A century of vaccination : and what it teaches / by W. Scott Tebb.

Contributors

Tebb, W. Scott 1862-1917.
Harvey Cushing/John Hay Whitney Medical Library

Publication/Creation

London : Swan Sonnenschein & Co., Lim, 1898.

Persistent URL

https://wellcomecollection.org/works/cazhyvfb

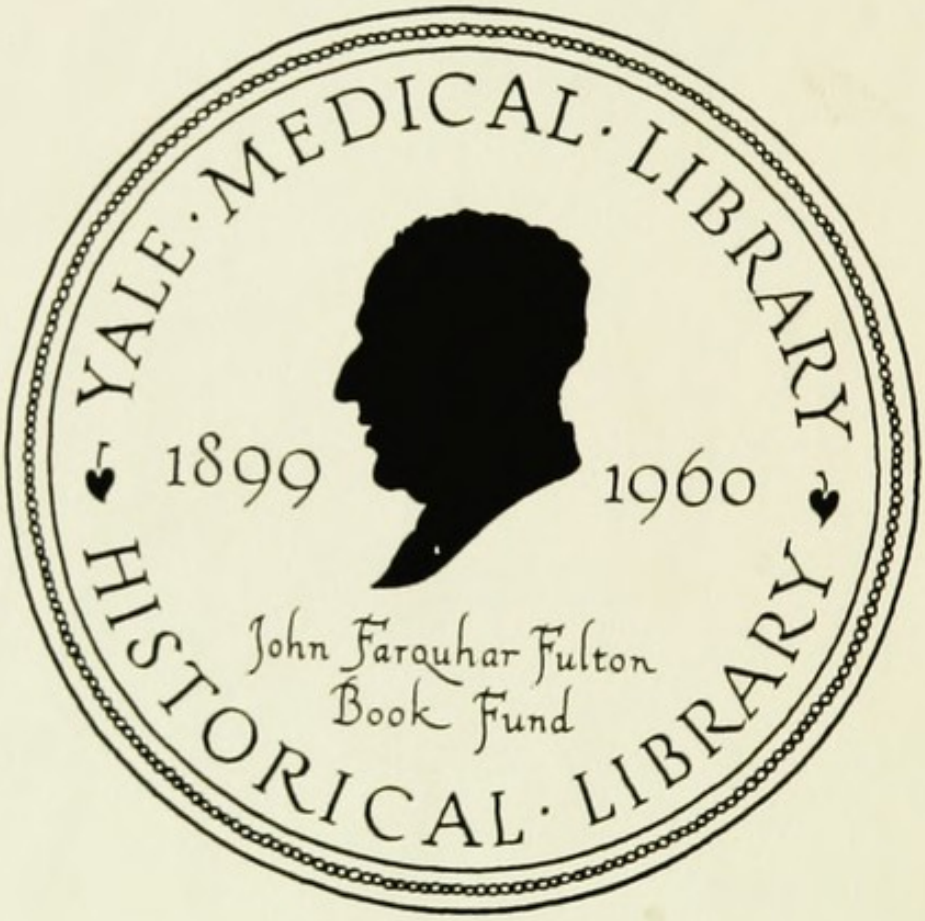
License and attribution

This material has been provided by This material has been provided by the Harvey Cushing/John Hay Whitney Medical Library at Yale University, through the Medical Heritage Library. The original may be consulted at the Harvey Cushing/John Hay Whitney Medical Library at Yale University. where the originals may be consulted.
This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.

Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
https://wellcomecollection.org

Medical,
6/6
6r6



(IL-75)

ERRATA.

Page 23, line 22—Insert quotation marks after the word *matter*.

Page 53—For correction of error in second foot-note, see first foot-note p. 393.

Page 266, line 19—For "ingenuously," read *ingeniously*.

Page 274, first foot-note—After "System of Medicine," insert vol. ii.

Insert foot-note indicators—

After word "pamphlet," p. 114, line 9.
,, "Birdwood," p. 194, line 16.
,, "Ricketts," p. 195, line 18.
,, "days," p. 271, line 5.

A CENTURY OF VACCINATION

A CENTURY OF VACCINATION

AND WHAT IT TEACHES.

BY

W. SCOTT TEBB, M.A., M.D. (Cantab.), D.P.H.

SURGEON TO THE BOSCOMBE HOSPITAL.

LONDON:

SWAN SONNENSCHEIN & CO., LIM.

1898.

HAY NISBET AND COMPANY, LIMITED,

PRINTERS,

GLASGOW AND LONDON.

19th
cent
RM787
T42
1898

TO MY FATHER,

WILLIAM TEBB,

THIS BOOK

IS AFFECTIONATELY DEDICATED.

PREFACE.

So long as the practice of vaccination remains established and enforced by law, it will be the duty of every citizen, who is also the father of a family, to form a judgment upon it; unless, indeed, it is to be held that the infallibility of the legislature and of the medical profession, which in this instance directed legislation, is so well assured that enquiry is superfluous, if not culpable. But it is a sounder doctrine that the existence of the law does not relieve parents of responsibility towards their children, and more especially parents (nowadays the majority) who have heard that the efficacy of this operation has been called in question by competent men, while its risks, so long denied, are now on all hands admitted. I am, therefore, not without hopes that among my readers will be included a fair number of the "general public" interested in the subject by the pressure of compulsion, and anxious before they submit a child to vaccination to feel assured that they are doing the right thing, being also resolved to withhold the child from the operation if they cannot be satisfied of this.

But I here address myself more particularly to two classes—to my medical brethren, and to those whose

business it is to legislate for the country on this subject. On the former I desire, with all respect, to urge the following considerations :—

Can it be said that the Jennerian doctrine of vaccination has ever been placed on a truly scientific basis? I specify the "Jennerian doctrine," for there are other aspects of the vaccination or inoculation theory, which I expressly rule out of my enquiry. It is a generally received opinion that in the case of certain diseases one attack affords some degree of immunity against a second. It is certain that there are exceptions to the rule, and it is further certain that the rule has never been scientifically established as such. Nevertheless, it is a generally accepted belief, with evidence in its favour, and in the pages that follow I do not reject or even attack that belief. Further, it is a postulate of the modern inoculation doctrine that a mild or modified attack suffices to secure this immunity. Whether this be so or not, I cannot tell. It is a matter into which I have not been led to enquire, and I am willing to grant it for the sake of argument, since it does not really concern the position which I am calling in question. What I do deny, as the result of my enquiries, is that an attack of cow-pox secures immunity against small-pox. To use technical terms in order to make the distinction clear: while I may allow within limits the truth of homoprophylaxy or homœoprophylaxy, I am satisfied that there has never been shown any sort of scientific basis for heteroprophylaxy. If the reply be made that, granting it is wrong to teach that vaccination is homoprophylactic, it is fair to claim for it that it is homœoprophylactic, I should deny that such a claim can be

sustained; and, though I am, of course, aware that variolous matter can be so modified by being taken at an early stage and passed once or twice through the calf as to produce, when inoculated, not an attack of small-pox, but local effects similar in appearance to those of vaccination, yet that is not what is done every day by medical men who vaccinate. What they are doing they really do not know, nor does any one know, for the ultimate origin of the vaccine lymph in common use has long ago been lost sight of; but if it be true that that ultimate origin is cow-pox, if, that is to say, when we vaccinate we are carrying out the teaching of Jenner, then, certainly, we are acting as if heteroprophylaxy had been established scientifically; for the investigations of Dr. Creighton and Professor Crookshank have proved conclusively that cow-pox is a disease radically different from that against which it is said to protect. Effects similar to those of vaccination can be produced in a variety of ways, and, therefore, to produce them as Dr. Klein and others claim to have done, by means of small-pox virus, attenuated or in other ways concocted, does not identify the disease on which Jenner relied for protection with the disease against which he claimed that it protected, any more than does the production of a vaccine vesicle from cattle-plague identify vaccination with that disease.

Many of my brethren, while willing to acknowledge that there is no true pathological relation between cow-pox and small-pox, fall back on the alleged evidence of statistics, and claim to find in them a scientific vindication of vaccination. The majority of the Royal Commissioners took this view, and rather

deprecated the idea that any other scientific vindication was necessary. To the questioning of the position that trustworthy statistics do provide such a vindication my pages are partly devoted. I do not deny that the "century of vaccination" synchronises roughly with a century in which small-pox (in Europe, at any rate) has largely declined. But this coincidence by no means involves any connection in the way of cause and effect. Small-pox, like typhus, has been dying out since 1780. Vaccination in this country has fallen largely into disuse since people began to realise how its value was discredited by the great small-pox epidemic of 1871-72. So that, while small-pox has declined during the last one hundred and twenty years, twenty years may be cut off from each end of this period, as contributing no evidence whatever of the decline being due to vaccination, and as involving the conclusion that some other causes have been at work to promote this result. I am, of course, only speaking approximately. To the evidence afforded by detailed cases criticism of another kind is applicable, and to this I will presently refer. But, first, in passing, I would call attention to the ease with which an alleged protective operation can acquire a great reputation as successful, more especially if its adoption should coincide with a decline from other causes of the disease against which it is supposed to protect. A local epidemic of small-pox is seldom so severe as to attack more than 5 per cent. of the population. If, therefore, a small minority has adopted some alleged prophylactic, it is very unlikely that the disease will count among its victims any considerable proportion of those who are thus fortified,

particularly as they would be likely to be more than ordinarily careful in matters relating to health. In this way their prophylactic will acquire a great reputation, and the vastly greater number who have equally escaped without having recourse to the protective operation will be overlooked. This is what happens in pretty nearly every epidemic in regard to re-vaccination and the security it is alleged to provide. In the case of primary vaccination other but not less misleading inferences are drawn. Should there be an epidemic of small-pox in a locality where 85 per cent. of the population are vaccinated, it is obvious that the 95 per cent. of the population who escape the epidemic (assuming, as before indicated, a maximum of 5 per cent. attacked by it) will largely coincide with the 85 per cent. vaccinated ; and vaccination thus gains credit. But it will be objected, if the 5 per cent. attacked coincide, in however small a degree, with the 15 per cent. unvaccinated, this is strong testimony to the risk of being unvaccinated ; and so, no doubt, it would be, but for the fact that in localities where the vaccination law is vigorously carried out, the unvaccinated, as a class, will be found to consist largely of the outcasts of society, nomads whom the law has failed to reach, and of weakly children who on account of their health have been excused the operation. This class, therefore, is likely to furnish a disproportionate number of the victims of the epidemic ; and thus again the prophylactic acquires reputation. Add to this the facts, often overlooked, that medical men, even if officials and highly placed, are still liable as men to err, and that their errors will probably accord with their cherished beliefs, and it will readily be understood

that the evidence of detailed cases—which is really the only evidence on which the credit of vaccination depends—cannot be accepted wholesale as if it were not open to question. A vaccinated patient with no visible signs of vaccination is likely to be described as unvaccinated if his case is severe, and especially if death ensues; while if the marks are not plainly visible, the explanation of "not properly performed" is an obvious one; and the patient will be included as "belonging to the unvaccinated or imperfectly vaccinated class" in the list of cases, and, *tout court*, as "unvaccinated" or "having no marks" in the official summary. I think it would be advisable for my medical brethren to accept as authentic only published and tested cases, or such as have come under their own personal observation.

To those who are about to legislate for the country on this vexed question I also address myself particularly. The Queen, in her Speech at the opening of the present Session of Parliament, called for "earnest consideration" of the subject. Hitherto vaccination bills have been passed into law without adequate discussion or debate. Parliament has been assured (incorrectly) that there is complete unanimity in the medical profession concerning the nature, value, necessity, and safety of vaccination; and that has sufficed. Lords and Commons have at once bowed before this alleged unanimity, with the result, as vaccinists claim, but cannot possibly prove, that small-pox has been practically stamped out, but undoubtedly also with the result that hundreds of infants have died from the effects of the operation, that thousands of otherwise blameless citizens have been fined or imprisoned for their very natural and proper

resistance to this extraordinary law, and hundreds of thousands of pounds of public money have been spent on what I am satisfied is nothing but a useless and mischievous fallacy. It is strange that members of Parliament do not perceive that the strength of the pro-vaccinist party lies in the public endowment of the practice. Right through the century there has existed a body of officials, ostensibly paid to promote the practice of vaccination, but also, partly at least, paid to vindicate it theoretically, and to explain away its failures and its accompanying disasters. But for this State aid, vaccination would long ago have been consigned to the same limbo as has received a thousand other similar fads which, fortunately for the public, have not secured official recognition and support. I hardly expect that legislators will have time to read the numerous cases I adduce—some showing that immunity from small-pox exists without vaccination, others that mild attacks of small-pox were recorded long before there was any alleged mitigating power in vaccination to which to ascribe them, and, again, others proving that neither vaccination nor re-vaccination nor recent vaccination can be depended upon to protect from small-pox or even from death from that disease. But to the cases of injury and death resulting from vaccination I trust they will not refuse to give some attention. This evidence should be enough to determine any fair-minded enquirer that the enforcement of vaccination by law is indefensible. Take away first the compulsory law, and then take away (if vested interest is not too strong for you) the endowment of the practice, and, when this has been effected, medical

men will find themselves for the first time since 1803 free to discuss the vaccination question as a scientific one on its own merits. To what result that unfettered discussion will lead I have myself (now that I have studied the matter carefully for some years) no sort of doubt.

In conclusion, I desire to express my obligations for the valuable assistance of Mr. A. W. Hutton, whose letters on "The Vaccination Question," addressed to Mr. Asquith and Mr. Balfour in 1894 and 1895, I can recommend as an introduction to the rational study of this vexed problem.

CONTENTS.

CHAPTER I.

A Brief Account of the Early History of Vaccination, showing how it was accepted by the Profession on inadequate evidence — PAGE 9

CHAPTER II.

The Decline in Small-pox since the Introduction of Vaccination — 31

CHAPTER III.

Some of the Causes of the Decline in the Small-pox Mortality — 57

CHAPTER IV.

The Incidence of Small-pox on Vaccinated and Unvaccinated Communities — 87

CHAPTER V.

Does Vaccination Prevent Small-pox? — 105

CHAPTER VI.

The Mitigation Theory — 179

CONTENTS.

CHAPTER VII.

PAGE

Re-vaccination - - - - - - - 214

CHAPTER VIII.

Influence of Sanitary Measures on the Incidence and Mortality of Small-pox - - - 241

CHAPTER IX.

The Injurious Results of Vaccination - - - 267

CHAPTER X.

Summary and Conclusions - - - - - 385

Diagram and Appendix - - - - - 405

Index - - - - - - - - 413

A Century of Vaccination.

CHAPTER I.

A BRIEF ACCOUNT OF THE EARLY HISTORY OF VACCINATION, SHOWING HOW IT WAS ACCEPTED BY THE PROFESSION ON INADEQUATE EVIDENCE.

Dr. Jenner, in one of his later papers, "The Origin of the Vaccine Inoculation," informs us that his inquiry into the nature of cow-pox commenced shortly before the year 1776. There is, however, an incident alluded to by Baron,[1] his biographer, which would seem to show that his attention was drawn to the subject during his apprenticeship, which lasted from 1762 to 1768. A young countrywoman came to seek advice; the subject of small-pox was mentioned in her presence; she immediately observed, "I cannot take that disease, for I have had cow-pox." This, we are told, riveted the attention of Jenner. Whether this was so or not, he apparently did not follow it up till the year 1788, when he repeated the tradition of the dairymaids in London, taking with him a drawing of the cow-pox eruption on the hand of a milker.

[1] Baron's "Life of Jenner," vol. i., pp. 121, 122.

About the year 1791 Jenner appears to have seriously commenced to collect notes of cases of cow-poxed milkers who were said to have resisted small-pox inoculation. His first paper, which was shown to the Council of the Royal Society in 1797, and afterwards returned to him,[1] gives ten such instances. In order to examine somewhat closely this claim—that those who had taken cow-pox were secure against the artificial introduction of small-pox—it is necessary to give a short account of small-pox inoculation as it was practised in the last century.

This practice, the forerunner of vaccination, was first brought to English notice by a letter from Dr. Timoni, a Greek physician practising in Constantinople; the letter was addressed to Dr. Woodward, Gresham Professor of Physic, who had it printed in the "Philosophical Transactions" for 1714. The credit of the introduction of the practice into this country is, however, due to Lady Mary Wortley Montague. Mr. Wortley Montague was appointed Ambassador to the Porte in 1716, and not long after their arrival his wife wrote to a friend about the invention of ingrafting. "Every year," Lady Montague says, "thousands undergo this operation; and the French Ambassador says pleasantly that they take the small-pox here by way of diversion, as they take the waters in other countries." Shortly afterwards, her son, aged five, was submitted to the operation, which was performed by a Greek woman under the supervision of Mr. Charles Maitland, Surgeon to the Embassy. In 1721, Lady Mary, who had returned to London, had

[1] Letter from Jenner to Moore. Baron's "Life of Jenner," vol. ii., p. 364.

her daughter inoculated by Maitland. In the same year this surgeon experimented on some condemned criminals at Newgate, and in 1722 variolation was encouraged by Royalty.

Another of the early inoculators was Thomas Nettleton, of Halifax, who recommended long and deep incisions, and the using of matter from ripe pustules. The severity of the disease induced was a great bar to the progress of small-pox inoculation, and by the year 1728 the practice had almost ceased. It was revived about 1740, and in 1754 was authoritatively sanctioned by the Royal College of Physicians, who pronounced it to be "highly salutary to the human race." About the year 1763 a milder method of procedure came into vogue; this was first introduced by Gatti, the French inoculator, and was taken up in this country by Daniel Sutton and Dr. Dimsdale, the latter of whom has published accounts of his practice. Dimsdale says:—"It seems not improper to add, that the method I now generally use in performing the inoculation, as believing it to be the best, is simply this: The point of a lancet slightly dipped in the recent variolous matter, which I prefer taking during the eruptive fever, is introduced obliquely between the cuticula and the cutis, so as to make the smallest puncture possible, rarely producing a drop of blood." [1]

Dimsdale preferred inoculating from mild cases and from arm to arm, for he says:—"If neither an inoculated patient is at hand, nor anyone in the neighbourhood has a distinct kind of the natural disease, a thread may be used as in the common manner, provided the

[1] "Tracts on Inoculation," p. 130. Hon. Baron T. Dimsdale. London. 1781.

thread be very recently infected."[1] About the results he adds:—"In general, the complaints in this state are very moderate, and attended with so little illness that the patient eats and sleeps well the whole time: a few pustules appear, sometimes equally dispersed."[2]

He also had some very mild cases which not only had little or no pustular eruption on the body or fever, but did not even present a pustule at the seat of inoculation, there being simply local inflammation; and in his book he gives a list of twelve such cases, which, however, he considered protected from any future attack of small-pox.

Another writer, Dr. Giles Watts, in referring to this new method of inoculation, says:—"To say the truth, it is a fact well known to inoculators, in this way, and I have sometimes known the same happen in the old, that the patients pretty often pass through the small-pox so easily as to have no more than five pustules. Nay, it happens every now and then, in this way of inoculation, that even an adult patient shall pass through the distemper without having one, or even so much as a single complaint, other than, perhaps, a slight shivering, chill, or some such trifling disorder, which he would hardly have taken the least notice of at any other time."[3]

Thus the inoculation-system of Sutton and Dimsdale, which produced such mild results, depended upon getting matter from the eruption of small-pox at an early

---

[1] "The Present Method of Inoculating for the Small-pox," p. 29. Thomas Dimsdale, M.D. London. 1767.

[2] *Ibid.*, p. 37.

