declared the confidence of eleven out of thirteen of its members in the discovery of Jenner, joined with the hope that their Report "will stimulate belief in the efficacy of vaccination." That the expression of this belief should have been followed in the Report by suggestions and recommendations of a practical character which hardly appear to be logically consistent with it, is a circumstance not without parallel in deliverances of this kind, to the incongruities of which a desire to realize unanimity in the verdict, rather than a logical coherence between evidence and verdict, is often the keyword. And, in translating the somewhat conflicting opinions of the Commission into the shape of practical legislation, it will be well that both the imperial legislature and the local authorities, on the latter of whom the responsibility of carrying out the law as it now is still devolves, should have clearly before them the experience of Gloucester, and the effect which it has had in modifying the previous opinions of the great majority of its citizens. It is an object lesson which Providence would seem to have provided at the very time when it is most wanted, as a practical justification of the soundness of the Commissioners' conclusions as to the efficacy of vaccination as a preventive of small-pox, and possibly, also, as a guide to facilitating the more effective application of this preventive for the protection of the community as a whole. For it may be fairly assumed that, if the Commissioners had had clearly before them the terrible lesson which the people of Gloucester have had to learn, and the alacrity with which they have applied it to relieve themselves from the visitation in which a small but pertinacious minority have involved them, the views which they have expressed as to the force of so-called "conscientious" objections would have been even less open to criticism than they are at present.

THE ORIGIN OF THE MISCHIEF.

Up to the middle of the eighth decade of the present century the belief of the citizens of Gloucester in the efficiency of vaccination as a protection against small-pox was as strong as that of any other portion of the Queen's subjects. About that time a local anti-vaccination society was established in the city, of which the conductor of a local daily paper became president, and an active campaign against vaccination was begun. In the columns of this publication, as well as in bills and pamphlets of all kinds which were circulated broad-

cast, inaccurate statements, calculated to prejudice the belief in vaccination, not only as being useless as a defence against small-pox, but as being a danger to health, a degrading superstition, and a practice which was promoted by the doctors merely for their own pecuniary benefit, were freely made. To this attack no defence was offered, except what was to be found in the occasional reports of local medical officers of health.* The hands of the medical profession were tied by the imputation made against their honesty, and no one else knew enough or cared enough about the matter to induce them to embark on a discussion in which the evidence of experienced and responsible observers was met by assertions, generally by persons of no authority, often under the cloak of anonymity, and always involving considerable difficulty in disentangling fiction from fact. Whilst the enormous mass of evidence in favour of vaccination which had been accumulated during the experience of nearly a century, and which from being embedded in professional publications is practically inaccessible to the general public, was sedulously kept out of sight, everything that had the appearance of telling against what was labelled "The Jennerian rite" was ostentatiously paraded.

The troubles which so often occur in infant life about the time when vaccination is enforced, and which in most cases have no necessary connection with vaccination itself, were magnified and distorted, so that anxious parents were led to believe that the complication of the operation by them was the rule instead of being the rare exception; whilst the awful slaughter of the innocents which small-pox inflicted before the time of Jenner was carefully ignored. Of this experience of a period which had passed beyond the memory of living man none but students of medical literature knew anything. For even the scarred faces, which used, half-a-century ago, to be so common in our streets, and to tell in a way that could not be misunderstood the story of the struggle their owners had had to escape from the clutches of the disease, had become so rare that you might walk from one end of Gloucester to the other without meeting one of them.

THE POLICY OF "PEGGING AWAY" AT LAST SUCCESSFUL.

It is not to be wondered at, therefore, that, under the influence of this agitation, carried on as it was, incessantly, by a small but fanatically enthusiastic body, who made up in activity what they lacked in numbers and authoritative weight, the faith of the less informed section of the community in Gloucester should have begun to waver. They heard only one side of the story, and, naturally, in default of any answer

* See "A Forecast and its Fulfilment," in Appendix.

to it, believed that there was none to be given. It was the old experience over again. The defenders of vaccination, impregnably intrenched, as they thought themselves, behind a rampart of insuperable evidence, allowed their position to be gradually sapped by a system of mining which enabled the enemy to capture the position by a *coup de main*. This piece of strategy consisted in taking a so-called "census" of the city, for the purpose of obtaining a numerical expression of opinion on the subject of vaccination.* As might have been expected, the enumerators of the papers collected in this "census" declared that the "Noes" had it, which they very probably had, as a large number of persons, who did not care to be parties to such a form of procedure, did not fill up their papers at all.

Meanwhile, the anti-vaccinators had been storming the citadel in another direction. The office of Guardian of the Poor has for many years, in localities like Gloucester, where party feeling runs high, been the stepping-stone for political "business" of all kinds. The anti-vaccinators, for reasons which are not far to seek, without making vaccination a distinctly political question, succeeded in identifying it in an irregular way with the Liberal party. Candidates for the office of Guardian were required to pledge themselves to oppose compulsion. The then local Member for Parliament was captured and duly harnessed in the traces of the anti-vaccination car; and the Conservatives were obliged to follow the example of their opponents, and to bolt what was probably a nauseous morsel with the best grace they could. In this way a sufficient number of the city members of the Board of Guardians were in time "nobbled," and the opposition of the rural members, who, to do them justice, have been generally advocates of vaccination, was overcome.

RESULT OF "NOBBLING" THE BOARD OF GUARDIANS.

In February, 1887, a resolution was submitted to the Board, which was, after much discussion, passed by 12 votes to 10 in a meeting of 32, out of a total of 53 elected and nearly

* Anyone who is unacquainted with the way in which this device is worked may learn something about it by perusing a Report of a similar so-called "census" which was carried out in Darlington in 1891, the result of which was published as a pamphlet, under the specious title of "Vaccination Injuries: the Short and Simple Annals of the Poor." This precious publication—precious now in more senses than one, as its author has been compelled to call in all the copies and to humbly apologise to the Public Vaccinator of Darlington, as well as to pay costs for libels which it contained—takes a high rank amongst the curiosities of anti-vaccination literature for unblushing impudence of assertion.

as many *ex-officio* Guardians. This was "that the vaccination officers take no further steps in vaccination prosecutions until authorized by the Board." This important resolution, carried by such a trifling majority, did not, on the face of it, commit the Board to anything more serious than to restraining the vaccination officers from the free hand which they had been previously allowed in carrying out the duties imposed upon them by the Vaccination Acts. But it practically led to the suspension of vaccination, as the Board declined on subsequent occasions to authorize any action by their officers. In estimating the responsibility of the Gloucester Board of Guardians for the arrest of vaccination which followed the passing of this resolution, it is only fair to bear in mind that they are an elective and representative body, and that, in the absence of any evidence to the contrary, the census which the Anti-Vaccination Society had taken in Gloucester was claimed by those who took it, and with some show of reason, to be a mandate to suspend compulsory vaccination. Of course, the Local Government Board might have intervened, but they contented themselves in this, as in other cases, with merely academic remonstrances, which, in Gloucester as elsewhere, have been allowed to "lie upon the table," or have been replied to with polite evasions. Whatever ingenuity may have been required to frame such excuses before 1889, the task became easy enough after that date. For the appointment in that year of the Royal Commission on Vaccination was not unreasonably interpreted by the Gloucester Guardians, as by other similarly disaffected Boards, as a justifiable excuse for assuming that the Government had, by appointing the Commission, admitted the question of vaccination to be an open one. As year after year passed by without anything being forthcoming except successive bulky Blue-books, the whole question got into an *impasse*, and the only wonder is, not that vaccination fell into abeyance at Gloucester, but that it did not do so over the whole country. For such a mercy we have rather to thank the limited resources of the Anti-Vaccination League, and the absence in most other towns of the favourable local conditions which enabled that body to take such a hold of Gloucester, than any legislative or administrative foresight on the part of the central authorities.

FRUITS OF THIS POLICY.

The effect of the resolution adopted by the Gloucester Board in 1887, by which they practically suspended compulsory infantile vaccination in their district, soon became evident. The following tabular statement of the decline of

public vaccinations will show how soon the class of the population for whose benefit gratuitous vaccination is provided began to take advantage of the option which was thus offered to them :—

							Total Vaccinations.
1886	..	..	..	..	..	..	1,095
1887	..	..	..	..	..	..	472
1888	..	..	..	..	..	..	140
1889	..	..	..	..	..	..	95
1890	..	..	..	..	..	..	60
1891	..	..	..	..	..	..	34
1892	..	..	..	..	..	..	39
1893	..	..	..	..	..	..	38
1894	..	..	..	..	..	..	34
1895	..	..	..	..	..	..	371

Total vaccinations in 10 years 2,378

Do. in 9 years (1887-95) .. 1,283

During these ten years 15,682 children had been born in Gloucester, of whom 3,176 had died, leaving a balance of 10,128 children to be accounted for. This fact is a sufficient answer to the statement that Gloucester at the time of the outbreak of the epidemic was, so far as its juvenile population was concerned, "not generally an unvaccinated city."* Nor is there any pretence for assuming that, in regard to its adult population, Gloucester was any better protected than other towns in the Kingdom. Probably it was worse; for the disbelief which had discouraged primary vaccination was not likely to lead to anything but decreased care in renewing the protection which those who had been vaccinated in infancy more or less enjoyed.

It is important, also, to note that during these ten years, as well as for the twelve which had preceded them—that is to say, since 1873, when Gloucester was visited by the epidemic which prevailed generally throughout Western Europe—the city had been practically free from small-pox.

THE PERILS OF AN ILL-VACCINATED POPULATION.

It was not until the close of 1895 that infection, which had been imported in some obscure way into the city, as had occurred from time to time in previous years, began to show signs of having seriously established itself. This was due to the fact that a case of small-pox in an unvaccinated child had been concealed and treated as measles. It is precisely in this way that the disease may be expected to break out among an unvaccinated infantile population. The possibility

* See Statement of "Four Facts," issued by the Anti-Vaccination League, with the view of explaining away the Experience of Gloucester.

of confounding an attack of small-pox in its earlier stages in a child with measles on the one hand, and with chicken-pox on the other, is such that a case might readily remain unrecognized for some time before professional assistance was called in, even without any intention of concealment on the part of the parents. During this interval the infection might easily get diffused on all sides, as was the case at Gloucester, a number of new centres of infection being thus established, and the difficulties of dealing with the outbreak rapidly increased. It is for this reason that the presence of unvaccinated children in a community is not merely a danger to themselves, but a standing menace to the public generally. If our adult population were as well re-vaccinated as that of Germany, the existence in their midst of unvaccinated children would be much less dangerous than it now is.

In that case, our position would be much as it was in the days before Jenner, when the bulk of the adult population was more or less perfectly protected, not as it is now, by infantile vaccination, but by having had small-pox in early life. We should have recurring epidemics, which would attack mainly the juvenile portion of the community as measles and whooping cough do now, from which adults are generally protected by having had the disease in childhood.* But when, as in the case of Gloucester and other towns which have neglected infantile vaccination, a large amount of dangerously explosive material is distributed amongst a larger mass of less inflammable matter, the risk is that the accidental introduction of a spark of infection may determine an explosion at any moment, and then a conflagration becomes unavoidable.

BEGINNING OF THE EPIDEMIC.

It will be seen from the above table that altogether, in 1894, the total number of children registered as having been vaccinated was only 34; in 1895 the numbers ran up suddenly to 371. But it is significant of the unconsciousness as to the danger of their position in which the bulk of the community were slumbering that the number of public vaccinations registered during the year was only 23, out of 1,587 registered births. The balance of the 371 vaccinations is to be attributed mainly to the existence of cases of small-pox in the city towards the end of the year having become known to the medical profession, who began to exercise their influence to promote vaccination and re-vaccination. With

* This is stated to have been the case in Afghanistan hitherto, one-fifth of the children born each year being carried off by regularly recurring epidemics of small-pox. The Ameer has now decided to adopt vaccination.

the opening of 1896, the situation became rapidly more serious. During the month of January the number of cases of small-pox notified, which had only been 30 in the city and suburbs during the whole of 1895, ran up to over 50. By this time the isolation resources of the City Council, never very large, had become exhausted, and a number of cases had to be left in their own homes. Then began a race between the Council and the epidemic, the like of which has probably never been seen before. Under the influence of the strongly-expressed opinion both of the medical profession in Gloucester and of the citizens generally, the Sanitary Committee began to erect one temporary building after another on the site on which their original hospital was placed.

These buildings, constructed of iron lined with wood, were pushed on with all the energy that could be brought to bear upon the work in a city in which the conversion of iron and wood are two of the leading industries. And, as they arose one after the other, around the original hospital, on a site near the Midland Railway, the traveller, as he entered Gloucester from Bristol, could see, as he whirled by it, a small colony of low, grey buildings, with whitewashed roofs, which he learned on inquiry to be the small-pox hospital of Gloucester. He did not need to inquire as to the suitability of the site for such an appropriation. A glance was sufficient to satisfy him on that point. For, all around the hospital he could see the streets of new houses and semi-detached villas, which had been growing up there during the few previous years, and in which it was now, as it were, embowered.

INFLUENCE OF THE HOSPITAL.

Into this congeries of temporary buildings, with two large Board Schools and another large Parochial School all within less than half a mile of it, were deported upwards of 700 cases of small-pox during the course of the epidemic. Small need for wonder that the full force of the pestilence made itself first and worst felt in this portion of the city. Not, as has been erroneously stated, because the sanitary condition of this portion was any worse than that of the northern side of the city, for it is in some respects the better of the two, but because the chief residential portion of the city is on this side, and in the large population, teeming with children, in which the hospital was thus placed, it found a ready field for scattering its infection. That the hospital was, in more ways than one, a potent cause of the increase of the epidemic, is unquestionable; and it is only one of numerous illustrations of the general irony of the situation that, only a short

time prior to the outbreak, the Urban and Rural Authorities of Gloucester had agreed to a scheme for a joint hospital, to be erected at a point well outside the city, as a result of which the existing hospital would have been removed. Unfortunately, before anything was done in this direction, the storm burst, and then began the race before referred to between the City Council and the epidemic, the former pushing on, with unstinted energy, the erection of one new building after another, but always in the rear of the pestilence, until the epidemic began suddenly to collapse, and soon left the Council with as many empty beds in their hospital as they had previously wanted full ones. How rapid was the spread and decrease of the infection may be appreciated from the fact that in February the number of cases notified in the city and suburbs was 146, in March 644, whilst in April the high-water level of 744 was reached, from which time the numbers began steadily to decrease, until by the end of July the epidemic was altogether extinct.*

ARREST OF THE EPIDEMIC.

Now, an epidemic of small-pox, after acquiring the hold upon a population which that at Gloucester obtained, does not come to a sudden standstill and then rapidly die away altogether without a cause. The arrest was certainly not due to the effective isolation of the sick, for, out of somewhat more than 2,000 cases of the disease which were notified in the city and suburbs, only a little over 700 could be accommodated in the isolation hospital. It was not due to the exhaustion of the virulence of the infection, for severe and fatal cases occurred up to its close. If a fire breaks out in a town of wooden shanties, such as Chicago once was, it goes on burning as long as it can find anything to consume, and simply dies out when it can find no more inflammable material to devour. So it would have been with the Gloucester epidemic, if it had been left to take its course after it once got out of hand in regard to the matter of isolation. Instead of its ravages having been limited to somewhat more than 2,000 out of the 42,00 inhabitants, which the city and suburbs contained when it started, the number of cases would have been multiplied tenfold. Nor would the evil have ceased there. For it is certain that if it had gone on spreading as it was doing in April, the panic-stricken inhabitants would, as in the plagues of the Middle Ages, have forsaken the city wholesale, and have thus carried the infection to all parts of

* See diagram in Appendix.

the kingdom. What was it, then, that prevented this terrible catastrophe, and, at a juncture when the pestilence was advancing with rapid strides, suddenly paralysed its energies and rapidly brought it under complete control?

THE COUNCIL APPEAL TO THE DOCTORS.

To answer this question in a way that shall leave no doubt, we must revert to the early part of the year, when the citizens had begun to awaken to the serious nature of the danger with which they were threatened. By that time the existence of the epidemic was becoming generally known to the public outside Gloucester, and a boycott had begun to be enforced against the city. Under the prospect of the financial catastrophe which thus menaced them, the citizens appealed to the City Council to take more effective action in arresting the epidemic. The Sanitary Committee, as representing the City Council, in their difficulty as to what to do, appealed to the Gloucester doctors for counsel and advice. The doctors, in meeting assembled, unanimously declared that there were only two remedies of any value—the effective isolation of the sick, and immediate vaccination and re-vaccination for those who were not already properly protected against the disease.

For the accomplishment of the first of these objects, they urged the Sanitary Committee to at once enlarge the resources of the hospital; to realize the second, they called on the Board of Guardians to recognize their responsibilities in regard to vaccination.

Their advice was, in both cases, accepted and acted upon. The Sanitary Committee at once began to enlarge the hospital, as has been already told, and the Guardians soon gave evidence of a change of mind as regarded vaccination which would, a few months earlier, have been considered in the highest degree improbable. On March 24, at a meeting at which 53 Guardians were present, the Board resolved, by 31 votes to 22, "that the vaccination officers be and are hereby directed to carry out the provisions of Article 16 of the General Order of the Local Government Board of October 31, 1874, relating to vaccination, in accordance with the terms of the resolution of the Board of September 19, 1876."

HOW GLOUCESTER "GOT HOME" AT LAST.

In the nursery tale, with which we were all familiar in our childhood, the old woman was unable to get home because the dog would not bite the cat, and so on through a chain of incidents, each of which in its order was necessary to the

attainment of the required result. So it was in Gloucester. What was wanted was to stir up the Guardians, and to do this the roundabout process of stimulation just described had to be adopted. The public bit the Sanitary Committee; the Sanitary Committee bit the doctors, who in their turn bit the Guardians, with the result that it soon became evident that Gloucester would "get home" at last. The resolution rescinding that of February, 1886, was of itself a great achievement. By it the brake, which had for nine years been applied to the ordinary machinery for enforcing infant vaccination, was lifted. But something more needed doing. The machinery itself had grown rusty by so long a disuse. It required a good deal of pressure to overcome the inertia which had accumulated with each succeeding year, bringing with it more than a thousand new births; and this was no easy task. It was estimated that at least ten thousand children under ten years of age would have to be tracked and dealt with, if the juvenile population of the city were to be brought into as efficient a state of protection as they were in ten years previously.

THE GUARDIANS BEGIN TO MOVE.*

It was scarcely to be expected that the Guardians would at once unsheath the sword, with which the law had entrusted them, for the punishment of the contumacious. They naturally preferred to try first the more excellent way of persuasion. For it was not only the 10,000 unvaccinated children who needed protection, and whose parents could be, if necessary, coerced by the powers which the Guardians had now resolved to resume, but at least 20,000 adults, who were also in a more or less imperfectly protected condition, throughout the city. The problem which the Guardians had before them was, in fact, no less than the vaccination and re-vaccination of three-fourths of a population of about 42,000 persons. To this step they were urged not only by the advice of the medical profession in the city, but by the representations of the Local Government Board, who, on the application of the Guardians, sent down two of their most experienced medical inspectors to confer and advise with them.† The City Council had already attacked the problem on their own part by engaging a certain number of local medical men to visit different parts of the city, and to offer vaccination, free of charge, to all who wished for it. But it was felt that a more comprehensive and systematic effort was required, for which a special machinery would have to be created.

* The facts recorded in the following pages are mainly derived from the Report of the Vaccination Committee of the Board of Guardians.

† Drs. Franklin Parsons and Sweeting.

CREATION OF THE SPECIAL MACHINERY.

On April 27th the first step was taken for this purpose by the appointment of a Vaccination Committee. This Committee first secured the services of three experienced assistants to organize and take charge of the whole of the vaccination work. An office was then opened in a central position, eight qualified medical practitioners—seven gentlemen and one lady—were appointed to assist the public vaccinators, a staff of clerks and vaccination inquirers was engaged, the city and suburbs were mapped out into districts convenient for the purpose of inquiry, and the public were duly notified by various means of the arrangements which had been made. Within a few days of the opening of the campaign every house in the city and suburbs was visited, a vaccination census of the whole population was taken, the vaccinators were at once sent wherever their services were found to be required, and all who could be induced to avail themselves of the protection now brought to their doors had an opportunity of doing so.

The machinery thus called into existence was kept actively at work for two months, and by the end of June the whole of the city and suburbs had been effectually covered. The vaccination and re-vaccination of all who could be induced to voluntarily submit themselves and their children to the operation had been effected. In securing this result the employers of labour generally throughout the city gave valuable assistance; and though some of their employees resented the pressure that was put upon them to discard their prejudices for the public good, the great majority readily accepted the offer of free vaccination which was made to them.

EFFECT OF THIS EFFORT ON THE EPIDEMIC.

From first to last, upwards of 36,000 persons were vaccinated or re-vaccinated. A certain number of adults, it is true, still held out, but the great majority of the children had been brought under protection. The effect of this on the progress of the epidemic was conspicuous. The rapid increase of attacks which was going on up to the end of April, and had reached 1,580 cases, was arrested. This result was, no doubt, largely due to the effort which had been made before the appointment of the Committee by the medical practitioners of the city, by the City Council, and also by the public vaccinators themselves. But it was the organised machinery of the Committee which, by the system of house-to-house inquiry carried out, enabled the whole work to be consolidated and completed, brought the epidemic again under control, and, by the end of July, stamped it out altogether.

WISDOM IS JUSTIFIED OF HER CHILDREN.

Thus ended one of the most striking and instructive epidemics of modern times. Out of a population of a little over 42,000, approximately* 2,000 persons were attacked, 400 of them fatally, within a period of scarcely six and a half months, by one of the most noisome diseases to which humanity is liable. By the same cause, too, the commercial prosperity of a flourishing centre of industry was suddenly paralyzed, as it might have been by an earthquake or by any other incalculable visitation of Providence. But what gives peculiar interest to this calamity and makes it pregnant with instruction to other places which are similarly situated is that the advent of this visitation was not incalculable. The certainty of its arrival at some time or another had been officially predicted in warnings repeatedly addressed to those who were more immediately responsible for guarding against it.† Moreover, the disease itself is, in the practically unanimous opinion of all who have had anything to do with it, so completely preventible that there is no excuse, save ignorant prejudice and wrong-headedness, for its prevalence. Yet, by one of those anomalies of which our legislation contains so many illustrations, the responsibility of protecting the public against this special form of visitation has been divorced from all other branches of sanitary administration and left in the hands of an elective body quite unfitted, for obvious reasons, to deal with it.

And if, under the pressure of public opinion as well as of convictions which the force of circumstances could not fail to enlighten, the Gloucester Guardians have risen to the emergency with a zeal for vaccination which has been as conspicuous as their apathy was previously pronounced, their change of mind may, it is to be hoped, be reckoned to them for righteousness, but it cannot be quoted as a justification of the maintenance of an anomaly and an anachronism which abundant evidence in other places than Gloucester has shown to be in the highest degree prejudicial to the public good.

A THREE-FOLD MORAL.

Of the many interesting details of the Gloucester epidemic, of the suggestions with which it is pregnant, and of the misrepresentations about it which have been circulated, it is not possible here fully to speak. Some of them will be found in the Report of the Vaccination Committee of the Board of Guard-

* It is impossible to give the number of attacks with absolute accuracy, but they are believed to have been within a very few of this number.

† The Boards of Guardians of Gloucester and some other parts of the country. See "A Forecast and its Fulfilment" in Appendix.

ians;* others are dealt with in an Appendix hereto. But there are three points on which, in conclusion, it is desirable strongly to insist.

The first is that not only have the Gloucester Board of Guardians, who had for nearly ten years refused to carry out the duties imposed upon them by the legislature in regard to vaccination, re-considered their position and recognised their responsibilities by enforcing vaccination, but that the great bulk of the population of Gloucester have also been converted by the hard logic of facts and, have confirmed the judgment of their representatives by accepting vaccination for their children and re-vaccination for themselves. To use the concluding words of the Report above referred to: "from the general body of evidence which the Report thus contains it will be clear to every intelligent and unprejudiced person that whatever the views entertained by a considerable number of persons in Gloucester may have been up to the end of 1895 as to the uselessness of vaccination as a protection against small-pox, there can be no doubt now that the vast majority of the citizens are convinced of the error of the course pursued by all classes in neglecting vaccination as they did up to that date. Probably no record exists of so rapid, so extensive, and so momentous a conversion on any matter not directly connected with a question of religious belief. Gloucester, which in the year 1892 headed the record of badly vaccinated communities in England and Wales, showing a percentage of 86.9 children who had been born during the year and were not accounted for in the vaccination returns, is now, in regard both to its infantile and adult population, probably one of the best vaccinated towns in the Kingdom. But at what a cost has this conversion been achieved!"

The second point is that, by the light thrown by the epidemic upon the true opinion of Gloucester, the real strength of the small but noisy minority, who have for years, by an adroit system of manœuvres, imposed their will upon the majority, has been shown in its actual numerical insignificance. If the acceptance of vaccination in the hour of peril from small-pox, by pronounced anti-vaccinators, may be considered a proof of conversion, the unconvinced members of that body in Gloucester must be small indeed. Some leading anti-vaccinators have taken the disease and have died; others have had it in their houses, and have been vaccinated, together with their families; others have adopted this latter course without having such an excuse, as was the case with the

*To be obtained on application to the Jenner Society, Gloucester; price 3½d. post free.

original leader of the agitation, to whose position and influence as a journalist the success which the movement achieved is mainly due, who was himself re-vaccinated with all his family. Could any stronger proof be desired of the conversion which a sharp lesson in what another journalist has so appropriately called "Nature's School"* is calculated to effect? It is true that there are yet left in Gloucester persons who still maintain their disbelief in vaccination, and their determination to refuse it both for themselves and their children. How far this band of "stalwarts" will receive a new lease of life from the encouragement which they allege they have received from the views expressed by the Royal Commission, on the subject of compulsory vaccination, remains to be seen. Error always dies hard, and never more so than when it has been convicted of conspicuous folly, as it has been in Gloucester.

The third lesson which has enforced itself in Gloucestershire, and which, it is to be hoped, may carry its infection with it to all parts of the kingdom, is that those who believe in vaccination have a duty to perform, which cannot be discharged by sitting still and leaving everything to the law, even if Parliament should eventually decide to maintain compulsion in its present form. No law can be upheld unless it rests upon the intelligent conviction of the large majority of those who are to be bound by it; and that conviction can only be secured by educating the subjects of it to appreciate the force of the evidence upon which the necessity for it is based. The influence which the opponents of vaccination have acquired in Gloucester, as elsewhere, has been gained by a persistent and systematic misrepresentation of some facts, by the exaggeration and perversion of others, by appeals to sentiment founded on ignorance and misstatement, and by the assertion of a right on the part of the individual to imperil the welfare of the community at large, on so-called "conscientious" grounds, which does not exist. How far it may be desirable, as a mere question of expediency, to make concessions to individual wrong-headedness in this matter, is a problem which it will be for the Legislature to solve. But, whatever may be our views upon this point, there is one thing in which we must all agree, and that is the need for at least as much activity and enthusiasm in educating the public in the evidence on which the case for vaccination rests, as its opponents have shown in misrepresenting it. It may take time, and it will, unquestionably, require organization and funds, to counteract the agitation against vaccination which the Anti-Vaccination League has set itself to carry on

* See *The Spectator* for 29th Aug., 1896.

in all parts of the country. For, it must be remembered that, although the professed object of the League is only to abolish compulsion, its real work, and that on which alone its existence can be justified, as its whole action proves, is to shake to its foundations the faith of the community in vaccination itself.

In such a matter as this there is, as the *Times* remarks, "no rational middle course. A natural law must be obeyed or broken, and all who break it must be prepared to accept the consequences. If vaccination and re-vaccination, properly performed, affords security against small-pox, then vaccination and re-vaccination ought to be enforced. If vaccination does not afford security against small-pox, then it ought to be discontinued. The decision of the question, whether or not the security is afforded, cannot be left to the ignorance to which politicians and agitators alike too often find it convenient to appeal." It is to the eradication of this ignorance that every right-minded citizen must direct his efforts, with as little delay as possible.

WHAT LIGHT DOES THE EXPERIENCE OF GLOUCESTER THROW UPON THE VACCINATION QUESTION?

Before we can answer this question satisfactorily we must first settle what is the Vaccination Question. Unless we are clear upon this point any discussion of the subject will be futile. We shall be only beating the air.

Fortunately we have an authoritative guide in this matter in the Report of the Royal Commission. The Vaccination Question is three-fold: (1) Does vaccination reduce the risk of and mortality from small-pox? (2) If so, are the dangers incident to the practice of it such as to out-weigh the benefit which its protective powers confer? (3) If not, should the practice of it be enforced, and if so, on what conditions?

With the latter two forms of the question we need not concern ourselves. They have been fully discussed by the Commission, and though the experience of the Gloucester epidemic does throw light upon them, its bearings on these points can be more conveniently postponed until another occasion.

In regard to the first form of the question, the advocates of vaccination maintain that successful vaccination does protect from small-pox, and, therefore, does reduce its prevalence; that even when it does not absolutely prevent an attack of the disease it materially reduces its severity, and, therefore, its fatality; but the extent to which it produces these effects depends, as Jenner himself insisted, upon its being "duly and efficiently performed."

The opponents of vaccination, on the other hand, declare that vaccination is "a fraud," "a degrading practice," "a filthy superstition," and repudiate its exercising any influence either in protecting against small-pox or in modifying the severity of the attack should it occur.*

*Reference is made here to what is commonly maintained by anti-vaccinators in publications of all kinds. One at least (Professor Crookshank) has been constrained to admit that vaccination has a protective power. Even the two dissentient Royal Commissioners expressly refrain from denying any protective power to vaccination. They say "Even if vaccination were a more effective and trustworthy prophylactic than we hold it to be"; and speaking of the immunity enjoyed by re-vaccinated nurses in small-pox hospitals, they say "We are compelled to conclude that (it) cannot be wholly accounted for by the fact that they have been re-vaccinated." So far as Dr. Collins, who alone of the two dissentient Commissioners can speak with authority on this subject, is concerned, there is no evidence that he has ever uttered or written a word which could be quoted as implying that he does not believe in vaccination as having some protective power against small-pox.

This is the issue. What light does the experience of Gloucester throw upon it. The experience has cost a good deal to those who have had to buy it. It would be hard if it did not give us some help towards the solution of a dispute in which one of these two wholly incompatible views of the matter must certainly be wrong.

But before we can examine with advantage the evidence of Gloucester on this subject, we must be also clear about what is meant by the "due and efficient" performance of vaccination.

The term officially used in regard to the vaccination of a child for which a public vaccinator is entitled to claim payment from the national funds is "successful." Are not "successfully" and "duly and efficiently" the same thing? By no means. A child may have been "successfully" vaccinated, and the vaccination will certainly protect it for a time against catching small-pox; but, for how long it will do so, and how far, if the child, when it has grown into youth or more advanced age, and may happen to catch the disease, will be protected against its severity, will depend upon the "efficiency" with which the operation has been originally performed, and the protection first obtained has been since maintained. A little explanation may be desirable upon this point, as it is one which is not generally appreciated as it ought to be.

THE DIFFERENCE BETWEEN "EFFECTUAL" AND "SUCCESSFUL" VACCINATION.

When the idea first suggested itself to Jenner, the discoverer of vaccination, to test the alleged protective powers of cow-pox against small-pox, by inoculating some lymph from a cow into a human subject, he found, on repeating experiments in this direction, that he obtained different results. In some cases he obtained no result at all. In others he observed that a peculiar bleb or *vesicle* gradually developed itself on the spot where the lymph had been inserted, which reached its maturity on the eighth day and then faded away. In a third set of cases he obtained a vesicle which was less characteristic. In the first two of these conditions further experiment showed that the cause of the difference was clear. Where the vaccination failed, the person operated on was found to have had either small-pox or cow-pox before. Jenner concluded, and rightly, that such a person was protected, or as we now say, *immune* against vaccination. Where the characteristic vesicle was produced, it was invariably in a person who had not had either affection.

It was the production of this vesicle which constituted in Jenner's eyes, and still constitutes in the opinion of all authorities the "success" of the operation. It was not because the operation was assumed to be successful in protecting the individual operated on from catching small-pox. No one, of course, could tell whether this would be so or not, until he died. If he died without catching small-pox, it might perhaps have been assumed with some probability that he had been successfully protected; but not with certainty, as he might never have been exposed to the infection. But this was not the sense in which Jenner used, and we still employ, the word.

Jenner did, however, endeavour to satisfy himself as to whether the operation was likely to be successful in the sense of effectually protecting the vaccinated person against small-pox. He did this in two ways. He exposed persons whom he had successfully vaccinated to the infection of the disease, by causing them to sleep with those who had it, and in other ways. The result confirmed his expectations. They remained unaffected. He went further. He inoculated them with the actual infected lymph of a person who had the disease, just as persons were then inoculated to give them small-pox. They still remained unaffected. These experiments which Jenner himself first made were subsequently repeated by doctors to whom he communicated his discovery, in various parts of the kingdom, with results that confirmed the accuracy of Jenner's observations.

It is not unnatural that Jenner, and those who thus followed in his steps, should have inferred that, as the persons whom they thus vaccinated were so conclusively protected against catching small-pox, the protection would be also a lasting one; and they were reasonably confirmed in this impression by knowing that one attack of small-pox was commonly supposed to give a life-long protection against another attack. In the earlier days of his experience Jenner did, unquestionably, commit himself to the assertion that a single vaccination would protect throughout life. But, before he died he saw reason from his subsequent experience to satisfy himself, as others by that time had also done, that although the effect of one efficient vaccination might indeed protect effectually, and would certainly make itself, to a greater or less extent, felt throughout life, it generally lost the fulness of its protective effect by degrees as years passed by. The larger experience of the many thousands of observers who have studied this subject since Jenner's time has confirmed the conclusions to which Jenner thus came, that a

successful and efficient vaccination will, in the great majority of cases, give as good protection as an attack of small-pox itself gives, *for a certain time*, since neither of them can be reckoned on to give absolute protection against attack or even against death for the rest of life.

The opponents of vaccination do not hesitate to charge Jenner with dishonesty, because at the outset of his inquiries he claimed for vaccination a protective power which he learned by fuller experience it did not fully possess. But Jenner was not the first nor the last discoverer who has been led by sanguine enthusiasm to over-estimate at first the value of his discoveries; and it must be admitted that the success which he met in his demonstrations of the perfect protection vaccination gives in the vast majority of cases, for some years at any rate, after the operation, is no small excuse for the somewhat hasty jump which he made to the conclusion that the protection would last undiminished through life.

There is another fact which goes far to explain and justify Jenner's over-estimate of the protective value of vaccination. He naturally formed his opinion as to the protective effect of intentional inoculation of vaccine lymph by what was then believed about that of accidental inoculation of cow-pox from the cow itself, by milkers, who all believed that it gave protection against small-pox through life. And so it probably did in most cases. For the persons who were ordinarily thus affected were adults, men and women who had passed the stage of youth when the enfeeblement of infantile vaccination becomes most marked, and who, when thus accidentally inoculated, were in much the same position as persons of the same age now are when re-vaccinated. To compare the durability of the protection of infantile vaccination with theirs was to apply an unduly severe test to the former operation. This distinction could scarcely be expected to present itself to Jenner as it does to us, who have accumulated an amount of experience on the subject which he could not possibly have acquired.

The "success," then, which is the indispensable condition of a vaccination that is to be of any value for protective purposes, consists in the production of at least one characteristic vesicle as the result of the operation. Wherever such a vesicle is produced it is reasonable evidence of two things; one, that if the person on whom it is produced had been exposed to the infection of small-pox he would in all probability have caught it; the other, that if he is subsequently exposed to the infection he will not catch it.

But, say Jenner's critics, "Is he certain not to do so?" It has been said that there is nothing certain in life except death and the tax collector. Assuredly, the probability that a person who has been successfully vaccinated will not take small-pox for some years after he has been operated on is of such a high degree that it almost amounts to certainty; and anyone who may be in doubt on this point has the satisfaction of knowing that he can easily determine for himself the efficiency of the protection which he enjoys. He has only to be vaccinated again. If the new vaccination "takes" he has good ground for assuming that, to say the least, his previous vaccination was not "effectual." But, if it fails, is he justified in considering himself immune? That depends. Here arises one of the complications of vaccination as it has come to be practised in recent years. Wherever the vaccine lymph is taken direct from the calf or from the human subject, there is scarcely any room to doubt that, if it fail, in competent hands, to raise a "successful" vesicle, the failure may be taken as a proof of the immunity not only against cow-pox, but also against small-pox, of the person operated on. But where "stored" lymph is used—that is lymph that has been "preserved" in any way, or kept for any time, whether it came originally from the human subject or from the calf—there is always a degree of uncertainty as to whether it may not have lost some or all of its efficiency by keeping. The practice of vaccination by stored calf lymph loses much more from this source, in the way of uncertainty, than it gains in the avoidance of alleged dangers from the employment of human lymph; and until calf vaccine stations, from which the lymph can be obtained for immediate use, can be more widely established than they are at present, every person who desires to ensure the largest amount of effectual protection will do well to avail himself of human lymph, taken directly from a subject above suspicion, wherever it is practicable to do so.

The production, then, of a single characteristic vesicle constitutes "successful" vaccination; and it guarantees, if not at once, at any rate within the course of a few days, protection against an attack of small-pox, which is so nearly certain, that for all practical purposes it may be considered so. Of all the children who were vaccinated for the first time "successfully" in Gloucester during the recent epidemic, not one case is known to have been attacked by small-pox after a sufficient interval, to exclude the possibility of its having been infected before being vaccinated. Many cases are alleged to have been attacked after recent vaccination, but they have

not stood the test of careful inquiry as to their having been "successfully" vaccinated.

But the fact that his vaccination is "successful" is not the only point on which the person operated on is interested. He naturally desires to know how long that protection will last. Jenner, as we have seen, thought in the early stages of his inquiries that it would last indefinitely, but maturer observations convinced him that he was wrong, and, like the honest man that he was, he frankly admitted his mistake. For nearly one hundred years the advocates of vaccination have fully recognised the fact that the protection conferred by vaccination is limited both in point of time and in the degree of its efficiency; but anti-vaccinators appear to think that they can score something by continually reiterating the statement that though Jenner at first claimed permanency for the protection given by a single vaccination, it is not permanent. If their cause were a stronger one than it is they would hardly attempt to make capital out of so obviously feeble an argument.

CONDITIONS OF IMMUNITY.

To return, however, to what is much more important, *viz.*, the conditions which affect the permanency of the protection given by vaccination, and which, therefore, determine its *efficiency*. They are mainly two. First, the amount of the dose of vaccine administered. In the case not only of all ordinary medicinal agents, but of animal products, which are comparable in their actions with vaccine, such as the poison of serpents, bees, &c., the effect is proportionate, as a rule, to the dose. So it is with vaccination, within certain limits. A person on whom two vesicles are raised receives a larger dose than if only one were raised, and so on up to at least four or five. It is true that in this consideration the size of the vesicle counts for a good deal; one large vesicle having as much effect as two small ones. But abundant experience has shown that with from four to five fair-sized vesicles the protection conferred is so effectual that it need scarcely be desired to better it. This is a matter which clearly rests entirely between the patient and the doctor. In the case of public vaccination the doctor is required, as a condition of payment by the Government, to vaccinate in not less than four places, and the result has been that persons who have been vaccinated by the public vaccinator as a rule succumb to small-pox less frequently and, when they do, take the disease less severely than those who are vaccinated by private practitioners, who too often are induced to defer to the foolish prejudices of mothers against having more than one or at most two "marks."

VALUE OF SCARS AS A PROOF OF VACCINATION.

And this leads to the need of a few words on the value of scars as an indication, not only of vaccination itself, but of successful vaccination, as it has been made the basis by the opponents of vaccination of objection to a large proportion of the statistics on which the evidence for vaccination is founded. This is a matter in regard to which the evidence is very conclusive. The statistics of many thousand cases do unquestionably show, that the characteristic scar which a good Jennerian vesicle leaves behind it is, in the immense majority of cases, indelible for life, and that it can, therefore, be relied on as evidence of the fact that the person has been at some time successfully vaccinated. It is contended by the opponents of vaccination that the statistics of alleged "unvaccinated" persons who have been attacked by small-pox are unreliable, because the mark may be obliterated by age or may be concealed by the eruption of the disease itself. The answer is very simple: this is essentially a matter of observation and experience, and the observation and experience of a large body of authorities all over the world concur in proving that this contention has no substantial foundation. Occasionally, there may be room for doubt whether there is evidence of a mark or not, but such cases are very exceptional; and a large accumulation of evidence which has been gathered on this point shows that a person who has no clear mark must be assumed, for practical purposes, to be unprotected, whether he has gone through the operation of vaccination or not.

When anti-vaccinators can produce anything like a similar body of opinion in support of their objection it will be deserving of more attention than it is at present.

The second of the two conditions which affect the permanency of the protection given by vaccination, as has been above indicated, is *time*. In proportion to the lapse of time after a successful vaccination will its "efficiency" become diminished. The effect of this enfeeblement appears to be more perceptible in early than in later life, due, probably, to the greater activity of the changes in the tissues, and in the constitution generally, in childhood than in adult life. Hence the need of renewing the protection of infantile vaccination at least once subsequently. If this be done about the age of twelve, it will be desirable to test the condition of protection once in later life. If, however, the re-vaccination be postponed until later life, and the operation be effectively performed, the protection may be considered permanent, as that of an attack

of small-pox after childhood is, and as was the case with accidental vaccination of milkers in Jenner's time.

We are now in a position to approach, with a prospect of a satisfactory answer, the question with which we started, what light do the statistics of the Gloucester epidemic throw on the Vaccination Question? Or, to put the question as precisely as possible, how far do the Gloucester statistics confirm, or the reverse, the contention of the advocates of vaccination, that the evidence accumulated during the last hundred years has abundantly proved the correctness of Jenner's assertion that vaccination "duly and efficiently performed" may be expected to give as much protection against small-pox as an attack of the disease itself is known to confer? Before giving the statistics themselves it may facilitate their appreciation if we first inquire what answer we should expect to receive to our question if the statements above made as to what constitutes due and efficient protection be correct.

NATURE OF THE EVIDENCE.

The evidence of the Gloucester epidemic is of two kinds, positive and negative. The positive evidence is of this kind: a certain number of persons caught the disease; some of them were unvaccinated, others were vaccinated. If we could ascertain the precise relations between the numbers of these two classes and those of the same classes in the whole population at the time of the outbreak, we should have satisfactory evidence as to what influence, if any, vaccination had exercised on the vaccinated class. But it is not possible to ascertain these relations with precision, because we have no exact statistics on this point. We may make an approximate estimate, but it is, of course, open to question. We have, therefore, to look for better evidence in another direction, and that is in the relations between the two classes themselves, in regard to their ages and to the severity of their attacks, to see how far they support the contention of the supporters of vaccination or not.

The negative evidence is of a different kind, and does not lend itself so easily to numerical expression, being rather a question of probabilities, founded upon the general consideration of a large number of facts. It is of this kind. A certain portion of the population were vaccinated for the first time after the commencement of the outbreak, others were re-vaccinated. What evidence is there as to how many of these two classes respectively took the disease, and what are the probabilities that others of them who did not take it were protected by vaccination? If the vaccination theory be true,

few, if any, of these two classes ought to have taken it. If a large number of persons are known to have been vaccinated and re-vaccinated during the course of the epidemic, and especially during the early part of it, and few, if any, of them took the disease, it would be evidence of the highest degree of probability that the rest of the members of these two vaccinated classes had been protected by their vaccination. It is true that this evidence is negative; but negative evidence is often more convincing than positive, especially when it is cumulative. It is the cumulative character of the evidence in favour of vaccination generally which constitutes the true strength of the case in its favour. It is not difficult to take one section of the case and to show that there are weak points in it, and by exaggerating these, one after another, or by an isolated presentment of them, to give a false impression of the relative strength or weakness of the case as a whole. This is a common device of all polemical attacks, and it is a very effective piece of strategy when the object is to impress ignorant persons, who have neither the means nor the capacity to view the question at issue from a sufficiently elevated standpoint to appreciate the true perspective of all its details. Generally, this fallacy is probably an unconscious one, being practised by persons who are themselves devoid of this sense of perspective, and who unintentionally exaggerate these relations of detail, and, like the distorting mirrors to be seen occasionally in the shop windows, throw into a relief which is so excessive as to be grotesque, features that are naturally of very subordinate importance.

Taking, then, the positive evidence which the Gloucester epidemic affords, what would an unprejudiced inquirer expect it to prove, if the vaccination theory be correct?

In the first place, looking at the fact that in Gloucester, even with its ten thousand unvaccinated children at the commencement of the epidemic, that portion of the population which had been vaccinated in infancy and had passed beyond the age when the protection of infantile vaccination begins seriously to fail, so largely exceeded, even at that date, the unvaccinated element, he would expect to find that in point of numbers the attacks of vaccinated persons exceeded in some proportion those of the unvaccinated. Moreover, this expectation would be materially strengthened when he learned that at least half of those ten thousand children had been brought under the influence of vaccination before the epidemic had reached its point of greatest intensity, so that the proportion of vaccinated persons over ten years of age to those of every age who were wholly unvaccinated would be greatly increased.

We should thus have a large number, probably not less than 25,000, more or less imperfectly protected persons, and a much smaller number, probably not more than five thousand at the outside, of entirely unprotected persons, who would be liable to attack.

But there is another important consideration in connection with this point. The unprotected persons would be mainly children under ten years of age, and the majority of them probably under five years. Such persons are much less liable to be exposed to the risks of infection than older persons, who by their business or other avocations are constantly mixing with their fellows. As a rule, the places where children would be exposed to infection would be their homes, at school, or at a place of worship, or in walking to and from these places. The localities where small-pox infection is probably most commonly distributed (apart from aerial diffusion from hospitals or infected houses) are public conveyances, shops, places of public entertainment (including fairs, fetes, &c.) and workshops. When small-pox infection is distributed through a School, it is by such rare accidents as those which suddenly lit up the epidemic in Gloucester.

From all these considerations it is evident that even in a city like Gloucester, where, during the course of the epidemic, there was an abnormally large proportion of entirely unvaccinated persons, that section of the community who were more or less imperfectly protected by vaccination in infancy only, must still have been largely in excess, and would, therefore, be reasonably expected to predominate in the numbers of attacks. Of course, in epidemics in towns where infant vaccination has been fairly maintained, the disproportion between the vaccinated and unvaccinated would be greater still.

WHY THE VACCINATED ARE CHIEFLY ATTACKED.

That this should be so is no argument against the efficacy of vaccination, as its opponents constantly allege, but a confirmation of the position which has been maintained by the advocates of vaccination for a long time past, that those who have been vaccinated in infancy only, however well they may generally be protected up to and even beyond youth, do certainly though gradually lose their protection, and if exposed to infection from small-pox, run a risk of catching it, which increases with their years.*

* Such persons might not inappropriately be designated "devaccinated," on the analogy of such words as degenerate, deficient, &c., and their condition in regard to immunity indicated by a term that is less open to misconception than "vaccinated," which simply expresses the fact that they have at some previous time been protected.

If this contention be true it is obvious that, proceeding further in our expectation of what we ought to find, we should discover that the liability to attack amongst the vaccinated increased with age, and that the proportion of attacks at advanced ages to the numbers of persons at those ages who were liable to be attacked would be much greater than at earlier ages. For instance, if we take any one thousand persons promiscuously we shall find a much larger number of them between 1 and 10 years of age than between 40 and 50; say, for the sake of argument, that there are four times as many. Then it is obvious that, other things being equal, and if vaccination exercised no protective influence at all, there would be four times as many vaccinated persons attacked between the ages of 1 and 10 as between those of 40 and 50. It is true we should have to make some allowance for the lessened risks of exposure amongst the younger portion of the population, as suggested above, but there would still be a large excess of the less aged members of this class.

There is, moreover, still further evidence which the figures of the age incidence of attacks ought to supply, and that is as to the duration, generally, of the protection against attack which infantile vaccination gives. If, for instance, we find that the proportion of vaccinated persons under ten years of age who are attacked is a very small one we should be justified in concluding that the protection given by vaccination up to ten years of age is proportionately high. And the importance of this consideration is the greater because it is from this source that we can obtain the most conclusive information as to the duration of the protection which vaccination gives. As we cannot now inoculate people with small-pox, as could be done in the time of Jenner, to test whether they are protected by vaccination or not, we can only infer the extent of their protection from what the statistics of small-pox in relation to vaccination on the one hand, or the experimental test of the result of re-vaccination on the other, tell us.

EVIDENCE FROM SEVERITY OF ATTACKS.

Leaving the consideration of mere numbers of attacks, what should we expect to find in regard to the relations of severity of attacks in the age relation of the two sets of cases? Obviously if, as the advocates of vaccination assert, in cases where vaccination in infancy does not entirely protect against attack, it mitigates severity, we ought to obtain some evidence of this fact in the statistics.

But how are we to test the *severity* of individual attacks? We cannot express it directly in figures, except, perhaps, by

estimating the number of persons who are pock-marked or blinded, which would be very difficult, and the figures would be open to a great deal of cavil. There is, however, a way in which we can with absolute certainty express the severity of the attacks as a whole numerically, and that is by a comparison of *deaths*. For death is the highest measure of severity of attack. If a person dies from small-pox we are quite safe in assuming that the severity of his attack was of a high degree, and that, in any large number of cases it was much higher in those who died than in those who lived.

Hence, then, we should expect our statistics to show us an increasing mortality in the vaccinated cases as age advanced. This fact would be the strongest proof of the protective value of infantile vaccination we could have. For even, if vaccination in infancy does not guarantee us protection throughout the whole of our lives against small-pox, it is a great gain if it does, in a large degree, guarantee us against a severe attack, and, above all, if it can protect us against death.

There is a form of evidence on this point which cannot be expressed numerically, but can only be gathered from the general consensus of opinion in regard to it, and that is the impression made on those who have come largely into contact with small-pox in hospitals and elsewhere. If that be taken, it will be found that the impression formed by those who have had such experience is almost, if not quite, without exception, that vaccination in early life greatly mitigates the severity of an attack, as measured by the suffering of the patient, and by the disfiguration which is produced by it.*

Such, then, are the expectations with which an impartial and unprejudiced person would enter upon an inquiry into the statistics of the Gloucester epidemic, if the contention of the advocates of vaccination as to the nature of its protective power be correct. Let us see how far they are justified by the facts.†

* See letter of Rev. H. Proctor on this point in the Appendix.

† It may not be out of place here to refer to the opinions on the subject of the statistics of epidemics of small-pox generally, which have been expressed by perhaps the most moderate and least disengenuous of the writers on the anti-vaccination side. In his work on "The Vaccination Question," published in 1895, Mr. Arthur Wollaston Hutton thus writes—"It is the absence of any definite relation between the decline of small-pox and the use of vaccination which we affirm; and this absence of any definite relation is illustrated, *as clearly as anything can be*," (the italics are not in the original) "by the reckless disregard for vaccination which epidemics are found to manifest as they come and go, if only the figures are allowed to tell their tale." p. 58.

Again; "That there is no relation between the use or disuse of vaccination and the presence or absence of small-pox of such a character as to

THE STATISTICS OF THE GLOUCESTER EPIDEMIC, AND WHAT THEY PROVE.*

The circumstances under which the epidemic occurred have any scientific value, is further shown by quite recent experience in our own country."

* * * "On the whole, we are pointed to the conclusion that where there is least vaccination there is least small-pox." p. 66.

Further: "Special prevalence of small-pox ought to be the result of neglect of vaccination, which is popularly supposed to act as a kind of bulwark, shutting the disease out; and especially marked neglect of the great preservative ought to be followed by a small-pox epidemic. But, what are the facts? What do the figures show?" p. 67.

When Mr. Hutton wrote these words he probably had little anticipation that the chapter of accidents would so soon present an opportunity of testing, in an exhaustive way, their accuracy. He and other writers on the same side have made a good deal of the cases of Leicester, and other towns in which there have been moderate epidemics of small-pox, which have not escaped control, as that at Gloucester did; it will be interesting to see how they will "face the music" of the Gloucester statistics. Possibly, if Mr. Hutton's ingenious but sophistical work should go to a second edition he may feel it expedient to cut out or modify the following passages:—

"If these statistics" (of Leicester and some other towns which have been lucky enough as yet to escape the experience of Gloucester) "prove anything, they show that neglect of vaccination has involved no special disaster." p. 70.

"It (Leicester) is an excellent instance to adduce of the *now undeniable fact*" (the italics are not in the original) "that even at a time of small-pox epidemic, the disease does not of necessity spread amongst an unvaccinated population." p. 71.

"If an epidemic does come, vaccination is seen to be powerless." p. 80.

Nor will Mr. Hutton probably be desirous of giving further publicity to the hope that "there may be nothing like a serious epidemic of small-pox during the time that the question of compulsory vaccination is being considered by Parliament." Was ever the earnest desire of a petitioner to Providence more contemptuously flouted by events? In a note on "The Net Result of the Royal Commission," Mr. Hutton puts in a plea for that much-vituperated body, to the effect that its leisurely procedure will have achieved "one most important—possibly the most important thing, viz.: the advent of the "psychological moment," when the British public will be willing to give a fair consideration to the evidence against the practice of vaccination." "They who watch the signs of the times," Mr. Hutton continues, "can see clearly that such a moment of enlightenment is coming to the British public generally. Perhaps it will come in the course of 1896." Was ever forecast more unlucky in its fulfilment? The "psychological moment" has come, in the shape of the Gloucester epidemic, and it will be interesting to learn what Mr. Hutton thinks of the way in which Providence has answered his prayers, and also whether the enlightenment which the B.P. is receiving through the experience of Gloucester is precisely the kind of illumination which is likely to lead it to court many more such disasters, by allowing its parochial administrators to ignore the teachings of the last hundred years, which the experience of Gloucester has once more emphatically accentuated.

* For the materials of this portion of the story I have to express my obligation to Dr. Campbell, Medical Officer of the City of Gloucester, who has kindly placed his records of the epidemic at my service.

were, fortunately, such as enabled the facts connected with it to be recorded with an accuracy that leaves no room for such cavil, as has arisen in the case of some other previous epidemics. The official records of the local authorities have been checked by an independent investigation, made by an expert deputed for the purpose by the Royal Commission on Vaccination. The difference between the results arrived at by these two inquiries is so inconsiderable that it may be disregarded.

Taking the period from the 15th of June, 1895, when the first case occurred, until the 25th of July, 1896, when the last was recorded, the total number of cases of small-pox in the city and suburbs* was 2,035.

Of this number 1,979 were in the city proper, and 56 in the two suburbs, which are practically identical with the city, but are under the sanitary administration of the Gloucester Rural Authority.

Several questions suggest themselves in reference to this number of attacks. The first is, what were the relations between it and the total number of persons liable to be attacked? This will give us an estimate of the *Severity of the Epidemic*.

The total population of the area involved may be taken at about 42,000. This gives practically one attack for every 20·6 of the population, or approximately 5 per cent. If the epidemic had lasted for a much longer time than it did, this proportion would have been a sufficiently severe one; but when it is remembered that, as the diagram given in the Appendix clearly indicates, its intensity was concentrated in a period of about three months, it appears that its severity much exceeded that of any British epidemic of modern times, except, perhaps, that at Willenhall, in 1893-4.†

The first consideration to which we have to direct our attention in the Gloucester statistics is

* By the "suburbs" is intended that portion of the Gloucester Rural District which is in direct contiguity with the city, and is included in Districts 11 and 13 of the Vaccination Survey hereafter referred to.

† The relations between the recent epidemic and that which occurred 23 years ago in Gloucester, as well as with that which occurred in 1894 in Willenhall, will be dealt with later on.

THE RELATION OF VACCINATED TO UNVACCINATED.

This is shown by the following numbers :

Vaccinated in infancy	1208
Unvaccinated	789
Uncertain	38
	2035*

The "uncertain" figures represent a small number of cases about which no information at all, or none of a satisfactory character, could be obtained. This number is relatively so small that it may be disregarded altogether without materially affecting the main issue.

As to the unvaccinated cases, there cannot be much doubt about the accuracy of the record in the great bulk of them, as no less than 699 out of the 789 were under 10 years of age, and there was no difficulty in obtaining satisfactory evidence that they had never been vaccinated.† In the great majority of the remaining 90 cases the evidence was obtained from the statements of the patients themselves or their friends.

Nor is there any need to discuss the accuracy of the number of vaccinated persons who took the disease. That must be assumed to be correct, unless we admit the accusation which anti-vaccinators so generally make in regard to all statistics that are unfavourable to their views, that they are specially "cooked" for the purpose, by the fraudulent inclusion in the unvaccinated class of cases which should be tabulated as vaccinated, and that all who compile them are in a conspiracy to impose upon the public. Indeed, this plea of conspiracy is the foundation on which a great portion of the case against vaccination mainly rests. For not only is it one of the stock allegations of anti-vaccinators that the evidence as to the relative numbers of vaccinated and unvaccinated attacked in outbreaks of small-pox is systematically falsified in order to support the vaccination case, but that the medical profession, the press, men of science, and hospital and Government officials are all combined in a huge conspiracy to impose upon

* The numbers given above include 31 cases which occurred in 1895, from June to the end of the year. During this period there certainly was no "epidemic" in the ordinary sense of the word. But it has been thought better to include the whole of the cases in the tables.

† It is necessary to state here that no case has been included in the "vaccinated" series which was vaccinated less than one month before the recognition of the disease. This period might, perhaps, be lessened by a few days; but, for the sake of simplicity in tabulation as well as for other reasons, which will commend themselves to those who are familiar with these matters, the round period of one month has been adopted.

the public a superstition which they do not themselves believe and which most of them have no interest in maintaining. It is true that it is also asserted that the doctors have an interest in the maintenance of vaccination, though they allege that they have not, and that the profession as a whole would gain more by the entire abolition of vaccination than they do by its enforcement. Anyhow, so long as doctors continue to show sufficient faith in this "superstition" to vaccinate both themselves and their families it must be admitted that their credulity is some guarantee for the honesty of their action. Anti-vaccinators cannot ride upon two horses in this matter. Doctors may be assumed by them to be either rogues or fools—they cannot well be both.

From the above numbers it appears that if we disregard the "uncertain" cases, the vaccinated form a little more than 60 per cent. of the whole.

WHAT DO WE MEAN BY VACCINATED?

Now it is at this point that the case against vaccination appears at first sight a strong one. It is said "the attacks of the vaccinated are to those of the unvaccinated as 3 to 2: this proves that vaccination is useless as a protection." But does it? Before we should be justified in arriving at this conclusion, we should have to prove in the first place that the numbers of these two classes in the population of Gloucester as a whole, and the relative risks of their exposure to infection, bore the proportions of these numbers to one another. It is certain that they did not. The number of those who had been vaccinated only in infancy in Gloucester at the commencement of the epidemic was probably at least three times as great as that of the unvaccinated. Then we should have to make an allowance of some kind for the greater liability of vaccinated adults to exposure to the risk of infection than was the case with the unvaccinated, who were mainly children. So that, even if there were no other consideration involved, these numbers would show that vaccination in infancy has some protective value; because fewer vaccinated persons were attacked than might have been reasonably expected, if vaccination exercised no protective influence at all. But, as has been already pointed out, the argument altogether breaks down when we remember that "vaccinated" in this table means "vaccinated only in infancy," and that if the majority of these so-called vaccinated cases were, as it will be seen presently was the case, adults, they had lost the greater part of the protection which their infantile vaccination had originally conferred upon

them. They were like savages defending themselves with small shields against a deadly rifle-fire. As the French general observed of the Balaclava charge—"It may be very brave, but it is not war."

It is obvious, therefore, that so long as the opponents of vaccination persist in assuming that the word "vaccinated" implies a belief on the part of its advocates in the uniformity and the continuity of the protection conferred by it, so long can there be no common ground of discussion as to the value of these or any other statistics of the kind. A debate in which a leading term is used in two incompatible senses by the two parties to it is a mere waste of time. It is an essential condition of any attempt to appreciate the lesson which these statistics teach that this limitation of the term should be borne in mind.

The information, therefore, which the above table gives us, is very small. All that it really tells us is that, of the whole number of persons attacked during the epidemic, a certain proportion had never been vaccinated at all, and a somewhat larger number had been vaccinated only in infancy. Beyond this, we can draw no certain conclusion, though there is a high degree of probability, from other considerations which have been referred to above, that that portion of the population which had been vaccinated only in infancy came off much lighter in regard to the proportion of them which was attacked than did those who had not been vaccinated at all. To get to the bedrock of this matter we have to go deeper still, and to ascertain what were the ages at which these two classes of the community were chiefly attacked, and also what was the relative severity of their attacks.