[3] "A Vindication of the New Method of Inoculating the Small-pox," p. 10. Giles Watts, M.D. London. 1767.

stage of the disease, using it when fresh, inoculating from mild cases or from arm to arm, taking the smallest quantity of matter and introducing it by a superficial puncture. This, it may be noted, is precisely the sort of inoculation Jenner recommended should be used in applying the variolous test in cases which had been vaccinated. Jenner says :—"In some of the preceding cases I have noticed the attention that was paid to the state of the variolous matter previous to the experiment of inserting it into the arms of those who had gone through the cow-pox. This I conceived to be of great importance in conducting these experiments."[1] Now, if we refer to the case of John Phillips, aged sixty-two, who had had the cow-pox at the age of nine years, we learn that the matter for inoculation was taken from the arm of a boy just before the commencement of the eruptive fever, and instantly inserted. A little further on he relates a story of a medical man who used stale small-pox lymph for inoculation, with serious results. Then he continues :—"As a further cautionary hint, I shall again digress so far as to add another observation on the subject of inoculation. Whether it be yet ascertained by experiment that the quantity of variolous matter inserted into the skin makes any difference with respect to the subsequent mildness or violence of the disease, I know not ; but I have the strongest reason for supposing that, if either the punctures or incisions be made so deep as to go *through* it, and wound the adipose membrane, that the risk of bringing on a violent disease is greatly increased."

---

[1] "An Inquiry into the Causes and Effects of the *Variolæ Vaccinæ*." Jenner. London. 1798.

With regard to these ten cases of casual cow-pox in milkers who had been subsequently inoculated with small-pox, the method of inoculation then in vogue was probably used; therefore, from the conditions under which the test was made, on Jenner's own showing, a slight and trivial result was the most that should have been anticipated. Jenner, however, admits a certain amount of local inflammation supervening in all the cases he describes, which, if we make allowance for the general looseness and ambiguity of his statements, may, not inconceivably, include the appearance of a local pustule at the seat of inoculation.

In 1796 Jenner vaccinated his first case, James Phipps. In less than seven weeks from the insertion of the cow-pox matter Phipps was inoculated with small-pox, with the result that "the same appearances were observable on the arms as we commonly see when a patient has had variolous matter applied, after having either the cow-pox or the small-pox."

Now, the question is, What appearances did Phipps actually have on his arms as the result of the variolous test? And to guide us in forming an opinion, there is a letter of Jenner's to a medical man, Mr. John Shorter, who wrote to him about two cases in which he had applied the test six months after successful vaccination, with the result of producing a pustule at the seat of inoculation in each case. Jenner, in his reply, December 29, 1799, says:—"Pray, recollect how seldom we find the skin insensible to the action of variolous matter in those who have previously gone through the small-pox. The cow-pox leaves it in the same state. The patients you mention were not insensible to the local action of the

variolous virus."[1] Thus, if the skin is seldom insensible to variolous matter after cow-pox or small-pox, and these cases of Shorter's are samples of the result, it seems not improbable that when Jenner applied the variolous test in the case of Phipps he got a local pustule at the seat of inoculation; for the same appearances, he says, were produced as commonly observed when variolous matter was applied to a person who had had either cow-pox or small-pox.

Mary James[2] is another of the few cases Jenner is known to have subjected to the variolous test. This was applied eight months after vaccination, with the result of a local pustule, fever, and the faint appearance of a rash about the wrists; matter taken from the arm of this case produced small-pox when inoculated on her brother.

To sum up the value of these tests. It amounts to this: that Jenner, in applying them, used a form of inoculation which produced little more than a local result, and the appearances he obtained were not very different from what would be produced by that form of inoculation when there was no question of cow-pox at all.

Apparently the test broke down, not only in the case of Mary James, but in other instances. Mr. Thornton,[3] surgeon, of Stroud, published his experience. The cases are important as being the first independent evidence after the publication of Jenner's "Inquiry." He vaccinated a Mr. Stanton and four of his children

---

[1] *Medical and Physical Journal*, vol. iii., p. 351. (April, 1800.)

[2] "Further Observations on the *Variolæ Vaccinæ*, or Cow-pox." Jenner. 1799.

[3] Letter dated February 7, 1799, and published in Dr. Beddoes' "Contributions to Physical and Medical Knowledge," p. 398.

from a milker on the Stonehouse Farm, a source used by Jenner himself. The matter was taken from a purulent pock, the only one which was not degenerated into a sordid and painful ulcer. In the four children the inflammation was severe and protracted, the scabs falling off about the twentieth day. "From the long continued local excitement," Mr. Thornton adds, "I began to entertain a hope that the virus might imperceptibly have crept into the habit, and proved a security against the variolous infection." So, to relieve his own doubts, and to ensure the safety of the patients, he inoculated them with small-pox, with the result that "all the children received the infection, and passed through the different stages of the disease in the usual slight manner." Mr. Stanton, in whom the inflammation had not been so severe, was the only one who resisted the variolous inoculation.

At the end of 1798, six months after the publication of Jenner's "Inquiry," the case for vaccination stood thus: Most of the children's arms had ulcerated, and the variolous test, in the few cases in which it had been applied, had produced equivocal results. Moreover, all Jenner's stocks of lymph had been lost, so that no further experiments could be made. Dr. Beddoes, of Bristol, in writing to Professor Hufeland, of Berlin, said:—"You know Dr. Jenner's experiments with the cow-pox. His idea of the origin of the virus appears to be quite indemonstrable, and the facts which I have collected are not favourable to his opinion that the cow-pox gives complete immunity from the natural infection of small-pox. Moreover, the cow-pox matter produces foul ulcers, and in that respect is a worse disease than the mildly inoculated small-pox." The celebrated Dr. George

Gregory, Physician to the London Small-pox Hospital, in his lectures at St. Thomas's Hospital, has alluded to the inconclusiveness of Jenner's thesis. "When we were engaged in tracing the early history of vaccination, you must have been struck with the extraordinary contrast between the absolute scepticism concerning the prophylactic virtue of cow-pox which prevailed before the publication of Jenner's first essay and the unlimited confidence reposed in it, within two years afterwards, in all parts of the world. A calm and dispassionate examination of Jenner's first essay is calculated to awaken some surprise at this sudden conversion of men's minds."[1]

It can thus be quite understood that the profession required more satisfactory proof before accepting the new doctrine; and they shortly afterwards obtained evidence which to them appeared to support Jenner's theories.

On January 20, 1799, Dr. William Woodville, Physician to the London Small-pox Hospital, received intelligence of an outbreak of cow-pox among the cows at a dairy in Gray's Inn Lane. The disease on a milker's hand was compared with Jenner's plates and pronounced genuine. It was then decided to give it a trial; and the experiments were conducted by Drs. Woodville and Pearson at the Small-pox Hospital. The first inoculations were made from the cow and from the hand of a dairymaid, and the subsequent ones, to the number of five hundred, from arm to arm. With regard to the testing of the cases by small-pox inoculation, Dr. Woodville says:— "Of all the patients whom I inoculated with variolous matter, after they had passed through the cow-pox,

---

[1] "Lectures on the Eruptive Fevers," p. 207. London. 1843.

amounting to upwards of four hundred, none were affected with the small-pox."[1] Concerning these tests M'Ghie says:—"Suffice it to observe, that the trials which were made by the profession, to communicate variola to those whom they had vaccinated, completely failed. The cow-pox having thus triumphantly undergone the *experimentum crucis*, vaccination was soon eagerly adopted by the unprejudiced and disinterested in every country to which the vaccine lymph was conveyed."[2]

If we analyse these so-called vaccinations, we find that three-fifths of the patients had pustules about the body—and it is no longer disputed that these pustular cases were cases of small-pox—and hence the subsequent variolous tests were of no value in settling the question of the protective value of cow-pox. Let us now consider the remaining two-fifths, which only presented a local pustule at the seat of inoculation; and to do this it is important to discuss the means by which Woodville's cases became contaminated. As the Vaccination Commissioners[3] have pointed out, small-pox may have been introduced—

(1) By infection at the Hospital or at the patients' homes.

(2) By the inoculation of small-pox; several patients being purposely inoculated with small-pox a few days after "vaccination."

(3) The lymph with which the patients were "vaccinated" may have become contaminated with small-pox.

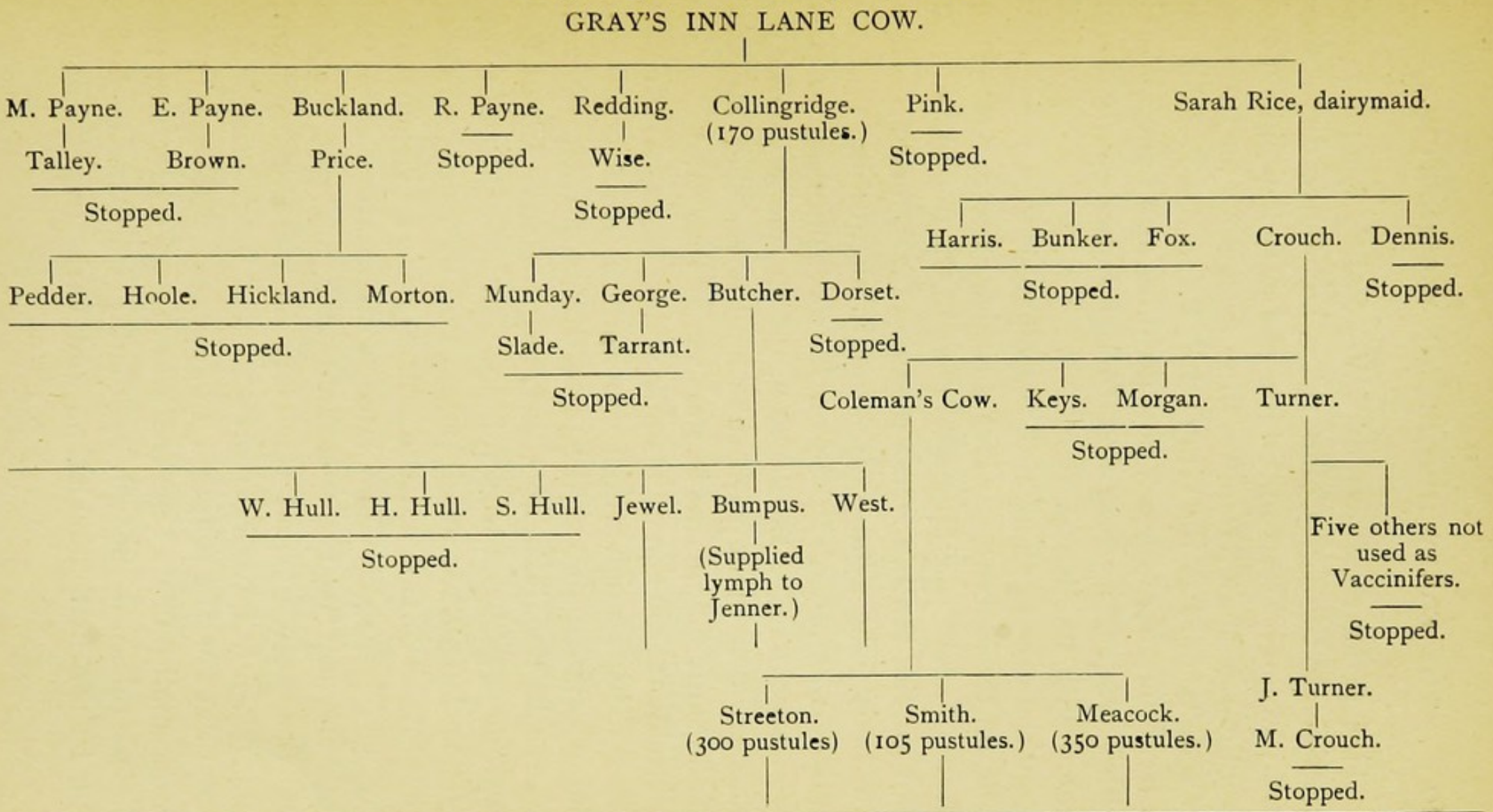
---

[1] Reports of a Series of Inoculations for the *Variolæ Vaccinæ*, or Cow-pox. William Woodville, M.D. London. 1799.

[2] "Thoughts on Vaccination," p. 11. Dumfries. 1827.

[3] Final Report, Royal Commission on Vaccination, p. 147.

The following is the pedigree of Woodville's "Hospital matter," showing how the strain continued only through subjects with small-pox pustules.[1]



[1] Royal Commission on Vaccination. Dissentient Commissioners' Statement, section 50.

This pedigree shows that Woodville's lymph passed exclusively through Collingridge, inoculated direct from the cow, and Streeton, Smith, and Meacock, inoculated from a cow at one remove, from a pustule on the hand of a dairymaid at the Gray's Inn Lane dairy. All had a large number of small-pox pustules, and hence Woodville's cases were from first to last hopelessly contaminated with small-pox.

In the case of Buckland, "vaccinated" direct from the cow, on the seventh day two pustules exactly resembling those of small-pox appeared near to the inoculated part, and on the tenth, several pustules on different parts of the body; the symptoms strongly suggesting that the patient was inoculated when he was supposed to have been vaccinated. In Streeton, Smith, and Meacock the facts are consistent with the small-pox being acquired in the same manner as in the case of Buckland.

Besides these three persons, Collingridge was the only other case through which Woodville's strain continued. She was inoculated at the same time and with the same matter as Buckland, and, the margin of the inoculation swelling, was beset with minute confluent pustules, suggesting inoculated small-pox. The difficulty, however, in this case is that on the fifth day after "vaccination" she was purposely inoculated with small-pox (on the opposite arm to the "vaccination"), and the pustules which appeared about the body on the thirteenth day may possibly have been due to this inoculation. The usual day for the eruption to appear in ordinary inoculated small-pox was the tenth or the eleventh, and thus the pustules on the thirteenth day were rather late if due to the first inoculation, and early (eighth day) if

due to the second; and therefore it is just as likely as not that Collingridge was variolated on her first inoculation.

Hence it is probable that the whole of Woodville's "Hospital matter" was contaminated at its sources, and the absence of pustules in two-fifths of the cases does not prove that these were of other than variolous origin; for, as Dr. Collins and Mr. Picton[1] say, "on the assumption that Woodville was dealing with arm-to-arm variolation, he only succeeded in obtaining what inoculators before and since claimed to have obtained when working with undoubted small-pox matter."[2] There is the further argument that matter from secondary small-pox pustules in several instances produced only a local pustule in the next remove.

Woodville's lymph, when used by others away from the Hospital, produced eruptions: thus Jenner was supplied with a thread from Bumpus, who had three hundred and ten variolous pustules. In the first case inoculated by him, "spots" appeared on the face; and in the second, the local vesicle assumed "more perfectly the variolous character than is common with the cow-pox at this stage," and the areola was studded over with "minute vesicles." Baron tells us that "the eruptions which attended many of the early cases of vaccination in London were unfortunately also propagated in different parts of the country, where the *contaminated* matter had been distributed by Dr. Pearson."[3] Moore says:—"Variolous matter, under the denomination of vaccine lymph, was spread widely through England, and trans-

---

[1] *Ibid.* [2] Baron's "Life of Jenner," vol. i., p. 245. [3] *Ibid.*, p. 339.

ported to Germany, and even to the Island of Madeira, where a physician described the vaccine as a pustular disease."[1]

Woodville's lymph, or the "world's vaccine," as it has been called, had an enormous circulation both in England and abroad, at a time when Jenner had no stocks; it was this lymph, in fact, which convinced the world of the efficacy of vaccination.

In summing up the value of the Woodville evidence, Dr. Collins and Mr. Picton say:—"It is, therefore, probable that the whole of Woodville's five hundred cases, which appeared to confirm Jenner's thesis, and secured the support of professional authority, were, in fact, only a series of mild variolations. It is certain that they were, from first to last, contaminated with small-pox. We agree with Professor Crookshank that, in either case, they must be set aside for the purpose of arriving at a decision as to whether uncontaminated cow-pox confers immunity towards small-pox. Woodville's cases, therefore, which did so much to establish the practice of vaccination, and which for nearly a century have been cited as demonstrating the truth of Jenner's doctrine, must be rejected as furnishing false evidence, and valueless as a scientific experiment."[2] Although at first some of the cases inoculated with Woodville's lymph were undoubtedly infectious, after a time, whether from attenuation or dilution of the original matter, from the selection of mild cases, or from other causes, the number of pustules

---

[1] "History of Vaccination," p. 36.

[2] Royal Commission on Vaccination. Dissentient Commissioners' Statement, section 51.

diminished. Thus Woodville, writing in June, 1799, with reference to three hundred and ten cases subsequent to the Reports, says:—"Out of the first hundred, nineteen had pustules, out of the second thirteen, and out of the last hundred and ten only seven had pustules."[1] The pustular eruptions ultimately ceased, and the appearances came to assume the ordinary phenomena of vaccination.

That small-pox matter may, by a judicious selection of cases or lymph, be so attenuated as to produce restricted effects, which might be mistaken for the appearances generally recognised as pertaining to ordinary vaccination, is illustrated by the experience detailed by Mr. John Mudge, of Plymouth; but these cases differ from Woodville's recorded results, in that when they were subsequently inoculated with small-pox, they were found unprotected.

Mr. Mudge[2] relates that Messrs. Langworthy and Arscott, surgeons at the neighbouring town of Plymton, inoculated forty patients in 1776. In thirty the operation was performed "with crude matter from the arm of a young woman, five days after she herself had been inoculated with concocted matter. (She had smart fever and eruption later.) The other ten were done with concocted matter from a pustule of the natural small-pox. All the forty took, "and the latter ten, after the eruptive fever, had the small-pox in the usual way," but "of the other thirty, though the infection took place on their arms so as to inflame them considerably, and to produce a very large prominent pustule, with matter in it, on

---

[1] *Medical and Physical Journal*, vol. i., p. 417. (July, 1799.)

[2] "A Dissertation on the Inoculated Small-pox," pp. 20, 21. London. 1777.

each of them, yet not one had any eruptive fever or a single subsequent eruption on any part of the body; but about the eighth, in some the ninth, and in others the tenth day, the inflammation began to disappear, and about the twelfth or thirteenth the pustules on their arms scabbed off." Matter from those pustules inoculated on others "produced on them exactly the same appearances, unattended also with either fever or small-pox."

The whole thirty were re-inoculated (no date given), this time with concocted matter taken subsequently to the eruptive fever, five being done from natural and twenty-five from artificial small-pox. The result was that "every one of them had the eruptive fever, and succeeding eruptions; in short, they had the small-pox in different degrees, but all in the usual way of inoculated patients."

These experiments differ from those described by Woodville. In criticising variolous tests in general we must always remember, as the Commissioners have pointed out, "that, in this as in other things, a sanguine hasty person might be led by the desire of seeing his expectations fulfilled to minimise the effect of the operation; he might be led to overlook results which a more cautious observer would regard as evidence that small-pox had been really produced."

Now Woodville's tests are by no means perfectly satisfactory. In some of the early cases,[1] which he described individually and in more detail, he obtained

[1] In the case of George Reed (No. 33) Woodville says: "He was afterwards (*i.e.*, after the fourteenth day) inoculated with variolous matter, which formed a pustular appearance; but no disorder was produced."

slight local appearances, whereas in the later ones the results of the tests are for the most part given collectively, and we obtain such vague expressions as "no disease ensued;" concerning Nos. 89, 90, and 91 we read, "none of the above three patients took the small-pox," and in referring to sixty-seven tests (Nos. 132 to 200, omitting Nos. 193 and 194), all the information we have is that "the above patients . . . had variolous matter inserted in their arms . . . but it produced no disorder." If Woodville had given details in each instance, it seems probable that a considerable number would have been described as presenting some local manifestation, and if, as suggested by the Commissioners, we are to make allowance for the expectant attitude of mind betrayed by the sanguine experimenter, these cases were evidently not so immune as generally believed; but, as shown above, even if we accept the position that the whole of Woodville's four hundred cases were immune to inoculated small-pox, this proves nothing in favour of Jenner's thesis.