The real strength of the evidence which the Gloucester epidemic affords in support of the protective value of vaccination is not reached until we dissect these crude numbers of "vaccinated" and "unvaccinated" cases, which is done in the following table of the

AGE INCIDENCE OF THE ATTACKS.

				Under 10 years.	10 to 20 years.	20 years and over.	Total.
Attacks	Vaccinated in infancy	..	..	23	269	916	1208
	Unvaccinated	..	..	699	51	39	789
	Uncertain	..	..	1	2	35	38
				723	322	990	2035

The relations of these figures will be made more striking by stating them as percentages of the total numbers.

	Under 10 years.	10 to 20 years.	20 years and over.	Total.
Vaccinated in infancy ..	1.9	22.2	75.8	59.3
Unvaccinated ..	88.6	6.4	4.9	38.7
Uncertain ..	2.6	5.2	92.1	1.4
	35.5	15.8	48.6	99.4—9

Leaving the "uncertain" cases out of consideration, though it would appear probable from the relations of the numbers that most of them belonged to the "vaccinated" class, what is obvious from a first glance at the other two series of numbers? Why, that though in both cases there are fewer people living to be attacked as age increases, the more the age increases in the "vaccinated" class the greater the number that are attacked, whilst in the "unvaccinated" class it is children under 10 years of age who form the great bulk of the attacks. For, whilst 98 per cent. of the attacks in the vaccinated occur over 10 years of age, and more than 75 per cent. of them over 20 years of age, more than 88 per cent. of those in the unvaccinated were under 10 years, and less than 12 per cent. were over 20 years. Could any contrast be more striking? On the one hand we have a section of the population who, during the earlier part of their lives, enjoy a large degree of immunity from small-pox, whilst on the other the remaining portion of the population during the same period exhibit an almost equally overwhelming liability to it.

There is only one point in regard to which these two sections differ from one another; the one has been vaccinated in infancy, the other has not. Is it possible for any person who is not wilfully blind to evidence to resist the force of these facts?

Do not these numbers clearly indicate an influence which protects with almost absolute certainty to about 10 years, but which then begins to be enfeebled, though it evidently does not lose its effect even at 20 years of age? For, although there are a much larger number of persons in the population between 10 and 20 than from 20 upwards, only 269 of the former class were attacked, against 916 of the latter.

It is clear, therefore, from the above numbers, that vaccination does give a high degree of protection against attack up to 10 years of age, but that this protection exhibits a falling-off in efficiency between 10 and 20 years, and a great decline from this latter age upwards. How much of this failure is due to "inefficiency" of the original infancy vaccination cannot be accurately estimated. Those who have had practical experience in these matters will probably have little

hesitation in agreeing that if all the 1,208 "vaccinated" cases had been efficiently vaccinated in infancy, the number would have been very materially reduced.

In regard, therefore, to the effect of vaccination in protecting from the risk of catching small-pox, the age incidence statistics of the Gloucester epidemic are of themselves conclusive, even if we had not had abundant evidence of a precisely similar character from many other previous epidemics in all parts of the world.

EVIDENCE FROM FATALITY OF THE EPIDEMIC.

But the strongest evidence which the figures of the Gloucester epidemic afford as to the protective value of vaccination is derived from a consideration of the relations of age incidence to the mortality of the attacks, *i.e.*, the relative *fatality*. And first let us examine the

MORTALITY STATISTICS.

				Under 10	10 to 20	20 years	Total.
				years.	years.	and over.	
Deaths	Vaccinated in infancy	..	..	0	11	102	113
	Unvaccinated	..	..	281	14	18	313
	Uncertain	..	..	0	1	16	17
				281	26	136	443

From these figures two very striking facts are evident. The first is that whilst no less than 281 unvaccinated children under 10 died, there was not a single death of a vaccinated child under that age. The second is that whilst the number of attacks in the three age periods of the vaccinated class is roughly in the proportion of 1 : 11 : 40, the *severity* is in the proportion 0 : 11 : 102; that is to say, whilst a person over 20 years of age who has been vaccinated in infancy has, on an average, 40 times the chance of being attacked by small-pox that a child under 10 has, he is exposed to a good deal more than one hundred times the chance of dying from it.

But the true test of the effect of vaccination in infancy on the severity of the attacks can only be obtained by estimating the *fatality* of the attacks—that is the proportion *per cent.* of those who die to those who are attacked, in both cases. The following table gives the evidence on this point:—

FATALITY STATISTICS.

				Under 10	10 to 20	20 years	General average.
				years.	years.	and over.	
Percent- age of Deaths	Vaccinated in infancy	..	..	0	4.1	11.1	9.3
	Unvaccinated	..	..	40.2	27.4	46.1	39.9
	Uncertain	..	..	0	20.0	45.7	44.7
				64.1	5.9	30.7	mean fatality 21.7

From the figures it follows that whilst the odds against a person who has been vaccinated in infancy dying from small-pox cannot be estimated for ages under 10 years, so far as the experience of the Gloucester epidemic goes, because no vaccinated child under that age died out of the 23 who were attacked, 40 per cent of the unvaccinated children who were attacked by the disease perished.

If we dissect the figures of the vaccinated children more minutely still, we obtain corroborative evidence of the protective effect of vaccination in early life, for of the 23 children under 10 who were attacked, none were less than 7 years of age, 2 were under 8 years, 9 were under 9 years, and 12 were under 10 years old. Moreover, 17 of these 23 are reported to have had "mild" attacks, one "very mild," 3 had "moderately severe," and only two had it in the "confluent" form.

We may strengthen this evidence still more by dissecting the ages and deaths above 9 years, as is shown by the following table:—

Ages.	Attacks.	Deaths.	Ages.	Attacks.	Deaths.	Per cent.
10 to 11	16	1	20 to 30	370	24	6.5
11 - 12	20	0	30 - 40	279	28	10.0
12 - 13	16	1	40 - 50	151	22	14.5
13 - 14	30	1	50 - 60	67	15	22.4
14 - 15	37	1	60 - 70	35	9	25.7
15 - 16	36	1	70 - 80	13	3	23.0
16 - 17	21	1	80 - 90	1	1	100
17 - 18	34	1				
18 - 19	29	2		916	102	11.1
19 - 20	30	2				
Total	269	11 = 4 p.c.				

The above table shows that though there is some irregularity in the increase of the attacks in the successive years from 10 to 20, due, probably, to purely accidental causes, there is a very distinct augmentation of the number at ages near to 20, such as we might expect with a decreasing protection from infantile vaccination. This increase in the attacks is perceptible up to the age of 40, and then we get a rapidly increasing decline. It must be remembered that this apparent increase conceals a larger one, which can only be estimated by allowing for the diminishing numbers of the whole population at every additional year of rise. If this were done the diminution in the protecting power of infantile vaccination with increase of age would become much more evident than appears from this table.

But there is another important fact which the table discloses, and that is the great increase in the fatality of the disease as age advances in persons who have only been vaccinated in

infancy. Thus, the fatality from 10 to 20 years is only 4 per cent, then it steadily rises until at 70 years it reaches 25·7 per cent. Between 70 and 80 there is a slight fall, and at 90 we get a maximum mortality of 100 per cent. But it is obvious that the figures in these last two series are too small to give a trustworthy percentage. It is well to note here that if we had refrained from dissecting, as has thus been done, the number 102, which is given as the fatality for '20 years and over' in the Fatality Statistics, this important fact as to the steady increase of the fatality with each decade beyond 20 would have been entirely unnoticed.

SUMMARY.

Having thus examined the statistics of the Gloucester epidemic, we are in a position to summarise the facts which they prove. But before doing so it is worth while to point out how the lesson which they teach is to be discovered only by a detailed dissection of the crude numbers given in the first of the above tables (the relation of vaccinated to unvaccinated). Had we been content to take the numbers as they stand in this table, *which is what the opponents of vaccination do*, we should have entirely failed to recognise the important series of relations between the age incidence of the attacks, the variations of mortality at different ages, and the overwhelming evidence of the high protection given by infantile vaccination during the earlier years that succeed it, as well as of the gradual decline of this protection afterwards.

We may, perhaps, best epitomise the evidence thus obtained by presenting it in the form of the conclusions at which the majority of the Royal Commissioners have arrived from their consideration of the much larger bulk of evidence which has been submitted to them.

The evidence of the Gloucester epidemic, then, fully confirms the opinion of the Commissioners that—

(1) Vaccination diminishes the liability to be attacked by small-pox. This is conclusively established by the Age Incidence statistics of the epidemic.

(2) It modifies the character of the disease and renders it (a) less fatal and (b) of a milder type. This is equally clearly shown by the Mortality and Fatality statistics.

(3) The protection it affords against attacks of the disease is greatest during the years immediately succeeding the operation of vaccination. The Commissioners consider that the period during which the protection may be held to be effective

may be taken generally at nine or ten years. The fact that no case vaccinated in infancy occurred in the whole of the Gloucester epidemic below the age of seven years, and that only two occurred under eight years, strongly confirms the Commissioners' conclusions.

(4) After the lapse of the period of the highest protective potency, the efficacy of vaccination to protect against *attack* rapidly diminishes, but it is still considerable during the next five years, and possibly never altogether ceases. The figures of the last of the above tables abundantly confirm the first of these two conclusions; the second is one less easily amenable to the test of statistics, as the conditions which have to be taken into consideration are much more complicated. But few who have had much practical experience of small-pox will probably dissent from the opinion that where the primary vaccination is done with a high degree of efficiency the protection against attack survives to some extent at any rate past mid-life.

(5) The power of vaccination to modify small-pox is also greatest in the period in which its power to prevent from attack is greatest, but its power thus to modify the disease does not diminish as rapidly as its protective influence against attacks, and its efficacy during the later periods of life to modify the disease is still very considerable. This conclusion of the Commissioners is well illustrated by the table of fatality statistics, in which the great difference between the fatality of the disease even over 20 years of age is indicated by the difference between a fatality of 11·1 in those vaccinated in infancy and of 46·1 in the unvaccinated. Nothing can explain this difference except the residual effect of their infantile protection in the members of the first of these two classes, which, though not sufficient to ward off an attack, yet helped them in a large number of cases to struggle through it.

EVIDENCE FROM RE-VACCINATION.

We now arrive at the two last conclusions of the Royal Commissioners, the first of which is—

(6) That re-vaccination restores the protection which lapse of time has diminished. What evidence does the Gloucester epidemic supply as to the accuracy of this conclusion?

The evidence which might be expected is, as was indicated, in the earlier part of this section of the Story, of two kinds, positive and negative.

So far as the positive evidence is concerned it amounts to this, that without going so far as to say that there have been no cases in which persons who have apparently been successfully re-vaccinated at some period antecedent to their exposure

to infection have taken the disease, such cases, if they have occurred at all, are so few in comparison with the total numbers in which the evidence as to the protective power of re-vaccination is conclusive, that they may be disregarded as rare exceptions, such as we might expect to find in a condition of such complexity as vaccination is. What is certain is that a considerable number of cases which have been, and still are, alleged by local anti-vaccinators to be proofs of the worthlessness of re-vaccination have, when carefully inquired into, completely broken down.

The negative evidence is presented in the Appendix to the Abstract of the Report of the Vaccination Committee of the Gloucester Board of Guardians, which is hereto appended, in which a large number of re-vaccinated persons who have been more or less exposed to infection, some of them repeatedly, such as medical men, nurses, and others, have altogether escaped.

These cases might be supplemented by many of a most striking character in which small-pox has attacked families, and has singled out the unvaccinated members, leaving the vaccinated to go scot free, with a precision which would be altogether inexplicable, if we denied the protective effects of vaccination.

Finally, the Commissioners are of opinion that—

(7) The beneficial effects of vaccination are most experienced by those in whose case it has been most thorough.

With reference to this conclusion no statistical evidence can, at the time of writing this, be adduced by the writer from the experience of the Gloucester epidemic which is sufficiently comprehensive to make it comparable with what has been offered in the foregoing tables. It is thought better, therefore, to leave this point open for fuller inquiry than is practicable at the present moment. But the writer believes that the general experience of those who have had opportunities of forming an opinion on this matter during the recent epidemic will confirm his own, that though the total area and character of the marks left by vaccination and re-vaccination cannot be relied on as an *infallible* criterion of the efficiency of the protection enjoyed by the subject of them, they do give such a good general indication of it that they may be accepted as a sufficient working guide for practical purposes. The point is one of the kind on which evidence requires to be weighed as well as counted.*

* See, for example, the letter of the Rev. H. Proctor in the Appendix.

COMPARISON
OF THE
EPIDEMICS OF SMALL-POX IN GLOUCESTER
IN 1872-5 AND 1895-6.

The opponents of vaccination, in their attempt to explain away the lessons of the recent epidemic in Gloucester, have referred at times to one which preceded it about twenty years ago, as "the epidemic of 1872."* As a matter of fact this latter epidemic commenced not later than January, 1872, and continued, with some intermissions, until the end of February, 1875, at least. It is not possible to say exactly when it commenced or when it ended, as infectious diseases were not notified then as they now are, and there are no records extant which give any definite information about this epidemic except the registers of deaths for that period. From these it appears that the first death from small-pox, after a considerable interval of apparent absence of the disease from the city, occurred in January, 1872, and the last in February, 1875, there being none in any subsequent month of this year. During that period 160 deaths were registered. If we assume that the proportion of deaths to attacks was somewhat lower than it has been in the recent epidemic (21·7 per cent.), say

* One such reference was made in a letter to the *Echo*, in the following terms:—"The Gloucester Guardians' Vaccination Committee report that from 1873" (it should have been 1875) "the town was practically free from small-pox, and the conclusion is drawn that the outbreak of 1896 was due to the laxity of the authorities during that period in not compelling people to vaccinate. But why 1873 to 1895? What is the matter with 1872? Simply that in 1872, when Gloucester was a thoroughly vaccinated town, there was a far worse epidemic than in 1896, which the Committee do not think it convenient to mention." How recklessly inaccurate the author of this statement is in saying that "the epidemic of 1872" was "far worse" than that of 1896 will be apparent from the numbers given in the text. He evidently never took the trouble to ascertain anything about the epidemic in question, but made a random assertion for the purpose of discrediting the Vaccination Committee, who were appointed to deal with the epidemic of 1896, not with that of 1872, to which they were not called upon to refer at all. The fact that this assertion about the epidemic of 1872 has been freely circulated of late in letters by anti-vaccinators to various journals in different parts of the kingdom is a good illustration of their tactics at the present time, which may be summed up in the advice, "Never mind what you say so long as you can explain away the Gloucester epidemic."

20 per cent., this would give between 700 and 800 attacks. From this it will be seen that so far from this epidemic having been "far worse" than that of 1896, it was, in the gross, much less severe, especially when we compare the lengthened period over which the attacks were distributed with the very short duration of the latter outbreak.

The only information obtainable about this epidemic is derived from an examination of the deaths, the age incidence and time relations of which are given in the following table:*

AGE				1872	1873	1874	1875	TOTAL
Under 1 month	..	..	..	1	2	2	0	5
1 month and under 1 year	..	..	..	1	3	7	3	14
1 year	"	5 years	..	0	3	8	1	12
5 years	"	10	"	0	6	16	0	22
								— 53
10	"	15	"	0	8	10	1	19
15	"	20	"	2	5	10	1	18
20	"	30	"	2	10	24	1	37
30	"	40	"	0	4	9	0	13
40	"	50	"	1	7	7	0	15
50	"	60	"	0	0	3	0	3
60	"	70	"	0	1	1	0	2
				—	—	—	—	— 107
				7	49	97	7	160

It will be seen from the above table that only 33 per cent. of the deaths were under 10 years of age, as compared with 64 per cent. in 1896. The striking difference between the two epidemics in this respect, as well as in their duration and intensity, is illustrated in No. I. of the appended diagrams. If we contrast the dribbling and interrupted nature of the earlier epidemic, as exhibited by its mortality, with that of 1896, when in the months of February, March and April it moved up with rocket-like rapidity and in the three following months collapsed with even greater abruptness, we shall be able to form an exact idea of the difference between the two outbreaks. The cause of the divergence will be shown by Diagrams II., III. and IV. to lie in the difference in the relations between the deaths under and over 10 years of age in the two epidemics. The nature of this difference is shown in different ways in these diagrams, but they all emphasise the same fact, viz., that though the earlier epidemic was, like many epidemics of small-pox which occurred in other places about this period, one in which a larger proportion of children were attacked than has been the case in most subsequent epidemics

* For the opportunity of consulting the death registers of this period I am indebted to the courtesy of Mr. L. G. H. Mayer, the Superintendent Registrar.

until the recent one at Gloucester, its most disastrous effects were visited mainly on persons over 10 years of age, whilst in 1896 it was those under that age who mostly suffered. Evidence of this probability is to be found in the fact that so many of the deaths under 10 in the earlier epidemic were between 7 and 10 years of age.

Unfortunately the details as to the vaccination of the persons who died in this epidemic are so scanty that they are of no value for statistical purposes. We cannot, therefore, tell what proportion of the 53 deaths under 10 years of age were vaccinated and what not. Still less can we tell what was the condition in regard to vaccination of the much larger number of cases above that age. But, looking at the facts that, although vaccination was legally compulsory before 1871, the enforcement of it was not so effective before that date as it was afterwards, and that so large a proportion (more than two-thirds) of these deaths occurred after 7 years of age, we have good grounds for assuming that if the majority of them were not absolutely unvaccinated, they were at least poorly protected.

But, even accepting the mortality of children under 10 in this epidemic as a high one compared with that of subsequent epidemics, it will be seen from the diagrams that it is small when compared with that of 1896. As Diagram IV. shows, the proportions of deaths below and above 10 years of age are as nearly as possible inverted in the two epidemics. There must be some explanation for this, and what other explanation can be offered than this, that although there were probably a good many unvaccinated or poorly vaccinated children in Gloucester in 1872, their number was very small in comparison with those in 1895, and they suffered proportionately less?

So that the records of the earlier epidemic in Gloucester, which have been so confidently cited as proving that Gloucester was "a thoroughly vaccinated" town at that time, that it was a much more severe one than that of 1896, and that the latter epidemic was not due to the local authority having neglected to enforce vaccination, give good grounds for believing just the reverse. It is scarcely necessary to point out that the assertion as to the "thorough" condition of the vaccination in Gloucester at this date is quite gratuitous and unsupported by evidence. It is pretty certain that, so far at any rate as persons over 15 or 20 years of age are concerned, the population of Gloucester was much less efficiently protected then than it was in 1895, for there would have been fewer who had been vaccinated in infancy, and there is no reason for believing that more would have been protected by

re-vaccination in the earlier than in the later period. Indeed, the reverse is probably the case.

It may be well to mention that there were no means of isolating cases of the disease at this time, but a considerable number were sent to the infirmary of the workhouse, from which the infection spread to the workhouse itself, with disastrous results. In only 20 of the records of death is any information given as to the vaccinal condition of the patient, and in all of them it is stated to have been unvaccinated. One of the deaths, that of a male 32 years of age, is stated to have been the result of a second attack of the disease.

COMPARISON OF THE EPIDEMICS OF SMALL-POX AT GLOUCESTER IN 1896 AND AT WILLENHALL IN 1894.

In speaking of the severity of the Gloucester epidemic, so far as it can be estimated from the relation between the total number of persons attacked and that of the whole population, it was stated that it was higher than that of any recent British epidemic, that in this sense it more than equalled that which occurred two years ago at Willenhall.

The reason thus suggested for comparing the two epidemics is strengthened by the fact that in some other respects also the Willenhall epidemic is more nearly comparable with that of Gloucester than any other, whilst in at least one feature it is strikingly distinguishable. Moreover, the Willenhall epidemic has been repeatedly cited by the opponents of vaccination as a proof, on the one hand, of the occurrence of a small-pox epidemic in a well vaccinated population, and, on the other, as a justification of the contention that the Gloucester epidemic was not due primarily to neglect of vaccination.

The general relations of the two epidemics may be thus epitomised :—

	WILLENHALL	GLOUCESTER
Population	17,684	42,000
Duration of Epidemic ..	8 months	7 months
Total Attacks	842	2,035
Per cent. of Population ..	4·7	4·8
Cases treated in Hospital	254	703
Per cent of total cases ..	30	34·5

From this table it will be seen that there is a striking similarity in the two epidemics, so far as their general features are concerned. Their relations in regard to vaccination were as follows :—

	WILLENHALL		GLOUCESTER	
	<i>Pr. ct. of total</i>		<i>Pr. ct. of total</i>	
	<i>Attacks</i>	<i>Attacks</i>	<i>Attacks</i>	<i>Attacks</i>
Vaccinated in Infancy ..	739	87·7	1,208	59·3
Unvaccinated	89	10·5	789	38·7
Ditto, but had had Small- pox previously }	2	0·2	—	—
Doubtful	12	1·4	38	1·8
	842	100·0	2,035	99·8

Disregarding the doubtful cases in the two epidemics, and the two cases in the Willenhall epidemic in which the question

is complicated by the previous occurrence of small-pox, we observe a notable difference in the relations of the vaccinated and unvaccinated cases in these epidemics, there being nearly 30 per cent. more of the former at Willenhall than at Gloucester; or, to put it another way, the percentage of unvaccinated attacks was nearly four times as numerous at Gloucester as at Willenhall. This predominance of the vaccinated in the Willenhall epidemic has, of course, been made a great deal of by the opponents of vaccination. "See," they have said, "Willenhall was a well vaccinated town, and this is what its vaccination has done for it: nearly 90 per cent. of those attacked in the epidemic were vaccinated." No fact would seem to be more significant to a person who is not able to detect the fallacy which such a statement conceals. But, before we can draw any safe conclusion from these figures alone we must ascertain what is their real meaning. We must *dissect* them, as we did those of the Gloucester epidemic. It is quite possible that the "vaccinated" at Willenhall may turn out to have been mainly adults, who had been vaccinated in infancy only. And if so, we know very well that we should have to discount very largely the value of their protection.

Here, unfortunately, we are in a difficulty, from the fact that the existing records of the Willenhall epidemic do not allow us to construct an age-incidence table of attacks such as we have discussed in the case of Gloucester, for the purpose of strict comparison. The record of ages at Willenhall only deals with those under 5 years of age, and from 5 years upwards. We cannot, therefore, ascertain the age incidence of the "vaccinated" in a way which will enable us to form any safe opinion as to what proportion of them had passed beyond the period when infantile vaccination begins to fail. We must, consequently, apply the test of *fatality* to the Willenhall epidemic, in order properly to compare it with that of Gloucester. Leaving out of consideration the doubtful cases in both epidemics the following are the relative gross fatalities of the two:—

	WILLENHALL			GLOUCESTER		
	<i>Attacks</i>	<i>Deaths</i>	<i>Fatality</i>	<i>Attacks</i>	<i>Deaths</i>	<i>Fatality</i>
Vaccinated in Infancy	739	17	2·3 p.c.	1208	113	9·3 p.c.
Unvaccinated ..	89	30	33·7 p.c.	789	313	39·8 p.c.
	828	47 ^{mean} _{fatality}	5·6 p.c.	1997	426 ^{mean} _{fatality}	21·3 p.c.

These figures reveal a fact which was not obvious in the previous table, and that is, the extremely small fatality of the Willenhall epidemic. For, whilst the whole fatality of the Gloucester epidemic was 21·3 (excluding the doubtful cases)

that of Willenhall was only 5·6, which, for so extensive an epidemic, was phenomenally small. What was the cause of this small fatality? Obviously the great preponderance of "vaccinated" cases, amongst whom the fatality was only 2·3 per cent. So that although the fatality of the unvaccinated Willenhall cases (33 per cent.) approached that of the same cases in the Gloucester epidemic, and notwithstanding that these latter cases constituted 10·7 per cent. of the whole, the general mildness of the attack in the vaccinated at Willenhall brought the mean mortality of the whole epidemic there down to little more than one fourth of that of the Gloucester epidemic.

So far as the unvaccinated are concerned the fatality of the Willenhall epidemic was not unusual. The excess of the fatality of the Gloucester epidemic over that of Willenhall is accounted for by the large preponderance of children under 10 in the former epidemic, as will be seen by the following table of the relative mortalities at different ages in the two epidemics:—

	WILLENHALL			
	Under 10	10 to 20	20 and over	Total
Unvaccinated { Number of Deaths ..	18	0	12	30
Per cent. of total Deaths	60	0	40	100
	GLOUCESTER			
	Under 10	10 to 20	20 and over	Total
Unvaccinated { Number of Deaths ..	281	14	18	313
Per cent. of total Deaths	89·7	4·4	5·7	100

It thus appears that whilst the leading feature of the Gloucester epidemic was an abnormally high general fatality of unvaccinated cases, due to the large preponderance of small-pox amongst children under 10, the characteristic of the Willenhall epidemic was its large preponderance amongst adults who had been vaccinated in infancy only, but who, so far as mortality is evidence, suffered very slightly. That this was the case is corroborated by the report of the Medical Officer of Health for Willenhall,* who specially refers to the general mildness of the attack in the vaccinated cases.

What is the explanation of this difference between the two epidemics in regard to the fatality of small-pox amongst adult vaccinated persons? It is the more important to discover it because it illustrates the ambiguity with which the word *severity* may be used in regard to small-pox epidemics. Viewed in regard to the proportion of the total population affected, these two epidemics were nearly equally severe; but, when severity is estimated by *fatality*, the Gloucester epidemic was four times as severe as that of Willenhall.

* Mr. J. T. Hartill, to whom I am indebted for most of the facts contained in this section.

The consideration of this difference is also important because it helps to throw some light upon an aspect of epidemic small-pox on which the Royal Commission has commented, and that is the fluctuation of severity which different epidemics exhibit. The Commissioners seem to have looked on this feature as somewhat mysterious in its nature; but it is highly probable that all mystery would disappear if we could get at the vaccination history of each locality for some time prior to an epidemic as well as we can do in the cases of Gloucester and Willenhall.

It has been claimed by the opponents of vaccination that Willenhall was a well vaccinated locality. And so it was in one sense. There is good evidence that for many years infant vaccination was extremely well done there. By far the greater number of the babies born in the Willenhall district up to 1882 were vaccinated in four places. But from that year forward not only did the number of vaccinations progressively decrease, but, what is equally important, the efficiency of vaccination in the town generally appears to have declined, many children having been vaccinated in only two and some in only one place.

From this account it is not difficult to form an estimate of the condition of the population at Willenhall in regard to vaccination at the time of the outbreak. The great bulk of the population above 12 years of age must have been well protected in infancy, but would have exhibited a general decline in immunity against mere attack proportionate to their advance toward and beyond adolescence, except where they had been re-vaccinated effectively, which probably very few had been. In the children born since 1882 we should have a variable condition of things. Those who had been efficiently vaccinated, *i.e.* in four places, probably comparatively few, would almost, if not entirely, have escaped attack. A larger percentage, who had been vaccinated imperfectly, would be attacked, but would probably, on the whole, escape with their lives; whilst the unvaccinated remainder would be attacked and with a high degree of severity.

On the other hand we should expect to find in the case of most vaccinated persons above ten years of age, who had been well vaccinated in infancy, a general mildness of attack, characterised by a very low degree of fatality.

These are just the features which the statistics, imperfect as they are in some respects, do exhibit. The explanation of the mildness of the Willenhall epidemic, therefore, so far as the vaccinated are alone concerned, may confidently be referred to the prevalence of effective vaccination in the district up to about 10 or 12 years before the outbreak. And this inference is cor-

roborated by the evidence contained in the Medical Officer of Health's report on the epidemic, which shows that the severity of the attack in a large number of cases bore a direct relation to the number of vaccinal scars, the attack having been least severe in those who had four scars. The treatment of cases in the hospital does not appear to have made any difference in the fatality of the epidemic, the same proportion of cases having died both inside and outside the hospital at Willenhall and at Gloucester.

There is only one additional remark which need be made, and that is that if Willenhall had happened to have had the misfortune of such an accidental explosion of infection amongst its unvaccinated children as occurred in Gloucester in February last, its epidemic would in all human probability have assumed a character more nearly allied to that of Gloucester in all respects, and it would certainly have been more extensive in proportion to its population.

The result, then, of a comparison of the Gloucester and Willenhall epidemics is to show that so far from offering any evidence against the efficiency of vaccination as a protection against small-pox, their contrast helps to strengthen the conclusions to which that of Gloucester itself points. For, whilst it enables us, on the one hand, the better to appreciate the ravages which small-pox will commit when it takes good hold of an unvaccinated community, it shows, on the other, the influence which infantile vaccination, when well performed, will exercise in mitigating the severity of the disease, even in adult life, and when the protection it gives for some years has not been confirmed by re-vaccination. Further, it enables us to estimate the risk which such a population as that of Willenhall runs of incurring a much greater disaster than it actually did, by an explosive outburst, such as occurred at Gloucester, and against which there is absolutely no protection except the enforcement of infant vaccination; since, even the provision of hospital accommodation on a scale which few local authorities would have the courage to institute or maintain, would of itself be useless without the co-operation of a rigid and universal system of compulsory isolation, which even the opponents of vaccination have not ventured to advocate as an alternative to it.

HOW ANTI-VACCINATORS EXPLAIN THE LESSON OF THE GLOUCESTER EPIDEMIC.

The Gloucester Epidemic has been a heavy blow to the opponents of vaccination. The circumstances which led up to it were so apposite as almost to suggest an intentional and well-arranged experiment to test the value of Jenner's discovery, under conditions which he himself would have recognised as satisfactory, on the nearest population of sufficient size to the locality in which he made it. The severity of the epidemic was so great as to make it almost unexampled in the history of modern outbreaks of the kind. The large predominance amongst its victims of unvaccinated children has made it even more unique. And, last but not least, it has occurred at what a leading anti-vaccinator has aptly designated the "psychological moment" of the conclusion of the protracted labours of the Royal Commission on Vaccination, by which its teachings have been invested with an opportuneness and a force which they could have hardly acquired at any other time.

It is not to be wondered at, therefore, that the anti-vaccinators both in Gloucester and elsewhere should, at an early stage of the outbreak, have appreciated the gravity of the situation and have seen the need for explaining away the hard facts which they had to face, in default of a complete and ignominious collapse of their agitation. Accordingly, some time before the epidemic had reached the point of its greatest severity, two of the most practised emissaries of the Anti-vaccination Society* were sent down to Gloucester to re-assure the failing courage of the local members of the Society, who were showing the smallness of their faith in their creed by freely "submitting" themselves and their families to the vaccinator's lancet. There was a general stampede, and the campaign, which had been so valiantly carried on under great difficulties for ten long years, threatened to end in a rout all along the line.

It must be admitted that it required some assurance on the part of these champions of so discredited a cause to undertake its rehabilitation under such discouraging circumstances. But they were equal to the emergency, and soon began to evolve a series of theories to account for the outbreak and to

* Mr. Walter Hadwen, M.R.C.S. and L.R.C.P., of Highbridge, Somerset, and General Phelps, of Edgbaston, Birmingham.

convince the citizens of Gloucester that it was not due to their neglect for ten years of infant vaccination, and, for a still longer period, of the renewal of the protection of those who had been vaccinated before that period, but to the "filthy" state of their city and to official mismanagement, which was, to use the precise words of the most authoritative of these two modern Daniels, "a disgrace to modern civilisation and the greatest scandal in municipal administration that had taken place in the present century."*

This was turning the tables with a vengeance. Even if the indictment had been launched against a Kaffir kraal in Rhodesia, or against some burlesque municipality in a South American State, one would have been inclined to suggest that it was a trifle over-coloured. But anti-vaccinators, as most people who have had much to do with them know very well, are nothing if not "thorough," and it was soon evident that "hot and heavy" was the watchword with which these two leaders of a forlorn hope had come down to do battle against an array of facts which might well have disconcerted warriors who were not armed, as they were, "with triple brass."

For the facts of the epidemic were so clear that it was useless to attempt to deny them. A larger proportion of the population on which this experiment had been made had been attacked by small-pox than in any other modern epidemic, except, perhaps, that at Willenhall in 1894. An unusually large proportion of those who had been attacked were unvaccinated. A still more unusually large number of the unvaccinated were children under ten years of age. And lastly, the mortality of the epidemic, though not as a whole excessively high, was mainly due to these unvaccinated children, the vaccinated ones having got off as lightly as they generally have done in other epidemics.

* It is an instructive illustration of the recklessness with which this campaign against truth has been carried on that one of these two veracious partners in perverting it has had the effrontery to say that "there had never been such a cleverly worked up panic in modern times. It had been worked up with a generalship worthy of Napoleon and with a strategy which would have done credit to Wellington at Waterloo." But the most amazing feature of this successful *coup de théâtre* is the fact that according to this highly competent authority in such matters, "the whole trick had been managed by a doctor and a couple of parsons. When the doctors and parsons amalgamated to do mischief there was no telling what they would do." Perhaps so; but we can tell with much more certainty the mischief which an amalgamation of a doctor and a general can perpetrate, when they are not particularly scrupulous about what they say, and especially when the doctor is, to adapt Mrs. Malaprop's simile, himself "two single gentlemen rolled into one," and aspires, as in the present case, to cure souls as well as bodies. He is not what Sydney Smith called a "squarson" but might not inappropriately be designated a "parstor."

It was evidently necessary to explain, if the vaccination theory as to the cause of the epidemic was to be discredited, (1) why so many unvaccinated children had been attacked, (2) why the mortality among them had been so excessive, and (3) why the vaccinated of all ages, but especially in early life, had escaped comparatively so easily. The first device which was invented to solve this somewhat unpromising problem was what may be called

THE OVERCROWDING THEORY.

This theory was first propounded in the columns of a local paper by the Secretary of the Gloucester Anti-vaccination Society, who alleged that the two large elementary schools, in which the explosive outburst of the disease occurred in February, had been greatly overcrowded, and suggested that the constitutional vigour of the children had been so impaired thereby that they had fallen ready victims to the disease.

In answer to this allegation the Chairman of the School Board and the manager of the other school implicated, each replied that the schools which had been overcrowded had been those of the older boys and girls, who had been comparatively free from attack, and that the infant schools, in which in both cases the outbreak had occurred, had for some time had less than their complement of scholars. It is only fair to say that on the publication of this statement the Secretary withdrew his charge, and apologised for it, in the columns of the local paper in which it was made. But he does not seem to have thought it necessary to give any wider publicity to his withdrawal, or to reprobate the repetition of this fiction by a variety of other anti-vaccinators, especially by Mr. Hadwen and General Phelps, who have gone on reproducing it over and over again, as if it were Gospel truth, in letters to journals and in platform addresses in all parts of the kingdom. This looks very like what logicians call *suppressio veri*.

THE INSANITARY SCHOOL THEORY.

The overcrowding theory having so ignominiously collapsed, it became necessary to invent another reason for "debilitated constitutions" on the part of the infant victims of the epidemic. This was quickly found in the fact that the School Board, during the course of the epidemic, had found it expedient to expend about £150 on the sanitary arrangements of the Widden Street School. Here, evidently, was the "missing link." So the sanitary arrangements of the school were accordingly denounced by the irrepressible Mr. Hadwen as being "in a shameful condition," and the public were led to believe that the School Board, in their remorse at the terrible

calamity which their negligence had caused, had incurred a large expenditure in converting an unhealthy school into a healthy one. The Chairman of the School Board had again to explain that all that the Board had done was to take advantage of the closure of the school, in consequence of the epidemic, to carry out an alteration in the construction of the closets, the water supply of which had involved considerable expense from waste of water, and that to do this it had been necessary to make a general change in the fittings: hence the outlay. Result: collapse of theory No. 2, but, this time, without withdrawal or apology by anybody; and, like its predecessor, it is still travelling through the provincial journals as a genuine truth, and will, no doubt, continue to do so until it loses the appearance of ingenuousness which it has hitherto possessed.

It is scarcely necessary to point out that however the alleged insanitary condition of the Widden Street Schools might, so far as the scholars as a whole were concerned, help to support the theory of constitutional enfeeblement which was invoked to account for the disaster that occurred there, it quite failed to account for the fact that it was the infants who were almost exclusively attacked, and not the older children, who were equally exposed to the influence of the alleged insanitary conditions. Still less could it explain why the infants at other schools in the town, whose condition was not alleged to be insanitary, suffered also in a similarly heavy way.

This second solution of the vaccination puzzle having failed to square with the facts of the epidemic as signally as the "overcrowding" one had done, the local anti-vaccinators were at their wits ends to find some other plausible suggestion which could be made somehow or other to dove-tail in with them. "Necessity," as the old adage asserts, "is the mother of invention," and the ingenuity of the two expounders of riddles who had been invoked to interpret in a more congenial sense the handwriting on the wall, in which the citizens of Gloucester were beginning to spell out the word "tekel," was again equal to the occasion, and, with a flash of inspiration, which almost amounts to genius, they speedily incubated between them what may be called

THE GREAT SOUTH GLOUCESTER THEORY.

To properly appreciate what Captain Cuttle would have called the "bearings" of this theory requires a little explanation of local topography. In the first place then, like the celebrated chapter, "On snakes in Iceland," in Pontoppidan's history of that island, there is no such place as "South Gloucester" at all. Of course, Gloucester, like every other

town, has a south side and a north side, and a portion of the south side of the city is known for parochial purposes as the South Hamlet.* But, there is no part of Gloucester with any definite boundaries to which the designation "South Gloucester" could be correctly applied. It was, therefore, necessary for the purpose in view to manufacture it. There was no difficulty about this to such experts in fabrication of all kinds as had taken this matter in hand. This is how it was done. A line was drawn arbitrarily, but with much ingenuity, east and west, through a part of the city known as St. Michael's Square, and the portion south of this was dubbed "South Gloucester." A "local habitation" having thus been found for the epidemic, and "a name" for it, the prevalence of the disease in South Gloucester was easily demonstrated. Indeed, one of the two sponsors for this theory (General Phelps) went so far (in a letter to the *Birmingham Daily Post* of July 28, 1896) as to assert that "it is now well known that while children were unvaccinated equally in North and South Gloucester, the epidemic of small-pox was confined to South Gloucester." Now General Phelps could know nothing as to whether children were equally unvaccinated or not in North and South Gloucester. No one could, without an inquiry that would be very laborious and which would not be worth the trouble of making. But, what is very easy is to show the untruth of General Phelps' assertion, which a reference to the record of the residences of those who were attacked during the epidemic, and to the house-to-house survey of the city made by the Vaccination Committee does, by proving that so far from the epidemic having been confined to South Gloucester, there were at least 214 cases north of the artificial equator which he had drawn.

It is true that these are only a little more than one-tenth part of the whole number attacked. But then the relative populations of these two districts have to be considered, and when this is done the proportion is reduced to about one-fifth. Still, it must be admitted that there is a sufficient difference between one-fifth and four-fifths to demand explanation. But before considering the anti-vaccination theory,

WHY THE EPIDEMIC PREVAILED IN SOUTH GLOUCESTER, in detail, it will be well to explain why it was that the epidemic really did find so much larger a proportion of victims on one side of this imaginary line than on the other. This may be

* It may be mentioned here that one of the arguments cited to support the South Gloucester theory at one time was the excessive mortality from small-pox in the South Hamlet, no explanation being given at the same time that the small-pox hospital was in this Hamlet!

best done by quoting the following extract from an article on the subject in the *British Medical Journal*: "The explanation," the writer observes, "of the concentration of the disease in the eastern and southern ends of the city is not far to seek. The houses in these districts are occupied mainly by respectable artisans, clerks, trade assistants, and others of the same social position. Now it is just this class who have fallen most under the influence of the anti-vaccinators' fallacies. How large a juvenile population has been growing up unvaccinated in these districts can be recognised at a glance by anyone who will note the fact that the three large Board Schools, which have been erected within recent years, are all within them. The outbreak of small-pox on this side of Gloucester was originally a matter of pure accident; but having once established a hold there it soon spread, from the abundant material which it found available for its attack."

But there is another reason for the prevalence of the epidemic in South Gloucester, and that is because the small-pox hospital was located in this district, with houses all round it. For, it can hardly be doubted, in view of the evidence which has been collected as to the possibilities of aerial diffusion of small-pox infection, that the hospital exercised a very material influence in the spread of the disease, in this as well as in other ways.

So that, when we take into consideration the difference in the numbers of residents in these two factitious districts, the large unvaccinated juvenile population with which the southern district swarmed, the influence of the hospital, and the fact that, in consequence of the explosion in the Widden Street and St. Luke's Schools in the month of February, during which no less than 96 children under 10 years of age were attacked, the infection was suddenly diffused in as many different centres of this district, there is small room for surprise that it should have clung to it with considerable tenacity.

But, as these considerations were incompatible with the anti-vaccination theory it became necessary to find some other point in which the two districts differed from one another to which the prevalence of the epidemic in one of them could be with some pretence of probability attributed. This was soon forthcoming in an assertion that the condition of the southern district was much more "insanitary" than that of the northern. In order that there may be no mistake upon this point it will be well to give the indictment of South Gloucester in the precise words in which it has been made. In the letter to the *Birmingham Daily Post*, before quoted, July 28th, 1896, General Phelps after stating that while children were unvaccinated equally in north and south Gloucester the epidemic of small-pox

was confined to south Gloucester, proceeds, "The sanitary conditions of south Gloucester are notorious and *fully account for the outbreak,** and for the failure of the 20 or 30 cases in north Gloucester to spread." Again, in the same paper on the 9th of July, the gallant General had impressed upon its readers that "the most important fact about the epidemic was that although north Gloucester had neglected vaccination as much as south Gloucester *the epidemic obstinately restricted itself to south Gloucester.*" We have seen that this is untrue. 1882

Now, what was the special insanitary condition to which the prevalence of small-pox in south Gloucester was attributable? One might have expected to hear of overcrowding; for, if there is any insanitary condition which is specially calculated to promote the diffusion of small-pox, as of all other infectious diseases, it is this. It was, however, out of the question to allege the existence of over-crowding in south Gloucester, which is the newest and most open part of the city, except the much more limited district of Wotton, and is inhabited by a class of population of too respectable a character generally to be given to over-crowding. The cause could not be a contaminated water supply. For, irrespective of the most important fact that no one has yet demonstrated that small-pox is a water borne disease, the greater part of south Gloucester is supplied from the same source as north Gloucester. It could not be the sewer ventilators, which have been depicted as "belching forth their sewer gas"; for, some of the worst of these are in north Gloucester, and in that part of it (Wotton) where there have been no small-pox cases at all. Moreover, neither Mr. Hadwen, General Phelps, nor any one else has brought forward any evidence of any definite connection between any specific manholes in south Gloucester and cases of small-pox, to say nothing of the consideration that it is open to doubt whether the infection of small-pox can under any circumstances be communicated by sewer emanations.

There was, clearly, only one sanitary condition left to indict in South Gloucester, and that was the drainage; so upon this the attack was concentrated. Of the drainage of South Gloucester we are told by Mr. Hadwen that "it is totally inadequate"; and the proof given of the inadequacy is that "the drainage in this portion of the City had to go down and then work its way round again in order to open up two outlets into the river Severn. One of these outlets had to pass under the canal by means of a syphon before it empties into the river,

* The italics are *not* in the original. Note that the reference to the "20 or 30 cases" was made when the epidemic had ceased, and when it would have been easy to ascertain that there had been ten times as many.

and in order to pass through the syphon it necessitates a certain amount of force and it would require thorough flushing." "But," we are told, "Gloucester had had no water supply worth having," and, consequently, the public are led to believe, the sewers were not flushed.

Now, without taking the trouble to demonstrate the untruthfulness of these statements, which has been fully done by the City Surveyor,* it is sufficient to point out that, notwithstanding the assertion of General Phelps, that "whilst the sewerage arrangements were good in North Gloucester they were abominably bad in South Gloucester," and that "the sewerage of North Gloucester is exceptionally good," everyone who knows anything about the drainage of Gloucester is aware that all the defects of drainage on the south side of the City, such as they are, can be at least paralleled on the north side, a portion of which lies lower, and is consequently more difficult to drain, than any part of the opposite end of the City. The fact is that, as the City Surveyor has conclusively shown, all these statements about the defects of the sewerage of the south side of Gloucester are merely exaggerations of difficulties such as are liable to occur from time to time in the drainage of every place which has not very good gradients. They have exhibited themselves quite as much on the north as on the south side of the City, and not a particle of evidence that will bear investigation has been adduced either by Mr. Hadwen or anyone else to show that a single case of small-pox was caused by them. Yet this same unscrupulous partisan has not hesitated further to assert that in the newer portion of Gloucester, every house in which has been built in accordance with the rigid building bye-laws of the Local Government Board, "an enormous number of jerry-built houses have been erected"; that the south side of the City, which is one of the highest parts of Gloucester, "lay low and swampy"; that the sewers in the streets are so small as "to cause constant choking"; that in a district where probably not one house in fifty has a cellar, "the general inefficiency and unsatisfactory levels of the drainage" cause the "cellars to flood with sewage."

It is not surprising that the torrent of misrepresentation as to the insanitary condition of South Gloucester when once set free soon spread itself over the whole City; and accordingly, with an inconsistency which less reckless calumniators could

*Exhaustive replies to the misstatements of Mr. Hadwen and General Phelps have been published by Mr. R. Read, the City Surveyor, on several occasions, both in local journals and in others circulating outside Gloucester. Mr. Read's evidence on this point is the more worthy of consideration by anti-vaccinators as he was for years one of the very few men of any position in Gloucester who identified himself with the anti-vaccination cause.

not fail to perceive, General Phelps, in a speech at Coventry, had the audacity to state that "the sanitary condition of Gloucester was something of a horrible kind"; that "the City ran its sewage into the Severn, which went past the doors of the houses. That was foul enough, but when the City ran short of water they pumped the water out of the river into the mains and it was drunk!" No wonder that the newspaper reporter put a note of astonishment after this lively picture of the sanitary arrangements of the City of Gloucester, or that other platform orators and newspaper scribblers should have felt safe in "going one better" than the General and in summarising the indictment against what Mr. Hadwen has been pleased to call "this poor, miserable, and devoted City," in the comprehensive formula

"FILTHY GLOUCESTER!"

And it is an epithet which would be well deserved, if there were any substantial truth in these statements. But General Phelps, though he has been in Gloucester more than once, and must have seen the river which he has so particularly described as running "past the doors of the houses," must have known well enough that there are not fifty houses in the whole city "past the doors" of which the Severn runs, and that the majority of the houses are at least a mile from the river. Nor did he think it inconsistent with the character for veracity which an officer who has borne Her Majesty's commission might be expected to treasure, that he should suppress what had been fully made clear to him, namely, that the water which has on two occasions, for limited periods, been pumped from the Severn, to supplement the supply from the ordinary sources, was taken from the river at least a mile above where the sewage enters it; that there is no back tide in the river at that point, except for a few hours in each month; and that any danger from such backflow had been effectually safeguarded.

But it would be a waste of time to expose in detail other and similar misrepresentations as to the general sanitary condition of Gloucester which these two unscrupulous calumniators of the city have scattered broadcast about the country, in the hope that by so doing they would divert attention from the damning evidence which the general facts of the epidemic offered of the folly of those who were responsible for its outbreak. There is ample proof for those who are desirous of obtaining accurate and impartial information on this subject that for some years past Gloucester has, with one solitary exception, been singularly free, when compared with other towns of its size and character, from those

diseases, especially typhoid fever, which are the certain criteria of a general insanitary condition. All that needs pointing out here is that, by their own showing, all the charges which have been so recklessly circulated by Mr. Hadwen and General Phelps against the water supply, sewer ventilators, drains, jerry buildings, and other alleged sanitary enormities of Gloucester apply with quite as much—or as little—force to North as to South Gloucester, and that this effectually cuts the ground from under the “South Gloucester Theory.” But, even if these charges were as true as they are false, it must be sufficiently evident to any person of ordinary intelligence that though they might possibly explain why so many persons were attacked by small-pox in Gloucester, they have not the slightest bearing upon the question why the unvaccinated children and the vaccinated adults contributed so largely to the total number of attacks. It has been simply to distract attention from this aspect of the epidemic that all these fabrications about the insanitary state of Gloucester have been concocted, with the hope that if only enough “insanitary” mud could be cast upon the statistics of the epidemic its true lesson might be confused or blotted out. If the question at issue had been a severe epidemic of typhoid fever or cholera there would have been some relevancy in this attack upon the sanitary condition of the city. But to represent that bad drainage or water supply can of themselves generate or transmit small-pox is to exhibit an amount of ignorance of the true nature of the disease and of the methods by which it is propagated which though pardonable in a retired Indian general is scarcely creditable in a duly qualified medical practitioner, even though he be of only three years standing in his profession.*

* In confirmation of the statements above made as to the groundlessness of the charges made by Mr. Hadwen and General Phelps against the sanitary condition of Gloucester, the following counter statements of Mr. R. Read, the City Surveyor, and Dr. Campbell, Medical Officer of Health, may be quoted :—

In a letter to the *Birmingham Daily Gazette* of June 8, 1896, Mr. Read thus writes—“Sir, Your issue of this date contains another letter from Lieut.-Gen. Phelps, in which he again draws upon his fertile imagination to malign Gloucester, apparently from texts supplied to him by some madman or reckless joker. He states that ‘the water supply is now intermittent, being shut off at night. The authorities dare no longer pump up the raw sewage and water out of the Severn into their water supply. The result is that flushing of the solidified sewage in the sewers is less possible than ever.’ At a meeting of the Vegetarian Society in London, General Phelps is reported by two London newspapers of the 30th ult. to have made other and similar statements, which are absolutely false, and which I have since contradicted.”

Mr. Read then proceeds to show that the water supply of Gloucester has been constant, with the exception of one week, since 1891, and that there is no justification for Gen. Phelps’ assertion that it contains sewage.

With special reference to the sewers of Gloucester, Mr. Read has made the following Report to the City Sanitary Committee: "Gentlemen, In consequence of the numerous false statements recently published with reference to the sanitary condition of this city, and the very definite but untrue statements made by Lieut.-Gen. Phelps and Mr. George Newman (Local Secretary of the Anti-Vaccination Society), I have been requested to make an official report on this subject.

"During the last fortnight I have, in conjunction with the Assistant Surveyor (Mr. H. J. Weaver), made personal and careful inspection of the sewers in the districts affected by the small-pox, and I most positively deny the truth of the wild and exaggerated statements which have lately been circulated with reference thereto. Generally speaking the sewers of the city have as good gradients as possible, having regard to the configuration of the ground, and they are in very fair condition, and in good working order. Out of a total of 35 miles of sewers there are not more than three of our streets which have flat gradients. These get special flushing.

"The statements in Mr. Newman's letter to the *Standard*, with regard to the Sudbrook sewer, are altogether untrue and show gross ignorance as to the actual facts."

Mr. Read, after explaining in detail the relations of various sewers to one another, proceeds: "Mr. Newman writes, 'Every high tide an immense volume of water rushes up the main sewer. I do not pretend to explain the result of this in forcing gas back into streets and houses, but it is a fact that during recent high tides sewage has been welling up into the streets in low levels.' This statement is absolutely untrue and has no foundation in fact." Mr. Read then explains the relations of the sewers to the canal and river, and, with reference to the tides, states "the tides never reach that height (viz.: 13 feet 5 inches before the syphon under the canal can be water-logged) unless in conjunction with a very great flood, the like of which has only happened once in twenty years."

Dr. Campbell also reported at the same time as follows:—"As false statements are constantly being made by irresponsible persons regarding the epidemic of small-pox now affecting the city of Gloucester, I think it right to give them a denial. It has been suggested that the outbreak is due to the bad drainage of the streets and houses, but I can with confidence say that this is untrue, and, in conjunction with the City Surveyor, I can affirm that the sewers are acting satisfactorily.

"During the past few years Gloucester has been practically free from the diseases usually resulting from bad drainage, bad water supply, and the like. Typhoid fever, the disease *par excellence* of bad surroundings, is scarcely ever notified here; and I think it is a great pity that untrue and apparently malicious statements should be published."

Mr. George Embrey, the County Analyst, in a letter to the *Birmingham Gazette* of June, 1896, writes:—"Sir, in your issue of yesterday, Lieut.-Gen. Phelps is trying to get out of a difficulty by raising side issues, and is again making mistakes. His original statements were, first, that 'the tides in the Severn cause the water in the sewers to rush out through the ventilators, which he knows to be untrue. Second, that 'the epidemic is greatest in the low-lying ground near the polluted river.' This is also untrue. Third, that 'sewage is washed to and fro in front of the houses.' Again untrue."

It is not often that an officer in Her Majesty's service has the lie direct given to him so plainly and so publicly as this.

CHARGES AGAINST THE HOSPITAL.*

We have not, however, yet reached the lowest abyss of misrepresentation into which the opponents of vaccination have plunged in their anxiety to find the means of discrediting it. The attempts to explain away the striking fact of the attack statistics of the epidemic by a general onslaught on the alleged insanitary condition either of "South Gloucester," or of the city as a whole, must have been recognised by the more astute members of the League as a very feeble weapon for the purpose. A more plausible pretext for discounting the lesson taught by the experience of Gloucester was wanted, and it was found in an attack upon the hospital. The fatality of the epidemic as a whole (21·7 per cent of the total attacks) was unduly high when compared with that of other epidemics of recent date. That of the hospital (27·9) was higher still. This suggested that the hospital was the source of the high mortality, and it seemed to be only necessary to make out a case against the hospital in order to account for the excessive mortality of the epidemic, and thus to explain away its relations to vaccination, so far as the evidence from the mortality statistics is concerned.

But there was another object to be gained by this manœuvre, and that was *to confuse the issue*. The real issue of the Gloucester epidemic was, as has been before indicated, what light does it throw on the result of neglecting vaccination? The answer is so conclusive that it does not leave the opponents of vaccination a leg to stand upon, and their only resource was to confuse this issue as much as possible by importing extraneous ones into the discussion, giving them an undue importance, and thereby distracting attention from the real issue.

The charges which have been brought against the hospital are three: first, that by its position it promoted the diffusion of infection and so unduly increased the epidemic; second, that the accommodation which it provided was insufficient; thus conducing to the same result; and, third, that the general management of the hospital was inefficient and the treatment of the patients such as to have caused what has been called by one† of the two persons who have made these charges "a terrible sacrifice of human life," and by the other|| "a shocking

* It may be desirable to state that the writer of this has no official connection with, or responsibility for, the administration either of the Isolation Hospital or of the City of Gloucester generally, his official duties lying entirely outside the city proper.

† Mr. Walter Hadwen. || Mr. George Newman, Secretary of the Gloucester Branch of the Anti-vaccination League.

death-rate." Let us see what truth there is in these charges, and how far, if true, they affect the question at issue.

That there is a case against the position of the hospital must, of course, be freely admitted. But, as has been pointed out in an earlier portion of this story, this is a matter for which the then existing Sanitary Committee were not responsible, but their predecessors, for years previously. The Committee had fully recognised the unsuitability of the position, and had practically agreed with the Gloucester Rural District Council to remove the hospital and to erect one for the joint district, in a suitable position, outside the city shortly before the epidemic broke out. But, though the hospital was, in consequence of its position, responsible for a considerable diffusion of infection, it is difficult to see what bearing this fact can have upon the question, whether efficient vaccination confers protection against small-pox or not? If the hospital had been as well isolated as it was the reverse, there would certainly have been a smaller number of persons attacked, but there is not the slightest proof that the age incidence of the attacks and the remarkable evidence it affords in favour of vaccination, would have been in any way affected.

It is clear, therefore, that the hospital contributed materially to the spread of infection; but so did the fact that over 1300 persons had to be treated in their own homes. We do not want to be told that, apart from the preventive influence of vaccination, isolation is the first and essential condition of arresting the spread of small-pox as of all other infectious diseases; and there can be no doubt that the magnitude of the Gloucester epidemic, though primarily due to neglect of vaccination, was secondarily caused by the insufficiency of the means of isolation; for if every case had been at once effectually isolated the epidemic would have been much more limited than it was. But this is not an experience which is peculiar to Gloucester or to small-pox. Every outbreak of infectious disease, if it once passes the limit of effective isolation, gets beyond control, and a big epidemic is the consequence, as was the case at Willenhall.

The Gloucester epidemic was a big one; but that is not its chief point of interest. Its magnitude only gives it an importance as an object lesson which it could not have claimed if it had been very much smaller. One of its most instructive teachings is the risk which unvaccinated communities run of losing control of an epidemic of small-pox when it does fall upon them and, from accidental causes, outstrips the limit of effective isolation. This limit at Gloucester was a hospital

with 48 beds,* which is more than one bed per 1000 of population, the proportion generally considered sufficient for ordinary requirements. And it would have been ample for small-pox alone had the children of Gloucester generally been as well vaccinated as they were ten years ago. For, up to the end of January, when, though the epidemic was incubating, it was still under control, 59 cases were removed to the hospital, being all that were notified.† Of these, 25 were unvaccinated, and 34 were vaccinated only in infancy. Of the unvaccinated, 22 were under 10 years of age, 2 between 10 and 20, and one over 20. Amongst these 59 cases there were 11 deaths, 6 of whom were unvaccinated children under 7 years of age and 5 were adults, all over 30 years of age, who had been vaccinated only in infancy.

Now, if anything is morally certain, it is that if the whole of the 25 unvaccinated cases had been vaccinated in infancy at least 20 of them would have never taken the disease at all, and, therefore, would not have required to be removed to the hospital. Of the vaccinated cases the 5 deaths relieved the hospital to that extent; so that, without taking into consideration the fact that, if they and the other vaccinated cases (all of whom were over 16, except 2, one of whom was 11 and the other 14) had been re-vaccinated they would in all probability not have been in the hospital at all, at the end of January there would, in the ordinary course of things, have been not more at the outside than 39 cases in the hospital.

As a matter of fact there were over 50. But many of these were small children, and by this time the hospital which had been provided, but never used, for cholera cases at Hempstead, had been appropriated for the isolation of small-pox cases, so that, even at this date, the limit of isolation had not been reached. But already the number of cases was beginning to increase rapidly in consequence of the number of fresh centres of infection that had been developed, and, the infection having taken hold of the unvaccinated children, the epidemic then assumed all the violence of an explosion, and soon got beyond control.

* In order to disparage the hospital and to throw odium on the Sanitary Committee, it has been labelled a "toy hospital," and the Committee have been held up to reprobation for not making more appropriate provision. Whether the provision for dealing with infectious disease at Gloucester at the time of the outbreak was all that could be desired is open to question, but nothing can be more unjust than to speak of the hospital itself as otherwise than fairly sufficient, in point of accommodation, for all ordinary requirements.

† It was discovered afterwards that a few mild cases had escaped notification, and these undoubtedly helped materially to spread the infection.

It is clear, therefore, that there is no case against the sufficiency of hospital accommodation up to the end of January. But, when the hospital became full, and the Hempstead hospital was opened, a severe strain upon all the administrative arrangements began, no doubt, to make itself felt. It is very easy to look back upon the position in which the Sanitary Committee were then placed and to urge that they might have done this or that, and thus have relieved this strain at an earlier date than they actually did; but this *ex post facto* wisdom is a very cheap form of criticism, which is generally indulged in most by those who would have themselves been least competent to better the conduct on which they so freely animadvert. It seems to be assumed by these critics that hospital buildings can be erected with the rapidity of Aladdin's palace, and that the resources which were sufficient for the ordinary requirements of the hospital could be at once expanded to meet the largely increased necessities of the emergency. That during this period of the epidemic the administration of the hospital must have exhibited defects which a well regulated hospital should not show may be assumed. But the question to be discussed here is not how far these defects might have been obviated by more competent management, but, what effect had they upon the recovery of the patients? The only answer which can be given to this question must be obtained by a comparison of the fatality of the attacks inside and outside the hospital respectively.

Now, it is well to note that according to the anti-vaccination indictment it is only during the months of February, March, and April that there is any case against the hospital at all; since, at the end of April, Dr. Brooke was appointed by the Sanitary Committee to take charge of its administration, and after that time it is assumed to have been greatly improved. This is graphically illustrated by a statement made by one of the speakers at an anti-vaccination meeting at Coventry, that "when Dr. Brooke went there, the mortality at the small-pox hospital was 57 per cent., but after Dr. Brooke had been there it went down to 8 per cent." How truthful this statement is may be inferred from the following facts: the cases admitted into hospital from Jan. 1 to April 30, about which latter date Dr. Brooke assumed the charge of it, were 549 in number, but, as 6 of them died after he took charge, and were thus referable to both periods, they may be excluded, leaving 543 cases, of whom 153 died, showing a fatality of 28.1 per cent. Now as the fatality of the hospital cases for the whole period of the epidemic was 27.9, it is clear that Dr. Brooke's arrival made little or no difference in it.