Instances of the variolous test breaking down were not uncommon. Thus a surgeon, named Boddington, found in the case of his own child that the inoculation test produced not only a local pustule, but also a general small-pox eruption. He wrote to Jenner on the subject, who replied, "How a gentleman, following a profession the guardian angel of which is Fame, should have so committed himself as to have called this a case of small-pox after cow-pox, is not only astonishing to me, but must be so to all who know anything of the animal economy."[1] Baron refers to this as a sample of Jenner's

[1] Baron's "Life of Jenner," vol. i., p. 445.

method of dealing with "rumours" of this kind. Ultimately Jenner discarded the test, for in 1804 he writes:—"I will just remark that the fairest of all tests is exposure to variolous contagion. This is the natural test; inoculation is not. Who does not know (all medical men ought to know) that the insertion of the variolous poison into the skin of an irritable person will sometimes produce great inflammation, disturbance of the system, and even eruptions?"[1]

Any other evidence brought forward by Jenner is entirely discounted by his invention of the term "spurious cow-pox." This was first used to describe cases of cow-pox which did not originate from grease in the horse, and subsequently as an excuse when it was discovered that the vaccinated were liable to be attacked by small-pox. In his paper on "The Origin of the Vaccine Inoculation," he gives the following ingenious explanation:—"In the course of the investigation of this subject, which, like all others of a complex and intricate nature, presented many difficulties, I found that some of those *who seemed to have undergone the cow-pox*, nevertheless, on inoculation with the small-pox, felt its influence just the same as if no disease had been communicated to them by the cow. This occurrence led me to enquire among the medical practitioners in the country around me, who all agreed in this sentiment—that the cow-pox was not to be relied upon as a certain preventive of the small-pox.

"This for a while damped, but did not extinguish, my ardour; for, as I proceeded, I had the satisfaction

[1] Letter from Jenner to Dunning, July 22, 1804. Baron's "Life of Jenner," vol. ii., p. 339.

to learn that the cow was subject to some varieties of spontaneous eruptions upon her teats; that they were all capable of communicating sores to the hands of the milkers, and that whatever sore was derived from this animal was called in the dairy the cow-pox.

"Thus I surmounted a great obstacle, and in consequence was led to form a distinction between these diseases, one of which only I have denominated the *true*, the others the *spurious* cow-pox, as they possess no specific power over the constitution."

I may here remark that Jenner never gave any signs by which the true and spurious cow-pox could be distinguished, and the mystery remains unsolved until this day.

In some concluding remarks of the "Inquiry," he relates the cases of Hannah Pick and Elizabeth Sarsenet, who contracted cow-pox with all the other servants at a farm in the parish of Berkeley. These cases fairly puzzled him; for Hannah, when inoculated with small-pox, was found protected; but Elizabeth, on exposure to the infection, contracted the disease. In the latter case, although there were multiple vesicles, there was no glandular or constitutional affection. Jenner says:—"This impediment to my progress was not long removed before another, of far greater magnitude in its appearances, started up. There were not wanting instances to prove that, when the true cow-pox broke out among the cattle at a dairy, a person who had milked an infected animal, and had thereby apparently gone through the disease in common with others, was liable to receive the small-pox afterwards."

Baron observes—"Most men would, at this stage,

have abandoned the investigation in despair. It was not so with Jenner."[1]

Jenner continues—"This, like the former obstacle, gave a painful check to my fond and aspiring hopes; but reflecting that the operations of nature are generally uniform, and that it was not probable the human constitution (having undergone the cow-pox) should in some instances be perfectly shielded from the small-pox, and in many others remain unprotected, I resumed my labours with redoubled ardour.

"The result was fortunate, for I now discovered that the virus of cow-pox was liable to undergo progressive changes, from the same causes precisely as that of small-pox, and that when it was applied to the human skin in its degenerated state, it would produce the ulcerative effects in as great a degree as when it was not decomposed, and sometimes far greater; but, having lost its *specific properties*, it was incapable of producing that change upon the human frame which is requisite to render it unsusceptible of the variolous contagion; so that it became evident a person might milk a cow one day and, having caught the disease, be for ever secure, while another person milking the same cow the next day might feel the influence of the virus in such a way as to produce a sore or sores, and in consequence of this might experience an indisposition to a considerable extent; yet, as has been observed, the specific quality being lost, the constitution would receive no peculiar impression."

Only think of the absurdity of it. One day matter from the nipple of the cow, when inoculated on a

---

[1] Baron's "Life of Jenner," vol. i., p. 132.

human being, produces true cow-pox, and renders that person for ever afterwards secure from small-pox; the very next day matter from the same cow will produce identical symptoms, but the cow-pox having lost its specific properties, the second person remains entirely unprotected!

The "spurious cow-pox" cry contributed largely to establish vaccination; for before the Committee appointed by the House of Commons to consider Jenner's claim for reward, some of the leading medical men gravely asserted that cases of failure must have been done with spurious matter.

It is only fair to mention that this explanation was condemned by the College of Physicians. "Some deviations from the usual course have occasionally occurred, which the author of the practice has called spurious cow-pox, by which the public have been misled, as if there were a true and a false cow-pox."[1] This condemnation, however, came too late to arrest the mischief, for cow-poxing had already become an established practice.

It was also unfortunate that the early opponents of vaccination were almost entirely an interested opposition, being pledged to small-pox inoculation; and it was especially unfortunate that if they had questioned the validity of the variolous test they would have exposed their own nostrum, which, as I have shown, was in some cases little else than an imposture.

Another thing which largely contributed to establish vaccination was the misleading name of "*variolæ*

[1] Report of the Royal College of Physicians of London on Vaccination. (Ordered to be printed by the House of Commons, July 8, 1807.)

vaccinæ," or small-pox of the cow, given to the disease by Jenner; and this, giving as it did a truly scientific ring, most materially assisted the cow-pox propagandists in their innovation. The theory that cow-pox was small-pox of the cow was quite new to the veterinary surgeons and other practical people of that time, and was objected to by one of Jenner's leading contemporaries, Dr. George Pearson, on the ground that "cow-pox is a specifically different distemper from the small-pox in essential particulars, namely, in the nature of its morbific poison, and in its symptoms." Dr. George Gregory, a more recent authority, was also entirely opposed to the identity theory. "On all these grounds, I demur to the theory of identity, and hold that small-pox and cow-pox are antagonistic affections—that cow-pox, instead of being, as Dr. Baron maintains, of a variolous, is, in fact, of an *anti-variolous* nature—that it alters and modifies the human constitution so as to render some individuals wholly, others partially, and for a time, unsusceptible of small-pox."[1] The total unlikeness of cow-pox to small-pox in all respects, save their names, has been much dwelt upon by several modern pathologists,[2] to whose writings I refer my readers.

---

[1] "Lectures on the Eruptive Fevers," p. 207. London. 1843.

[2] "*Vaccine et Variole*," p. 100. Chaveau. Paris. 1865. "Human and Animal *Variolæ*," p. 4. George Fleming, F.R.C.V.S. London. 1881. "The Natural History of Cow-pox and Vaccinal Syphilis." Charles Creighton, M.D. London. 1887. "History and Pathology of Vaccination." Edgar M. Crookshank, M.B. (2 vols.) London. 1889.

CHAPTER II.

THE DECLINE IN SMALL-POX SINCE THE INTRODUCTION OF VACCINATION.

THE argument that small-pox has declined since the introduction and more efficient enforcement of vaccination is an important one. It is commonly asserted that in former times this disease raged like the plague,[1] but a careful examination of the London Bills of Mortality will show the absurdity of the claim. In the whole history of small-pox it never raised the total deaths so as to make them stand out conspicuously among surrounding years; but this was very far from being the case with the plague.

Burials within the London Bills of Mortality from plague and "all causes" for the plague years 1603, 1625, 1636, and 1665.[2]

Years.	Deaths from plague.	Deaths from all causes.
1603	30,561	37,294
1625	35,417	54,265
1636	10,400	23,359
1665	68,596	97,306

[1] "Your Committee, however, believe that, . . . if vaccination had not been general, this epidemic (1871-72) would probably have become a pestilence, raging with destructive force, like the plague of the Middle Ages." (Draft Report proposed by the chairman of the Select Committee on the Vaccination Act, 1867.)

[2] Second Report, Royal Commission on Vaccination, pp. 289, 290.

For the non-plague years, 1604-24, the average annual number of deaths from all causes was 8,548; for the years 1626-35, 8,986; and the years 1637-64, 12,554. It is thus evident that the plague made an enormous difference to the total mortality, which was never the case with small-pox.

Let us now see what small-pox was at its worst. The only continuous set of figures we have extending over a long period of time are those for London, and, in the absence of any reliable information about the population, we are forced to the imperfect method of comparing the ratios of deaths from small-pox to those for all causes. The following figures give the highest years for small-pox in the seventeenth, eighteenth, and nineteenth centuries :—

	Years.	Deaths from small-pox.	Deaths from all causes.	Ratio per 1,000 from small-pox.
Seventeenth century	(1634)	1,354	10,400	130
Eighteenth century	(1796)	3,548	19,288	184
Nineteenth century	(1871)	7,912	80,430	98

Although there is not a great difference between the maxima of the seventeenth and nineteenth centuries, a sensible decline has nevertheless taken place, for the small-pox epidemics appear at much less frequent intervals than formerly.

Since the commencement of the Registrar-General's returns in 1838 we have the advantage of exact figures, and the interval from this date to the present time may be conveniently divided by the great epidemic of 1871-72. It was during the first of these periods that all the important laws relating to vaccination came into force.

In 1840 an Act (3 and 4 Victoria, cap. 29) was passed making it the duty of Guardians to provide facilities for vaccination; but it was not until 1853 (16 and 17 Victoria, cap. 100) that neglect of vaccination was made punishable by fine, or imprisonment in default of distress. The effect of this law was seen in the large increase of the number of vaccinations in 1854. By the Act of 1861 (24 and 25 Victoria, cap. 59), Guardians were authorised to appoint officers to institute and conduct proceedings for the purpose of enforcing obedience to the law. The most important Act of all, however, was that of 1867 (30 and 31 Victoria, cap. 84), which imposed on the Guardians the duty of seeing that children were duly vaccinated, and empowered them to pay any officer appointed by them to prosecute persons charged with offences against the Act.[1] It also introduced a provision (section 31) to secure the vaccination of children born before the Act came into force; but the most important provision of all was that relating to repeated penalties for the non-vaccination of the same child, and this harsh process of the law could hardly fail, in the then state of public opinion, to greatly increase the number of vaccinations. Referring to this Act, the Select Parliamentary Committee say—"Your Committee are glad to find that wherever the Guardians endeavour to carry out the law, it is very generally, and indeed almost universally, enforced;" and they proposed an amendment to the effect that the appointment of vaccination officers

[1] Dr. Seaton informed the House of Commons' Committee of 1871 that of two hundred and sixty Unions, inspected in 1870, only one hundred and twenty were reported as not having vaccination officers; a large number of these, however, had appointed officers since (before May, 1871).

should be made obligatory—a suggestion which was embodied in the Act of 1871 (34 and 35 Victoria, cap. 98).

The Act of 1871 made other alterations. By the 27th section of the 1867 Act, it was provided that the Guardians shall make inquiry, and "if they find that the provisions of the Act have been neglected, shall cause proceedings to be taken against the persons in default." This clause was repealed by the Act of 1871. The repeal of this section absolved the Guardians from the duty of prosecuting for the time being; but in 1874 an Act was passed (37 and 38 Victoria, cap. 75) empowering the Local Government Board to make "rules, orders, and regulations prescribing the duties of Guardians and their officers in relation to the institution and conduct of proceedings to be taken for enforcing the provisions of the said Acts (1867 and 1871)." The Local Government Board have acted on this power, and in their General Order, dated October 31, 1874, have introduced a clause (art. 16) which takes the place of the repealed 27th section of the Act of 1867.

If we refer to the diagram in the Appendix, which gives the proportion of public vaccinations under one year of age to the births, from 1845 to 1895, we find that the Act of 1853 doubled the number of vaccinations; after this the number diminishes, to increase again in 1863-64. This increase was probably due to an outbreak of small-pox. After another decline, there is an increase of vaccinations in 1868-69, which may be attributed to the Act of 1867; and a still further rise in 1871, due, no doubt, to the great epidemic of small-pox then prevailing. The effect of the legislation of 1871

is not apparent, for there is no further increase in the number of vaccinations in 1872, when the Act came into operation.

Another method of testing the increasing efficiency of the Vaccination Acts is the proportion of the small-pox cases vaccinated. The figures for the London Small-pox Hospital work out as follows :—

Years.	Percentage of small-pox cases vaccinated.
1826-34	35
1835-45	44
1845-55	64
1855-65	78
1867	84
1871	92

An examination of the diagram referred to shows that with the gradually increasing proportion of the population vaccinated there is no diminution in small-pox, and the epidemic of 1871-72, coming when England was thoroughly vaccinated, points forcibly to the inutility of the operation.

Let us now examine the history of small-pox and vaccination subsequent to the great epidemic. The same diagram shows that the infantile public vaccinations remained practically stationary until 1881 or 1882, when they began to decline; from 1881 to 1895 they decreased from 57·3 to 35·1 per cent. of the births, which is a considerable reduction. It will be seen that since the great epidemic (1871-72), and coincident with the decline in vaccination, small-pox has diminished, and quite recently markedly so.

An examination of the statistics for London, since the opening of the hospitals of the Metropolitan Asylums

Board, also shows conclusively that the enormous decline in the small-pox mortality in recent years cannot be attributed to vaccination. The figures are taken from the last published reports of the Metropolitan Asylums Board (1895) and the Local Government Board (1895-96).

Years.	Estimated population in the middle of each year.	Deaths from small-pox.	Small-pox death-rate per million.	Percentage of births not finally accounted for in regard to vaccination.
1871	3,267,251	7,912	2,421	No return.
1872	3,319,736	1,786	537	8·8
1873	3,373,065	113	33	8·7
1874	3,427,250	57	16	8·8
1875	3,482,306	46	12	9·3
1876	3,538,246	736	207	6·5
1877	3,595,085	2,551	709	7·1
1878	3,652,837	1,417	387	7·1
1879	3,711,517	450	120	7·8
1880	3,771,139	471	124	7·0
1881	3,824,964	2,367	617	5·7
1882	3,862,876	430	110	6·6
1883	3,901,164	136	34	6·5
1884	3,939,832	1,236	307	6·8
1885	3,978,883	1,419	347	7·0
1886	4,018,321	24	5	7·8
1887	4,058,150	9	2	9·0
1888	4,098,374	9	2	10·3
1889	4,138,996	—	—	11·6
1890	4,180,021	4	1	13·9
1891	4,221,452	8	2	16·4
1892	4,263,294	41	10	18·4
1893	4,306,411	206	48	18·2
1894	4,349,166	89	22	Returns not yet published.
1895	4,392,346	55	13	

Thus it will be seen that with an increasing proportion of the population vaccinated, up to the great epidemic

of 1871-72, there was no corresponding decline in the small-pox mortality, and more recently, while the reduction in small-pox has been enormous, the vaccinations have also declined.

As pointed out above, however, if this century be compared with the two previous ones, a large decline in small-pox has taken place; and this has been accompanied by an equal if not a greater decline in another zymotic disease, which is spread by overcrowding and insanitation—viz.: typhus fever. In 1685-86 the country suffered from a severe epidemic of a fever which has been described by Sydenham, and, according to Dr. Murchison,[1] presented all the symptoms of typhus—viz.: headache, pains in the limbs, dry brown tongue, delirium, and an eruption resembling that of measles, and often accompanied by true petechiæ. According to the London "Bills" there were 3,832 deaths from fever in 1685, or a rate of 165 per 1,000 of the total deaths (23,222) in the year; and 4,185 deaths in 1686, or one of 185 per 1,000 (total deaths, 22,609).

The most severe fever year was in 1741. In London 7,528 died, or a rate of 234 per 1,000 from all causes (32,169). This considerably exceeds the figures for small-pox, which, at its worst, in 1796, had only a rate of 184 per 1,000 total deaths. Dr. Murchison, in speaking of the fever epidemic in 1741 (p. 34), says:—"In London it is said to have broken out among the poor, who had been half-starved for two years, and obliged to eat uncommon and unwholesome things. In all the accounts mention is made of the eruption: in some cases it is described

[1] "The Continued Fevers of Great Britain," p. 30. Second edition. 1873.

as like that of measles, in others as like so many small flea-bites, while in a few instances it is said to have been mixed up with petechiæ and vibices." From the description given by one of the writers at the time—Barker,[1] of Salisbury—there can be but very little doubt that this epidemic was one of true typhus. The patient, after having languished for several days, was seized with rigors or cold chills, and with a heavy pain in the forehead or over the eyebrows, which rendered him stupid and dejected. About the seventh day petechiæ or spots sometimes appeared upon the breast or arms; these were commonly of a pale red colour, like measles, and sometimes purple, like so many small flea-bites. In a very few the eruption was of a deep violet colour, and in others very broad, like scurvy spots or bruises. In the later stages the patient became delirious, the breathing was often laboured, and there was also convulsive twitching of the tendons, and fumbling with the bed-clothes.

In 1837-38, epidemics of small-pox and typhus took place simultaneously. In England and Wales, during the eighteen months ending December 31, 1838, 27,822 died from typhus, and 22,079 from small-pox; while in the Metropolis, during the same period, there were 6,011 deaths from typhus, and 4,580 from small-pox. In London we know that this epidemic of fever was almost wholly typhus. Of sixty cases in 1837-38, of which notes were kept by West, under Latham, at St. Bartholomew's Hospital, none that died and were examined *post-mortem* had ulcerations of Peyer's patches,

[1] "An Inquiry into the Nature, Cause, and Cure of the present Epidemic Fever," pp. 39-42. J. Barker, M.B. London. 1742.

pathognomonic of enteric or typhoid fever, although some had congestion of Peyer's patches, the cases being all reckoned typhus *exanthematicus*.[1] Sir Thomas Watson has also testified to the nature of this epidemic:—"Fever is very rife in St. Giles's, and in other crowded parts of this town, just now (1838). Our wards at the Middlesex are full of it; and scarcely a case presents itself without these spots. We speak of it familiarly as the *spotted* fever, or (from the resemblance which the rash bears to that of the measles, hereafter to be described) as the *rubeoloid* fever."[2]

The 1847 epidemic of fever in England was almost entirely one of typhus, there being 30,320 deaths, or a number considerably exceeding any year for small-pox over the whole period of registration. Since this epidemic, typhus fever has largely diminished; but it has been noticed that at the London Fever Hospital all the great annual rises in the deaths from fever in London since 1849 (after which year enteric fever and typhus were first separated in the returns of the Hospital) have corresponded to a greatly increased admission of typhus, and not of enteric cases.

In the returns of the Registrar-General it was separated from enteric fever in 1869; and from 1871-75 to 1891-95 the average annual typhus death-rate in England and Wales has declined from 81 to 4 per million, or a fall of 95 per cent. on the earlier rate. The fact that this complaint, which was formerly more prevalent than small-pox, should have diminished to such an extent as

---

1 "A History of Epidemics in Britain," vol. ii., p. 194. Creighton.

2 "Lectures on the Principles and Practice of Physic," vol. ii., p. 732. Third edition. 1848.

to have become practically extinct, has a very important bearing on the decline of small-pox, for it is admitted that typhus fever is a disease which is spread by overcrowding and insanitation, and in a subsequent chapter it will be seen also that small-pox is largely disseminated in the same manner.

The following table shows the decline that has taken place in small-pox, fever, typhus fever, and scarlet fever since the commencement of registration. It is divided into five-year periods.

England and Wales.—Average annual death-rate per million living, from small-pox, fever,[1] typhus fever, and scarlet fever, in five-year periods from 1838-95.[2]

Years.	Small-pox.[3]	Fever.	Typhus fever.	Scarlet fever.
1838-42	576	1,053	—	—
1847-50 (4 years)	292	1,246	—	—
1851-55	248	983	—	—
1856-60	198	842	—	—
1861-65	219	922	—	982
1866-70	105	850	—	960
1871-75	408	599	81	759
1876-80	82	380	34	680
1881-85	83	273	23	436
1886-90	16	202	7	241
1891-95	24	185	4	182

Over the whole period it will be found that the small-pox death-rate declined 96 per cent., while fever declined 82 per cent. But the most extraordinary feature of the table is the large small-pox death-rate in 1871-75,

[1] The term "fever" includes typhus, typhoid, and simple and ill-defined fevers.

[2] From 1843-46 the causes of death were not abstracted.

[3] The figures for small-pox include chicken-pox.

twenty years after vaccination had been made compulsory. Thus, between 1838-42 and 1871-75 the death-rate from small-pox had only abated 29 per cent., while fever diminished 43 per cent.; and, therefore, since the commencement of registration there was practically no important decline in small-pox until after the 1871-72 epidemic, although the death-rate from fever had materially diminished. Let me call attention to what has happened with the other diseases in the table. Since 1871-75, typhus (for which we have no State-enforced preventive inoculation) has declined 95 per cent., or a fall as great as there has been in small-pox over the whole period of registration; and scarlet fever shows the important reduction of 81 per cent. since 1861-65.

An objection has been made to the fever figures, on the ground, it is said, that formerly fever included other diseases, such as pneumonia, influenza, etc., which now appear under their respective headings. The following quotation, however, from the Registrar-General's forty-second annual report (1879) proves that this is not the case to any large extent. The cause of the decline is also explained. The Registrar-General says (p. xxx.):—"Had the deaths from one or more of this group of causes fallen, while those from others in the same group had risen, or had the fall been trifling, or the totals dealt with insignificant in amount, it might have been suspected that the alteration was a mere alteration in name. But as the deaths under each heading have declined, as the fall in the death-rate from them has been enormous—62·4 per cent. in the course of ten years—and as the totals are by no means small, it may be accepted as an indisputable fact that there has in truth been a notable

decline in these pests, and it may be fairly assumed that the decline is due to improved sanitary organisation."

I will now allude to the alterations that have taken place from time to time in the age-incidence of the small-pox mortality. Dr. Creighton has pointed out that, in all probability, in the seventeenth century small-pox was more a disease of adults than in the eighteenth century, when it was largely a disease of children; at any rate, it was on account of its incidence on adults that the disease obtained its evil repute. In the diary of John Evelyn, we read that he himself had small-pox when a young man. His two daughters died of it in early womanhood within a few months of each other; and a suitor for the hand of one of them died of it about the same time. Among the medical writers, Willis gives four cases, all in adults; and Morton, sixty-six clinical cases of small-pox, twenty-three of which were under twelve and the rest over twelve years of age.[1]

Again, in their writings the physicians of that time indicated that small-pox was a mild disease in infants. Willis says, "There is less danger if it should happen in the age of childhood or infancy;" again, "the sooner that anyone hath this disease, the more secure they are, wherefore children most often escape."[2] Dr. Walter Harris, in a treatise on the acute diseases of infants, says:—"The small-pox and measles of infants, being for the most part a mild and tranquil effervescence of the blood, are wont to have often no bad character, where neither the helping

[1] "A History of Epidemics in Britain," vol. ii., pp. 443, 444. Creighton.

[2] Thomas Willis, M.D., on "Fevers." Translation by S. Pordage, pp. 139, 142. London. 1681.

hands of physicians are called in, nor the abounding skill of complacent nurses is put in requisition."[1]

In the eighteenth century, on the contrary, the incidence of the small-pox mortality, especially in the manufacturing towns, was almost entirely on infants and young children, as is shown in the following table:[2]

	Years.		Small-pox deaths at all ages.	Small-pox deaths under five years of age.	Percentage under five years of age.
Kilmarnock,	1728-63	...	622	563	90·5
Manchester,	1769-74	...	589	559	94·9
Warrington,	1773	...	209	197	94·3
Chester,	1774	...	202	180	89·1
Carlisle,	1779-87	...	241	229	95·0

In country districts, however, where small-pox appeared at less frequent intervals, there was time for the children to grow up without having the disease; and thus, in some instances, there were very few cases and deaths in the early years of life. Aynho, a small market town in Northamptonshire, is an instance in point. The following figures are recorded by the rector of the parish for fifteen months in 1723-24:[3]

Ages.		Cases.		Deaths.
0– 1	...	—	...	—
1– 2	...	—	...	—
2– 3	...	3	...	2
3– 4	...	4	...	1
4– 5	...	6	...	0
5–10	...	15	...	1
10–15	...	33	...	3
15–20	...	14	...	1
20–25	...	16	...	3
25–30	...	9	...	3

[1] "A History of Epidemics in Britain," vol. ii., p. 441. Creighton.
[2] *Ibid.*, pp. 527, 536, 538, 554. [3] *Ibid.*, p. 520.

Ages.		Cases.		Deaths.
30–40	...	12	...	3
40–50	...	10	...	4
50–60	...	4	...	1
60–70	...	4	...	2
Above 70	...	2	...	1
	Total,	132		25

Thus, in the eighteenth century, although there may have been exceptions in some country districts, in towns the rule was for small-pox to be almost entirely a children's disease. This continued to be the case until after the 1837-38 epidemic. The Registrar-General first separated ages for all England in 1847, and the following table gives the proportion of small-pox deaths under five years of age from that time.

England and Wales.—For small-pox[1] the deaths at all ages and under five, and the percentage of deaths under five to deaths at all ages in five-year periods from 1847-95.

Years.		Small-pox deaths at all ages.	Small-pox deaths under five years of age.	Percentage under five years of age.
1847-50 (4 years)	...	20,439	14,307	70·0
1851-55	...	22,801	15,091	66·2
1856-60	...	19,270	11,010	57·1
1861-65	...	23,007	12,477	54·2
1866-70	...	11,779	6,403	54·4
1871-75	...	47,696	14,929	31·3
1876-80	...	10,243	2,938	28·7
1881-85	...	11,025	3,002	27·2
1886-90	...	2,320	820	35·3
1891-95	...	3,515	1,313	37·4

[1] These figures include chicken-pox; if this disease be omitted from the calculations, 26·9 per cent. of the total deaths from small-pox were under five years of age in the period 1891-95, or a percentage reduction of 62 since 1847-50.

The figures in this table are corrected for chicken-pox; this disease was included with small-pox until 1874, but since that date chicken-pox deaths have been separately classified. My authority for adding them is contained on page x. of the fifty-second annual report of the Registrar-General (1889):—"There were, however, eighty-three deaths ascribed to chicken-pox, and it is very probable that most of these were in reality cases of modified small-pox, true chicken-pox being an ailment that is rarely, if ever, fatal." It will be seen from the table that over the whole period the percentage of deaths from small-pox under five years of age has declined from 70·0 to 37·4, or a percentage reduction of 47.

Not only has the children's share of the small-pox death-rate diminished, but at ages above ten the mortality has actually increased; that is to say, there has been an age-shifting of the small-pox death-rate. This is shown by the following figures taken from the forty-third annual report of the Registrar-General (1880, p. xxii.).

England and Wales.—Mean annual deaths from small-pox at successive life-periods, per million living at each life-period.

	Age-periods.					
	Under 5.	5–	10–	15–	25–	45 and upwards.
Vaccination optional, 1847-53	1,617	337	94	109	66	22
Vaccination compulsory, 1872-80	323	186	98	173	141	58

The increase in the adult mortality of small-pox during the period of compulsory vaccination has been urged by Dr. Bridges as a sufficient ground for altering the law. He thought that, if these facts had been generally known at the time, the Legislature would have hesitated before making vaccination compulsory. Dr. Collins and Mr.

Picton[1] have also shown that since the last century there has been an alteration in the share borne by children of the small-pox deaths independently of vaccination. From 1881 the Registrar-General has classified the small-pox deaths into three groups—the vaccinated, the unvaccinated, and those in which there is no statement. In the unvaccinated class, from 1881-93, there were in all 3,746 deaths, 1,483, or 39·5 per cent., of which were under five years of age; during the last century, as pointed out above, the proportion under five years of age was more than double this figure. It is not easy to understand how vaccination can have brought about this change in the unvaccinated.

Comparisons have been instituted with other diseases. In this connection Dr. Ogle, the late Superintendent of Statistics to the Registrar-General, informed the Royal Commission (Q. 516 and 518) that the zymotic diseases were the better ones with which to compare small-pox; but he said, "It is impossible to make similar comparisons in the case of scarlet fever or measles, and diseases that only affect children. Fever is the only one of the zymotic headings that you can take, because it is the only one that affects all ages to any extent. Fever is, therefore, the only one which it is possible to subject to this kind of investigation."

The following table gives the children's proportion of deaths for fever in five-year periods from 1847-95. Corrections have been made for remittent fever. From 1869 to 1880 the deaths from remittent fever, under five

---

[1] Royal Commission on Vaccination. Dissentient Commissioners' Statement, section 147.

years of age, were classed with typhoid, and therefore I have added these deaths to fever for the other years in the table—viz.: from 1847-68 and from 1881-95.

England and Wales.—For fever the deaths at all ages and under five, and the percentage of deaths under five to deaths at all ages in five-year periods from 1847-95.

Years.		Fever deaths at all ages.	Fever deaths under five years of age.	Percentage under five years of age.
1847-50 (4 years)	...	88,093	15,880	18·0
1851-55	...	92,440	19,539	21·1
1856-60	...	82,847	19,072	23.0
1861-65	...	95,723	19,166	20·0
1866-70	...	94,057	17,352	18·4
1871-75	...	70,109	12,994	18·5
1876-80	...	47,524	8,375	17·6
1881-85	...	37,005	4,692	12·7
1886-90	...	28,698	2,908	10·1
1891-95	...	27,628	2,180	7·9

Over the whole period the children's proportion of deaths from fever has declined from 18 to 7·9 per cent., or a percentage reduction of 56. This is greater or less than the figure for small-pox, according to whether the chicken-pox deaths are included or not in the small-pox totals.

Not only has there been an alteration in the age-incidence of fever as a whole, but there is every reason to believe that the same change has taken place in the several diseases composing the group. Except in quite recent years this is difficult to prove in the case of typhoid fever; but in typhus there is very little doubt that such has been the case. In order to compare present-day typhus with some former period, it is necessary

to find, not only years of undoubted typhus, but also years in which the ages are separated. The epidemic years, 1837-38, are out of the question, because deaths were not classified at different ages; but the epidemic took place later in the North of England, and for 1839 we have the figures for Manchester and Liverpool. I also give the statistics for all England and London for the epidemic of 1847, which was almost exclusively typhus fever.

Deaths from typhus fever at all ages and under five, with percentage under five years of age, for Manchester and Liverpool in 1839, and for England and Wales and London in 1847.

	Years.	Typhus deaths at all ages.	Typhus deaths under five years of age.	Percentage under five years of age.
Manchester[1] ...	1839	323	51	15·8
Liverpool[1]	1839	305	46	15·1
England and Wales[2]	1847	30,320	4,364	14·4
England and Wales[2] (excluding London)	1847	27,136	3,823	14·1
London[2]	1847	3,184	541	17·0

In 1869 the typhus deaths were separated from typhoid in the returns of the Registrar-General. The following gives the figures for typhus from 1871-95 for England and Wales and for London:—

	Years.	Typhus deaths at all ages.	Typhus deaths under five years of age.	Percentage under five years of age.
England and Wales	1871-95	18,206	1,040	5·71
England and Wales (excluding London)	1871-95	15,955	848	5·31
London	1871-95	2,251	192	8·53

[1] Third Annual Report of the Registrar-General, pp. 194 and 206.

[2] Tenth Annual Report of the Registrar-General.

Thus it would appear that there has been a great alteration in the age-incidence of typhus fever from the commencement of registration. Since the separation of typhus and typhoid fevers in the returns of the Registrar-General, both diseases have shown a change in this particular. The percentages under five years of age are as follows[1] :—

	1871-75.	1876-80.	1881-85.	1886-90.	1891-95.
Typhus	6·4	6·1	3·5	3·4	5·1
Typhoid ...	17·4	16·0	11·2	8·4	6·6

In typhoid, there has been a marked change in the age-incidence; but in typhus, the quinquennium, 1891-95, shows only a slight decline in the children's share of deaths as compared with the earlier period, 1871-75.

The age-shifting of the small-pox death-rate—that is to say, the lessened death-rate in children combined with an increased death-rate in adults—has been claimed as a "phenomenon" which is "without a parallel in the history of human mortality."[2] Mr. Alfred Milnes[3] has, however, pointed out that a similar "phenomenon" has occurred in the case of influenza. The Registrar-General, in his fifty-fourth annual report (1891, p. xx.), gives the death-rates per million living

---

[1] The figures up to 1890 are those given by Mr. Alfred Milnes in *The Vaccination Inquirer* for February, 1893. The last column has been calculated by me from the returns of the Registrar-General. The typhoid fever percentages have been corrected for remittent fever deaths under five years of age.

[2] "Vaccination Vindicated," p. 18. John C. M'Vail, M.D. 1887.

[3] *The Vaccination Inquirer*, May, 1893.

at different ages in the influenza epidemics of 1847-48 and 1890-91.

	Age-periods.									
	Under 5.	5-	10-	15-	25-	35-	45-	55-	65-	75-	85-
1847-48...	713	80	49	51	79	139	284	809	2,372	5,510	11,243
1890-91...	306	55	46	115	197	347	595	1,060	1,985	3,355	4,821

On comparing this table with that on page 45, it will be seen that both small-pox and influenza show a decline up to ten years of age. In the next age-period, 10-15, the death-rate at both periods is nearly the same, while from fifteen onwards the later period shows a greater mortality from both diseases; but the influenza mortality in persons aged sixty-five and upwards shows a decline in the later epidemic of 1890-91 as compared with the earlier one of 1847-48.

Before leaving the subject of age-incidence, I would draw the attention of my readers to a table in section 171 of the Final Report of the Royal Commission. It gives for England and Wales the deaths from small-pox at certain age-periods to 1,000 deaths from small-pox at all ages. The figures under one year of age are as follows:—

Years.	Deaths from small-pox under one year of age to 1,000 deaths from small-pox at all ages.
1848-1854	251
1855-1859	231
1860-1864	237
1865-1869	231
1870-1874	143
1875-1879	112
1880-1884	113
1885-1889	112
1890-1894	166

From 1848-54 to 1855-59 the proportion of infantile small-pox deaths declined from 251 to 231, or a reduction of 8 per cent. The successful public vaccinations of infants under one year of age are given in the Appendix.[1] On calculation it will be found that from 1848-54 they averaged 36·9 per cent. of the births, and from 1855-59, 51·5 per cent.; that is to say, that between the two periods the proportion increased from 36·9 to 51·5 per cent., or a percentage increase of 39·6. By a similar calculation, from 1865-69 to 1870-74 they increased from 48·5 to 55·6 per cent., or a percentage increase of 14·6. Between the latter periods the proportion of small-pox deaths under one year of age declined from 231 to 143, or a reduction of 38·1 per cent. To put it in tabular form :

From the period	Percentage increase in the proportion of successful public vaccinations under one year of age to the births.	Percentage decline in the proportion of small-pox deaths under one year of age to 1,000 deaths from small-pox at all ages.
1848-54 to 1855-59	39·6	8·0
1865-69 to 1870-74	14·6	38·1

It is obvious from the above that there is some cause other than vaccination contributing to the alteration that has taken place in the age-incidence of the small-pox mortality.

There is another point on which the Commissioners have laid considerable stress. They show that at Leicester and Gloucester the proportion of small-pox deaths

---

[1] It will be observed in the Appendix that the returns are made up to September 29, but for the purposes of these calculations, the proportion of successful public vaccinations under one year of age to the births has been estimated to December 31 for the years in question.

under ten years of age is greater than in the well-vaccinated towns of Sheffield and Warrington. The figures given are as follows :—

Epidemics.	Small-pox deaths at all ages.	Small-pox deaths under ten years of age.	Percentage under ten years of age.
Warrington, 1892-93 ...	62	14	22·5
Sheffield, 1887-88 ...	500	128	25·6
London, 1892-93 ...	182	67	36·8
Dewsbury, 1891-92 ...	110	57	51·8
Gloucester, 1895-96 ...	434	280	64·5
Leicester, 1892-93 ...	21	15	71·4 (or 66·6) [1]

If the reader will consult the diagram in the Appendix, he will find that England and Wales, for seventeen years previous to the epidemic of 1871-72, was very well vaccinated. In that epidemic there were 42,220 deaths from small-pox, of which 20,094, or 47·6 per cent., were under ten years of age. This is double the proportion at Warrington and Sheffield, and very nearly the same as at Dewsbury, where, according to the Commissioners, vaccination had been greatly neglected. In 1892, the second year of the Dewsbury epidemic, the percentage of children born and not finally accounted for with regard to vaccination was 37·7. In England and Wales, in 1872, the default was only 5·1 per cent.

As the Commissioners have, in two of the towns named, based their conclusions on a small number of

---

[1] At Leicester, in consequence of the proximity of a scarlet fever ward to the hospital in which small-pox cases were treated, several children in that ward were attacked by small-pox, of whom three died. The 66·6 per cent. is obtained by deducting these three deaths.

deaths, perhaps I may be forgiven if I add the following :—

Epidemics.		Small-pox deaths at all ages.	Small-pox deaths under five years of age.	Percentage under five years of age.
Mold,[1] 1871-72	...	44	15	34·1
Willenhall,[2] 1894	...	47	16	34·0
Keighley, 1893	...	7	0	0·0

I shall have occasion to refer to Mold and Willenhall in subsequent chapters. It is sufficient to say here that at the time of their respective epidemics, both were very well-vaccinated districts. With regard to Keighley, there is no reason to believe it to be better vaccinated than Leicester or Gloucester; indeed, evidence points to the contrary. I do not wish to infer from the experience of these districts that vaccination increases the share of the small-pox mortality borne by children; the figures are too small for accurate inferences, as also are those of the Commissioners.

To sum up the contents of the present chapter, it will appear that, although there has been a marked decline in small-pox since the last century, there has been an equal, if not a greater, reduction in typhus fever. It has also been shown that since the commencement of registration the vaccination of a gradually increasing proportion of the population previous to the great

---

[1] The local Registrar has kindly supplied me with the figures for the registration sub-district of Mold.

[2] At Leicester, in 1892-93, of twenty-one small-pox deaths, nine were under five years of age. Two of these were among the children who suffered from the proximity of the scarlet fever ward to the hospital in which small-pox cases were treated. If these be deducted, 36·8 per cent. of the total deaths from small-pox were under five years of age, a proportion not much higher than that of Willenhall or Mold.

epidemic of 1871-72 had very little effect on the small-pox death-rate, although there was an appreciable diminution in fever. From this epidemic to the present time, with an increasing neglect of vaccination since 1881, an enormous decline in small-pox has taken place, and a corresponding diminution in typhus and scarlet fevers; the reduction in all three diseases being due, no doubt, in large measure to the sanitary improvements introduced by the Public Health Act of 1875.

With regard to the age-incidence, when small-pox first began to be much known, in the Stuart period, it was chiefly as a malady attacking adults; as it became more generally diffused, in the eighteenth century (except in a few country districts where epidemics came infrequently), it was almost entirely a disease of childhood; and more recently it is recognised again as a disease attacking adults as well as children. That this is not due entirely, or even principally, to vaccination, seems clear from the fact that a similar alteration of incidence has taken place in the unvaccinated. Another notable point is that, since the commencement of registration, the most important decline in the proportion of infantile small-pox deaths has not coincided with the period representing the greatest increase in the public infantile vaccination; nor is there sufficient evidence to show that the children in well-vaccinated towns suffer less than in those districts where vaccination has been largely neglected. When we come to compare the behaviour of other diseases in this particular, we find that in the only group which are fairly comparable with small-pox a similar change has been observed.

Before concluding the chapter, I must allude to a favourite argument in defence of vaccination, which seems to weigh with a large number of people—that is, the rarity of pock-marked faces at the present time, as compared with some former period. As to the disfigurement of the population in the seventeenth and eighteenth centuries, there is little or no evidence; but it is significant that in the issues of the *London Gazette*,[1] from 1667-1774, of one hundred advertisements for runaway apprentices, servants who had robbed their masters, horse-stealers, highwaymen, etc., only sixteen were described as more or less marked with small-pox, four being black men or boys. This consecutive hundred included only those who were so particularly described in feature that pock-marks would have been mentioned had they existed. Apparently pock-marked faces were not so common as is generally imagined.

The argument that vaccination has lessened the number is an old one, for in their annual report for 1821 the National Vaccine Board say: "We appeal confidently to all who frequent the theatres and crowded assemblies, to admit that they do not discover in the rising generation any longer that disfigurement of the human face which was obvious everywhere some years since." In the report for 1825 we read: "What argument more powerful can be urged in favour of vaccination, than the daily remark which the least observant must make, that in our churches, our theatres, and in every large assemblage of the people, to see a young person bearing the marks of small-pox is now of extremely

---

[1] "A History of Epidemics in Britain," vol. ii., p. 454. Creighton.

rare occurrence?" Half a century afterwards, in 1872, *The Lancet*, of June 29 (vol. i., p. 907), lamented "the growing frequency with which we meet persons in the street disfigured for life with the pitting of small-pox. Young men and, still worse, young women are to be seen daily whose comeliness of appearance is quite compromised by this dreadful disease."