This is no discredit to Dr. Brooke, but gives reasonable ground for assuming that, whatever were the defects of the administration before his arrival, the fatality of the cases was not due to any cause which could have been affected by his administration.

COMPARISON OF HOSPITAL AND NON-HOSPITAL DEATH-RATES.

Taking, then, the total number of attacks, exclusive of those whose vaccination was uncertain, the number of which is not enough to materially affect the calculation, the following are the results of the comparison of the fatality of the cases inside and outside of the hospital respectively :

Hospital cases : total attacks, 679 ; deaths, 190 ; fatality 27·9 per cent.

	VACCINATED IN INFANCY ONLY				UNVACCINATED		
	Attacks	Deaths	Fatality		Attacks	Deaths	Fatality
Under 10	5	0	0	..	275	128	46·5
10 to 20	97	6	6·1	..	19	7	36·9
20 and over	262	40	15·2	..	21	9	42·8
	—	—	—	..	—	—	—
	364	46 ^{mean} _{fatality}	12·3	..	315	144 ^{mean} _{fatality}	45·7

Non-hospital cases : total attacks, 1318 ; deaths 236 ; fatality 17·9 per cent.

Under 10	18	0	0	..	424	153	36·0
10 to 20	172	5	2·9	..	32	7	21·9
20 and over	654	62	9·4	..	18	9	50·0
	—	—	—	..	—	—	—
	844	67 ^{mean} _{fatality}	7·9	..	474	169 ^{mean} _{fatality}	35·6

From the above figures it will be seen that the greatest difference in the two classes of cases was in the unvaccinated, in which it was 10·1 per cent., whilst in the vaccinated it was only 4·4 per cent. But, further, it is evident that in the unvaccinated cases the source of the difference is mainly in the children under ten years of age ; for although the mortality in the cases between 10 and 20 years is as high as 15 per cent. against the hospital, the number of patients in this section is, relatively, so small as to exercise no serious influence on the gross fatality. In the unvaccinated cases above 20 there is a trifling percentage in favour of the hospital. On the other hand, in the vaccinated cases, the fatality is comparatively much higher in those above 10 years of age in the hospital than it is amongst those treated outside, but the actual difference was very small—less than 6 per cent. The ratios of the fatalities of the vaccinated and unvaccinated to one another, in and out of the hospital respectively, are approximately the same.

Putting these facts together it is not difficult to see that the 10 per cent. greater fatality of the hospital cases is fully accounted for (1) by the larger proportion of unvaccinated children received into the hospital (nearly 8 per cent.) than were treated outside, and (2) by the greater fatality amongst these children and amongst the vaccinated adults. This latter fact is explained by the practice which was adopted as soon as the strain on the hospital accommodation began to be felt, of selecting the more severe cases for removal to the hospital.

So far, therefore, as the hospital statistics are concerned, they offer no evidence in support of the alleged neglect and maltreatment of the cases that were taken there. If the death-rate at the hospital was a "shocking" one, as the anti-vaccinators allege, it was only certainly not far less shocking outside the hospital, and in both cases its excess was evidently due to unvaccinated children under 10, and adults, over that age, who were vaccinated only in infancy or unvaccinated altogether. This conclusion is the more instructive because so much credit has been taken by the local anti-vaccinators for the good results obtained outside the hospital by the "Pickering treatment," the "Crimson Cross treatment," and other modes of dealing with the disease which were so liberally patronised by them, and were claimed to be not only of great value as curative but also as preventive agents. If, with the remarkable success which is claimed to have attended the treatment of a large number of the cases outside the hospital by these agencies, the mean fatality was still 17.9 per cent. of the total attacks, it is evident that the 27.9 per cent. mean fatality of the hospital, handicapped as it was by the larger proportion of unvaccinated children and of severe cases generally that were taken to it, gives very small support to the charge of the "terrible sacrifice of human life" which is alleged to have taken place within its walls, or for the still stronger assertions which anti-vaccinators have made about it, that it was "a veritable death-trap," that it was "little other than a shambles," and that the state of things in it was "indescribably dreadful."*

As no direct evidence whatever in support of these charges has been adduced, it may be sufficient, until it is forthcoming, to supply an answer which cannot fail to carry weight, in the shape of the following letter, which was addressed to the

* General Phelps, as usual, has exhibited his readiness to "go one better" than any of his other rivals in mendacity, and has lately stated, in a letter to the *Birmingham Argus* (Nov. 13, 1896) that "out of every one hundred discharged [from the hospital] fifty-four were corpses," i.e., a fatality of 54 per cent.!

Gloucester Journal of the 28th of March, by the Rev. J. Hughes Owen, Vicar of St. Paul's, Gloucester, one of two* of the city clergy who between them visited the hospital daily during the whole time when this "terrible state of things" is alleged to have existed:

"PATIENTS IN THE HOSPITALS."

SIR,

The mischievous imaginations of some and the credulity of others, with the readiness of too many to pass on groundless statements, are causing a vast deal of unnecessary distress and not a little disgust amongst those who know the truth about the Infectious Diseases Hospitals and their inmates.

May I, Sir, as one who has some practical experience of hospital life, assure the sorrowing friends of all these unfortunate patients that nothing could be kinder or more tender than their treatment, and that among the sufferers themselves there is to be found nothing but gratitude and satisfaction at the nursing, food, and general arrangements? It is my conviction, too, that though at first the work was too much for the nurses, now there is a sufficient staff, seeing that many of the convalescent patients are not only able but very willing to assist, as, indeed, convalescents are expected to do in all hospitals.

Whether there are too many patients in some of the wards I am not competent to say, as I do not know how many cubic feet of air are required for children or adults, but I am quite certain that no evil can possibly arise from the judicious placing of two small children, most of them under eight years old, in an ordinary sized adults' bed. There is a very large double bed which I have seen made up for four little mites, the pillows being placed at the head and the foot, and I think this arrangement gave even more room (the bed being much wider) than when two are placed in a single adults' bed. There are also many cots, but I have never seen more than one child in each.

In conclusion, let me add, that should it please God to visit me with any infectious disease, I shall only be too glad to place myself under the able care of Mr. Hall and his kind assistants, many of whom are educated ladies, some also trained nurses, and all, I believe, good, Christian, English women.

I am, Sir,

Yours faithfully,

J. HUGHES OWEN,

Vicar of St. Paul's, Gloucester.

P.S.—I should like to add that considering the loathsome nature of the disease, the wards are, in my opinion, singularly free from offensive smells, and kept admirably clean and neat.

It must be obvious that the charges which have been so recklessly made against the hospital, like those which have been made against the insanitary condition of "South Gloucester," are only devices to explain away the lesson which the general evidence of the epidemic so abundantly affords in confirmation of the opinion expressed by the Royal Commission as to the value of vaccination in protecting against small-pox.

But there is another lesson which the Gloucester epidemic

* The other being the Rev. H. C. Foster, Vicar of All Saints, who has expressed himself as ready to bear similar testimony if required.

undoubtedly teaches, and that is the grave responsibilities which local authorities who are entrusted with the care of the public health incur when they neglect or refuse to make the provision which the law empowers them to make against such a disaster as has overtaken Gloucester. Of the provision necessary in regard to vaccination it is unnecessary here to speak. That will be a question with which the Legislature must deal. But it may not be out of place to say a word or two, in conclusion, on the subject of what is rather vaguely called "sanitation" as a substitute for vaccination.

The opponents of vaccination are very fond of claiming for themselves a special mission to proclaim the virtues of sanitation. It will be hardly necessary for the writer, who has been engaged for more than twenty years in promoting in various ways the improvement of the public health, to say that he does not yield to any anti-vaccinator in his appreciation of everything that can conduce to that object, or in his unwillingness to advocate anything that can increase in any way the difficulties involved in attaining it. Nay, he may even go further in the expression of his concurrence, and admit that if we could make one, and in this respect the most important branch of our "sanitation," *viz.* isolation, perfect, we might dispense with vaccination, or, at any rate, might relegate it to the position of those works of supererogation which may be safely left to individual conviction to perform or neglect as it may feel expedient. But what does this mean? It means a much greater readiness on the part of local authorities to incur expenditure in providing the means of dealing with small-pox than they at present exhibit. It means, too, much more effective legislative provisions for enforcing both corporate and individual responsibility in regard to small-pox as well as other infectious diseases than now exist. When that millennial period shall arrive when every locality shall be provided with sufficient hospital accommodation and other necessary resources to meet any possible emergency, and when every person who may be attacked with small-pox, especially in its milder forms, shall be recognised as a menace to the community and be deported at once to a well equipped isolation hospital, and all those who have been in contact with him shall be effectually quarantined, and every infected article effectually disinfected or destroyed, we may, perhaps, be justified in leaving each individual to protect himself by vaccination or not, as he may think fit. But even then we shall have to remember, that though by a rigorous enforcement of these provisions, which would be far more difficult than that of vaccination now is, we might succeed in

stamping out small-pox amongst ourselves, our relations to other countries are such that until they became equally enlightened with us in this matter we should be perpetually liable to a re-introduction of the infection.

With the claim which anti-vaccinators make for the promotion of other forms of "sanitation" as means of preventing small-pox, in the shape of good water supply, good drainage, good house accommodation, and plenty of sunlight and fresh air, vaccinators can also cordially agree, not because they are satisfied that they have any direct influence in conferring such immunity against small-pox as vaccination gives, or that small-pox is essentially a "filth" disease, but because their possession and appreciation by any community is of itself evidence of that intelligent regard for local self-government which when applied to the problem of dealing with small-pox will be as effective in helping to stamp it out as it has been shown by experience to be in the case of other infectious diseases. But here, too, we are far from that Utopia which must be effectively established before we can afford to throw away a means of defence so valuable as vaccination has proved itself to be.

May we not, then, whilst expressing our willingness as sanitarians to co-operate with the opponents of vaccination in promoting all that they can possibly desire in the way of improved sanitation, invite them to join with us in adopting, even though it be only as an auxiliary and temporary protection, a means of defence which the experience of Gloucester no less than that of the world in general has shown to be the cheapest, the most easily maintained, and the most effective safeguard against small-pox yet known?

WHAT THE EPIDEMIC COST GLOUCESTER.

The preceding account of the epidemic of small-pox at Gloucester would be incomplete without some attempt to convey, for the instruction of others, an idea of what the city has had to pay for its neglect of vaccination. Any such attempt is naturally a difficult one, in consequence of the impossibility of estimating in any way one part of the penalty which has been already paid, and of assessing with accuracy even the more tangible portion of it, to say nothing of that which yet remains to be liquidated in the shape of interrupted trade and damaged reputation.

For who can measure in figures or express in words the unutterable distress, suffering, and remorse which must have been experienced by the relatives of the 443 victims of the epidemic who paid the penalty of their own or their parents' folly by their deaths? or the somewhat less acute but more widely spread misery which must have followed the illness of the 1600 others who escaped with their lives?

To anyone who may visit the Gloucester Cemetery the crowd of newly-made graves in that part of it in which the victims of the epidemic have been chiefly buried appeals, with mute but expressive eloquence, as a far more telling memorial of Jenner than the marble embodiment of the great discoverer of vaccination which stands in the Nave of Gloucester Cathedral. For it records in no uncertain language the price in *blood money* which the city has had to pay for the folly into which it has been led by a few astute but unscrupulous fanatics. It is appalling to think of the mischief which a man who possesses the means of misleading the public in matters of life and death, such as this, and who is devoid of any sense of responsibility, may thus do. In comparison with him the dynamiter, who merely wrecks a building or two, or sacrifices a few lives, for which he pays with his own, is almost a creditable character. If the moral sense of the community were more educated than it unfortunately is the lightest punishment which would be inflicted on such a man would be social ostracism.

As to the pecuniary penalty which Gloucester and those who are interested in its prosperity have had to pay as a consequence of the epidemic, it is sufficient to say that it has been estimated and stated at a public meeting by the President of the Gloucester Chamber of Commerce* to be at least

£150,000,

* Mr. Alfred Slater, at the Mayor's Banquet.

or, approximately, an amount equal to the whole rateable value of the City! The amount is so enormous that it may well stagger belief. But it is founded on inquiries which tend to show that it is probably rather below than above the mark. That portion of it which has to be paid immediately by increased rates is £17000.

And in regard to this aspect of the question it must be remembered that Gloucester is not a fashionable watering place like Eastbourne, or a great educational centre like Cheltenham, or even an ordinary residential town, like so many others, but mainly an importing and a manufacturing centre, whose chief imports and exports are corn, wood, and manufactured articles of various kinds.

If it is difficult to estimate the immediate penalty which Gloucester has had to pay in cash, it is still more so to gauge what may be the protracted effect of the epidemic on its future prosperity. Much will depend in this matter on what can be done to contradict and neutralise the effect of the unscrupulous and baseless misrepresentations as to its insanitary condition which have been scattered broadcast over the Kingdom by anti-vaccinators generally, at the instigation and with the connivance of one or two of its own citizens, for the obvious purpose of discrediting the lesson which the epidemic teaches.

Against this base conspiracy to blacken the hitherto unblemished reputation of their city, its other citizens have the remedy in their own hands. But it may be well for other towns which, by their unprotected condition at present, are inviting a catastrophe as serious as that which has befallen Gloucester, to remember that should it overtake them they may have to pay an even heavier penalty than "the faire citie" by the Severn has had to meet.

*Summary of the more important Evidence as to the Protective Value
of Re-vaccination, obtained from Public Establishments, Employers
of Labour, and others in the City of Gloucester.**

Gloucester County Asylum. No. of staff and patients, 1481. Four persons attacked, viz., three patients and one nurse. All the rest immediately re-vaccinated: no further attacks.

H.M. Prison. No. of staff and prisoners, about 100. One prisoner, who had not been re-vaccinated, attacked; all the rest re-vaccinated; no further attacks.

H.M. Post Office. Total staff, 221. Contracted small-pox, 2, neither of whom had been re-vaccinated, as all the rest who escaped had been. Small-pox occurred in houses of 13 of them.

Police Force. Total staff, 61. All re-vaccinated, with their families, and escaped, except wife and two children of a constable who was an anti-vaccinator, and refused to have them re-vaccinated.

Great Western Railway Co. Staff of Passenger and Goods Department number 244. Of these 223 were re-vaccinated, and none took small-pox. Of remaining 21, not re-vaccinated, 9 were attacked.

Gloucester Waggon and Carriage Co., Ltd. Out of 950 men employed, 42 were attacked, the rest having been re-vaccinated.

Gloucester and Birmingham Navigation Co. Staff and workmen number 50. All re-vaccinated and escaped, except one whose re-vaccination was doubtful.

Gloucester Tramway Co. Staff of 32 men and boys. Three were attacked and one died; neither of them vaccinated. The rest all re-vaccinated and escaped.

Gloucester Nursing Association. Of staff of about 70, nurses and assistants, eight of whom had had small-pox and all the rest re-vaccinated, none were attacked.

Small-pox Hospital. Not a single nurse attacked,

(For further evidence from various other sources see fuller notes which follows.)

* Abstracted from the Report of the Vaccination Committee of the Gloucester Board of Guardians.

EVIDENCE AS TO EFFECT OF RE-VACCINATION.

N.B.—In some of the following communications the names of the individuals or firms are omitted for obvious reasons. The original letters still exist, and can be examined for purposes of corroboration if necessary.

In order to prevent misconception in connection with some statements in the following evidence as to persons having developed small-pox shortly after vaccination or re-vaccination, it is well to mention that it takes generally 14 days from the first reception of the infection of small-pox before the earliest symptoms of the disease appear. It also takes from six to eight days for the protective influence of vaccination to be fully established. Hence, if a person was vaccinated on the 1st of the month, and exposed to the infection on the 7th, he might develop an attack of the disease on the 21st, but it would probably be very mild, unless the original dose of infection was very large, and that of vaccination correspondingly small, *e.g.*, from one poor bleb.

It is to be noted that the evidence here given is only a selection from a large mass obtained, the chief object being to illustrate the report by the experience of those who have had under their management or observation large numbers of persons. So far as the individual cases are concerned, which illustrate, often in a startling way, the protective influence of vaccination, they could be largely multiplied, if necessary. But it is believed that enough are given to convince any person who is open to conviction of a fact which no one who has had any practical experience of small-pox at all doubts.

GLOUCESTER COUNTY ASYLUM. (Supplied by F. Hurst Craddock,
Esq., Superintendent.)

Staff and their families :—

Primary vaccinations	..	..	..	..	22
Re-vaccinations	..	..	..	..	215
					237

Patients :—

Primary vaccinations—60 males; 90 females	—	150
Re-vaccinations .. 445 .. 499 ..		

505	589	— 1094
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Total..1481

Total number of persons attacked by small-pox, 4; *viz.*, one male and two female patients and one nurse. One female patient died of hemorrhagic variola, the other three recovered. The type of the malady in the male patient was confluent and very severe; in the other female patient it was discrete and mild. Of these four cases, one, the fatal case, had never been vaccinated until she was done two or three days before being attacked; a second, the male, was vaccinated in infancy, but not again until within a few days before the attack; the two other cases had been vaccinated in infancy, and re-vaccinated, and one of them is reported to have also had small-pox some years ago. The large number of primary vaccinations in a community of adults, as this is, is explained by the fact that no evidence could be obtained of their having been vaccinated previously.

Note by Committee. The experience of the County Asylum is one of the most striking in the course of the epidemic. Although every practicable precaution was taken by the authorities at the outset of the epidemic to isolate the patients from the risk of contact with the infection, by rigid rules as to the visitation and admission of patients, and by the re-vaccination of the whole of the staff, one of the female patients was suddenly attacked in the middle of March. How the infection was introduced could not be satisfactorily ascertained. But there it was, like a lighted fuse inserted into a barrel of gunpowder, in the person of a patient in one of the general wards. She was at once isolated, the whole of the patients were vaccinated, and the explosion, which would have otherwise been certain and terrific, was, by the prompt action of the Superintendent, reduced to the "fizzle" of the three other cases alluded to above. It is not often that such a well authenticated and conclusive proof of the efficacy of vaccination as this can be obtained.

H.M. PRISON, GLOUCESTER. (Information supplied by Dr. O. Clark.) In the month of May, a male adult prisoner was attacked with confluent small-pox. He had been in the Prison sufficiently long to make it certain that he had not brought the infection with him. No clue could be discovered to the source from which he received it. The whole of the staff, most of whom lived outside the Gaol, had been previously re-vaccinated, and the prisoners were in process of being vaccinated when the disease broke out, but the prisoner who was attacked had not been re-vaccinated. The total number of the prisoners and staff at the time was about 100. No one else was attacked. The patient recovered.

GLOUCESTER POST OFFICE. (Information supplied by W. H. Godby, Esq., Postmaster). Total staff employed 221. Contracted small-pox, 2. When these two officers came up for appointment some years ago they were rejected by the medical officers and in consequence were not re-vaccinated. One of the two was re-vaccinated when the epidemic was at its worst, but he must have then actually contracted the disease as it shewed itself within a very few days afterwards. Mr. Godby adds: "All persons placed upon the establishment of the Post Office must be re-vaccinated, and I know of no better illustration of its efficacy than the case of the Gloucester Post Office *employés* during this epidemic. Postmen are constantly moving about delivering and collecting letters in infected districts. Sorting Clerks have to deal with letters which must convey infection; and Counter Clerks are, of course, continually in contact with the public, yet no person upon the established staff at Gloucester has contracted the disease. The Medical Officer ordered compulsory absence in 13 cases, in consequence of Small-pox breaking out at the houses of these men. In all cases the men themselves were either re-vaccinated, or they bore such very distinct marks of former vaccination as to render another operation unnecessary. Only one of the number was opposed to vaccination, and he has had four children attacked and one has died. In nearly all other cases vaccination of the members of the families who were attacked had been neglected."

Gloucester Police Force (Information supplied by Mr. Deputy Chief Constable Philpott):—The Police force of the division consists of 61 members, all told, the whole of whom, together with their wives and families, have been vaccinated or re-vaccinated (except the wife and two children of one constable), with the result that *not one member of the force has been attacked with small-pox, and only the wife and two children, mentioned above, took it.* This constable was a great anti-vaccinator, and had more to say about it than all the rest. His family consisted of his wife and three children. He and his youngest child were vaccinated after his wife and two children had been removed to the Hospital, and escaped the disease. They are all now in favour of vaccination. In another case, a constable

with his wife and family, all vaccinated, lived in a house which had small-pox on each side of it, the backs of the houses coming together, but none of them were attacked. Another constable has been employed with the small-pox van removing patients to the Hospital, from the commencement of the epidemic; but neither he nor his wife or children, all vaccinated, have been affected. There have been cases of small-pox all round the Police Station, and nearly the whole of the married constables reside in the part of the city in which the infection has been hottest.

The Great Western Railway Company. (Information supplied by Mr. E. M. Bridger, Station Master.) "The staff employed in both the Passenger and Goods Departments number 244. Of these, 223 were vaccinated, and none of them took small-pox. The remaining 21 were not re-vaccinated, and nine of them were attacked, the remaining 12 escaped. The following is given as a striking instance of the efficacy of vaccination. A signal man had a daughter who sickened with small-pox and died. As soon as the disease was recognised the father left his home with a son who had been re-vaccinated about a month. They left the house together, and both slept in the same bed for about a week, when the father sickened with small-pox, and his case is reported to have been a severe one. But notwithstanding the lad had slept with his father for a week he escaped the disease. The father had not been re-vaccinated."

Gloucester Railway Wagon Co., Ltd. (Information supplied by A. Slater, Esq., General Manager.) Out of about 950 men employed by the Company at the time of the outbreak of the epidemic, including clerks, foremen, &c., all were ultimately re-vaccinated except five, who preferred to leave. The total number attacked was 42. Of these, four were attacked in February, one of whom died; 16 in March, with one death; 17 in April, with one death; four in May; and one in July. From April 4th to April 11th there were 245 vaccination tickets issued to those men who would take them, and from April 25th to May 2nd a further issue of 225 was made. Others had been re-vaccinated by other agencies, but it is impossible to say precisely how many. On May 7th, Dr. Bond and one of the staff of Vaccinators from the Vaccination Office visited the Works, and, with the aid of earnest persuasion from the General Manager, succeeded in getting a number of the more determined anti-vaccinators to submit to the operation.

Of the four cases in May, one was attacked on the 4th, one on the 9th, one on the 21st, and one on the 28th, after which date there were no more attacks until the 18th of July, when one more case occurred. Four cases of small-pox occurred in men who had undergone re-vaccination, one of them as late as May 21st, but there is no evidence as to whether in any of these cases the re-vaccination was successful.

[*Note.*—There is reason to believe that few, if any, of the operatives employed at this establishment were re-vaccinated before the first week in April. If 21 days be added to this period, so as to exclude the possibility of infection before the vaccination could produce its full effect, it will be seen that only four cases in May and one in July are left to be accounted for. In one of these cases, the last, the re-vaccination is admitted not to have been successful.]

Mr. Hubert Waddy, Secretary of the Gloucester and Birmingham Navigation Co., writes: "The staff of the Company, with the workmen, numbers about 50. All were re-vaccinated by the Public Vaccinator, except one man who preferred to be operated on by a Veterinary Surgeon, and subsequently took small-pox, but, I believe, very lightly."

The Manager of the City of Gloucester Tramways writes:—"Out of a staff of 35 men and boys, 32 were vaccinated or re-vaccinated. Three men who were not re-vaccinated took the disease, and one man died. Neither myself, wife, children, who were also re-vaccinated, nor any of the other 32 employés were attacked."

The Manageress of the Gloucester Nursing Association writes—"The number of our trained nurses was 23, of whom two had had small-pox; the others were recently re-vaccinated. The number of women engaged at various times, in waiting on patients, doing laundry work, etc., was from 45 to 50, of whom 8 had had small-pox, all the others having been re-vaccinated. There was not a single case of small-pox amongst the nurses or workers. Upwards of 940 cases of small-pox were nursed by the staff. Of these cases a few had been re-vaccinated and took small-pox very slightly, were ill for 3 days, perhaps, but not kept in bed more than one day."

Dr. Brooke, Superintendent of the Gloucester Small-pox Hospital, writes, in reply to an inquiry whether he had met with any case of a small-pox nurse who had taken the disease after being effectually vaccinated: "No, I have never seen such a case either in Gloucester or elsewhere, and I have looked through our Annual Reports of the Statistical Committee of the Metropolitan Asylums Board, and cannot find there any such case recorded, though many hundreds of people, nurses, workpeople, &c., have been employed at our Small-pox Hospitals at London."

Messrs. — write: "We employ about 110 men and boys. To the best of our knowledge and belief the whole of these have been vaccinated and re-vaccinated, with the exception of two elderly men over 60 years of age. Three of our workmen have been attacked with small-pox; two of them recovered and one died. Neither of them had been re-vaccinated."

Messrs. — write: "Only one of our *employés*, a youth of about 18, who had not been re-vaccinated, was attacked by small-pox, and recovered. Fifteen have been re-vaccinated this year and five some years ago, when in the militia. The remainder, about 20 in number, have not been, we believe, re-vaccinated; of the latter, three are quite old men."

Messrs. Price, Walker, & Co., Ltd., Timber Merchants, write:—"At the beginning of May we were employing about 210 men, of whom about 180 were vaccinated on our premises, about 26 were done at home, and four, through old age and various reasons, were not vaccinated. We had no cases of small-pox amongst the men after they were vaccinated, and only one man who was seriously indisposed from the effects of vaccination. We had about four or five cases before the men were vaccinated."

Messrs. — write:—"At our Gloucester house our staff and *employés* number about 65. Amongst our workmen we have had three cases of small-pox, one of which terminated fatally. After this death, many of the workpeople who had previously resisted all persuasion, offers of free vaccination, and appeals of all sorts, were re-vaccinated on their own account, we believe, we having withdrawn our offer to defray all expenses, after we had made it and repeated it two or three times. All three of the men who suffered had been vaccinated in infancy, but not since. One who went into the Hospital a strong "Anti-vaccinist" was completely cured of his delusion by his experience and what he saw around him. He said, 'You need not go into the Hospital to prove it; you need only look through the windows to see the marked difference in suffering between those who had never been vaccinated, and those who had, even if only in infancy'

Messrs. Foster Bros., Ltd., of the Gloucester Oil Mills, write: "Out of 109 men in our employ 108 were vaccinated or re-vaccinated. The one exception had already had small-pox, and it was not considered necessary to do him. Two men had small-pox a few days after vaccination, but so slightly that they were about in less than a fortnight, and neither of them was marked."

Messrs. — write to the following effect ;—" Number of *Employés*, about 250. Of these, 195 were re-vaccinated at the factory, and all the rest, except 5 or 6, at the public stations or their own homes. One man only (and no woman) had the small-pox; he was re-vaccinated on Saturday, and the case was notified on Monday. Some of the work-people had the disease in their own homes.

Messrs. Sully & Co., General Drapers, write that their *employés* are 13 in number, of whom 12 have been re-vaccinated, and none have been attacked by small-pox.

Mr. — writes :—" Weeks before the disease reached its height I thought it my duty as a citizen, and also as a small employer of labour, to have myself and family re-vaccinated, and then to do all I possibly could to get my *employés* to do likewise. I am pleased to say that after a little persuasion, and without any undue pressure, six out of seven were re-vaccinated. The seventh, I am sorry to say, was not until after a little child living in the same house was sickening for small-pox. He was then advised by a medical man to leave the house. On his acquainting me with the fact I told him he must be re-vaccinated before it would be safe for him to return to work, which he was. However, in three or four days he developed the disease. Not one of the six who were re-vaccinated has had small-pox. One of them has delivered oil from house to house all the time in the streets where small-pox has been the worst."

Messrs. Fisher & Fisher, linendrapers, &c., write : " We are glad to report that our belief in the protective value of vaccination is not only fully confirmed but greatly strengthened by the sad experience our city has had. All our household and business establishment generally (over 30) were vaccinated, principally from choice—some few under strong persuasion : but all have escaped and are now full believers in the efficacy of vaccination."

Messrs. C. Healey & Son, carriage builders, write : " Forty of our *employés* were re-vaccinated and not a case of small-pox has occurred amongst them."

The Secretary of the Gloucester Coffee House Co., Ltd., writes : " The number of the *employés* of the Company is 15; all have been re-vaccinated and none of them have been attacked by small-pox."

Messrs. R. T. Smith & Co., general carriers and shipping agents, write : " All the staff at our stations in Gloucestershire were re-vaccinated (with the exception of two or three men who had had small-pox, and with regard to whom the profession did not consider vaccination necessary). None of them were attacked in the recent epidemic."

Messrs. Priday, Metford & Co., City Flour Mills, write : " Dr. Bibby in March last vaccinated our *employés* (58) with entirely satisfactory results, as not one of them have suffered in person from the epidemic."

Messrs. Denton & Holbrook, silk mercers, &c., write : " We employ about 70 persons, male and female, the whole of whom have been re-vaccinated, and we are thankful to say not a single case of small-pox has occurred amongst any of them."

Messrs. W. Herbert & Sons, drapers, &c., write : " Our *employés* during the epidemic numbered 58, including servants and porters. They were all vaccinated or re-vaccinated and we have not had a case of small-pox amongst them."

Messrs. — write : " We have during the recent epidemic employed 25 hands (average) weekly, all re-vaccinated, with a result of not one case of small-pox. Although the wife (unvaccinated) of one of our men contracted

small-pox and died, he came off quite free of the disease, notwithstanding he was living in the same house with his wife up to the time she was taken to hospital. Another case was that of a man (unvaccinated) lodging in the house of one of our men, who also came off free, though living in the same house and helping to attend the one afflicted for several days."

The Proprietor of one of the largest Hotels in Gloucester, writes: "I have in this hotel 19 people always living here, viz.: myself, wife and three children, and a staff of 14 servants. Everyone has been re-vaccinated, and although many of the servants have their homes in infected streets I have not had a case of small-pox on the place."

Mr. A. V. Hatton, of the Northgate Brewery, writes: "I have 10 employés, all married except one, and all re-vaccinated. None were attacked by small-pox. The whole of their children, excepting one daughter of a man named B., were either vaccinated or re-vaccinated. This daughter held back from re-vaccination until her sister's arm had got well: in the meantime she took small-pox, but had it only slightly, was nursed at her own home, and the other members of the family, who had all been re-vaccinated, escaped."

Dr. Oscar Clark writes: "The following cases which came under my own observation appear to me to be worth recording."