Thus, while with the limited vaccination of 1825 the disfigurement of the young was extremely rare, yet, after nineteen years of compulsion, pock-marked faces had conspicuously increased. It is difficult to construct any scientific theory of protection from these facts, and we may therefore conclude that the argument so often brought forward as conclusive is illusory and untrustworthy.

CHAPTER III.

SOME OF THE CAUSES OF THE DECLINE IN THE SMALL-POX MORTALITY.

IN the last chapter attention was directed to the fact that although some of the epidemics of small-pox in the present century have been nearly as severe as those of the two previous ones, yet they took place at longer intervals; and thus there has been an important reduction in the mortality from this malady. The disease began to subside, however, before the introduction of vaccination, and was part of a general improvement in the public health which was taking place about this time. This is seen in the following table compiled by Dr. Farr.

London.--Average annual death-rates per 100,000 living at six different periods, from 1629-1835.[1]

	All causes.	Small-pox.[2]	Fever.
1629-35	5,000	189	636
1660-79	8,000	417	785
1728-57	5,200	426	785
1771-80	5,000	502	621
1801-10	2,920	204	264
1831-35	3,200	83	111

[1] "M'Culloch's Statistical Account of the British Empire," vol. ii., p. 579. Second edition. London. 1839.

[2] In a pamphlet by Mr. Ernest Hart, entitled "The Truth About Vaccination" (1880, p. 35), it is stated that "In Dr. Farr's valuable article on Vital Statistics in M'Culloch's 'Account of the British Empire,' it is shown that in the twenty-seven years, 1629-35 and 1660-79, the annual mortality

Commenting on these figures, Dr. Farr says:—"Small-pox attained its maximum mortality, after inoculation was introduced. The annual deaths of small-pox registered 1760-79 were 2,323; in the next twenty years, 1780-99, they declined to 1,740; this disease, therefore, began to grow less fatal before vaccination was discovered, indicating, together with the diminution of fever, the general improvement of health then taking place." Considering, also, that since the commencement of registration small-pox has completely ignored the fluctuations in the amount of vaccination, it is begging the question to assume that this is in any way relevant to the diminution that has been recorded. I propose, therefore, in the present chapter, to indicate some of the causes which have led to the decline of the disease.

It will be convenient at this juncture to consider the effect produced on the small-pox mortality in the displacement of small-pox inoculation by vaccination. As it was only in rare instances, that the inoculated were subjected to any form of isolation, it cannot be denied that they must often have acted as centres of infection and have diffused the disease. Dr. Wagstaffe,[1] writing in 1722, related an instance where, in consequence of a few inoculations, small-pox was spread in the town of Hertford, and occasioned a considerable mortality. In Paris, in 1763, the unusual severity of small-pox was attributed

---

from small-pox in London was equal to nearly 16,000 per million persons living; and in the forty years, 1728-57 and 1771-80, to nearly 18,000 per million living." It is not at first sight apparent how these high rates have been deduced from Dr. Farr's figures.

[1] A Letter to Dr. Freind, p. 38. London. 1722.

to increased infection from inoculation, and a decree was issued prohibiting the practice. The advocates of vaccination were almost unanimous in their opinion, that inoculation was responsible for much loss of life from small-pox; thus Moore[1] declared, that the neglect of the precaution of preventing the spread of infection from the inoculated had "occasioned the loss of millions of lives." The last statement must, however, for obvious reasons, be received with caution.

If we consult the London Bills of Mortality, we find that the small-pox mortality in the eighteenth century exceeded that of the seventeenth century. There are reasons, however, for believing that other causes besides inoculation must be sought for to explain the high small-pox rates in the eighteenth century. One of these is, that small-pox rose to a higher level of mortality about the year 1710; whereas inoculation was not introduced into this country until 1721. Dr. Creighton[2] informs us, that "from 1721 to 1727 the inoculations in all England were known with considerable accuracy to have been 857; in 1728 they declined to 37; and for the next ten or twelve years they were of no account." In London inoculation was revived about 1740, and after a few years became a lucrative branch of surgical practice, but was restricted almost exclusively to the well-to-do. Gratuitous inoculation commenced with the opening of a hospital in 1746; but it was not till 1751-52, that any consider-

---

1 "History of Small-pox," pp. 232, 233. James Moore. London. 1815.

2 "A History of Epidemics in Britain," vol. ii., p. 504.

able number of people were inoculated in connection with the charity.

According to the London Bills it does not appear that the few inoculations which took place during the years 1721-28 had any appreciable effect on the small-pox mortality, nor should we expect them to do so; but if a diagram be prepared showing year by year the rates of small-pox deaths to those for all causes, it will be found that from 1751 to 1781 a still higher level of small-pox mortality was reached than that which prevailed from 1710 to 1751; this seems to suggest an inoculation factor in the case. After 1781 small-pox was certainly at a lower level than that obtained between 1751 and 1781 (although in the one year, 1796, it touched the highest point in the century). This diminution, as Dr. Farr has pointed out, was associated with a decline in the general death-rate, and was no doubt brought about by the sanitary improvements introduced at that period; and thus small-pox became less prevalent, in spite of the fact that inoculation still remained in full operation.

To sum up the case, it is evident that the large mortality from small-pox in the last century cannot be wholly attributed to inoculation; but from the facts here presented I am led to believe that the augmentation which took place in 1751, and continued for a large number of years, might with fairness be put down to this cause. The first sign of any diminution in the small-pox death-rate commenced after 1781. This cannot be due to any falling off in the amount of inoculation, but must be associated with a general improvement in the public health then observable; the further decline after the

introduction of vaccination was in part probably brought about by the substitution of a non-infectious process.[1]

One of the causes of the spread of small-pox is over-crowding and want of air-space in and around houses. The fifth annual report of the Registrar-General gives the country and the town mortality from various causes for the four years 1838-41 ; in the case of small-pox the former is 507, and the latter 1,045 per million ; for all causes the figures are 19,300 and 27,073 respectively. This shows, that small-pox is much more influenced by the aggregation of the population than by all other causes of disease combined. The mortality from small-pox appears to vary according to the greater or lesser proportion of open spaces in towns. The following table illustrates this point.

---

[1] As most of the lymph with which the early "vaccinations" were performed was of variolous origin, it is important to show that after a time the cases inoculated with Woodville's lymph ceased to be infectious. The following, in a letter from Jenner to Lord Egremont (Baron's "Life of Jenner," vol. i., p. 342), is very much to the point. Referring to the threads distributed by Dr. Pearson, Jenner says: "In many places where the threads were sent, a disease like a mild small-pox frequently appeared ; yet, curious to relate, the matter, after it had been used six or seven months, gave up the variolous character entirely, and assumed the vaccine ; the pustules declined more and more, and at length became extinct. I made some experiments myself with this matter, and saw a few pustules on my first patients ; but in my subsequent inoculations there were none."

For twenty large towns[1] the acres of town area to one acre of park and the average annual death-rate per 1,000, for the ten years 1870-79, from small-pox, measles, scarlet fever, fever and whooping cough.

	Acres of town area to one acre of park.	Average annual death-rate per 1,000 living, for the ten years 1070-79.				
		Small-pox.	Measles.	Scarlet Fever.	Fever.	Whooping Cough.
Bristol	10	·21	·45	·99	·50	·54
Liverpool	10	·58	·76	1·35	·95	·88
Brighton	22	·13	·29	·47	·26	·49
London	23	·48	·52	·71	·42	·79
Leicester	32	·33	·38	·84	·48	·49
Bradford	34	·09	·46	1·12	·65	·58
Manchester ...	34	·19	·57	1·02	·69	·88
Birmingham ...	38	·37	·42	1·15	·48	·84
Leeds	47	·18	·48	1·11	·73	·65
Plymouth	63	·39	·71	·32	·49	·73
Nottingham ...	66	·40	·30	·65	·69	·34
Salford	74	·55	·81	·97	·68	·86
Oldham	78	·16	·53	1·53	·48	·66
Sunderland ...	115	·92	·33	1·19	·74	·72
Hull	117	·25	·27	·84	·83	·48
Newcastle-on-Tyne	153	·65	·30	1·19	·67	·55
Sheffield	249	·42	·40	1·50	·85	·66
Portsmouth ...	280	·52	·38	·62	·75	·40
Norwich	1,067	·70	·26	·55	·52	·57
Wolverhampton (no parks)		·68	·31	·93	·56	·60

This table indicates generally, that towns with the greatest amount of park space have low small-pox death-rates, and *vice versâ*. Liverpool appears to be an exception, but it will be noticed that in this town the rates for the other zymotic diseases are also very high, due to overcrowding and sanitary neglect. It must be

[1] Fortieth and Forty-second Annual Reports of the Registrar-General.

remembered, that with regard to air supply, small towns would have the advantage of large ones. A single dwelling would be surrounded on all sides with air; but suppose we have a group of houses of equal sizes arranged symmetrically in the form of a square, with five houses to a side, there will be sixteen outside houses with twenty-five altogether, and the fraction $\frac{16}{25}$ will represent the external aerial supply; with one hundred houses to a side, this will be shown by the smaller fraction $\frac{396}{10000}$; and hence the difference in the external ventilation of the two groups of houses would be very large, being represented by the difference between the two fractions $\frac{6400}{10000}$ and $\frac{396}{10000}$. Thus, independently of park space, a small town would have better external ventilation for its houses than a large one; this may to some extent explain several exceptions in the table.

It may be, that there are other causes than the amount of park space to account for the difference in the small-pox mortality in the several towns specified, but the figures, in comparison with those of the other zymotic diseases, appear to be so striking as to suggest that external ventilation really exercises an important influence on the prevalence and mortality of this disease.

The epidemic of 1871-72, which largely dominates the small-pox figures in the last table, was conspicuously severe in the mining districts, which, as a rule, are most overcrowded. Durham was one of the most devastated counties, eleven of the thirteen registration districts having enormous small-pox death-rates.

Registration districts.	Population in 1871.	Deaths from small-pox in the 1871-72 epidemic.[1]	Small-pox death-rate per million.
Darlington	40,812	152	3,724
Stockton	99,705	432	4,333
Hartlepool	39,970	175	4,378
Auckland	69,159	536	7,750
Durham	91,978	835	9,078
Easington	33,694	293	8,696
Houghton-le-Spring ...	26,171	193	7,375
Chester-le-Street ...	33,300	209	6,276
Sunderland	112,643	1,011	8,975
South Shields... ...	74,949	744	9,927
Gateshead	80,271	514	6,403

Dudley, in Staffordshire, had a small-pox death-rate of 8,977, Newcastle one of 6,456, and Bedwellty, Pontypridd, Merthyr, Swansea, Abergavenny, rates of 8,520, 7,492, 6,380, 5,627, and 4,768 per million respectively. Thus we see that small-pox picks out its victims from thickly-populated centres, and more especially towns which are imperfectly aerated, and where, as in mining districts, the industrial conditions predispose to overcrowding.

That our ancestors had a less plentiful supply of fresh air in and around their houses goes without saying. It is a well-known fact that our towns have increased in area quite out of proportion to the increase in the population. Mr. John Timbs[2] observes, that the majority of the London squares were the growth of the last century, and that few of those in the western district existed before 1770, their sites being then mostly sheep-walks,

[1] The epidemic was not limited to the years 1871 and 1872, in some cases it extended over several years.

[2] "Curiosities of London," pp. 746, 747. John Timbs, F.S.A. 1867.

paddocks, and kitchen-gardens; but we know that several of the London squares existed in the seventeenth century, and there is a reference to Bloomsbury Square in "Evelyn's Diary," under the date February 9, 1665:—"Dined at my Lord Treasurer's, the Earle of Southampton, in Blomesbury, where he was building a noble square or piazza, a little towne; his owne house stands too low, some noble roomes, a pretty cedar chapell, a naked garden to the north, but good aire."

At the beginning of the eighteenth century Grosvenor, Cavendish, and Hanover Squares were laid out, the last two about the year 1718. Portman, Manchester, Finsbury, and Fitzroy Squares were constructed at the end of the last century; and at the beginning of the present century, about 1804, Russell Square, one of the largest in London, was finished, and about this time, also, Bedford and Euston Squares were opened. In 1829 a variety of important improvements were made immediately around St. Martin's Church; a whole labyrinth of close courts and small alleys were swept away, a district including places known as the Bermudas, the Caribbee and Cribbe Islands, and Porridge Island, notorious for its cook-shops;[1] this wholesome and wholesale clearance prepared the site for the construction of Trafalgar Square. Other squares, such as Lowndes and Woburn Squares, were made about 1836; while Blandford, Harewood, and Dorset Squares are of more recent construction.

Besides a deficient aeration of towns, our ancestors suffered under an insanitary tax upon light and air,

---

[1] See Cassell's "Old and New London," vol. iii., p. 141.

known as the window-tax. This was imposed in order to make good the deficiencies of the clipped money. Its origin, in 1695, has been described by Lord Macaulay:—"It was a maxim received among financiers that no security which the government could offer was so good as the old hearth-money had been. That tax, odious as it was to the great majority of those who paid it, was remembered with regret at the Treasury and in the City. It occurred to the Chancellor of the Exchequer that it might be possible to devise an impost on houses, which might be not less productive nor less certain than the hearth-money, but which might press less heavily on the poor, and might be collected by a less vexatious process. The number of hearths in a house could not be ascertained without domiciliary visits. The windows a collector might count without passing the threshold. Montague proposed that the inhabitants of cottages, who had been cruelly harassed by the chimney men, should be altogether exempted from the new duty. His plan was approved by the Committee of Ways and Means, and was sanctioned by the House without a division. Such was the origin of the window-tax, a tax which, though doubtless a great evil, must be considered as a blessing when compared with the curse from which it rescued the nation." [1]

The tax first fell largely on the landlord, but by the 20th of George II. (1746) it was levied upon the several windows of a house at so much per window, and consequently fell more cruelly upon the tenants of the

---

[1] "History of England," vol. iv., p. 641. Macaulay.

tenement houses. By the 21st of George II., cap. 10, all skylights, the lights of staircases, garrets, cellars, and passages, were to count for the purpose of the tax; and it was further enacted (11th section) that "no window or light shall be deemed to be stopped up unless such window or light shall be stopped up effectually with stone or brick, or plaister upon lath, etc." The law was enforced by a corrupt machinery of commissioners, receivers-general, and collectors, who were paid by results, and thus could hardly fail to act injuriously. In 1803 the law was altered, the houses being rated as a whole according to the number of their windows, and at the same time the tax for tenement houses was made recoverable from the landlord; it thus became a sort of modern house-tax rated on windows.[1]

The great speculative builder of the Restoration was Nicholas Barbone, and his method of procedure may be inferred from the following:—"He was the inventor of this new method of building by casting of ground into streets and small houses, and to augment their number with as little front as possible, and selling the ground to workmen by so much per foot front, and what he could not sell, built himself. This has made ground rents high for the sake of mortgaging; and others, following his steps, have refined and improved upon it, and made a superfœtation of houses about London."[2]

"In these mazes of alleys, courts or 'rents,'" Dr. Creighton says, "the people were, for the most part,

---

[1] For the above description of the window-tax, I am indebted to Dr. Creighton's "History of Epidemics."

[2] Quoted by Dr. Creighton from "Lives of the Norths." "A History of Epidemics in Britain," vol. ii., p. 86.

closely packed. Overcrowding had been the rule since the Elizabethan proclamation of 1580, and it seems to have become worse under the Stuarts. On February 24, 1623, certain householders of Chancery Lane were indicted at the Middlesex Sessions for sub-letting, 'to the great danger of infectious disease, with plague and other diseases.' In May, 1637, one house was found to contain eleven married couples and fifteen single persons; another house harboured eighteen lodgers. In the most crowded parishes the houses had no sufficient curtilage, standing as they did in alleys and courts. When we begin to have some sanitary information long after, it appears that their vaults, or privies, were indoors, at the foot of the common stair. In 1710, Swift's lodging in Bury Street, St. James's, for which he paid eight shillings a week, had a 'thousand stinks in it,' so that he left it after three months. The House of Commons appears to have been ill-reputed for smells, which were specially remembered in connection with the hot summer of the great fever-year, 1685."

In the days of the Tudors and the Stuarts, the personal habits even of the upper classes left much to be desired. Fresh linen being a luxury, the clothes were seldom changed, and the dyer was more often in requisition than the laundress. Sir John Falstaff thus describes the contents of the buck or linen-basket:—"Foul shirts and smocks, socks, foul stockings, and greasy napkins; that, Master Brook, there was the rankest compound of villainous smell that ever offended nostril."[1]

---

[1] "The Merry Wives of Windsor," act iii., scene v.

From a washing tally found behind some oak panelling in the old chaplain's room at Haddon Hall, in Derbyshire, it would appear that towels had not always belonged to the domestic arrangements of this establishment, for in place of that word, which was scratched out, "laced bands" had been written on the horn of the tally.

Some interesting relics called "scratch-backs" have come down to us, the name sufficiently indicating the habits of the aristocracy of the time. A scratch-back is a hand or claw set in a long handle, which was sometimes made of silver elegantly chased, and there is one instance where a ring on the finger of the hand is set with brilliants. At one time these implements were as indispensable to a lady of fashion as her fan or her patch-box. They were kept in her toilet, and carried with her even to her box at the play. They belong to a period when personal cleanliness was not considered essential, when the style of dress worn was anything but conducive to comfort and ease, and when ladies wore immensely high head-dresses, which, when once fixed, were frequently not disturbed or altered for a month, and not until they had become almost intolerable to the wearer and to her friends.

In the sixteenth and seventeenth centuries, the state of the public health in London was at a very low ebb. The town ditch was a receptacle for all kinds of rubbish and decomposing organic matter; the streets were unpaved and saturated with slops and other filth. Instead of regular highways, the out-parishes were reached by a maze of narrow passages and alleys. The dwellings of the poor were as bad as they well could be; the

houses projected over the roadway, which was so narrow that they almost met at the top; there was no attempt at ventilation, and up to and even beyond the time of Queen Elizabeth, the floors were strewn with rushes, and, if we may trust to an epistle from Erasmus to his friend Dr. Francis, physician to Cardinal Wolsey, it would appear that these were seldom thoroughly changed, and, the habits of the people being uncleanly, the smell soon became intolerable. He speaks of the lowest layer of rushes (the top only being renewed) as sometimes remaining unchanged for twenty years, a receptacle for beer, grease, fragments of victuals, excremental and other organic matter. To this filthiness, Erasmus (one of the most acute observers) ascribed the frequent pestilences with which the people were afflicted.

Even as late as the beginning of the present century things were very different to what they are now. Thus, Willan, writing of fever, says:—

"Among the poor the mortality from this cause (contagious malignant fever) was nearly one in four of all persons affected, notwithstanding the attentive administration of proper articles of diet, and of suitable remedies, with plenty of wine.

"The good effects of all these applications are almost wholly superseded by the miserable accommodations of the poor with respect to bedding, and by a total neglect of ventilation in their narrow, crowded dwellings. It will scarcely appear credible, though it is precisely true, that persons of the lowest class do not put clean sheets on their beds three times a year; that, even where no sheets are used, they never wash or scour their blankets and coverlets, nor renew them till they are no longer

tenable ; that curtains, if unfortunately there should be any, are never cleaned, but suffered to continue in the same state till they drop to pieces ; lastly, that from three to eight individuals, of different ages, often sleep in the same bed ; there being, in general, but one room, and one bed for each family. To the above circumstances may be added, that the room occupied is either a deep cellar, almost inaccessible to the light, and admitting of no change of air; or a garret, with a low roof and small windows, the passage to which is close, kept dark in order to lessen the window-tax, and filled not only with bad air, but with putrid, excremental, or other abominable effluvia from a vault at the bottom of the staircase. Washing of linen, or some other disagreeable business, is carried on while infants are left dozing, and children more advanced kept at play whole days on the tainted bed ; some unsavoury victuals are from time to time cooked. In many instances idleness, in others the cumbrous furniture or utensils of trade with which the apartments are clogged, prevent the salutary operation of the broom and whitewashing brush, and favour the accumulation of a heterogeneous, fermenting filth. The rooms do not change their condition till they change their tenants. Often, indeed, so little care is taken that enough of the old leaven remains to infect all the inmates who successively occupy the same premises. I recollect a house in Wood's Close, Clerkenwell, wherein the *fomites* of fever were thus preserved for a series of years ; at length a friendly fire effectually cleared away the nuisance. A house notorious for dirt and infection, near Clare Market, afforded a further proof of negligence ; it was obstinately tenanted till the

walls and floor giving way in the night crushed to death the miserable inhabitants. From all these causes combined there is necessarily produced a complication of fœtor, to describe which would be as vain an attempt as for those to conceive who have been always accustomed to neat and comfortable dwellings.