S., Llandilo Street. The mother, a former servant of —*, refused to be re-vaccinated, and none of her four children had been vaccinated except one which was born at Berkeley and had been vaccinated there. This child was the only person in the house that escaped, the father, who was vaccinated in childhood, having a slight attack.

In a second family, the husband took the disease, but as the baby was suffering from bronchitis I thought it inexpedient to vaccinate it. The rest of the family, consisting of mother and five children, were. The baby was the only one, except the father, who took the disease.

In a third case, I vaccinated all the family, five in number, except the mother, who was recovering from a severe abscess of the face. She was the only one who took small-pox.

In a fourth family, the wife, not re-vaccinated, took the disease; the husband and four children, who were re-vaccinated, escaped.

During the epidemic, I felt that the only chance lay in vaccination, a I laid myself out to vaccinate all I could. I was so busy that I kept no record of the numbers, but I and my Assistant spent whole days vaccinating. I also sent a special circular to one of the largest Clubs in the City, for which I am Medical Officer, with the result that most of the members and their families were guided by me and were vaccinated. I am exceedingly glad to say that *not one* of the cases I have vaccinated has taken the disease, except where they were already infected (about four cases). In one case, hours of argument were thrown away upon an anti-vaccinator, who absolutely forbid his children to be vaccinated. I, however, managed to do so, with the result that when he himself subsequently took the disease, the wife and children all escaped.

[The subjoined letter, which is referred to in the evidence of Dr. Oscar Clark, is an interesting illustration of one of the various ways in which members of the medical profession exercised their influence under a sense of the responsibility imposed upon them.]

LOYAL PHŒNIX LODGE OF ODD-FELLOWS, M.U.

Gloucester,

February 24th, 1896.

Dear Brother,

Ever since the first outbreak of small-pox in the City I have been uneasy in my mind as to my responsibilities with regard to vaccination.

*A leading anti-vaccinator.

Now that the disease has broken out among children in the Widden Street Board Schools my uneasiness has much increased.

Hitherto the disease has chiefly been among adults, who are themselves responsible if they have not been vaccinated or re-vaccinated.

In the case of children the responsibility is divided between the parents and the parents' advisers.

As you have, by joining the Medical Aid, chosen me as the medical adviser for your family, I feel that I am sharing the responsibility of your children being possibly unvaccinated, and therefore unprotected against the infection of that terrible disease small-pox, unless I free myself from that great responsibility by *most strenuously* pressing upon you the extreme importance of their being so protected by vaccination.

I therefore take this opportunity of telling you that my trust in vaccination as a perfectly safe and almost sure protection against small-pox is absolutely firm, and has received very startling confirmation from what I have myself seen during this epidemic.

I have treated the mothers and children connected with this Lodge now for some seven or eight years, and I know that many families have perfect confidence in my knowledge in medical matters, so it is but reasonable that my words should have some weight in this question, which is a purely medical one, and a question where the views of an outsider must necessarily be almost worthless.

In order that every inducement for vaccination should be given, I have determined to vaccinate, free of charge, any child belonging to the Medical Aid, and I undertake to use calf lymph of the best quality procurable, and from the same source as that from which I vaccinated my wife and children, and have been myself re-vaccinated a few weeks ago.

In the case of re-vaccination, I merely ask that the cost of the lymph should be repaid, *i.e.*, one shilling for each person re-vaccinated.

I sincerely hope that you will trust me in this matter, for I cannot tell you how troubled I have been when I have seen children suffering with small-pox of a severe form (no words can exaggerate the fearfulness of this disease in such cases), feeling as I do that the child's suffering and danger to life and eyesight might, in all human probability, have been avoided if they had been vaccinated.

Yours fraternally,

BRO. OSCAR W. CLARK.

Mr. J. Crofts, Head Master of Sir Thomas Richs' School, writes: "Pupils attended the School from all parts of the city and the surrounding districts. This might lead to the conclusion that we had more than an average number of cases connected with the School. This, however, has not been the case. At the beginning of the year there were 261 boys on the books, and during the whole time we have had but three cases. One was unvaccinated; and the two, who had it slightly, had not been re-vaccinated. All the other boys, except six or eight, have been vaccinated or re-vaccinated; and the School has not been closed except at the usual holidays."

Mr. W. Hobbs, Head Master of the Tredworth Board School, writes; "Here-with a few facts *re* vaccination and its benefits or otherwise.

J. C.; re-vaccinated; contracted small-pox; inquiry discovered that he had poulticed his arm directly after the re-vaccination.

Family of J. All the family vaccinated or re-vaccinated except the mother, who contracted small-pox, the children escaping, though shut in the house with her during the whole time of her illness.

Family of G. Father re-vaccinated; mother and three children not. The four latter contracted small-pox, of whom two died; the father, who nursed them, escaped.

Family of M. Six of this family who were vaccinated escaped; the mother and three of the children, none of whom were vaccinated, all took the disease.

Family of G. Father, mother and four children, latter not vaccinated and the former not re-vaccinated, all took the disease and died.

Family of C. Eldest girl was a servant of ours, and was re-vaccinated under our influence. Seven of her brothers and sisters contracted the disease, of whom one died. Two of the children were vaccinated, but, whilst their arms were taking, a brother contracted the disease; these girls also took small-pox, and one of them died. The rest were either unvaccinated or had not been re-vaccinated. The girl referred to nursed them all and escaped.

Family of C. One son caught the disease, whereon the father, mother, and the other children were vaccinated. They all escaped, but the son referred to is fearfully marked, and has lost his hair.

Out of 35 teachers here two only refused at first to be re-vaccinated. One of the two contracted small-pox and will be marked for life (in spite of Professor P.); the second rushed to the vaccinator and escaped.

I could multiply such cases, but they are so similar it would be waste of time.

One man in this neighbourhood has 37 descendants, all vaccinated; none contracted the disease. His brother has 21, none re-vaccinated; 10 have had small-pox. About 250 of our children were attacked, with 30 deaths."

The Rev. J. J. Luce, of St. Nicholas Vicarage, writes: "There have been, in all, 31 cases of small-pox in our parish during the course of the epidemic. The ages varied from 17 days to 58 years. (1) A baby of 17 months was successfully vaccinated on April 9th, taken with the disease on April 20th, and recovered. The child's mother refused to be re-vaccinated, and, after nursing the babe, was taken on May 4th, and died May 10th. (2) Another baby of 16 months was vaccinated March 25th, the day before developing the disease, and died on April 3rd. (3) A man, aged 55 years, was successfully vaccinated on April 26th and taken with the disease four days afterwards. He has recovered, and has no marks whatever on his face. The 28 other cases were all unvaccinated or not re-vaccinated.

A child of 15 was said to have been vaccinated, but upon enquiry was found not to have been vaccinated at all. A young man who contracted the disease had been vaccinated two months before, but unsuccessfully. A woman, aged 55, who refused to be re-vaccinated because she had had small-pox, had it the second time.

In St. Stephen's Court we had 13 cases. All the children protected by vaccination escaped, though many were living in the same house in which there were patients at the time. For instance, five children, one of whom was a baby at the breast, escaped, although the mother took the disease.

In addition to the cases belonging to the parish we had one worth recording in the Schools. A boy, unvaccinated, died; his brother, vaccinated, was quite free, and is at school. In the same family the father, mother and one daughter, all re-vaccinated, were exempt, whereas another daughter, aged 19, who was not re-vaccinated, had the disease slightly. They all mixed freely together the whole time, and some slept together."

The Rev. W. C. Macklin, of the Church of the Good Shepherd, writes: "Amongst all the cases which have come under my notice I have not found one where a vaccinated child under 10, or a recently successful re-vaccinated person above that age, has taken small-pox. One boy (C. H., of Sidney Street) was re-vaccinated and had small-pox within a few weeks, but his mother told me that his arm 'never properly came up.' The saddest case amongst those which have come under my notice was that of the B's of Twyver Street, a family of ten, none recently re-vaccinated, and the four youngest not vaccinated at all. All the family had small-pox, and the four unvaccinated ones died. It was claimed by the advocates of the — treatment that it would 'stop the infection and stamp out small-pox' and thus render vaccination unnecessary; but, out of about 35 cases

which they have treated in this district, 11 occurred in houses in which the treatment was already being used; three of these 11 died, and all might have been avoided by prompt isolation in the first instance."

The Rev. S. E. Bartleet, Vicar of S. Mark's, writes: "We have had nearly 80 cases of small-pox in my parish and, with scarcely an exception, I have visited all of them, and I have also paid many somewhat lengthened visits to the Small-pox Hospital. I have had an opportunity, therefore, of seeing not a little of the recent epidemic and of noticing the class of persons attacked. Almost entirely they have consisted of unvaccinated children and adults who had not been re-vaccinated. The youngest child vaccinated in infancy who was attacked in my parish was a girl between 10 and 11 years of age, and her attack was a very slight one. Two others in the family contracted the disease, of whom three children were unvaccinated, and the mother had not been re-vaccinated. The contrast between the vaccinated child and her unvaccinated sister, two years younger, as they sat up in the same bed at the Hospital, was most remarkable. The one had scarcely a spot whilst the other's face was covered, and is disfigured still. The wife of one who was recently and is, perhaps, still an anti-vaccinationist, said to me, 'it is so unfortunate that the disease so uniformly picks out the unvaccinated.'

I only know of two recently re-vaccinated persons who have taken the disease. One is a young woman who was acting as nurse to a bad case. Only one of the vaccination incisions took very slightly, so that it could not be considered a case of successful re-vaccination. Her attack was very slight indeed. The other case was the young woman's brother, whose attack was also a slight one. I saw one case of a person re-vaccinated in the army ten years before. The attack was so very slight, just two or three pock marks on the arm, that the doctor hesitated to call it small-pox. Probably, however, it was a case of the disease, as a brother in the same house, who had not been re-vaccinated, had a severe attack. The experience of other places has held good in my parish, that those visiting or ministering to the sufferers, when re-vaccinated, have all of them escaped. An idea prevails amongst the poor that doctors and parsons have some secret mode of protection. Only to-day this answer was given to me when I asked how it was I was not stricken, though I had been to every infected house.

Sometimes a person who has not been re-vaccinated has seemed to resist contagion for a while and then has contracted the disease. The last case in my parish is an instance. A mother nursed a daughter who had small-pox very slightly, without herself suffering. After the daughter's recovery a married son took the disease in a worse form, and the mother went to nurse him. She refused to be vaccinated, and her immunity on the first occasion of exposure to the disease seemed to justify her in her resolution; but she now has a rather severe attack of small-pox."

Rev. H. H. Vowles, of Northgate Street Chapel, writes: "I have every confidence in the protective value of vaccination, and did what I could from the pulpit, as well as privately, to express that view, and with some success, as I don't think we have a single 'anti' left at Northgate Street, or any unvaccinated person."

Mr. Vinson, Secretary of the Gloucester Gas Light Co., writes; "All employed at these Offices, 27 in number, including clerks, collectors, meter inspectors, fillers, and lamplighters, were vaccinated (a few before April, the rest during that month). We have not had a single case of small-pox amongst the staff."

The Gloucester Gas Works. (From information by Mr. R. Moreland, Manager.) The number of men employed during the early part of the year would be about 50. Of these, 5 took small-pox. One of these men was nursed at home by his wife, who refused to be re-vaccinated, and contracted the disease. Another died after only a few days' illness. A third

had an unvaccinated child who took the disease and died. The father lodged away from home during his child's illness, but, on returning, contracted the disease, whilst his other children, who had been vaccinated, escaped altogether. Neither of these 5 men had been re-vaccinated. All the other men, with one exception, were re-vaccinated in April.

The Secretary of one of the largest Friendly Societies writes: "My experience during the recent epidemic has brought to my notice numerous instances of the protective value of vaccination and re-vaccination; and I should like to see vaccination enforced all over England, fully believing that nothing better could be done to protect the nation against small-pox."

Mr. A. Estcourt, Builder and Contractor, writes: "I cannot give you any fixed number of *employés*, as our work lies so much away from Gloucester. We may put the average for some time past in Gloucester at 40, most of whom have, I believe, been re-vaccinated. There are a few old hands who had small-pox years ago, and they have not been re-vaccinated nor had the disease again. We have only had two cases. One a young man who came from a country job and took the small-pox and died in the hospital. I cannot ascertain as to his vaccination in infancy, but he had not been re-vaccinated. A man named M. had been re-vaccinated some time ago in the Army, and has escaped; so have all his children, who were vaccinated. His wife deferred it, and caught the small-pox, and was suckling a baby who had been vaccinated three weeks before. The baby caught it, I presume, from the mother. They both went to the hospital and died."

Messrs. S. J. Moreland & Sons, of the Gloucester Match Works, write: "We employ about 470 hands. At the commencement of the epidemic six had small-pox, of whom two are rather badly marked. None of these had been re-vaccinated. Since re-vaccination of all the hands there have been two cases of small-pox, one occurring three days after re-vaccination; the other is stated to have occurred two months after the operation. All the work-people live in infected districts."

[*Note*.—The latter of the above two cases was investigated, and it was satisfactorily established on the evidence of two medical men who attended the young woman in question that her illness referred to was not small-pox.—F.T.B.]

The Collector of Customs writes: "Nothing of a striking character has come under my observation illustrative of the protective value of vaccination, beyond the fact that the whole of my staff are brought more or less in contact with the public, and that, with one or two exceptions, all have recently been re-vaccinated, and none of them have suffered from small-pox. The whole of my own household (9 in number) have been either vaccinated or re-vaccinated just lately, and none of them have taken small-pox."

Mr. A. King, Builder and Contractor, writes: "I and all my family believe in vaccination, and were all of us successfully vaccinated at the outbreak of our trouble. I, as you doubtless are aware, established the Small-pox Relief Fund, and more than £900 has come to hand, besides large consignments of clothing. The distributions have been made by myself, three sons, and by Miss King, who has done the clothing department. Thousands of visits have been made to the houses and families where they have been afflicted, and I am happy to say that we have not been attacked. This of itself is a strong argument as to vaccination being a certain preventative. After a lot of persuasion we induced all the men in the employ of self and sons, 25 in number, to be vaccinated with the exception of one man, who, poor fellow, took the small-pox, from which he died, as also did his daughter."

Messrs. Reynolds & Co., of the Albert Flour Mills, write: "The number of our *employés* who were vaccinated here at our cost was 74; vaccinated privately, six. Most of these were re-vaccinations, and all were done

within the week March 13-18. Of these 80 men and boys, 10 were subsequently compelled to assist in nursing friends or relatives who had contracted small-pox, and who were treated at their own homes partly or entirely. Of the 10 so directly in contact with the disease, not one fell ill or was in any way affected by the disease, and they all resumed work on medical certificates after the usual quarantine period. Of the entire number of our *employés*, one only fell ill with small-pox, and the circumstances in his case were somewhat peculiar. He was obstinately opposed to being vaccinated, but ultimately agreed to the operation, and was, he says, vaccinated by Dr. —. He did not go again to show his arm, and we think it doubtful whether he was successfully vaccinated. He, however, contracted small-pox, but not until his wife had undertaken the duty of nursing small-pox patients. In this capacity she was admittedly passing from severe cases of small-pox to her own house in which the man we refer to was then residing. Apart from this singular case, we consider that the experience of our workmen and our staff during the epidemic has proved conclusively the great protection against small-pox which vaccination affords."

[*Note*.—The above case was visited and examined by me at an early stage of the illness, and all that was visible on the arm was the healed wounds left by the lancet, but no evidence whatever of any characteristic scar, except from three in infancy.—F.T.B.]

The Rev. William Bazeley, *Matson Rectory, Gloucester*, writes: "This parish, containing some 350 inhabitants, is about two miles from the centre of Gloucester. Most of the men are employed in the City, the women shop there, and many of the elder boys attend the City Schools. Early in the year the children were nearly all unprotected by vaccination, and we were expecting a bad outbreak of small-pox. Fortunately, we were enabled to induce the parents to have their children vaccinated without a single exception. The result was that not one child caught small-pox. We had four cases amongst adults, none of whom had been re-vaccinated; but by isolating them we prevented the disease spreading, and it never became epidemic. The cases were none of them of a very severe type, and the patients soon recovered; all had been vaccinated in childhood.

I would gratefully acknowledge on behalf of my parishioners the kind way in which the Public Vaccinator for this district, Mr. W. Washbourn, made his visit to Matson at a time convenient to the working-men and others."

From *All Saints' (Gloucester) Parish Magazine, June, 1896*.—"One has known all along how worse than useless it is to waste time and breath in argument, or even talk, with anti-vaccinators. They are so unreasonable and blind, that one can only put it down to some mental defect; but in spite of all talk, argument, disbelief, or ridicule, the fact remains, supreme and evident, that the small-pox is leaving our City and Parish simply because the great majority are re-vaccinated; and if anti-vaccinators were as honest as they claim to be they would frankly acknowledge that such is the case. Ah well! there always will be those who think their own opinion the only possible one; they are very trying to those who come in contact with them, and doubtless their own life is not a bed of roses, and the mischief they do is infinite; but it would not do to have everything too smooth in this life, and so one pities them, and hopes, with a certain amount of doubt, that they may come to a better mind; but one cannot shut one's eyes to the fact that the result of their blindness has been disastrous, and poor Gloucester is, alas! only too terrible an example, as one may see by visiting the new part of the Cemetery, which is covered with the graves of the nearly four hundred* victims, not one of whom (in all human probability) would be there were it not for the obstinacy of the anti-vaccinators."

*Before the end of the epidemic this number had increased to 443.

APPENDIX.

The following letter, which appeared in the *Bristol Daily Press*, is given to illustrate the point referred to in the text, p. 33, viz., the marked difference in the severity of the disease in vaccinated and unvaccinated cases respectively:—

SMALL-POX IN GLOUCESTER.

SIR,

My attention has been called to the statement of a correspondent in your paper associating the present epidemic in this city with overcrowding in our infants' school. Will you allow me to state the following facts:

(1) Our infants' school is certified by the Education Department to accommodate 225 children; the average attendance for last year was 218; and for some weeks before the outbreak of small-pox it had been considerably lower, as the attendance of infants is always worst during the winter months.

(2) Your correspondent speaks of "both the teachers," as though there were only two. As a matter of fact there are eight teachers in the department. Of these only two caught the disease, and of those one had not been vaccinated since infancy, 17 years before; the other had been vaccinated three days before she was taken ill. This last had a younger sister who had not been vaccinated in infancy, she caught the disease and died, whereas both the teachers are now convalescent.

There are two families living just outside my garden. In one there are six children—five vaccinated and one not; the unvaccinated child is the only one that has taken the small-pox. In the other, out of eight children, one unvaccinated one has died of the disease.

In another case there were seven children. The father, mother, and four unvaccinated children have already died; another is hanging between life and death; *the other two, who were the only vaccinated members of the family, have not even taken the disease.*

I could multiply instances, but I will simply add this remark: I am now visiting over 100 small-pox patients from day-to-day—60 in the hospital and over 40 in their own houses in this parish—and I believe I could undertake to go round from bed to bed and state almost without error which had been vaccinated and which not, without any previous knowledge as to the facts, so marked is the difference in the effect of the disease in the two cases.

Yours faithfully,

St. Luke's Vicarage,
Gloucester, March 23, 1896.

HENRY PROCTOR.

A FORECAST AND ITS FULFILMENT.

The following extract from the Annual Report for 1895 of the Medical Officer of Health for the Gloucestershire Combined District is given here to show that the Authorities who are responsible for the protection of the City of Gloucester and its surrounding population against Small Pox had had ample warning of the danger which threatened them:—

"The unfortunate experience through which the City of Gloucester is passing at the time of the drafting of this Report, lends a special interest to the subject of Small Pox. For the past twenty years I have felt it my

duty in every Annual Report to refer to the perilous condition in which not only the Combined District, but also nearly the whole of the County of Gloucester has stood from the want of any adequate means of isolating cases of Small Pox. So far as the borough of Cheltenham is concerned, that danger has for some years been removed by the excellent resources for this purpose placed at the disposal of the Sanitary Authority by the trustees of the Delancey Hospital. But, in no other part of the county, except in those portions of it which are within the City of Bristol and the Evesham Rural District, and, to a limited extent, in the Cirencester Urban and Rural Districts, where a small Isolation Hospital exists, which has, on an emergency, been used to deal with a limited attack of Small Pox, has there been any provision for meeting a serious outbreak of this most infectious disease. From the date of the great wave of it which swept over the county, in common with the rest of the country, in 1873, until the present time, limited outbreaks have occurred, as a result of the casual introduction of the infection into the District, chiefly by tramps, hailing from Birmingham on the one side and from South Wales and Bristol on the other. The existence of the infection in these centres during the year 1894, led me to emphasize in my Report for that year more strongly than I usually had done, the warning I had repeatedly given before as to the danger of our being caught in our still unprepared condition by another of these outbursts, which an accidental combination of circumstances might easily fan into a general conflagration. The remarks which I then made have been so strikingly illustrated by the severe logic of events that, though the general account of the present outbreak will be more appropriately deferred until the Report for this year comes to be written, I may be pardoned for quoting them here, as a justification of the forecast which they offered and which was so soon to be fulfilled.

I observed that 'the absence of any effectual means of isolating Small Pox in any part of the Combined District, except, to some extent, in the Cirencester portion of it, might be looked on with some equanimity if vaccination were effectually enforced in all parts of it. Unfortunately, however, as I have had to note in successive Reports during the last few years, there is an increasing tendency to neglect the enforcement of primary vaccination, and, it is to be feared, to the neglect of re-vaccination also. During the greater part of the last half century the victims of Small Pox have been found almost exclusively amongst the adolescent or adult members of the community, who had either not been vaccinated in infancy, or who had outgrown the limited protection which primary vaccination can only be calculated on affording. But of late years the history of outbreaks of this disease shows an increasing number of cases of young children, the mortality amongst whom is proportionately very large. This is the result of the neglect of infantile vaccination; and it is as certain as anything can be in human affairs, that although a community in which infantile vaccination has been systematically neglected, as is the case in some parts of the County of Gloucester, may go on for some years, either by good luck escaping the importation of infection into it, or stamping it out, at considerable cost, even under favourable circumstances, when it is imported, a time will come, sooner or later, when the infection will be introduced under such circumstances that it cannot be so summarily eliminated. Then will be repeated the experience of Leicester, Sheffield, and other towns in which vaccination has been neglected and epidemics have occurred in recent years; there will be a general rush on all sides to be vaccinated, and there will be a large proportion of fatal cases of unvaccinated children. There are some grounds for hoping that the Report of the Vaccination Commission, which has been so unaccountably delayed, will ere long be issued, and the excuse for the do-nothing policy, on which so many Vaccination

Authorities have hitherto relied, will then be removed, and some decided course will have to be adopted.'

It has been well said that 'though the mills of God grind slow they grind very sure.' Retribution follows neglect of duty as surely in the case of communities as it does in that of individuals. Unfortunately the voice of the sanitary prophet, like the forebodings of his predecessors of old, too often appears to awaken no more sense of responsibility amongst the crowd, who are careful and troubled about other things, than if it were that of one crying in the wilderness. But he can calmly await the fulfilment of his warnings, conscious that, unlike those of olden time, they are grounded not on inspiration, but on the sure foundation of experience, and that in uttering them he has observed the wise canon of the cute Yankee—'never to prophesy unless you know!'"

GLOUCESTER EPIDEMIC OF SMALL-POX, 1895-6.

REPORT

of the Committee appointed by the Board of Guardians to organise and carry out the General Vaccination of the City and District.*

“THE Committee appointed by the Board of Guardians of the Gloucester Union during the recent epidemic of Small-pox, for the purpose of organising and carrying out the general vaccination of the district, submit herewith, for the information of the Board, a Report on the work which they have done.

As this Report may, in consequence of the magnitude and general importance of the epidemic, have more than a mere local and temporary interest, it is well to state that the area with which it deals (that of the Gloucester Poor Law Union) comprises two separate Sanitary districts, *viz.*, the City of Gloucester proper, under the control of the Gloucester Urban (County) Council, and the remainder of the Union, which is administered by the Gloucester Rural (District) Council.

The population of the whole of the Union at the census of 1891 was 50,907; of which 39,444 were contained in the Urban and 11,463 in the Rural district. Assuming that both districts have increased in population since the date of the census at the rates at which they increased in the previous decennial period, the population of the Urban district at the end of 1895 would be 40,616, and of the Rural 11,887. The Urban population as given by the census included the Wotton County Lunatic Asylum with 696 inmates, and the Gloucester Prison with 87 inmates, both of which, though inside the City boundary, are considered, for administrative purposes, to be in the County (Gloucester Rural District).†

* This Report, a large edition of which was printed, is now out of print. It has not been thought necessary to reprint it in full, but a selection is given here of so much as is of general interest. The Report contains, in addition, information on other matters connected with the work of the Committee, which are mainly of local interest only.

† The inmates and staffs of the Wotton Asylum and the Prison at the time of the epidemic may be taken at about 650 and 100 respectively.

Of 11,887 persons assumed to be residing in the nominally Rural district of Gloucester, upwards of 1,800 live in two sanitary sub-districts, known respectively as the East End and the South End; the latter of these being so closely related to the City that it would be impossible for anyone unacquainted with the precise boundary of the City in this neighbourhood to tell where the Urban district ends and the Rural begins; whilst the former, though distinctly demarcated from the City by the line of the Great Western Railway, which here forms the boundary, is mostly occupied by persons employed in the City, and may for all practical purposes be considered part of it.

It will be seen from the tabular statement of the results of the house-to-house visitation instituted by the Committee that the total population of the City accounted for in that way is only 39,857, leaving a discrepancy between that and the estimated population of 759. This discrepancy may be explained in several ways: (*a*) by an excess in the assumed rate of increase; (*b*) by an error in the assumed number of inmates in the occupied houses from which no information could be obtained; (*c*) by the absence of a good many of the inhabitants of the City, many unvaccinated children especially having been sent away in the early portion of the epidemic to escape the disease or the necessity of being vaccinated; (*d*) by the existence of some doubt as to how many of the 250 patients then in the Small-pox Hospital were accounted for in the survey.

Adding the population of the two sub-Urban districts (East End and South End) to that of the City proper, we obtain an approximate population not far, if at all, short of 42,000 as living within what is generally recognised as Urban Gloucester."

[After describing at some length the antecedents of the outbreak, the steps taken for promoting the general vaccination of the citizens, and other matters which have been dealt with in the previous story of the epidemic, the Report proceeds to recount various "impediments to the work" of the Committee, amongst which was the—]

Opposition of Anti-Vaccinators. "In a place where the statements of anti-vaccinators had been accepted and acted on for years as trustworthy, it may be readily understood that the opposition met with from them, even in the face of the abundant and constantly increasing evidence offered by the epidemic itself of the untenability of their contention, was considerable.

Meetings were held by them, letters were written to the journals in Gloucester and elsewhere, the services of professional lecturers were invoked, and bills of various kinds were circulated, maintaining that vaccination was valueless as a protection, and that the medical profession were upholding it for purely selfish ends. So largely was this assertion accepted, that the possibility that someone else was to benefit by the operation besides themselves led many to act as if, by accepting free vaccination and re-vaccination, brought to their own homes, they were conferring a favour on the vaccinators, and it often appeared to give an additional zest to a refusal.

Sentimental Objections. The reasons generally given by objectors were simply that "they didn't hold to it," or "they wouldn't have it done." Very frequently, too, the fatalistic theory was brought forward, "that if they had to get the disease they would get it anyhow," though this was urged, as a rule, without much appearance of sincerity. This readiness to gamble with Providence by running the risk of catching small-pox rather than submitting to the temporary inconvenience of a vaccinated arm is a phase of human nature too commonly met with to require more than a passing mention here. Objections of a purely frivolous nature were not infrequently to be reckoned with. More than one objector used the incontrovertible argument that the Founder of Christianity was not vaccinated, and that vaccination was not mentioned in The Bible; to which latter self-evident statement one large employer retorted to one of his workmen who made it, that neither was five shillings a day suggested in The Bible as a day's pay, but that one penny was, which he forthwith tendered to his inconsequential critic.

Use of Calf Lymph. The extensive use of this preparation began in Gloucester towards the close of last year, when it was generally employed by private practitioners. Had they not done so it would have been practically impossible either to satisfy the scruples of those who objected to human lymph or to meet the demand for vaccination as it arose. The example of using calf lymph having been thus set, and its propriety so far established, the Guardians had no alternative but to follow suit, and to intimate when first making arrangements for meeting the emergency, as has been before mentioned, that calf lymph would be used in the case of all who desired it, which came to mean all.

It would be out of place to enter here into any discussion of the relative merits of calf and human lymph from a scientific point of view; it is sufficient to say that, irrespective of

the considerations above mentioned, the Committee consider that the course thus adopted was fully justified, not only by the general practice of Germany and other countries in which calf lymph is generally used, but also by that of the Local Government Board itself, which maintains a special station for vaccinating with calf lymph, and supplies this material to public vaccinators when required. It was, however, necessary to obtain the formal permission of the Board for this departure from the regulations for public vaccination, as calf lymph, in the present state of its public employment, is, in the provinces, necessarily 'stored' lymph, and the Government have not yet seen their way, pending the publication of the Report of the Royal Commission, to sacrifice the advantage which human lymph presents, when employed by arm-to-arm vaccination, in regard to certainty of action, in consequence of the greater certainty of its freshness. This objection can only be adequately met by the establishment of calf vaccine stations more generally throughout the country than is the case at present.

The cost of the work was very materially augmented by the adoption of calf lymph, but this was unavoidable, and there is the satisfaction of knowing that it was the most remunerative outlay incurred throughout the epidemic. The Committee employed several well-known brands of calf-lymph, with results which seemed to indicate that there was no material difference in their value, when used under proper guarantees, so far as it could be tested by the character of the vesicles formed and the general immunity conferred alike by all of them.

It may not be out of place here to refer to the sentimental objection to the use of calf lymph, which obtained rather extensively, and embodied the idea that the lymph is a sort of concentrated extract of the animal from which it is taken, whether human or bovine, and that there is therefore a likelihood of the person into whose system it is introduced becoming impregnated in some way with the qualities of the animal from which it has been derived. This notion found vent in some cases in a distinct expression of repugnance to the operation on this ground. Some parents were unwilling that "a beast should be put into their children" or themselves, and a few pictured such terrible consequences to their children as that they might come to low and to browse in the fields like oxen.

It is difficult to deal seriously with a notion which, though ludicrously foolish, has prevailed amongst unthinking people from the time of Jenner downwards, and has been in some degree encouraged in an indirect way by those who oppose

vaccination generally. But it may be pointed out, as a matter of fact, that the lymph is only the medium in which the special germ of the vaccine contagion develops, just as a tree does in the soil, and that there is no more reason for supposing that the transference of a small quantity of tissue-serum, with the germ in it, from one animal to another conveys anything that is specifically characteristic of the animal which supplies the lymph than that the transplanting of a shrub from a cottager's garden to a park would carry in the soil, accidentally attached to its roots, any infusion of the surroundings in which it had originally sprouted. It is the living germ which is the potent agent, not the inert fluid in which it floats. To the view of science, no less than of common sense, a healthy child and a healthy calf are in each case merely the medium for the culture of the vaccine germ, the products of which render each alike proof against the more serious infection of small-pox, but do not otherwise affect the individuality of the organism in which the culture is effected.

Unqualified Practitioners. A very serious impediment to the work of the Committee was met with in the activity of enthusiasts of one kind or another, such as always push themselves forward in crises of this kind, each advocating his own special nostrum, not only as a safe and speedy cure for small-pox, but as a certain preventive against it. Modes of treatment which, within reasonable limits and under competent control, have for many years been well recognised by the medical profession as appropriate aids in the treatment of the disease, were thus invested with a protective power to which they have no claim, and the public were induced to subscribe money for administering them which might have been much more usefully expended. Many who were thus misled into relying upon them fell victims to the disease, and though in most cases disillusioned by their bitter experience, in some maintained their credulity even to death.

It is a striking and instructive comment upon this uprising of quackery that, with very few exceptions, the advocates of these delusions were active anti-vaccinators. In their desire to discredit vaccination and the medical profession at any cost, they welcomed with open arms anyone who professed to give any protection against small-pox other than by vaccination. By these means not only was the work of vaccination impeded but the infection was spread, partly by the constant visitation of infected houses by a variety of people for the purpose of treating the patients, and partly by the patients themselves being encouraged to go abroad before they were free from infection. The recourse which was had to legal

proceedings in some cases probably did something to check this latter mischief, but there is no doubt that a great deal of harm was done in this way which the authorities were powerless to deal with.

The Committee would not be discharging properly the responsible duty imposed upon them if they closed this disagreeable aspect of the subject without referring to the countenance and active support given to these misguided enthusiasts by some few persons who, from the social position they hold and the influence they can exert, invested them with a prominence which they could not have otherwise obtained. It is one of the painful lessons which Gloucester has had to learn from its recent sad experience that there is no form of fanaticism or folly which may not, however egregious its absurdity, find encouragement at one time or another from apparently intelligent and well-meaning men. Such persons seem altogether incapable of appreciating either the magnitude of their own assurance in "stepping in where angels fear to tread," or the grave responsibility which they incur in trafficking with human lives. It is through the influence thus banefully exercised by these persons that Gloucester has been gradually led into the hole into which it has fallen; that more than 400 of its inhabitants have been removed by death before their time; that more than four times that number have only escaped with their lives from one of the most noisome of diseases; and that a vastly larger number have, in one way or another, suffered in mind, body, or estate. It is a terrible responsibility to have incurred. Would that it could be adequately brought home to those who have assumed it!"

* * * * *

Ineffective Vaccination. "When the Committee commenced their operations they were much impressed with the importance of ascertaining, so far as was practicable, the value which might on these grounds be attributed to the work which had been carried on for some weeks before they were appointed. It is a matter of established experience that "panic" vaccination is always more or less indifferent in its character, because it is often hastily done and without that care and subsequent supervision which are essential to obtain the best results. In view of the fact that a good many thousand vaccinations, chiefly secondary, had already been effected, it was impracticable to inspect more than a limited proportion of them. With the object of meeting this requirement, it was decided to inspect a certain number of the cases which had been vacci-

nated officially, and Dr. Carter undertook this special work. It is not necessary here to enter into any details of the results of this inspection, beyond saying that ample evidence was obtained that a good deal of the vaccination which had been effected was not such as to guarantee protection of a lasting character, though it was so far technically "successful" as not to justify its being altogether disallowed. The Committee therefore desire to urge strongly upon the consideration of the Government the expediency in any legislation which may ensue upon the presentation of the Report of the Royal Commission, of providing for a more precise form of certificate than that which is now required to be given, in the case both of primary and of secondary vaccination.

At ordinary times, when there is no particular stress upon the vaccination machinery, little difficulty is experienced in securing an inspection of the arm, either in the case of vaccination or re-vaccination, so as to ascertain whether the operation has been "successful" or not. But when people presented themselves by scores at the stations to be re-vaccinated, it was extremely difficult to ensure their presenting themselves again at the proper period for the purpose of having their arms inspected. The Committee have reason to think that many persons who are supposed to have been successfully re-vaccinated, in default of their having been inspected as they should have been, are really not protected at all. These are the cases which, when they have been subsequently attacked by small pox, have been quoted by the anti-vaccinators as proofs of the uselessness of vaccination as a protection. All that they prove really is that at such a crisis as that through which Gloucester has lately passed there is sure to be a certain amount of hasty and more or less inefficient vaccination.

"Fake" Vaccination. The Committee feel it necessary also to allude to another source of inefficient vaccination, which has materially helped to swell the reports readily circulated by the anti-vaccinators of attacks after so-called "re-vaccination." As a result of the pressure which was so generally brought by employers of labour in the City to bear upon their *employés* to be re-vaccinated, a certain proportion of those who were thus, as they chose to consider, coerced into being invested with a protection which they did not appreciate, resolved to neutralise its effect so far as they could do so. The methods employed for this purpose were various. In some cases these unwilling victims of their employers' philanthropy sucked their arms, or had them sucked, as soon after the operation as they

conveniently could. In others, they washed the incisions, or rubbed ointments or other applications into them; in others, they poulticed them. In fact they did their best, so far as their own ingenuity, or the suggestions of other malcontents like themselves, enabled them, to defeat the work of the vaccinator, and, it is believed, in a considerable number of cases with success. With such hopeless perversity it is very difficult to deal, and it may be assumed with certainty that these recalcitrants would be pretty sure not to have presented themselves again voluntarily for inspection, and that their manœuvres were much facilitated by a laxity of inspection in the case of some establishments where this was not insisted on. It is amongst this class that a considerable proportion of the cases of small-pox occurring after re-vaccination have been traced, but even in these the attack appeared in some instances to have been distinctly modified by a small residum of the protecting influence of the lymph which was not destroyed.

Although the Vaccinating Staff, acting under the instructions of the Committee, made such efforts as were in their power to ascertain how far re-vaccinations which were alleged to have been recently performed were successful or not, it was impracticable to do more than inspect a small fraction of them without keeping the machinery at work for a length of time and at a cost which would have been out of proportion to the results obtained. But it can be positively asserted that in not one of the cases of small-pox after alleged vaccination or re-vaccination before exposure to infection which have been brought under the notice of the Committee was any sufficient proof obtained that the vaccination or re-vaccination had been "efficient" as defined above.

Coercive Measures. When it became evident that the unprotected had been at length reduced to a comparatively small number of children whose parents would not have them vaccinated, and to a somewhat larger number of adults upon whom no further impression in inducing them to be re-vaccinated could be made, the Committee decided to end the special facilities for voluntary vaccination which they had, with so much cost to the ratepayers, for some weeks offered, and to invoke, in the case of defaulting parents, the coercive powers of the law, which the Board of Guardians had by their resolution of March 24th last decided to again put in force.*

* "That the Vaccination Officers be and are hereby directed to carry out the provisions of Art. 16 of the General Order of the Local Government Board of 31st Oct., 1874, relating to Vaccination, in accordance with the terms of the resolution passed by this Board on 19th Sept., 1876." This resolution was carried by a majority of 31 votes to 22 in a meeting at which 53 were present out of a total of 63 Guardians.

**Classes of
Objectors to
Vaccination.**

As a great deal of misconception prevails as to the nature and the extent of the objection against vaccination which is supposed to exist in Gloucester, and no doubt also elsewhere, it seems desirable that the Committee should state the conclusions at which their experience has led them in regard to this point. There are, unquestionably, a certain number of parents who entertain a strong and conscientious objection to the vaccination of their children, upon grounds which they think satisfactory, however insufficient they may appear to the great majority of their fellow-citizens. How far legal compulsion is justifiable or expedient in such cases may be open to question. Without entering upon a discussion which would unduly lengthen this Report, it is sufficient here to point out that the right of the State to coerce individuals into action which is considered by the majority beneficial in the public interest, or to restrain them from action which is similarly considered to be prejudicial to the public interest, is established upon such substantial precedents that it cannot be disputed. If the plea of "conscientious objections" could be successfully urged as an excuse for not obeying the law, it is certain that the framework of society would soon be shaken to its foundations. The questions, therefore, as to the extent to which it is desirable to apply coercion, and as to the modes in which it should be applied, merely involve considerations of expediency, and not of moral or legal right.

**A common
fallacy
exposed.**

There is one very common argument used by the opponents of vaccination to which it seems appropriate to refer here. It is to this effect: "let those who believe in vaccination protect themselves and their children; why should we who conscientiously disbelieve in it be compelled to do so? Those who are vaccinated will be, so they think, protected; let them be satisfied with that and leave us alone: it is only we and our children who will suffer if we are attacked with small-pox, and we are quite willing to run the risk."

Now, in the first place, the law, which is the embodiment of the intelligence and humanity of the majority of the community, neither allows people to attempt to kill themselves with impunity, nor does it allow parents to trifle with the lives of their children, in other matters than vaccination, as the so-called "Peculiar People" have more than once had brought home to them. But, irrespective of these general considerations, if there is one thing more than another that the recent experience of Gloucester has demonstrated, it is the futility of the above-mentioned assumption. If only a

very small proportion of the children who have been born in or introduced into Gloucester during the last ten years had been allowed to escape vaccination, the recent epidemic would never, in all human probability, have occurred. Even if it had, the persons attacked by it would have been, as in most of the epidemics which have happened in other parts of the United Kingdom during the past half century, and as was the case at the outset of it, those who had been vaccinated in infancy, but who had more or less lost their protection through lapse of time. Without the means of efficiently isolating such cases directly they are discovered, an epidemic may soon be established in any populous district; but it would need great apathy or great mismanagement on the part of the local authority for it to get beyond control, as the Gloucester epidemic suddenly did.

What in Gloucester fanned with startling rapidity a smouldering fire into a sudden blaze was, as has been before stated, the accident by which the infection was sown broadcast amongst a number of unvaccinated children. It became impracticable then to control the epidemic, and we found ourselves face to face with a raging pestilence, against which the community as a whole were, in a degree, even less protected than they were in the times before Jenner. For then, as abundant evidence proves, an epidemic of small-pox was mainly confined to children, for the simple reason that the bulk of the older population had had the disease when young, and though they had only escaped from it with disfigured faces and often with the loss of sight, they at any rate enjoyed a pretty effective protection for the rest of their lives. But in Gloucester a considerable proportion of the adult population were not so effectually protected, for they had lost more or less of their infantile protection and were living in "a fool's paradise," either of disbelief in the need of protecting themselves again or of procrastination in so doing, from which they were rudely awakened when the pestilence laid its grip suddenly upon them.

If the mortality and suffering and pecuniary loss which the epidemic has imposed upon Gloucester could have been confined to the opponents of vaccination the rest of the community would probably not have been greatly disturbed. But this was impossible, and those who have had to pay the piper for the tune to which they have unwillingly been compelled to dance have some reason if they decline to face this particular "music" again.

It is, therefore, a fallacy for the opponents of compulsory infantile vaccination to assert that it is only they and their

children who will suffer for their folly. We know by the best of all evidence that this is untrue, and that they cannot disassociate themselves, as they profess to think, from the rest of the community, who must suffer for their shortcomings, and who, consequently, are justified, in this as in other matters, in compelling a minority, however conscientious they may allege their opposition to be, to conform to laws which are made for what the majority consider the general good. It has needed such an experience as that of Gloucester to enforce this elementary truth, and it will be some compensation to those who have had to pay for it so dearly if it should be the means of protecting others from a similar catastrophe.

Apart, however, from the class of assumably conscientious and, in a degree, consistent objectors to vaccination, who have some sort of justification on which they found their opposition to it, and who are really a comparatively small one, there is a far larger body of recalcitrants who have no reason whatever to give beyond the assertion that "they do not hold with vaccination." And there is a still larger class who entertain no particular objection to vaccination itself, but who simply refrain from having their children vaccinated because they have not had the danger of leaving them unprotected brought forcibly before them, and because they do not care to be compelled to do what other people are allowed to escape from doing.

**Converting
effect of the
Epidemic.** For many years past small-pox has been so largely a disease of adult life, even when epidemic, that, as has been just stated, it has required such an experience as Gloucester has gone through to convince many persons that it is still, as it was before the time of Jenner, preeminently the scourge of childhood, wherever circumstances expose an unprotected infantile population to the chances of its attack. That experience soon converted many a doubter or waverer in Gloucester, and sufficiently accounts for the readiness with which the large majority of parents presented their children for vaccination directly the outbreak in connection with the Widden Street School and the extension of the disease amongst the unprotected juvenile population which rapidly followed it, together with the high mortality by which it was accompanied, opened their eyes to the true nature of the risk they were imposing on their children. But even after this convincing demonstration there were still a number of parents who, under one excuse or another, refrained from making up their minds, and it needed the stronger conviction that they would

be summoned if they did not do so to bring them to a decision.

It was in view of this state of things that the Vaccination Committee felt bound to call into operation the power as well as the duty which the law has entrusted to Boards of Guardians, and to draw from its scabbard the sword which has lain rusty in it for so many years. The Board of Guardians had two months previously issued and widely distributed a notice calling the attention of defaulting parents to the legal provisions of the Vaccination Acts, and appealing to them to spare the Board the necessity of putting those provisions into force.

Good effect of Prosecutions. The issue of a definite threat to prosecute at once brought in a considerable number of defaulters, whilst the actual issue of the citation was in others also followed by submission. The prosecutions which followed have had an equally salutary effect, by showing on the one hand that the Committee had determined to carry out the decision of the Guardians, and, on the other, that there is a very large proportion of defaulters who only want to be submitted to a very moderate pressure to dissipate any antipathy which they may entertain to the vaccination of their children.

Effect of indirect Coercion. A similar remark may be made in the case of re-vaccination. A considerable proportion of those who have renewed their infantile protection during the past six months have done so under pressure of some kind. In some cases they have been induced to submit to the operation by fear of the risk of catching the disease thus brought so near to them. In others their submission has

By Employers. been due to pressure exercised by their employers. Ample evidence will be found in the Appendix of the beneficial effects of this pressure in protecting large bodies of *employés* against the disease. Whilst a large number of persons have thus had reason to feel grateful that they were induced to be re-vaccinated, in some cases against their inclinations, many others have had equal reason to regret the fact that similar pressure was not used in their case, and they and their friends in many cases have not failed to express themselves to that effect.

Through the Schools. The public elementary schools, the first of which (Widden Street) was closed on Feb. 23, and the others at different periods up to May 22, were re-opened on June 1st to all children who had been vaccinated. A great deal of outcry was made by the anti-vaccinators against this

restriction, which was not only a proper one in the interest of the schools themselves but of the unvaccinated children, for it exercised a healthy influence in stimulating vaccination. The likelihood of being summoned and fined and the certain inconvenience to themselves and the detriment to the children brought many parents to view in a new light a matter which they had been accustomed to consider as settled once and for all by their own private inclinations, and swelled the vaccination returns at a time when they were beginning to fall off. Many of the more noisy defaulters frankly declared their intention of not having their children vaccinated until they received a summons; others invited prosecution, and named large sums they were prepared to pay in support of their convictions. The sequel in one instance was instructive. A husband, who had expressed his intention to fight the case by the aid of £25 of his own money and £25 which he alleged had been promised him by the Anti-Vaccination Society, was ultimately represented in Court by his wife, and was mulcted only in 13/6 costs, whereon she left the Court declaring their inability to pay even this amount!

Intention to
uphold the
Law.

The Committee have, since the closure of the Vaccination Office and the suspension of the special vaccination machinery created to meet the needs of the epidemic, occupied themselves in gradually clearing up the arrears of primary vaccination which have accumulated during the last ten years. The great majority of children now resident in Gloucester have been more or less effectively protected by the wholesale vaccination carried on during the epidemic. But the difficulty is to trace the whole of these cases individually, so as to be sure that the provisions of the law have been complied with and the interests both of the individual and of the community have been adequately protected. The Committee are having the whole of the uncertified cases gradually sifted, and they expect at no distant date to bring the juvenile population of Gloucester into the same position in regard to vaccination as they would be in if the resolution of 1887 had never been passed.

In the Appendix will be found a statement of the number of children born in Gloucester during the ten years ending Dec. 31, 1895, and of the ways in which their vaccination history has been approximately compiled. Absolute accuracy in such a matter is impracticable, but it is believed that the record given is sufficiently accurate, to the 30th June, the date at which it was compiled, to give a fairly correct idea of the present condition of that large number of children.

General result
of the
work done.

In the Appendix will also be found the general returns of vaccinations and re-vaccinations, from all sources, effected during the epidemic. Nominally the return covers the returns received from Jan. 1st to Aug. 8th of this year; but a certain number of the returns include vaccinations and re-vaccinations performed by private practitioners during December, 1895, when the demand first became acute, though it is impossible to discover exactly how many. The return includes also the outlying villages of the Gloucester Rural District, and the suburbs of Gloucester, as well as the City proper. It thus appears that out of an estimated population of about 52,000, at least 36,000 have been induced to accept the protection of vaccination, either in their own persons or in those of their children.

The balance, of whom no record is given, is made up of a variety of different elements. Many are elderly persons who refused to be re-vaccinated because they believed themselves to be proof against small-pox from the fact of being protected by their age against the risk of infection. In connection with which assumption it is well to note that a trifle over 15 per cent. of the cases which have occurred during the epidemic have been over 60 years of age. A second category is that of persons who had previously had small-pox, and for that reason considered themselves to be protected. The Committee are not in a position to state exactly how many of this class were actually attacked, but they have reason to believe that the number is very small. Most of those who thus enjoyed immunity obtained it during the epidemic which prevailed in Gloucester and its neighbourhood in 1873. A third section includes those who, whether as children or adults, were considered to be in a condition of health in which vaccination was at the time not desirable. The residue is made up of children who have not reached the age of compulsory vaccination, persons who were temporarily absent from Gloucester, vaccinations unaccounted for (by the few medical practitioners who sent in no or imperfect returns), and, probably the largest body of all, the active opponents of vaccination and the apathetic, with their families, who have not yet been vaccinated or re-vaccinated.

Need for dif-
fusional of
information.

The Committee have to thank the Jenner Society for a large number of papers and pamphlets, designed to meet the objections against vaccination, which were placed at their disposal by the Executive Committee of the Society, and were freely distributed

throughout Gloucester during their earlier operations. It is clear that if the efforts of the opponents of vaccination are not to be allowed to go uncombated, as has been so largely the case hitherto, some such agency as that of the Jenner Society will be needed to successfully carry on the campaign. For, however weighty official statements of the statistics and facts in favour of vaccination, such as those issued by the Local Government Board, by Sanitary authorities, or by professional journals, may be, it requires an activity, promptness, and flexibility which is not generally found in official machinery to meet an agitation such as that which has been for some years carried on by the organised efforts of the Anti-Vaccination League. It is by a widespread diffusion of such evidence as the recent experience of Gloucester offers as to the protective value of vaccination that the misstatements and fallacies of anti-vaccinators can be best counteracted, for it has been an object lesson which nothing but the most firmly rooted prejudice could fail to comprehend.

Conclusion. In a section of the Appendix will be found evidence from a large number of persons occupying a prominent and responsible position, as heads of public institutions, employers of labour, and others who have been in close contact personally with the epidemic. From the general body of evidence which the Report thus contains it will be clear to every intelligent and unprejudiced person that whatever the views entertained by a considerable number of persons in Gloucester may have been up to the end of 1895 as to the uselessness of vaccination as a protection against small-pox, there can be no doubt now that the vast majority of the citizens are convinced of the error of the course pursued by all classes in neglecting vaccination as they did up to that date. Probably no record exists of so rapid, so extensive, and so momentous a conversion on any matter not directly connected with a question of religious belief. Gloucester, which in the year 1892 headed the record of badly vaccinated communities in England and Wales, showing a percentage of 86.9 of children who had been born during the year and were not accounted for in the vaccination returns, is now, in regard both to its infantile and adult population, probably one of the best vaccinated towns in the Kingdom. But at what a cost has this conversion been achieved! The Committee can only express the fervent hope that the result of their labours and of the efforts of all those by whom they have been so cordially assisted in effecting this great conversion may revive permanently the confidence which

not only Gloucester but Gloucestershire for so many years exhibited in the great discovery of her illustrious son, the centenary of which has been recently commemorated from one end to the other of the civilised world with an enthusiasm which is sadly in contrast with the treatment it has received in the home of its birth.

Signed,—

Committee :

JAMES CLARKE, *Chairman*.
CHARLES GOUGH.

JNO. WM. JEENS.
JOHN JENNINGS.
F. C. WORKMAN.

FRANCIS T. BOND, M.D., *Superintendent of Vaccination (pro. tem.)*

ERNEST CHRISTISON CARTER, M.D., *Deputy do.*

August, 1896.

P.S.—The Committee desire to place on record the great indebtedness, not only of themselves but also of the Board of Guardians and the public, for the very able and efficient manner in which Dr. Bond organized, and Mr. Stanway carried out—in both cases gratuitously—the work of the Committee in this very important matter.

They also desire to record their satisfaction with the capable manner in which Dr. Carter performed the responsible duties he undertook; and their thanks to Mr. L. G. H. Mayer, Superintendent Registrar, for his very useful and willing assistance, and for gratuitous permission to inspect his registers.

APPENDIX.

I.—Statistical and other Documents illustrative of the Report.

RESULT OF THE "HOUSE-TO-HOUSE VISITATION,"

By the Assistant Vaccination Officers; commenced April 27th, concluded May 15th, but subsequently revised.

District	Information obtained by the Assistant Vaccination Officers			
	Not at home	Particulars refused	Information received	
	Houses	Houses	Houses	Inmates of same
	A	B	C	D
1	54	7	968	4562
2	55	7	807	3520
3	4	4	436	2072
4	35	14	823	3568
5	32	19	429	1924
6	23	5	501	2265
7	18	4	801	3792
8	39	8	1001	4547
9	31	11	969	4735
10	14	6	497	2393
12	47	8	720	3274
	352	93	7952	36652
<i>Public Institutions:</i> Wotton County Asylum				658
Prison ..				97
Infirmary ..				117
Workhouse..				250
Police Station ..				32
Total for Gloucester City proper ..				37806
SUB-URBAN GLOUCESTER:				
South End	11	6	—	194 988
East End	13	11	—	178 784
	17	—	372	1772

SUMMARY OF GLOUCESTER CITY.

The Number of the Inhabitants of 7952 Houses as per columns C and D were.	36652
giving an average of 4.60 to each House.	
Add the Inmates of the Public Institutions	1154
Population accounted for	37806
The Number of the Houses from which no information was received, as per columns A and B, is 445; and if the Inhabitants are taken on the average of those seen, viz., 4.60 to each House, it would give a further Population of	2051
Making the Inhabitants of the City proper to be	39857

RECORD OF CHILDREN BORN IN THE GLOUCESTER DISTRICT

During the 10 years ending Dec. 31, 1895, and of their relations
to Vaccination.

Total births (1)	..	..	..	..	..	..	15682
Children under 10 years of age vaccinated prior to Jan. 1, 1896 (2)							2378
" " " since						(3)	8400
" " dead to date (4)					..	..	3176
" " gone away from Gloucester (5)					..		849
" " who have had small-pox and have recovered (6)	..	..	..	..	..	..	523
Children known to be unvaccinated (7)				..	..	..	209
" under three months old (8)			..	..	..	..	200
							15735
				From above	..	..	15682
				Balance being surplus	..		53

- (1) Obtained from the Registers of births.
- (2) " " Registers of the Vaccination Officers.
- (3) This number includes vaccinations registered by (a) the special staff appointed by the Board of Guardians; (b) the ordinary public vaccinators and their personal assistants; (c) the staff employed by the City Council, (d) the medical officers of the various public institutions; (e) the other medical practitioners of the city. In the case of the first four of these categories the numbers may be relied on as nearly exact, but in the last the number is only approximate, some of the medical practitioners not having kept an exact record of their primary vaccinations.
- (4) Obtained from the Registers of deaths.
- (5) " " Vaccination Officers.
- (6) " " Medical Officer of Health for the City.
- (7) " " record of the house-to-house inquiry made by the Committee.
- (8) Obtained from the Registers of births.

There is, in addition to the uncertainty as to vaccinations performed by private practitioners, another element of uncertainty arising from the children now under 10 years of age, who have come to reside in Gloucester within the last 10 years. Their number cannot be estimated with any approach to accuracy, and would swell materially the balance of 53 appearing above.

RETURN OF VACCINATIONS AND RE-VACCINATIONS

From January 1st, 1896, to August 8th, 1896, as ascertained from all known sources.

Vaccinators	Primary	Re-Vaccinations	Total
Vaccination Enquiry Office Staff ..	756	1098	1854
Public Vaccinators	5537	12435	17972
Corporation Staff	424	956	1380
Private Practitioners*	1827	11875	13702
Number of children, 10 and under, who are stated to have been vaccinated in infancy }	8544	26364	34908
	1072		1072
	9616	26364	35980

*From one Medical Practitioner no returns at all have been received, nor have any been received by the Committee from Private Practitioners generally since June 13th.

RESOLUTIONS OF THE MEDICAL PROFESSION.

CITY OF GLOUCESTER.

At a Meeting of the Medical Profession of this City, convened by Dr. Batten in consequence of an official communication from the Sanitary Committee of the City Council with reference to the epidemic of Small-pox, held at the Guildhall, on Thursday, the 16th day of January, 1896.

Present: Dr. Batten in the chair, and 21 other medical men.

RESOLVED:—

That this Meeting of the Medical Profession of the City of Gloucester, in response to the courteous invitation of the Urban Sanitary Committee for advice and assistance in the present serious outbreak of Small-pox, desires to express its readiness to assist the Sanitary Authority and its *unanimous* opinion:—

- (1) That the accommodation at the Hospital for Infectious Diseases should be at once increased; and that the plans should be such as will admit of still further extension, if necessary, so that every case of small-pox may be removed from the home to the Hospital without delay.

- (2) That we have *no hesitation whatever* in expressing our belief that "successful" vaccination in early life and re-vaccination at a proper interval afterwards is an effective and the only available means of protection against an attack of small-pox, and that it is the duty of all parents to provide such protection for their children.
- (3) That the Guardians be urged to comply with the provisions of the Vaccination Acts and the General Order made by the Local Government Board thereunder, and in particular with Article 16 of such Order; and also to instruct the Vaccination Officers to fully carry out their duties under the said Acts and Order.
- (4) That it is desirable that steps be taken by a house-to-house visitation and (with the co-operation of the School Authorities) by Examination of the children attending the Elementary Schools, to prepare lists of unvaccinated persons with a view to insure their prompt vaccination.
- (5) That in view of the intimate relations of the City and Rural Districts, especially in their suburban connections, it is expedient both in regard to efficiency and economy that the Urban Sanitary Authority and the Rural District Council should combine to provide such permanent accommodation as may be necessary to meet any future outbreak of Infectious Disease.

RESOLVED ALSO:—

That copies of these resolutions be sent to
 The Gloucester Urban Sanitary Authority
 The Guardians of the Poor of the Gloucester Union
 The Rural District Council
 The Local Government Board
 The Local Press, and
 The Medical Press.

(Signed) RAYNER W. BATTEN,
 Chairman.

N.B.—An expression of adherence to the above resolutions was subsequently received from two or three other members of the medical profession who were unavoidably prevented attending the meeting. So that the resolutions may be taken as expressing the unanimous opinion of the Medical Profession of Gloucester.

COPY OF POSTER.

SMALL-POX.

In view of the continued spread of the disease of small-pox in this City, the Guardians of the Gloucester Union earnestly recommend the parents of **all** un-vaccinated children to obtain their immediate vaccination; and for this purpose, Dr. J. R. Bibby, the Public Vaccinator, will attend every Saturday at the Old Crypt Schoolroom, Southgate Street, at 2.30 p.m., and will also be prepared to vaccinate, free of charge, any children, and re-vaccinate any adults, at his residence, 12, Clarence Street, Gloucester, between the hours of 9 and 11 a.m. daily. The vaccination will be with calf lymph if desired.—*Poor Law Offices, Gloucester, January 16th, 1896.*

III

PRIVATE CIRCULAR TO EMPLOYERS.

SMALL-POX.

Having regard to the very serious consequences resulting from the prevalence of small-pox in this City, the Sanitary Committee of the Corporation request employers of labour to urge upon their employees the extreme importance of vaccination.

The Committee are giving every attention to General Sanitary precautions, but are advised that vaccination and isolation are the only reliable means of checking the epidemic; and they are assured that if the vaccination of children and re-vaccination of adults were promptly and thoroughly carried out, there is every reason to hope that the disease would be at once checked and very soon stamped out.

In addition to the distress occasioned to the families of those afflicted, the epidemic is very seriously affecting the trade and welfare of the City; and unless promptly checked, it may at any moment interfere with and possibly result in the closing of various works and other centres of employment, just as it has already necessitated the closing of several of the Public Elementary Schools.

Although most anxious not to cause unnecessary alarm or to give undue publicity to a state of things, which everyone must regret, the Sanitary Committee feel it their duty to ask employers of labour to *privately* lay these facts before their employees and urge them to assist the Sanitary Authority to check the epidemic by at once arranging for the vaccination of the children and the re-vaccination of themselves and other adults in their respective households and by inducing their friends and neighbours to adopt a similar course. It may be well to intimate that all persons may be vaccinated (with calf lymph if desired) without any charge.

The Committee trust that all citizens, including those who hitherto have been opposed to vaccination, will, under existing circumstances, give due consideration to this strong and unanimous recommendation, especially as it is supported by the unanimous opinion of all the medical men in the City.

Signed by direction of the Sanitary Committee,

GEORGE SHEFFIELD BLAKEWAY,
Town Clerk.

JOHN CAMPBELL, M.D.,
Medical Officer of Health.

Guildhall, Gloucester,
13th March, 1896.

ADVICE OF LOCAL GOVERNMENT BOARD.