"The above account is not exaggerated. For the truth of it I appeal to the medical practitioners, whose situation, or humanity, has led them to be acquainted with the wretched inhabitants of some streets in St. Giles's parish, of the courts and alleys adjoining Liquor-pond Street, Hog Island, Turnmill Street, Saffron Hill, Old Street, Whitecross Street, Grub Street, Golden Lane, the two Brick Lanes, Rosemary Lane, Petticoat Lane, Lower East Smithfield, some parts of Upper Westminster, and several streets of Southwark, Rotherhithe, etc.

"It cannot be wondered at, that in such situations contagious diseases should be formed, and attain their highest degree of virulence. The inhabitants of the second storey in houses occupied by the poor are usually better accommodated, and therefore experience, during sickness of any kind, the best effect from public and private charities. But persons thus stationed suffer from contiguity, and from their friendly attentions to those above them, or to the tenants of the cellars; so that in whatever part of the house a fever commences, it is soon diffused among all the inmates and their occasional visitors, especially in seasons which favour its progress like the last autumn and winter. . . . It is a melancholy consideration that in London and its vicinity hundreds, perhaps thousands of labourers, heads

of families, and in the prime of life, are thus consigned to perish annually, being often so situated that medical applications or cordial diet cannot in any wise alleviate their distress."[1]

The sanitary condition of the prisons in the last century, as discovered by the great prison reformer, John Howard, gives some indication of the ignorance that prevailed in regard to the public health at that time. In the Introduction to his book,[2] he tells us that in his inspection of gaols, he noticed a complication of distress, but his attention was principally arrested by the gaol fever and the small-pox, which he saw prevailing to the "destruction of multitudes," not only of felons in their dungeons, but of debtors also. On page 8, in describing the air in prisons, he says :—"My reader will judge of its malignity, when I assure him that my clothes were in my *first* journeys so offensive, that in a post-chaise, I could not bear the windows drawn up, and was therefore often obliged to travel on horseback. The leaves of my memorandum book were often so tainted, that I could not use it till after spreading it an hour or two before the fire; and even my antidote, a vial of vinegar, has, after using it in a few prisons, become intolerably disagreeable. I did not wonder that in those journeys many gaolers made excuses, and did not go with me into the felons' wards.

"From hence anyone may judge of the probability there is against the health and life of prisoners, crowded

---

[1] Dr. Willan's "Observations on Diseases in London." *Medical and Physical Journal*, vol. iii., pp. 298-300. (April, 1800.)

[2] "The State of the Prisons in England and Wales." Second Edition. 1780. John Howard, F.R.S.

in close rooms, cells, and subterranean dungeons, for fourteen or sixteen hours out of the four-and-twenty. In some of those caverns the floor is very damp; in others there is sometimes an inch or two of water, and the straw, or bedding, is laid on such floors, seldom on barrack bedsteads. Where prisoners are not kept in underground cells, they are often confined to their rooms, because there is no court belonging to the prison, which is the case in most city and town gaols."

There was much overcrowding. On page 21 we read:—"Debtors *crowd* the gaols (especially those in London) with their *wives* and *children*. There are often by this means ten or twelve people in a middle-sized room, increasing the danger of infection." John Howard observes the effect of the window tax (p. 9):—"One cause why the rooms in some prisons are so close, is perhaps the window tax, which the gaolers have to pay; this tempts them to stop the windows, and stifle their prisoners."

Concerning the water supply and drainage, we read (pp. 8, 9):—"Many prisons have *no water*. This defect is frequent in bridewells and town gaols. In the felons' courts of some county gaols there is no water; in some places where there is water, prisoners are always locked up within doors, and have no more than the keeper or his servants think fit to bring them. In one place they were limited to three pints a-day each—a scanty provision for drink and cleanliness! . . . Some gaols have no *sewers*, and in those that have, if they be not properly attended to, they are, even to a visitant, offensive beyond expression. How noxious, then, to people constantly

confined in those prisons!" Under these conditions, is it to be wondered at, that typhus and small-pox prevailed to the "destruction of multitudes"?

Howard's attention was arrested by the insanitary state of the prisons, but it is doubtful whether the poor, especially in the large towns, lived in a much healthier atmosphere than the prisoners. Dr. William Buchan, in his work on "Domestic Medicine," says: "Whenever air stagnates long, it becomes unwholesome. Hence the unhappy persons confined in jails not only contract malignant fevers themselves, but often communicate them to others. Nor are many of the holes, for we cannot call them houses, possessed by the poor in great towns much better than jails. These low, dirty habitations, are the very lurking-places of bad air and contagious diseases. Such as live in them seldom enjoy good health, and their children commonly die young."[1]

Thus, Dr. Buchan connects the high mortality of children in the last century with overcrowding and filth. From these facts we may infer, that sanitary reform would tend to alter the age-incidence of zymotic disease. This has been fully recognised by the Registrar-General in the following notable words: "That the sanitary efforts made of late years should have more distinctly affected the mortality of the young is only what might be naturally anticipated; for it is against noxious influences to which the young are more especially sensitive that the weapons of sanitary reformers have been chiefly directed."[2]

---

[1] "Domestic Medicine," p. 86. Tenth edition. 1788. William Buchan, M.D.

[2] Forty-second Annual Report of the Registrar-General, p. xxiii. 1879.

There is no reason to believe that small-pox is any exception to this general law, and in this connection the following table quoted by Dr. Collins and Mr. Picton is not without interest.[1]

Fatal small-pox in Scotland, 1871.

	Small-pox deaths at all ages.	Small-pox deaths under five years of age.	Percentage under five years of age.
Principal towns (population above 25,000)	886	195	22·0
Large towns (population from 10,000 to 25,000)	143	32	22·3
Small towns (population from 2,000 to 10,000)	209	55	26·3
Mainland rural districts	183	25	13·6
Insular rural districts	11	0	0·0

The larger proportionate small-pox mortality of children in the towns, compared with rural and insular districts is certainly not due to any difference in the amount of vaccination, and it is difficult to resist the conclusion that the young are more injuriously affected by overcrowding and other insanitary conditions associated with town life than adults.[2]

While discussing the subject of sanitation, it is necessary also to allude to the influence of burial grounds on mortality. In the last century it was usual to establish these in the midst of populous towns, and there can be no question, that the constant inhalation of effluvia from dead bodies, had a deleterious effect on the living.

[1] Royal Commission on Vaccination, Dissentient Commissioners' Statement, section 148.

[2] See Paper read by Mr. Alfred Milnes before the Statistical Society, June 15, 1897.

Buchan observes (p. 85): "Certain it is, that thousands of putrid carcases, so near the surface of the earth, in a place where the air is confined, cannot fail to taint it; and that such air, when breathed into the lungs, must occasion diseases." With the growth of sanitary institutions, reforms have been made with regard to the disposal of the dead, and, in nearly all urban districts, the dead are now buried in outlying cemeteries. The next generation will no doubt witness a great extension of the still more sanitary practice of cremation, already introduced in London, Glasgow, Manchester, Liverpool, and other places.

Besides insanitation, other causes have probably had their effect on the small-pox mortality.

A number of typhus and small-pox epidemics have been intimately associated with periods of scarcity and want. The winter of 1683-84 was very severe. This was followed by a long drought in the summer of 1684, and another severe winter in 1684-85, and not until the spring of 1685 was there plentiful rain.[1] In 1685-86 the country was visited by a terrible epidemic of fever, and in 1685 small-pox was above the average, with 2,496 deaths in London, or a rate of 107 per 1,000 deaths from all causes. The winter of 1708-09 was excessively severe, frost lasting all over Europe from October to March. This was followed by a bad crop of cereals in 1709, the price of wheat per quarter running up from *27s. 3d.* on Lady-day, 1708, to *81s. 9d.* on Lady-day, 1710.[2] In 1710, the proportion of small-pox deaths was 127 per 1,000

---

[1] "A History of Epidemics in Britain," vol ii., p. 23. Creighton.

[2] *Ibid.*, pp. 54, 55.

deaths from all causes (3,138 small-pox deaths). 2,810 died from small-pox in 1714, or a rate of 106 per 1,000 from all causes. This followed a rise in the price of wheat.

In 1718 the harvest was a bad one; and about this time there was scarcity of employment amongst the weavers in the east end of London;[1] during the year 1719, there were 3,229 deaths from small-pox in London, or a rate of 114 per 1,000 from all causes. Up to the month of February, 1756, the season had been a forward one, but the early promise of spring was blighted by cold. This was succeeded by a wet summer and autumn; the fruit crop was ruined, and the corn harvest spoilt by long, heavy rains; dearth and bread riots followed.[2] In 1757, the proportion of small-pox deaths rose to 155 per 1,000 from all causes (3,296 small-pox deaths).

A bad harvest in 1794 raised the price of wheat to 55*s.* (January 1, 1795); by August, 1795, it rose to 108*s.*, falling in October to 76*s.*, owing to the action of the Government, in order to avert famine, causing neutral ships —bound to French ports with corn—to be seized and brought to English ports. In the spring of 1796, the acme of distress was reached, wheat being sold for 100*s.* per quarter.[3] Mr. Pitt admitted in Parliament that the condition of the poor "was cruel, and such as could not be wished on any principle of humanity or policy;"[4] in this year, the mortality figures showed the largest number of small-pox deaths of any year within the London Bills, being 3,548, or 184 per 1,000 deaths from all causes. The harvest in 1816 proved deficient in

---

[1] "A History of Epidemics in Britain," vol. ii., pp. 62, 64. Creighton.

[2] *Ibid.*, p. 125. [3] *Ibid.*, pp. 158, 159.

[4] Eighth Annual Report of the Registrar-General, p. 12.

quantity, and inferior in quality. Prices rose from 66*s.* a quarter in 1815, to 78*s.* in 1816, and 98*s.* in 1817.[1] This was succeeded by epidemics of small-pox, relapsing fever, and typhus in 1817-19.

From the Registrar-General's eighth annual report we learn that the year 1837 was one of great commercial depression. In referring to joint stock banks, Major Graham says:—"Many of the companies were got up by speculators, for the sole purpose of selling shares. The signal of collapse was given by the failure of the Agricultural Bank of Ireland in November, 1836. The Bank of England assisted the Manchester Northern and Central Bank in December, the large American houses in February and March, 1837. It was in vain. Commercial credit fell to its lowest point of depression in the first half of the year 1837."[2] Again—"In 1837 the price of bread rose rapidly, while trade was depressed, and speculation sat exhausted in the midst of ruin."[3] During the several years commencing in 1837, one of the most disastrous small-pox epidemics of the nineteenth century occurred, and also a very severe epidemic of typhus.

Another cause of the diffusion of small-pox, as well as of typhus and dysentery, is probably war. Dr. Guy writes:—"War is a special cause of that more general condition of overcrowding, so destructive to health, so productive of disease. It consists in bringing one crowd of trained, armed, and disciplined men into collision with another, under circumstances highly unfavourable to health. It reaches its climax in civil war, in prolonged

[1] Eighth Annual Report of the Registrar-General, p. 16.
[2] *Ibid.*, p. 23. [3] *Ibid.*, p. 24.

siege operations, and when armies are quartered among civil populations."[1] The shock of battle also, with its attendant anxiety and the high tension of the organism, are important and undeniable factors in the production of epidemic diseases.

Mr. Alexander Wheeler pointed out before the Royal Vaccination Commission (Q. 7,994) that during almost the whole of the last century Europe was one huge battle-ground, and wars continued on and off until the year 1815. The fact, that small-pox was declining during the opening years of the present century, does not exclude war as one of the causes of this disease.

As to the effects of war. In a work by Mr. William F. Fox, entitled "The Losses of the American Civil War," we read:—"110,070 were killed, 249,458 died of other causes, making 359,528 in all in the Northern army." In speaking of the 249,458 who died from disease, Mr. Fox says: "One-fourth died from fever, principally typhoid; one-fourth from diarrhœa or other forms of bowel complaint; one-fourth from influenza and lung complaints; and one-fourth from small-pox, measles, brain diseases, erysipelas, and various other forms of disease common to the masses."[2]

With regard to the Franco-Prussian war, Mr. Wheeler, in his evidence before the Royal Commission, quoted some of the commissioners sent to Eastern France to aid the peasantry. One of these, Dr. Robert Spence Watson, has published his experiences,[3] from which the following have been extracted. I may state that in 1870 there

---

[1] *Journal of the Statistical Society*, December, 1882, p. 579.

[2] Third Report, Royal Commission on Vaccination, Q. 8056.

[3] "The Villages Around Metz." Newcastle-on-Tyne. 1870.

was not more small-pox than usual until the later months of the year. Its increase was at the time of the terrible slaughter following the invasion of France.

"November 6, 1870. Then I went to Lessy and Chatel St. Germain, hearing everywhere the same state of distress. All the crops gone, all the winter's firewood gone, many houses destroyed, and numbers needing help in every village. . . . When the mare's hoofs sunk deep, she knocked up bits of flesh, and the stench was so sickening that I should have fainted but for my smelling salts. It was a strange and sad sight; sometimes twenty-five heaps of graves within sight at once. These graves are in a bad state, many of them were too shallow to begin with. The heavy rains have caused them to sink in, and they are covered with an inch or more of black, oily water, which has, when disturbed, a most disgusting stench" (pp. 22, 23).

"November 7th. All men and officers alike speak of the terrible loss of blood. At Rezonville, and in its neighbourhood, the people say 18,000 Germans are buried. This I doubt, but the number must be enormous" (p. 25).

"November 9th. Metz was literally crammed with soldiers. The Germans—strong, hearty, conscious of victory; the French—cowed, worn, starved, and miserable. . . . In one place there were fifteen long streets of railway vans, filled with typhus patients; in another as many streets of canvas tents, also filled with sick. I visited these places, and found them in the filthiest state; but the Germans had begun to put them into order. At first, you might see soldiers, in full small-pox, walking about the streets, but this was soon forbidden" (p. 28).

Dr. Watson concluded his last letter with the observation that "unless England puts forth her hand liberally and wisely, the coming winter must see in that beautiful and fertile land an amount of misery, famine, and plague which it is too dreadful to contemplate" (p. 36).

Another commissioner has kindly furnished me with the following statement:—"Mr. William Jones, of Sunderland, was one of those who went out on behalf of the Society of Friends to relieve the sufferings of the people. He was present at Metz when Marshal Bazaine's army surrendered. The main body were encamped outside the walls of Metz, on low ground near the Moselle, the wetness of the season having converted the camping-ground into a morass. In some places the impress of the men's bodies was left as a cast in the mud in which they had lain. Their clothes and their blanket were saturated with mud. Their food for weeks had only been a biscuit and a bit of horseflesh without salt. Dysentery was universal, and typhus and small-pox raged. Over a wide area around the camp the carcases of dead horses were left to rot and contaminate the air. On the 29th of October, 1870, Mr. Jones and his companion, Mr. Allen, were permitted to enter the city, which had opened its gates to admit the German army, which marched through in triumph. The narrow streets were crowded with French soldiers disarmed, and looking diseased and hunger-bitten. Numbers of them were going about the streets with confluent small-pox fully out over their faces. Black typhus raged in the hospitals. Ultimately the worst cases were removed into 320 railway vans drawn up in the 'Grande Place.' No one was allowed to pass the German

sentries into the square, but the constant cry of the wretched sufferers for water was distinctly heard by Mr. Jones outside the square in which they were isolated. It was stated that all these black typhus patients perished, and were buried in huge trenches outside the walls of the city.

"Mr. Jones's companion, Mr. Allen, who was vaccinated, and, he believes, re-vaccinated, took the small-pox, and his own sister, who came over to nurse him, caught the disease from him and died there, and was buried in the cemetery at Plantières outside the walls of Metz.

"*N.B.*—Mr. John Bellows, of Gloucester, who followed Mr. Jones to Metz, states in his pamphlet, 'The Track of the War round Metz,' that, of the twelve commissioners of the Society of Friends who were present in Metz, eight were at one time ill, five being down with small-pox, and one (Miss Allen) died of small-pox."

There is, indeed, some reason to believe that this war was the starting point of the great European pandemic of small-pox in 1871-72.

Another cause of the decline in small-pox during the present century, especially among children, remains to be told. Malthus, in 1803, wrote :—"For my own part, I feel not the slightest doubt, that, if the introduction of the cow-pox should extirpate the small-pox, and yet the number of marriages continue the same, we shall find a very perceptible difference in the increased mortality of some other diseases."[1] Malthus, thus early, clearly saw that even if cow-pox had possessed all the

---

[1] "An Essay on the Principle of Population," p. 522. T. R. Malthus. London. 1803.

virtues that were claimed for it, the reduction in the mortality from one zymotic disease would, other things being equal, have no appreciable effect on the death-rate.

This principle was first worked out experimentally by Dr. Robert Watt, lecturer on the theory and practice of medicine at Glasgow. He examined the Glasgow burial registers over a space of thirty years, from 1783-1812, and divided the thirty years into five periods of six years each. The following table gives his figures for small-pox, measles, and whooping-cough, as percentages of the deaths from all causes :—[1]

Periods.	Total deaths from all causes	Of the total deaths The percentage Under ten years of age.	From small-pox.	From measles.	From whooping-cough.
1783-88 ...	9,994	53·48	19·55	0·93	4·51
1789-94 ...	11,103	58·07	18·22	1·17	5·13
1795-1800	9,991	54·48	18·70	2·10	5·36
1801-06 ...	10,034	52·03	8·90	3·92	6·12
1807-12 ...	13,354	55·69	3·90	10·76	5·57

These statistics proved that while small-pox had diminished, measles and to a lesser extent whooping-cough had increased, so that a child had no better chance of reaching its tenth year in the last period[2] than in the first. Dr. Watt was somewhat staggered at the result. He says (p. 6):—"Taking an average of several years, I found that more than a half of the human species

---

[1] An Inquiry into the Relative Mortality of the Principal Diseases of Children, and the numbers who have died under ten years of age, in Glasgow, during the last thirty years (p. 49). Robert Watt, M.D. 1813.

[2] Dr. Watt remarks that in Glasgow during the last period (from 1807-12) vaccination may be said to have been pretty fully established, "perhaps, as much so, as in any other city in the Empire."

died before they were ten years of age, and that of this half more than a third died of the small-pox, so that nearly a fifth part of all that were born alive perished by this dreadful malady. I began to reflect how different the case must be now! In eight years little more than 600 had died of the small-pox; whereas, in 1784, the deaths by that disease alone amounted to 425, and in 1791 to 607, which, on both occasions, exceeded the fourth of the whole deaths in the year.

"To ascertain the real amount of this saving of infantile life, I turned up one of the later years, and by accident that of 1808, when, to my utter astonishment, I found that still a half or more than a half perished before the tenth year of their age! I could hardly believe the testimony of my senses, and therefore began to turn up other years, when I found that in all of them the proportion was less than in 1808; but still, on taking an average of several years, it amounted to nearly the same thing as at any former period during the last thirty years."

Dr. Farr was a firm believer in Watt. He writes:— "The zymotic diseases replace each other; and when one is rooted out it is apt to be replaced by others, which ravage the human race indifferently wherever the conditions of healthy life are wanting. They have this property in common with weeds and other forms of life: as one species recedes, another advances. By improving the hygienic conditions in which men live, you fortify them against infection; and further, by isolating the infected, the chances of attack are diminished."[1]

---

[1] Thirty-fifth Annual Report of the Registrar-General, p. 224.