Extract from a letter sent by the Local Government Board to the Corporation of Gloucester, a copy of which was forwarded by the Corporation to the Board of Guardians, and read at a meeting held in March, 1896.

"The Board are advised that under existing circumstances the only means that can be relied on to control the further diffusion of small-pox will be the *immediate organisation of a general system to procure the prompt vaccination* of all unvaccinated persons under 14 years of age, and the re-vaccination of all persons over 10 years of age who have been primarily vaccinated in infancy.

COPY OF HANDBILL.

HOW TO END THE SMALL-POX.

The Board of Guardians are advised by Her Majesty's Government that the only way of quickly ending the present deplorable outbreak of small-pox in Gloucester, which is causing such terrible loss of life and money to the City, is to secure the general vaccination of its inhabitants with as little delay as possible. The Board, therefore, feel it their duty to take every step in their power to obtain this end, and they are advised, as the first means of so doing, to make a

VACCINATION CENSUS.

To do this they have appointed a staff of *Vaccination Officers*, to visit each house in the City, and they earnestly appeal to their fellow-citizens to aid them by giving these officers full and exact information, when applied to by them, so that the vaccination of those who are not already vaccinated may be carried out with as little delay as possible.

The Guardians further appeal to those who have hitherto opposed vaccination to consider the grave responsibility they are incurring in continuing so to do, and they implore them to follow the good example already set by so many of their own persuasion, who have submitted *both themselves and their families* to the operation *for the public good*. BY ORDER.

COPY OF CIRCULAR LETTER TO EMPLOYERS.

VACCINATION ENQUIRY OFFICE

STATION ROAD (next to Creamery),

GLOUCESTER, May 2nd, 1896.

Dear Sir,

The Guardians are rejoiced to see that the steps already taken to prevent the spread of small-pox in this City have been followed by a diminution in the number of cases of the disease.

There is still, however, a large number of adults who have not availed themselves of the offer of Re-vaccination free of charge.

Until this is done the abatement of the epidemic must be necessarily slower than it would otherwise be. The Guardians therefore desire your cordial co-operation in securing the Re-vaccination of the entire adult population.

If you would be good enough to answer the first or all of the annexed questions, and return them here, you would greatly oblige us and lighten our work.

FRANCIS T. BOND, M.D.,

Superintendent of Vaccination.

- 1) How many of the hands in your employ have not been re-vaccinated?
- (2) Are you willing to have the operation performed on your premises in the case of those who have not availed themselves of the Guardians offer?
- (3) When would you be willing to see one of our Medical Staff?

COPIES OF VACCINATION FORMS.

GLOUCESTER UNION.

District No. 1.

Street, Chepstow, No. 12. No. 1.

Occupiers, John Jones and William Brown.

8 AND 6 INMATES.

It is the duty every evening of the Assistant Vaccination Officer to—

(a) Furnish lists to the Vaccination Officer of the district of all unvaccinated children under 14 years of age discovered by him during the day; and

(b) Similarly to the Medical Officer of Health lists of all persons found to be actually suffering from small-pox.

Name	Age	Vaccinated, and if recently, by whom	When	Re-Vaccinated, and if recently, by whom	When	Had Small-pox?	If so, when
12. Jones, John	15	V.	As infant	Yes (Bibby)	June 3	No	April, 1896
" Mary	13	V.	do.	No	and refuses	No	
" Charles	10	No		No		Yes	
" Henry	14	V.	As infant	Yes (Bibby)	June 10	No	
" Mary	12	V.	do.	do.	do.	No	
" Edward	10	V.	do.	do.	do.	No	
" Jane	8	V.	do.	No		No	
" Clara	6	No		Willing to be	done	No	
14. Brown, William	30	V.	As infant	No	willing to be done	No	April, 1896
" Sarah	29	V.	do.	No	refuses	No	
" Joseph	10	No	} Mother	refuses to have them done		No	
" James	8	No				No	
" Fanny	6	No				No	
" Robert	4	No				Yes	

Signed, R. SMITH.

Chepstow Street.

DR. MOORE.
District No. 1.

No. of House and Name of Person	Particulars	Vaccinator's Remarks
12 Jones, Mary	refuses	Wife
do. Clara	willing	Child of 6
14 Brown, William	willing	Husband
do. Sarah	refuses	Wife
do. Joseph	never V.	Child of 10
do. James	and mother	do. 8
do. Fanny	refuses	do. 6
		Mother still refuses and cannot persuade her*

Initials, R.D.M.

*These three cases were then transferred to "Primary Refusals Book," for the Vaccination Officer to take such steps as may be necessary.

N.B.—In the above two illustrations of the forms of return employed, two returns have in each case been included in one form, for the sake of economising space.

COPY OF BILL.

PUBLIC NOTICE.

VACCINATION.

To Parents and Persons having the Custody of Unvaccinated Children under the age of 14 years.

The Board of Guardians of the Gloucester Union has resolved to carry out as quickly as practicable, the provisions of the Vaccination Acts (30 & 31 Vict., cap. 84, and 34 & 35 Vict., cap. 98) and to secure as far as possible the vaccination of all unvaccinated children under the age of 14 years.

The Guardians desire to avoid the necessity for taking legal proceedings to enforce the Acts referred to, and they therefore appeal to the above-named to immediately take steps to obtain the vaccination of their children, as the only means of promptly stamping out the present epidemic of small-pox.

Notice of the various public vaccinators and stations, has already been made public, and the Guardians trust that this appeal will meet with a ready response—otherwise the law will be carried out.

BY ORDER.

Poor Law Offices,
4th April, 1896.

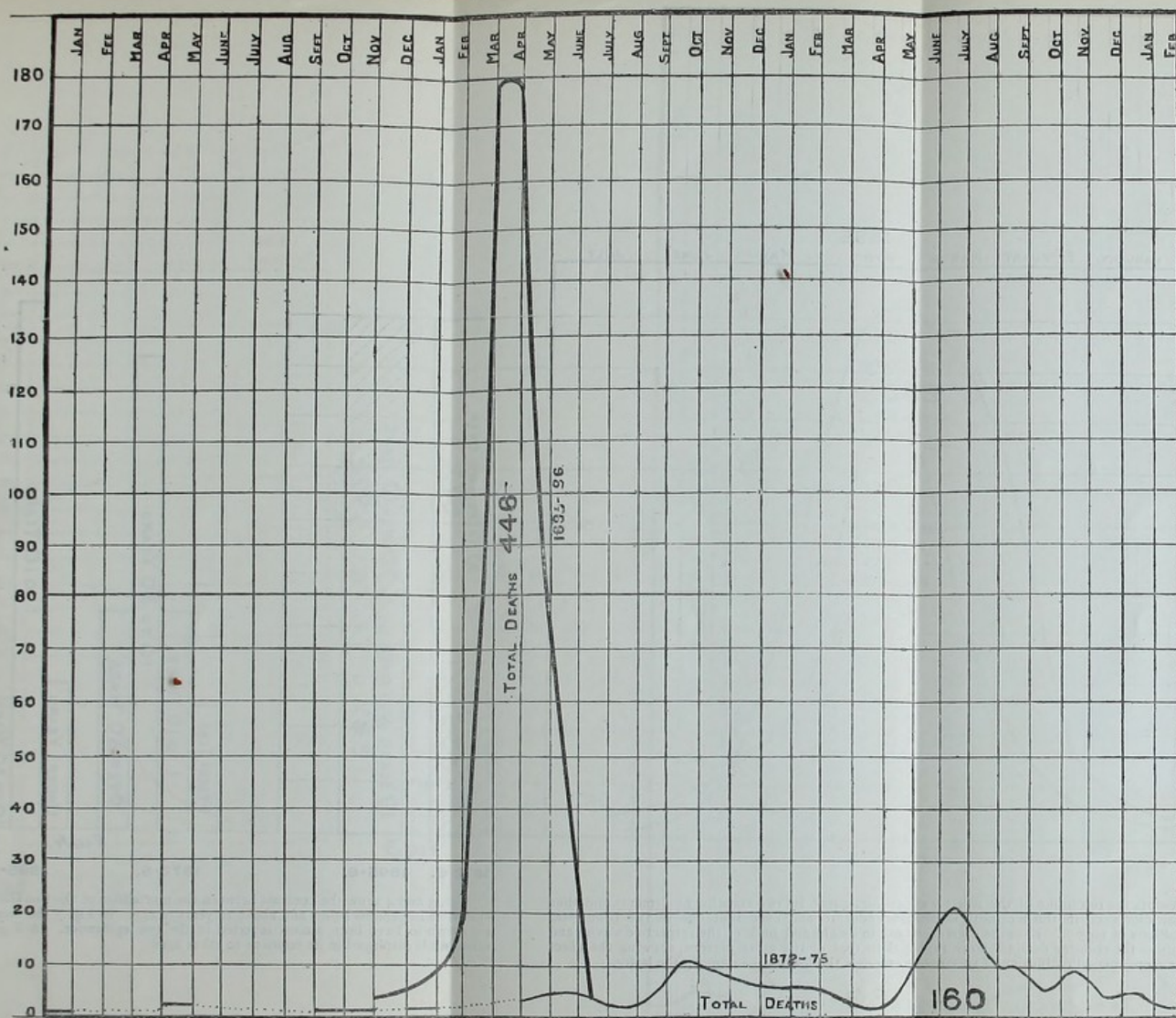


Fig. 1 represents the relative mortalities of the two Gloucester epidemics of small-pox of 1872-5 and 1895-6. It will be seen, that judging from the mortality of the former of these epidemics (no other source of information being available) it was for 16 months a discontinuous one, until May, 1873, when it continued uninterrupted until Feb., 1875, the mortality fluctuating, but in no month exceeding 21. The contrast in the intensity of the other epidemic is remarkable, as much so as between a sky-rocket and a squib.

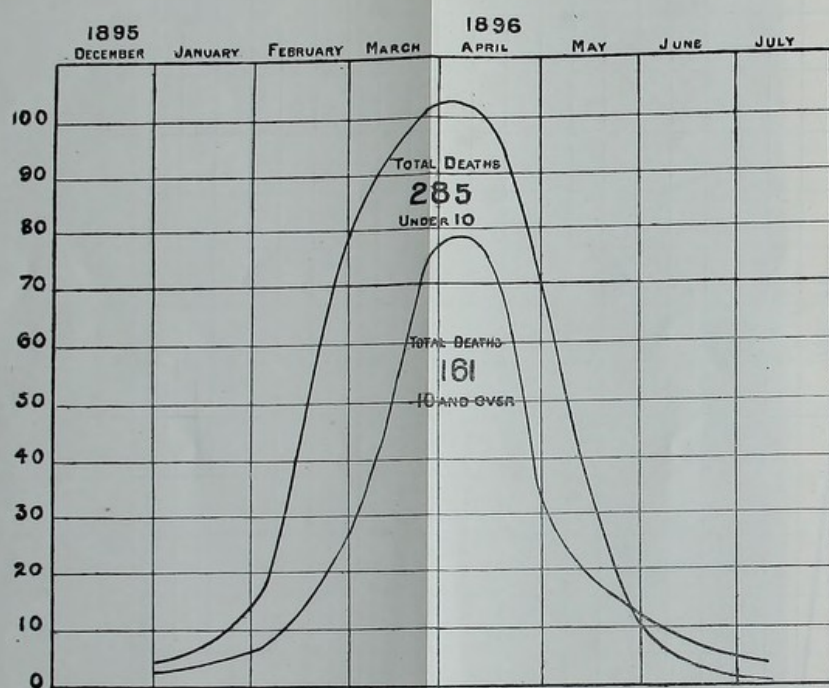


FIG. 2.

Fig. 2 represents the resolution of the single wave of Fig. 1 into its two constituent elements and thus demonstrates the difference in the mortality of attacks under 10 and over that age in the Gloucester epidemic of small-pox of 1895-6. Note the difference both in height and bulk of the respective waves, and that the mortality of the children declined more rapidly than that of the older persons, showing the effect produced by the more energetic diffusion of vaccination amongst the former than among the latter.

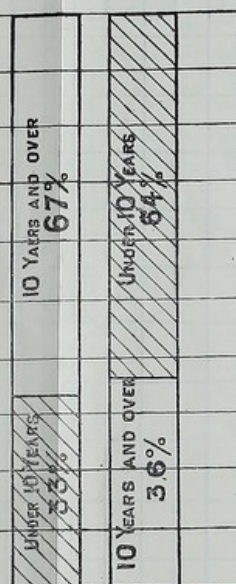


FIG. 3

1872-5. 1895-6.

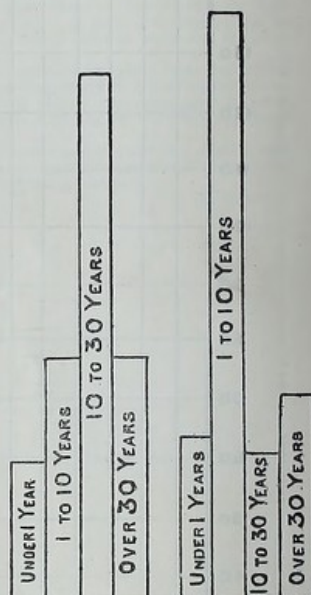


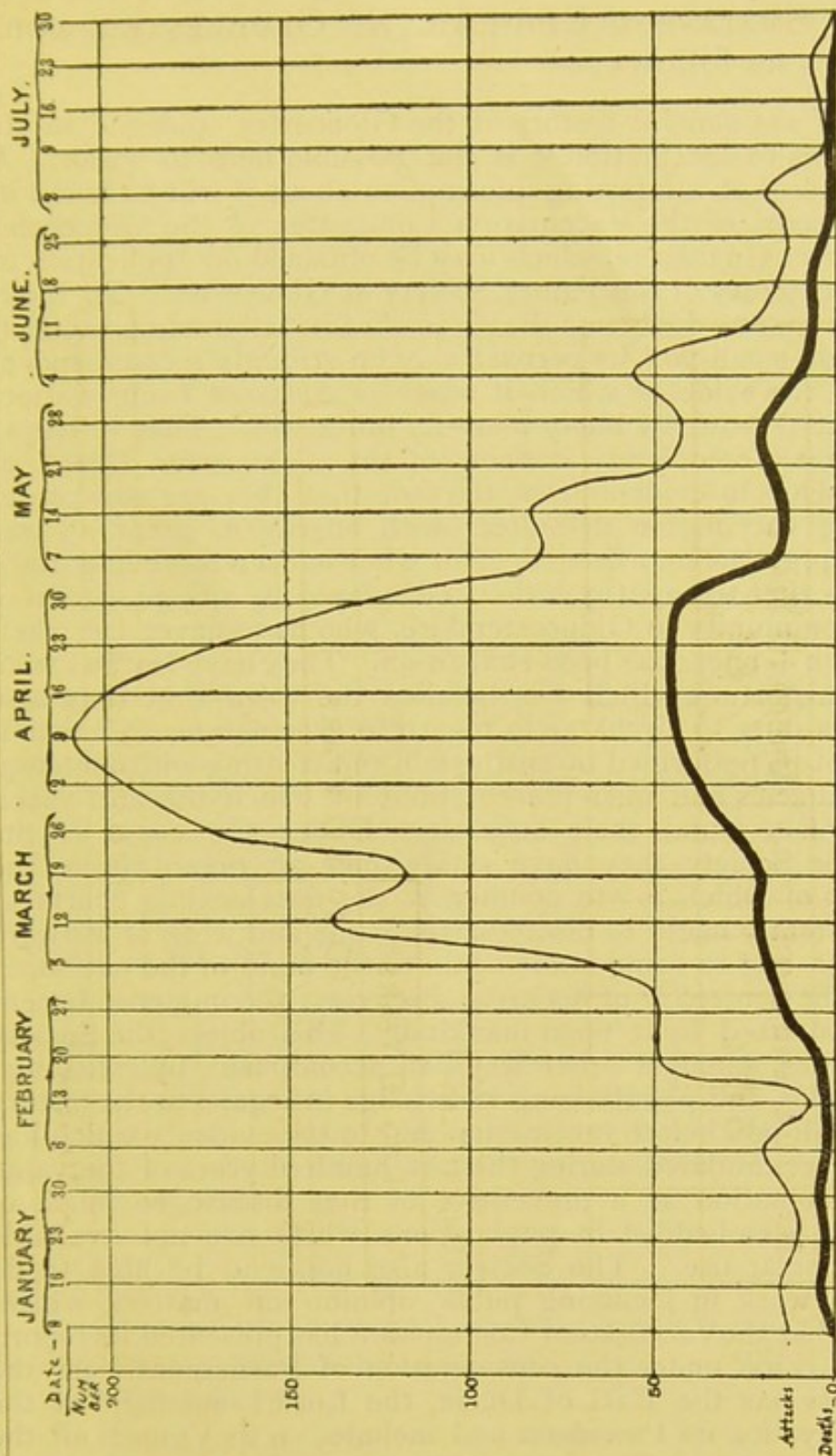
FIG. 4.

1872-5. 1895-6.

Figs. 3 and 4 show the contrast between the mortalities of the two Gloucester epidemics in persons below and above 10 years of age. In Fig. 3 the mortalities are shown to have been almost inverted in the two epidemics. In Fig. 4 the same fact is displayed in its relations to other ages.

FIG. 5.

Showing the progress of the Small-pox Epidemic at Gloucester during the months January—July, 1896.
[The thin (upper) line shows the number of attacks notified during each week. The thick (lower) line shows the number of deaths which occurred during each week.]

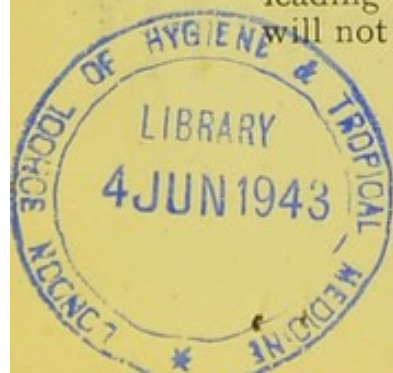


Although there are a few minor irregularities in the curves, due in some degree to irregularities in the dates of notification, the following facts are clearly brought out in the above diagram :

1. The general correspondence between the two curves : a rise in the attack-line being followed within about a fortnight by a rise in the death-line, showing the average length of the period of sickness.
2. The suddenness of the increase at three dates, *viz.*, the third week in February, the first week in March, and the third week in March ; the last-mentioned rise being continued until the second week in April.
3. The suddenness of the decrease in attacks after the middle of April, within a fortnight of the date when serious efforts to promote vaccination and re-vaccination were commenced.
4. The checks in the downward progress of the curves during May ; a time when many cases, owing to disturbing influences, were withdrawn from regular medical treatment and from being sent to the Hospital, the survivors being allowed to go abroad freely while still capable of infecting others.

An article in the *Times* of August 24th, headed THE SMALL-POX EPIDEMIC AT GLOUCESTER, concludes as follows:—

“Of the general history of the Gloucester epidemic in its relations to vaccination it is not possible here to speak. A great deal of interesting information about it will be found in the Report of the Vaccination Committee of the Gloucester Board of Guardians, which may be obtained on application to the Secretary of the Jenner Society at Gloucester. To those who have any doubts on the value of vaccination as a protection against small-pox its perusal may be strongly recommended, for, if the evidence which it contains does not bring conviction, it is scarcely likely that any other will. That it has at any rate completely convinced the Gloucester Board of Guardians is evident from the fact that they are now prosecuting vaccination defaulters with energy as great as was their previous indifference. But what is even more important still is that the apathy hitherto displayed by a large section of the community in Gloucestershire, who have never lost their faith in Jenner, has been shaken off. They have learned from the misfortune which has befallen the town that they also have a duty to discharge in regard to vaccination, and that it cannot be performed by sitting still and treating with contempt the fallacies and misrepresentations on which the anti-vaccinationists found their attacks. Under the name of the Jenner Society they have established an organization, the object of which is ‘to counteract the mischievous efforts so persistently made to discredit the name and work of Edward Jenner, and to bring home again to the mind of the nation, on this the centenary of his great discovery, the immense benefit he conferred by it upon mankind.’ This object the Society purposes, amongst other ways, to accomplish ‘by collecting, diffusing, and popularizing knowledge in regard to the history of small-pox before vaccination and to the evidence which has been accumulated during the last hundred years of the value of vaccination as a preventive of that disease, so much of which is embedded in publications which are not available for popular use.’ The Society also hopes to be able to do useful work in focussing public opinion on matters which, now that the Vaccination Commission has presented its report, must come under the consideration of Parliament. As the Society has the Earl of Ducie, the Lord Lieutenant of the County, for its President, and includes on its Council all the leading men of Gloucestershire, it may be assumed that it will not speak without some weight.”



OBJECTS OF THE JENNER SOCIETY.

The first object of the JENNER SOCIETY is to counteract the mischievous efforts so persistently made to discredit the name and work of EDWARD JENNER, M.D., of Berkeley, in the county of Gloucester, and to bring home again to the mind of the nation on this, the centenary of his great discovery, the immense benefit he conferred by it upon mankind.

In furtherance of this object the Society will use its best efforts to collect, diffuse, and popularise knowledge in regard to the history of small-pox before JENNER's time, and to the evidence which has been accumulated, during the last hundred years, of the value of vaccination as a preventive of that disease, so much of which is embedded in publications which are not available for popular use.

It will do this by the publication and distribution of approved literature on these subjects, and especially by the circulation of the substance of the Report of the Royal Commission on Vaccination, and of the evidence on which it is founded, in such a form as will adapt it for popular perusal.

It will also provide speakers and promote the holding of meetings for the diffusion of information as to the truth about vaccination in localities in which this mode of spreading it appears to be particularly called for.

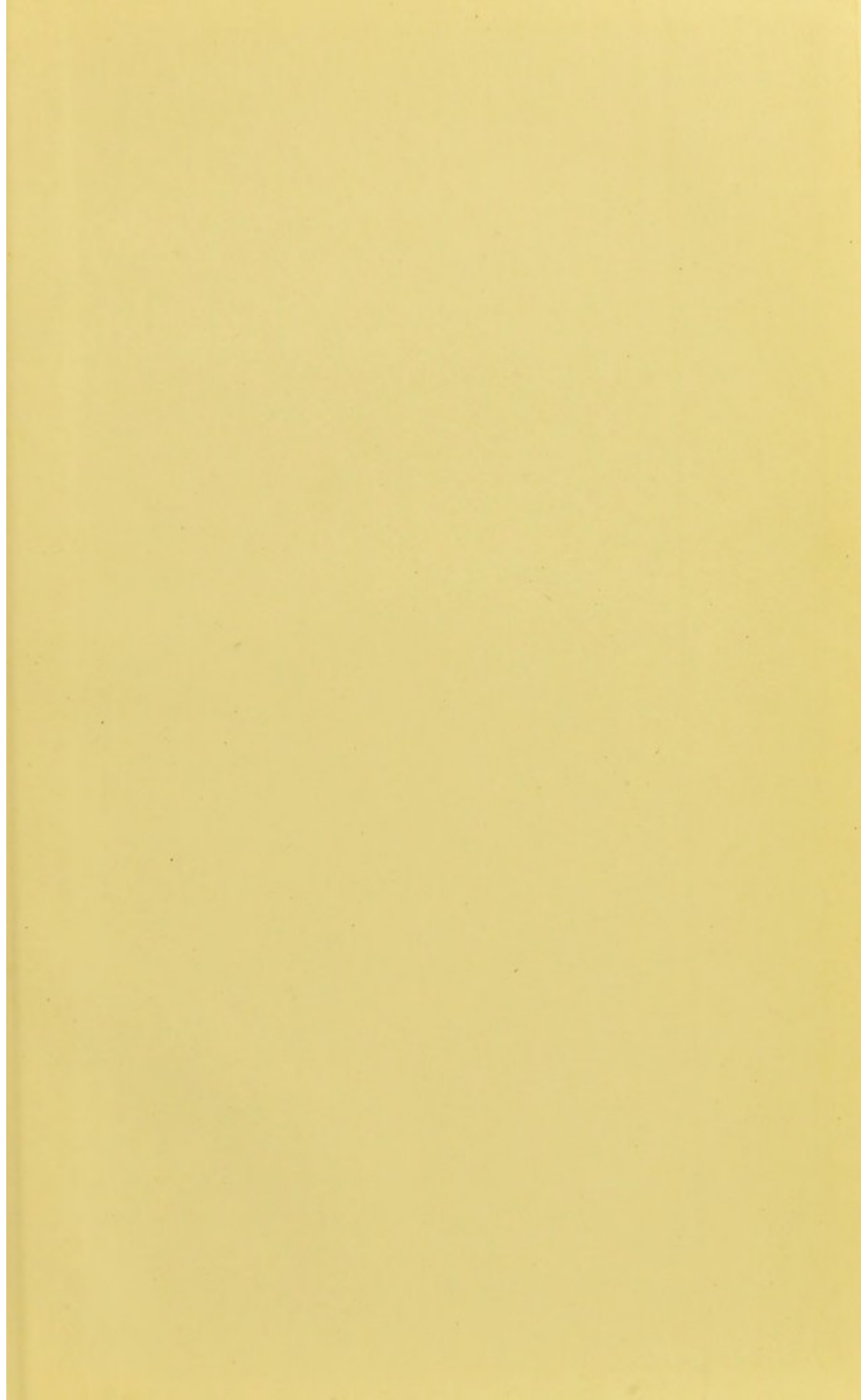
And it will, so far as seems necessary and is practicable, systematically reply to and expose the misstatements and fallacies so persistently circulated by the opponents of vaccination in the public journals, at public meetings, and in Boards of Guardians, to the neglect of which hitherto is mainly attributable the hold which this mischievous agitation has obtained on the public mind.

The work of the Society will thus be seen to be primarily an educational one, the importance of which cannot well be over-estimated, and it appeals for aid in promoting it to all who recognise how largely the opposition to vaccination is founded on ignorance and nurtured by misrepresentation.

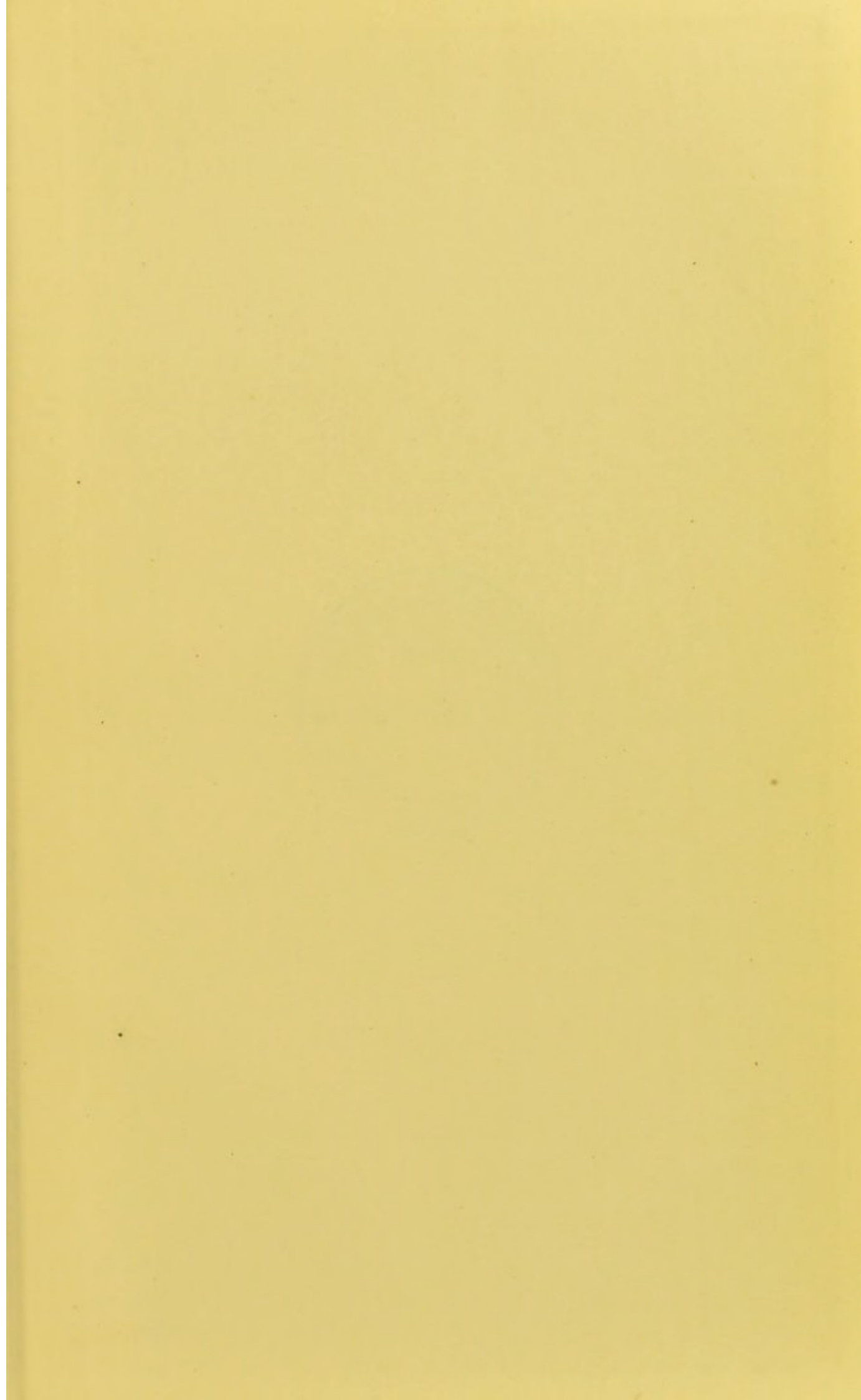
Further information as to other objects which the Society has in view is contained in the prospectus, which may be obtained from the Hon. Secretary, Dr. Bond, Gloucester.

Write re Dr Ransome's drag Jan 7/11 90

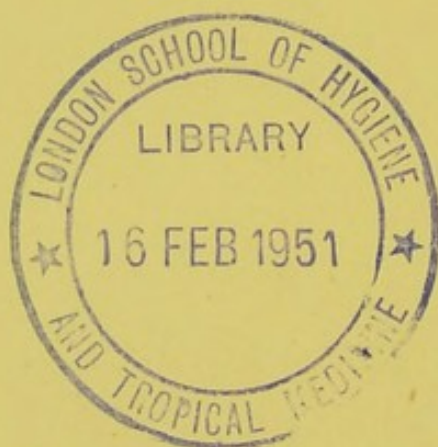








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