In this chapter, I have attempted to deal with some of the principal causes of the diminution of small-pox. Firstly, I have shown that a part of the decline, and especially that part which has taken place in children, is not necessarily a saving of life, but only a shifting of the mortality on to some other disease, such as measles or whooping-cough, which happens for the time being to be more predominant.

The residue of the diminution is a real gain, and is probably due partly to the displacement of small-pox inoculation by a non-infectious malady; and to this extent was vaccination an advantage as compared with the old variolous inoculation. Other causes have been due to the more abundant air supply in and around houses; the greater cleanliness of the people in their persons, their houses, and their towns; and last, but not least, the greater material prosperity and freedom from war, which has been the lot of those who have been fortunate enough to be born into the present century.

CHAPTER IV.

THE INCIDENCE OF SMALL-POX ON VACCINATED AND UNVACCINATED COMMUNITIES.

THE experience of Leicester has proved conclusively that small-pox can be kept from spreading in unvaccinated districts. In 1872, Leicester was a well-vaccinated town, and had an epidemic of small-pox, with 346 deaths registered from the disease. This failure to protect led to a revolt against the practice. The default commenced after 1874, and since 1885 the percentages of vaccinations to births have been as follows :—[1]

Years.	Births.	Primary vaccinations.	Percentage of vaccinations to births.
1885 ...	4,682 ...	1,842 ...	39·3
1886 ...	4,858 ...	1,122 ...	23·1
1887 ...	4,689 ...	474 ...	10·1
1888 ...	4,787 ...	314 ...	6·6
1889 ...	4,789 ...	172 ...	3·6
1890 ...	4,699 ...	131 ...	2·8
1891 ...	4,790 ...	92 ...	1·9
1892 ...	5,816 ...	133 ...	2·3
1893 ...	6,006 ...	249 ...	4·1
1894 ...	5,995 ...	133 ...	2·2
1895 ...	5,962 ...	75 ...	1·3

As far as the children are concerned, therefore, Leicester is practically unvaccinated. Let us see what

---

[1] Report of the Medical Officer of Health for the year 1895, pp. 31, 38.

has been their small-pox record since 1872, when the population was about half what it is at the present time.

Year.	Small-pox deaths.	Year.	Small-pox deaths.
1872	346	1884	0
1873	2	1885	0
1874	0	1886	0
1875	1	1887	0
1876	0	1888	0
1877	6	1889	0
1878	1	1890	0
1879	0	1891	0
1880	0	1892	6
1881	2	1893	15
1882	5	1894	0
1883	3	1895	0

The above figures up to the year 1889 have been taken from a table handed in by Mr. Biggs, and published in the Fourth Report of the Royal Commission (p. 438). They include two deaths not given by Dr. Priestley in his recent report, *viz.*, one in 1875 and another in 1877. Over a period of twenty-two years, from 1874 to 1895, which embraces the recent epidemic in the town, in spite of forty-nine separate importations from vaccinated districts, notably Sheffield, there were only thirty-nine deaths from the disease, or an average annual small-pox death-rate of 12·6 per million, against 47 per million during the same period in better-vaccinated England and Wales.

Certain objections have been raised to the Leicester system, but they are all totally irrelevant. One of these is given by Mr. Ernest Hart in his letter to the *Times* of August 31, 1894: "That wherever non-compulsion makes head in the matter of vaccination, a

great variety of forms of severe compulsion are the necessary and accepted sequence and corollary—as, for example, compulsory removal to hospital, compulsory isolation and disinfection, compulsory quarantine and detention from business of the persons in contact with the small-pox patients prior to their removal. All these forms of compulsion, and others connected therewith, are rampant in Leicester, the home and typical centre of non-compulsion and non-vaccination."

The answer to this is that there is no more interference with the liberty of the subject than the ordinary laws allow. Alderman Windley, chairman of the Leicester Sanitary Committee, writing to the *Times* of October 15, 1887, says :—"Will you permit me to say : (1) That the Sanitary Committee of this Corporation, in their treatment of small-pox cases, when they occur, act under the powers of the Pubiic Health Act, 1875, which apply to the country generally ; (2) that if the sufferer has not 'proper lodging and accommodation' he is removed to the Fever Hospital, and the house in which he was found is disinfected and limewashed ; (3) that, whenever we can, we induce the persons found at the house, who have been in contact with the patient, to go into the quarantine ward at the hospital for a fortnight, making their sojourn there as pleasant as practicable. In one instance we had a refusal, and in that case our inspector made daily visits to the house, in order to ascertain whether any other case had fallen of the disease. We have no power of forcible removal, and should hardly apply it if we had." With regard to the power of removing quarantines, the *Lancet* of June 5, 1886 (vol. i., p. 1091) admits that "actual legal powers do not exist ;"

and in the recent epidemic it was not found necessary to remove them, for of 1,261 patients quarantined, 1,026, or 81 per cent., were quarantined in their own homes; and the medical officer adds:—"I am satisfied that in an epidemic of small-pox, quarantining of persons who have come into contact with the disease can be carried out satisfactorily at their own homes—more efficiently, and at a much less cost, than in a special building or buildings built for the purpose."[1]

The cost has been brought forward as an argument against the system. The total expenditure on the epidemic was £4,500, which includes the cost of erection of new wards for the nurses. The amount is modest in comparison with the £32,000 spent in dealing with the epidemic in the well-vaccinated town of Sheffield, which sum, we learn, proved but a fraction of the total money loss caused to the inhabitants.

Another argument is that Leicester, notwithstanding its widespread insurrection against the Vaccination Acts, owes its protection after all to vaccination, or rather re-vaccination. Dr. J. G. Glover, in a letter to the *Times* of September 11, 1894, puts the case thus:—"The first line of their defence is a cordon of re-vaccinated persons round every case that occurs in the town. The medical officer is re-vaccinated; the sanitary inspectors are re-vaccinated; the nurses are re-vaccinated; and—tell it not in Gath!—the other persons in the house of the small-pox case are not only compelled (not by law) to keep themselves to themselves, but are re-vaccinated." With regard to the quarantines, the medical officer, on page 12 of his report, informs us that of 1,261 persons quarantined in the

[1] Report on the Epidemic of Small-pox, 1892-93, p. 14.

1892-93 epidemic, 51, or 4 per cent., were vaccinated, and 72, or 5·7 per cent., were re-vaccinated in quarantine. This disposes of the re-vaccination of the quarantines. On page 24, Dr. Priestley gives the hospital staff, all included, at forty; besides these, eight other sanitary officials must be added to make up the "cordon." Among these, five took small-pox, or an attack-rate of 104 per 1,000. Thus, this well-protected "cordon" had an attack-rate fifty-five times that of the unvaccinated population among which they lived (attack-rate of population = 1·9 per 1,000), and it is not easy to understand how it came to shield the town from small-pox.

In defence of the Leicester system, I cannot do better than quote the words of the medical officer in the preface to his annual report for 1893:—"You are entitled to great credit—more especially in the case of small-pox, which, by the methods you have adopted, has been prevented from running riot throughout the town, thereby upsetting all the prophecies which have again and again been made. I need only mention such towns as Birmingham, Warrington, Bradford, Walsall, Oldham, and the way they have suffered during the past year from the ravages of small-pox, to give you an idea of the results you in Leicester have achieved, results of which I, as your medical officer of health, am, justly I think, proud."

The following are the attacks and deaths, with their respective rates, for the unvaccinated towns of Leicester and Keighley in the recent epidemics:—

Small-pox epidemics.	Population.	Attacks.	Attack-rate per million.	Deaths.	Death-rate per million.
Keighley, 1893 ...	32,070	72	2,245	7	218
Leicester, 1892-94 ...	184,547	355	1,924	21	114

If these be compared with epidemics that have taken place in admittedly well-vaccinated towns, the result is very striking

Small-pox epidemics.	Population.	Attacks.	Attack-rate per million.	Deaths.	Death-rate per million.
Willenhall, 1894 ...	17,684	842	47,614	47	2,658
Sheffield, 1887-88 ...	312,793	7,066	22 590	679	2,171
Warrington, 1892-93	54,000	674	12,481	65	1,204
Birmingham, 1891-94	492,301	3,127	6,352	248	504

At Short Heath, near Willenhall, in 1894, out of a population of 2,667, there were 90 cases and six deaths from small-pox, or an attack-rate of 33,746, and a death-rate of 2,250 per million. In the case of Sheffield, Warrington, and Short Heath we have valuable evidence about the vaccination. At Sheffield, for a large number of years previous to the epidemic of 1887-88, over 80 per cent. of the births had been vaccinated; and in 1862, at an inspection of borough school children,[1] it was found that 86 or 87 per cent. were found "protected" in the like fashion. At Warrington, at the time of the epidemic, an examination of 7,522 school children revealed the fact that 7,135, or 94·9 per cent., were vaccinated; and at Short Heath, in 1893, 89 per cent. were found to be vaccinated. But, in making an estimate of the vaccination of the population, an allowance must be made for the fact that school children would, if anything, be slightly better vaccinated than the rest of the population.

At Willenhall and Birmingham, the large proportion of small-pox cases vaccinated is sufficient evidence that these towns were well "protected," being 89·3 and 88·8 per cent. respectively; for, as I have pointed out in a

[1] A total of 1,409 school children were examined (Sixth Report of the Medical Officer of the Privy Council, p. 165.)

letter to the *British Medical Journal* of November 9, 1895, the population cannot very well be vaccinated to a lesser extent, or we should have to admit that small-pox picked out the vaccinated for its victims. In the case of Willenhall, not only were a large proportion of the population vaccinated, but they were very efficiently vaccinated, for 78 per cent. of the vaccinated cases exhibited three or four marks.

Not only may well-vaccinated towns be affected with small-pox, but the most thorough vaccination of a population that it is possible to imagine may be followed by an extensive outbreak of the disease. This happened in the mining and agricultural district of Mold, in Flintshire. On the 9th May, 1871, Dr. Seaton informed the Select Committee of the House of Commons, that from 1853 to 1871 all the children born and remaining in the district of Mold had been vaccinated, and he gave the figures for thirteen years ending September 30, 1866. Of 6,601 births, 5,784 had been successfully vaccinated; 202 had left the district before vaccination; 600 had died previous to the operation; 4 had had small-pox previous to vaccination; and 11 remained over for the next year's vaccination. He added: "Of course it is a work of years to build up a district to the state in which Mold is." In 1871-72, fifty persons died of small-pox, or on the population (13,834) a rate of 3,614 per million.[1]

[1] The Registrar-General has courteously supplied me with the population and deaths from small-pox, in the registration sub-district of Mold. The number of small-pox deaths is slightly in excess of that given by the local registrar (see p. 53), but even adopting the latter's figures, if calculated on the population of the Registrar-General, the small-pox death-rate for Mold in 1871-72 will be over 3,000 per million.

Compare this with the immunity of Leicester in the late epidemic. Leicester, with the population under ten years of age practically unvaccinated,[1] had a small-pox death-rate of 114 per million; whereas Mold, with all the births vaccinated for eighteen years previous to the epidemic, had one of 3,614 per million.

Dr. Seaton informed the Committee, that a great deal was done in Swansea to secure vaccination, and the *Lancet* of August 6, 1870 (vol. ii., p. 205), refers to the report of the medical officer of health, wherein it was stated that nine-tenths of the population was vaccinated; and this is borne out by the Local Government Board returns for 1872, which give 91 per cent. of the births as vaccinated; yet, in 1870-73, there were 379 deaths from small-pox, or, on the population of 1871 (67,357), a death rate of 5,627 per million. The following table specifies those towns which, in the epidemic of 1871-72, had rates exceeding 6,000 per million.

Registration districts.	Population in 1871.	Deaths from small-pox in the 1871-72 epidemic.	Small-pox death-rate per million.	Percentage of vaccinations to births in 1872.	Percentage of vaccinations to births in 1892.
South Shields ...	74,949	744	9,927	83·2	74·7
Hackney	124,951	1,231	9,852	78·6	43·2
Northampton ...	50,743	467	9,203	79·7	6·2
Durham	91,978	835	9,078	77·4	84·2
Dudley	134,125	1,204	8,977	81·3	83·7
Sunderland.. ...	112,643	1,011	8,975	85·2	84·0
Easington	33,694	293	8,696	84·2	86·5
Bedwellty	51,763	441	8,520	82·2	78·4
Auckland	69,159	536	7,750	80·6	79·0
Caistor	48,885	371	7,589	71·5	83·6
Dover	35,249	265	7,518	84·9	74·1
Pontypridd... ...	51,921	389	7,492	81·8	82·3

[1] Medical Officer's Report for 1893, p. 67.

Registration districts.	Population in 1871.	Deaths from small-pox in the 1871-72 epidemic.	Small-pox death-rate per million.	Percentage of vaccinations to births in 1872.	Percentage of vaccinations to births in 1892.
Houghton-le-Spring	26,171	193	7,375	87·2	84·4
Walsall	71,834	527	7,336	83·1	60·9
Bideford	19,506	141	7,229	86·4	91·7
Norwich	80,386	562	6,991	81·5	26·2
Southampton ...	48,055	312	6,493	75·0	78·4
Newcastle	131,198	847	6,456	83·2	81·9
Gateshead	80,271	514	6,403	75·2	64·5
Merthyr	104,239	665	6,380	88·3	84·9
Lambeth ...	208,342	1,324	6,355	77·6	69·8
Chester-le-Street ...	33,300	209	6,276	85·8	83·7
Llanelly	34,732	216	6,219	90·4	82·3
Whitehaven ...	47,572	294	6,180	86·1	88·3

In nearly all of the twenty-four towns, the epidemic took place in the years 1871 and 1872, but in several it continued over three or four years. The small-pox deaths were distributed as follows :—

Registration districts.	1870.	1871.	1872.	1873.	1874.	Total.
South Shields ...	9	603	132	—	—	744
Hackney	16	868	313	21	13	1,231
Northampton	—	57	410	—	—	467
Durham	30	439	262	34	70	835
Dudley	1	10	1,128	58	7	1,204
Sunderland	2	933	75	1	—	1,011
Easington	—	183	110	—	—	293
Bedwellty	—	172	265	3	1	441
Auckland	9	150	371	1	5	536
Caistor	2	283	47	38	1	371
Dover	—	16	247	2	—	265
Pontypridd	—	7	319	38	25	389
Houghton-le-Spring ...	—	110	83	—	—	193
Walsall	—	16	502	2	7	527
Bideford	—	36	105	—	—	141
Norwich	—	245	316	1	—	562

Registration districts.	1870.	1871.	1872.	1873.	1874.	Total.
Southampton	3	305	4	—	—	312
Newcastle	8	702	132	5	—	847
Gateshead	1	409	101	1	2	514
Merthyr	2	32	538	58	35	665
Lambeth	28	972	295	24	5	1,324
Chester-le-Street ...	1	106	93	7	2	209
Llanelly	24	171	21	—	—	216
Whitehaven	3	7	163	105	16	294

I have given the percentages of vaccinations to births for the years 1872 and 1892; and it will be seen that most of the towns showed a higher rate of vaccination of infants in the earlier than the later year; some allowance must, however, be made for the epidemic of 1871-72 increasing the vaccinations, but there is no reason to believe that any of these towns were badly vaccinated.

Gloucester has quite recently experienced an outbreak of small-pox exceeding the rates in any of these towns, enormous as they are,[1] and as the town is one in which vaccination has of late years been largely neglected,[2] the occurrence has been seized upon by the press all over the country, with the result that numbers of Boards of Guardians, which had allowed the Vaccination Acts to fall into abeyance, have been stimulated to reimpose proceedings. The attack-incidence of the epidemic is heavy, being 48 per 1,000, or about the same as that for the well-vaccinated town of Willenhall in 1894; but it

[1] The rate for Gloucester is 10,548 per million.

[2] In 1895-96 61·1 per cent. of the cases of small-pox were vaccinated, and, therefore, the population must, on any theory of protection, have been vaccinated to this extent. The proportion is larger than at Leicester (55·7 per cent.), and considerably larger than at Keighley (43·1 per cent.) in the recent epidemics in these towns.

is the case-mortality of 21·8 per cent. of those attacked, which has made it one of the most remarkable epidemics of modern times. To explain this by want of vaccination is merely to beg the question; for at Chester, in 1774, where all the deaths were under ten years of age, and all, of course, unvaccinated, the fatality was 14·6 per cent.; and recently in the unvaccinated towns of Keighley and Leicester the fatality was 9·7 and 5·9 per cent. respectively. From certain statistics, published by the committee appointed by the Gloucester Board of Guardians, it appears that the fatality at the hospital was much greater than among cases treated at home.

	Cases.	Deaths.	Fatality per cent.
In hospital ...	730	199	27·3
At home ...	1,306	244	18·7

These figures treat of the whole epidemic; but it must be remembered that the hospital administration was taken over by Dr. Brooke, of the Thames Ambulance Service, towards the end of April, and, consequently, the case-mortality (27 per cent.) is considerably mitigated by the addition of cases with a low fatality, due to the reforms instituted under Dr. Brooke's regime. Dr. Walter Hadwen has pointed out that the total number of completed cases under treatment for the twelve months prior to Dr. Brooke's arrival was 277, of which 151, or 54 per cent., were fatal.[1] This tremendous hospital fatality, when compared with the 5·9 per cent. at Leicester, where the cases were nearly all treated in the hospital, suggests certain influences at the hospital which were deleterious to the vitality of the patients. The Dissentient Commissioners report (section 261) that they

[1] An Address by Dr. Hadwen at Weston-super-Mare, October 22, 1896

learn from Dr. Coupland, that the following circumstances contributed to the extension of the disease.

1. "A main factor was the introduction of the disease into some of the public elementary schools."

2. The large and increasing proportion of cases retained at home; especially as "quarantine," which in the early periods was under supervision, came to be more a matter of advice than of control. Dr. Coupland believes that "the facilities of intercourse between neighbours will account for a great deal—in other words, the failure of isolation."

3. The hospital is situate within the city, and was crowded to excess, there being at one time two and even four in a bed; it is possible that the hospital contributed to the spread, but it is difficult to prove this. On the other hand, "there had been aroused a deep feeling against the hospital; the mortality amongst the children admitted into it had been very high, and this feeling could not be eradicated, although the accommodation was extended and the organisation improved. Thus it happened that the majority of persons remained in their homes up to the last weeks."

4. The small sanitary staff was overtaxed; and Dr. Coupland reports there were serious defects in hospital administration.

5. The hospital accommodation was afterwards increased, and the administration improved. That these efforts were not more immediately successful was owing to the unwillingness of the people to enter the hospital, which had so suffered in reputation.

6. Dr. Coupland, in comparing the experience of Gloucester with that of Leicester, points out that

Leicester has the advantage of being better organised in its sanitary department, and its medical officer is not, as at Gloucester, engaged in private practice. There is more "sanitary vigilance" at Leicester, and its sanitary staff is more numerous.

At the quarterly meeting of the Gloucester City Council, held on Tuesday, January 26, 1897, the following report of Dr. Brooke was handed to the press for publication :—

Stroud Road, Gloucester
May 1st, 1896.

To the Sanitary Committee.

Gentlemen,—

In accordance with an arrangement made on the 20th ult. with the Metropolitan Asylums Board, my services, under certain conditions, have been temporarily lent to the Sanitary Committee of the City of Gloucester, for the purpose of taking entire charge and control of the small-pox hospitals.

In accordance with this arrangement I made a preliminary visit of inspection to the said hospitals on the 21st ultimo, and at a subsequent interview with the Chairman of the Sanitary Committee and Mr. Alderman Powell, I made several suggestions; one, which I deemed of the first importance, and which I suggested further should be carried out at once, viz., the appointment of a thoroughly experienced matron who must also be a trained nurse. Having obtained the consent of these gentlemen, I at once took such steps as were necessary. I issued an advertisement in three daily papers, *The Lancet*, and *The Hospital*, with the result that amongst a great number of applications I was fortunate enough to find the application of Miss E. Walker, late Assistant Matron at the London Hospital, and, more recently, Lady Superintendent of the Hill Road Infirmary, Liverpool, an infirmary with eight hundred beds. I engaged Miss Walker as matron, temporarily, at a salary of £4 4s. per week, with the usual allowances; and I consider that the city of Gloucester is to be congratulated on having

obtained the services of a lady who, from her past experience and training, is so eminently fitted to discharge the responsible duties and combat the difficulties attaching to her present post.

Acting upon an instruction conveyed in an urgent telegram from the Chairman of the Sanitary Committee, asking that Mr. Pitt might be relieved from the great pressure of work, I engaged, temporarily, Dr. C. K. Bond, late Resident Physician, St. George and St. James Dispensary, King Street, Golden Square, W., at a salary of £5 5s. per week. Dr. Bond is a gentleman who has had already considerable experience in small-pox. I also engaged two charge nurses— Nurses Wright and Wilkins, both of the Hospital Ships, near Dartford.

By the courtesy of the Clerk to the Metropolitan Asylums Board, I was allowed the use of the chief offices of the Board to transact all business and interview all candidates ; this was of the greatest possible service and convenience to me.

I came into residence at the house of Mr. M'Crea on the 28th ult. I have since my arrival, and accompanied by Miss Walker, made a thorough inspection of the Stroud Road Hospital, and we are of opinion as to the absolute unsuitability (1st) of the site, as such ; (2nd) of the structural arrangement, which is devoid of any plan, system, or method, and renders the satisfactory working of the hospital an impossibility.

The sexes, as perhaps you know, should in all hospitals be absolutely separated in a separate building situated in a different part of the ground ; to separate them now with the existing buildings would be practically impossible.

We find also, that, from a sanitary point of view, the whole administration of the hospital has been shockingly neglected.

One of the greatest defects is the deficient laundry accommodation, and the additional laundry which is in process of erection will not be nearly sufficient to meet the requirements. We are informed at the hospital, that it is impossible to obtain a sufficient supply of clean linen, and that they are already a month behind with the washing.

I considered it my duty, on visiting the hospital this morning, to direct Mr. Hall's attention to the fact that the gas stoves in the new kitchen should be placed on iron plates, and that there should

also be an iron plate over the match-boarding at the back, which is scorched and browned by the heat, and there is great danger of fire. This draws my attention to the fact, that there is, with the exception of a fire hose in centre of ground, a total absence of fire-extinguishing appliances attached to the wards, and no fire buckets.

Two additional men should be immediately engaged to clear the grounds and the various nooks and corners throughout the place, of the great accumulation of rubbish.

The ambulance shed near the main block is very foul and dirty, and smells most offensively ; and round many of the wards I found heaps of decaying animal and vegetable matter—bones, bread, vegetables, etc.—and sometimes a heap of foul linen and soiled dressings soaked in discharges. At any rate, in one of the wards we found neither kitchen, scullery, nor pantry, and in the bathroom a miscellaneous collection of dirty dinner things, patients' clothing, and soiled linen.

Our recommendations are :—(1st) the appointment of two men to clear the ground of the refuse and keep it clean, and to perform the ordinary duties of a hospital porter ; (2nd) the appointment of a gate porter at a salary of 25s per week, and his board and lodging ; and that a gate book should be kept, and that no one should be admitted but those connected directly with the hospital without a pass, to be obtained from the medical superintendent. I notice that the gate is left open and that people are allowed inside.

With regard to the Hempsted Hospital, I venture to say that the Sanitary Committee are incurring a great and serious responsibility in continuing to keep this hospital open, and to allow patients to be admitted. With regard to this, I state definitely that I have found abundant evidence that both patients and staff are detained there at a grave risk.

I can only add, that upon the whole question of the hospital accommodation, I am of opinion, in the interest of the inhabitants of this city, and, perhaps, not only this city, but also in the interests and welfare of the patients, that both hospitals should be closed as soon as possible, and that immediate steps be taken to form a camp by means of tents at a considerably greater distance from the town.

At the present time, only the brick foundations have been reached in the process of the erection of the building, which I suggested ten days ago should be immediately put up for my accommodation. I now suggest that this building, when completed, should, in at any rate a temporary way, be used for the accommodation of the matron, as it is most essential that she should reside on the hospital grounds. I am, Gentlemen, yours obediently,

F. B. BROOKE,
Medical Superintendent.

These facts are of so serious a character, that it is to be hoped there will be an official inquiry into the matter, as also into the sanitary condition of the city, regarding which there have been many complaints.

Apparently the epidemic at Gloucester, although it has been much commented upon in the press, is not by any means the most devastating epidemic of modern times. We have it on Dr. Edward Seaton's[1] authority that, during the year 1885, the inhabitants of Montreal suffered to the extent of 3,000 deaths from small-pox, *i.e.*, on the population (160,000), a small-pox death-rate of 18,750 per million. It has been alleged that this epidemic was occasioned by the neglect of vaccination among the French Catholic population.[2] In this connection, it is sufficient to quote from the late Dr. W. B. Carpenter, who, in referring to the 1874-75 epidemic of small-pox, and the resistance exhibited towards the proposed vaccination

---

[1] *The Times*, December 10, 1886.

[2] The allegation has been revived quite recently (1896) by Dr. Andrew White, late President and Professor of History at Cornell University, in his interesting work, entitled "A History of the Warfare of Science with Theology in Christendom" (vol. ii., p. 60.)

law, says:—"I made a point of enquiring during my stay there, in August last, as to what had been the subsequent course of affairs. I learned on the very best authority that the objections of the French Catholics had been completely overcome. . . Vaccination being now (1883) as well carried out in Montreal by its officers of health as in the other great cities of the Dominion, small-pox has become almost entirely extinct."[1]

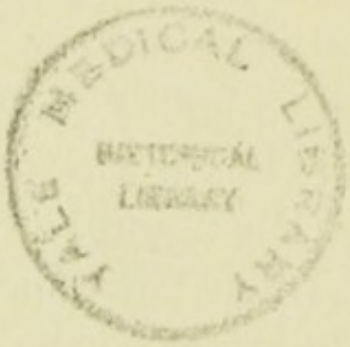
The causes of the epidemic in 1885 were not far to seek. Towards its close a member of the staff of the *Montreal Herald* interviewed Dr. Garceau,[2] of Boston, a supporter of vaccination, but who was declared by the editor to be one of the best-informed sanitarians on the American continent. When asked to what cause he attributed the extent of the epidemic, Dr. Garceau replied—"One cause is the fact that the people have not been properly vaccinated, but I attribute the chief cause to the frightful system of cesspits which prevails, and the insanitary condition of the place generally. It is unclean; and unless some action is taken to clean the privy vaults and remove all garbage, the city will next season be in excellent shape for cholera, or any other equally contagious disease." The Secretary of the Citizens' Committee (Mr. Michaels) appointed to enquire into the epidemic, said—"The streets and lanes are in a disgraceful condition. Not only in the distant portions of the city, but within the most aristocratic quarters and in the heart of the commercial portion, the lanes, and even portions of the streets, are reeking with filth."

---

[1] A Letter to the Right Hon. Lyon Playfair, C.B., pp. 13, 14. 1883.

[2] *Vaccination Inquirer*, vol. viii., p. 179. (February, 1887.)

In the present chapter, I have dwelt on the fact that unvaccinated towns may, by means of personal and municipal sanitation, be kept comparatively free from small-pox, and I have also pointed out, as in the case of Mold, that the most complete vaccination of a district possible, may be followed by an epidemic, with a small-pox mortality thirtyfold that of an unvaccinated community. On the other hand, recent experience has also proved, that towns where vaccination has been neglected may be seriously afflicted with the disease in precisely the same way as well-vaccinated districts. The moral to be derived from such occurrences is that small-pox, in common with other zymotic diseases, is largely influenced by over-crowding and insanitation, and until the profession awake to these important facts, we shall still continue to pay a heavy price for our ignorance and misdirected energy.


YALE MEDICAL LIBRARY
HISTORICAL LIBRARY

CHAPTER V.

DOES VACCINATION PREVENT SMALL-POX?

FOR a disease in the cow, to afford protection against a radically dissimilar disorder in man, is a proposition so strange, that we should demand the most complete evidence before subscribing to it. According to Jenner a vaccinated person is for ever afterwards secure from the infection of small-pox, and this opinion was absolutely endorsed by the Committee of the House of Commons in 1802;[1] in fact, as Baron informs us, if cow-pox had only been a temporary security, "it would have deprived the discovery of nearly all its value."[2] Of course, nobody at the present time believes in the life-long protection of vaccination, or revaccination would not be so urgently demanded, but the statement was quite unwarranted even

---

[1] "The result, as it appears to your Committee, which may be collected from the oral testimony of these gentlemen (with the exception of three of them) is, that the discovery of vaccine inoculation is of the most general utility, inasmuch as it introduces a milder disorder in the place of the inoculated small-pox, which is not capable of being communicated by contagion; that it does not excite other humours or disorders in the constitution; that it has not been known, in any one instance, to prove fatal; that the inoculation may be safely performed at all times of life (which is known not to be the case with regard to the inoculation of the small-pox), in the earliest infancy, as well as during pregnancy, and in old age; and that it tends to eradicate, and, if its use become universal, must absolutely extinguish, one of the most destructive disorders by which the human race has been visited" (pp. 3, 4).

[2] Baron's "Life of Jenner," vol. ii., pp. 18, 19.

in Jenner's day, and this no doubt explains the action of the Royal Society. When the subject was laid before the President, "Jenner was given to understand, that he should be cautious and prudent; that he had already gained some credit by his communications to the Royal Society, and ought not to risk his reputation by presenting to the learned body anything which appeared so much at variance with established knowledge, and withal so incredible."[1]

Baron informs us, that Jenner used to bring the subject before the medical society to which he belonged. "All his efforts were, however, ineffectual: his brethren were acquainted with the rumour, but they looked upon it as one of those vague notions from which no accurate or valuable information could be gathered, especially as most of them had met with cases in which those who were supposed to have had cow-pox, had subsequently been affected with small-pox."[2]

The celebrated Dr. Haygarth wrote and advised circumspection. He says: "Your account of the cow-pox is indeed very marvellous; being so strange a history, and so contradictory to all past observations on this subject, very clear and full evidence will be required to render it credible. You say that this whole rare phenomenon is soon to be published; but do not mention whether by yourself or some other medical friend. In either case, I trust that no reliance will be placed upon vulgar stories. The author should admit nothing but what he has proved by his own personal observation, both in the brute and human species. It would be useless to specify the doubts

---

[1] Baron's "Life of Jenner," vol ii., p. 168. [2] *Ibid.*, vol. i., p. 48.

which must be satisfied upon this subject before rational belief can be obtained. If a physician should adopt such a doctrine, and much more if he should publish it upon inadequate evidence, his character would materially suffer in the public opinion of his knowledge and discernment."[1] It is needless to remark that Dr. Haygarth's judicious counsels were disregarded by Jenner, as Baron and other authors repeatedly show.

In the first chapter of this volume, I have alluded to the fact that Jenner himself had instances of small-pox after cow-pox, and also to the ingenious explanations that he invented to account for failures. This happened in the following case, reported by Dr. Ingenhousz, who was distinguished as a man of science as well as a physician. He had made a particular study of small-pox inoculation under Dimsdale, and had been summoned to the Court at Vienna, and appointed Physician to the Emperor. Shortly after the appearance of the "Inquiry" he visited the Marquess of Lansdowne at Bowood, and took the opportunity of writing to Jenner on the subject of cow-pox.[2] Dr. Ingenhousz informed him that the first person he addressed was a Mr. Alsop, practitioner at Calne. This gentleman introduced him to a farmer of the name of Stiles at Whitley, near Calne, who, thirty years before, had bought a cow at a fair which was found to be infected with cow-pox; the disease soon spread through the whole dairy, and Stiles himself caught the complaint in a very severe way. After he had recovered and the sores dried up, he was

---

[1] Baron's "Life of Jenner," vol. i., pp. 134, 135.

[2] Letter from Ingenhousz to Jenner, October 12, 1798. Baron's "Life of Jenner," vol. i., pp. 291-293.

inoculated for the small-pox by Mr. Alsop. Stiles took the disease, had a number of eruptions, and communicated it to his father, who died of it. Dr. Ingenhousz besought Jenner to inquire further into the subject, before deciding in favour of a doctrine which might do great mischief, should it prove erroneous.

Jenner was in great trepidation, for in writing to his friend Gardner he said:—"It is a matter of real moment; a matter on which perhaps much of my future peace may rest—indeed, my existence."[1] But in reply to Dr. Ingenhousz he takes a very lofty tone—"Truth, believe me, sir, in this and every other physiological investigation which has occupied my attention, has ever been the object which I have endeavoured to hold in view. . . . Should it appear in the present instance that I have been led into error, fond as I may appear of the offspring of my labours, I had rather strangle it at once than suffer it to exist, and do a public injury."[2] But what sort of explanation did Dr. Ingenhousz receive of the case? We read in "Further Observations" that the cows gave out "an offensive stench from their udders," that Jenner had heard of other cases of the sort, and that he hoped the general observations he had to offer in the sequel would prove of sufficient weight to render the idea of their ever having had existence, but as cases of "spurious" cow-pox, extremely doubtful.

Dr. John Sims, a London physician of repute, contributed to the first number of the *Medical and Physical Journal*[3] the experience of a Mr. Jacobs, a solicitor of

[1] Letter from Jenner to Gardner. Baron's "Life of Jenner," vol. i., p. 296.
[2] *Ibid.*, p. 294.
[3] *Medical and Physical Journal*, vol. i., pp. 11, 12. (March, 1799.)

Bristol, who began life as a milker on his father's farm. Mr. Jacobs had twice suffered from cow-pox, and, on being inoculated for small-pox, had it in so great abundance that his life was for some time despaired of. He described the cow-pox as the most loathsome of diseases, and added that his right arm was in a state of eruption, both the first and second time, from one extremity to the other; the pain was excessive, and his fingers so stiff that he could scarcely move them. Dr. Sims added:—"What this gentleman remarks of the loathsomeness of the disease, although a circumstance entirely overlooked in Dr. Jenner's account, appears to be in itself a formidable objection to its introduction, even should it be found to answer the purpose for which it has been recommended. But, if in one case, and that where the patient has been twice so severely afflicted with it, it has already been found to be ineffectual in preserving from the infection of the small-pox, it will surely make us hesitate in recommending the introduction of a hitherto nearly unknown disease."

When Jenner read this he remarked, in a letter to his friend Gardner:—"I am beset on all sides with snarling fellows, and so ignorant withal that they know no more of the disease they write about than the animals which generate it. The last philippic that has appeared comes from Bristol, and is communicated by Dr. Sims, of London. Sims gives comments on it in harsh and unjustifiable language."[1] Sims appears to have lacked the courage of his convictions, and afterwards admitted that the case was "spurious," and in a year's time his conversion was complete, for his name appeared near

[1] Baron's "Life of Jenner," vol i., p. 321.

the top of a list of London physicians and surgeons who recommended cow-pox to the public.

There were other cases of the same description, and some of these found their way to the medical journals. Thus Mr. Charles Cooke,[1] an apothecary of Gloucester, related the case of a Mrs. Carter, of Longney, aged 50. At the age of eighteen, she lived in a dairy farm; at that time the cows were affected with chapped and sore teats, and all the servants who stripped them had inflammation and boils upon their hands. She was so ill with fever and with these boils, that she could not work for a week; her hands and arms were dreadfully swollen, and she kept her bed for two days. She was told by a medical man that the disease she suffered from was a very bad attack of cow-pox. When inoculated for small-pox by Mr. Cooke, in December, 1798, she took the disease, had "rather a burthen of pustules," and recovered without any variation from the common course of inoculated small-pox.

Another case is reported by Dr. R. Hooper,[2] of the Mary-le-bone Infirmary. Thomas and William Pewsey, brothers, in the service of a farmer who lived near Devizes, were seized with painful eruptions on different parts of their bodies, and suffered very considerably; they acquired the complaint in consequence of milking cows affected with a pustular disease. Five years afterwards one of the brothers, Thomas, was taken ill with confluent small-pox and died. The usual form of excuse was forthcoming, this time from the Rev. T. D.

---

[1] Dr. Beddoes' "Contributions to Physical and Medical Knowledge," pp. 387-392. Bristol. 1799.

[2] *London Medical Review and Magazine*, vol. i., pp. 505-508. (July, 1799.)

Fosbrooke, M.A., curate of Horsley, Gloucestershire, who, in a later number of the *Review* (August, 1799, p. 628), said that the case appeared plainly to be one of "spurious" cow-pox.

Dr. James Woodforde,[1] of Castle-Cary, reluctantly published a case which seemed "to militate against the permanent preventive influence of the *variolæ vaccinæ*." A patient—Mrs. Dredge, aged 55—took small-pox of the distinct sort; she informed him that she did not expect the disease, having taken cow-pox twenty-eight years previously from milking cows affected with the same. She observed that the cow-pox was very severe; she had numerous pustules on her hands and fingers, lost two nails, had considerable swelling in the arm-pit, and great fever.

There is a case, given in the third volume of the *Medical Observer*,[2] of a person who had cow-pox in the natural way, accompanied by much constitutional affection. About nine months afterwards he took small-pox and died.

So much for cases of small-pox after natural cow-pox. Jenner had a number of failures of this sort brought to his notice, quite in the early days, and he and his friends attempted no sort of explanation, except that these cases had somehow or other managed to get inoculated with a "spurious" form of the disease; the only proof of spuriousness, however, being that they had happened to take small-pox afterwards.

When vaccination came to be more extensively practised, there were a large number of instances recorded

---

[1] *Medical and Physical Journal*, vol. v., pp. 151, 152. (February, 1801.)

[2] *The Medical Observer*, vol. iii., p. 200. (August, 1808.)

both of mild and severe small-pox, even within the shortest periods of the operation. Mr. E. Harrison,[1] of Horncastle, related the case of Fanny Allington, who, when exposed to variolous inoculation six months after vaccination, was attacked with mild small-pox with moderate eruption. Mr. Harrison remarks that several who were vaccinated from this case resisted the infection. Thus we are invited to entertain the strange notion that "Fanny communicated a security against the small-pox to others, although she herself remained liable to its influence."

Mr. John Stevenson,[2] of Kegworth, did not feel "perfectly satisfied" that the cow-pox was "*universally* and *infallibly* an antidote to the small-pox;" and on reading his cases, it is quite evident that he had substantial grounds for his heresy. Two children were vaccinated in June, 1800. According to the account given by Mr. Stevenson, the vaccination was perfectly correct. Six months afterwards, both these children were inoculated with recent variolous matter, to remove all doubts in the minds of the parents about the efficacy of cow-pox. Mr. Stevenson says:—"You may conceive my confusion and chagrin when, on the eighth day, I received a message requesting me to visit my young patients, who complained of headache, chilliness, sickness, and the other precursory symptoms of small-pox. On my arrival, I found, to my sincere regret, that there was little doubt of their having the genuine variolous fever; the pustules on the arms of both were fully distended with purulent matter, and considerably inflamed around their margins. In Master

[1] *Medical and Physical Journal*, vol. v., pp. 108-111. (February, 1801.)
[2] *Ibid.*, vol. vi., pp. 121-124. (August, 1801.)

Edward, on the following day, a full crop of eruptions supervened; with respect to his brother, the eruptive fever was much milder. . . . That this secondary disease was the real small-pox, admits not of a doubt, since many children were inoculated successfully with matter taken from Master Edward."

In the report on the cow-pox inoculation from the practice at the Vaccine-Pock Institution during the years 1800-02, we read (p. 66), "The distressing information was lately given of two children in one family taking the small-pox casually, of which they died, although they were supposed to be in security, by having been inoculated for the cow-pox two years before."

The following letter, dated March 27, 1802, from Mr. John Grosvenor, of Oxford, to the Chairman of the House of Commons Committee, is printed in the Appendix to the Report:—[1] "I beg leave to inform you that, in the latter end of March, last year, two children were inoculated for the cow-pox by a young gentleman, a pupil of mine, and that I saw the children in the progress of the disorder, and they appeared to have received the infection properly, and were judged by us to be secure from the variolous infection. A few months afterwards they were seized with the natural small-pox, of which one of them died. They were the children of a servant of Sir Digby Mackworth, of this place."

From about 1804, as Baron[2] informs us, the reports of

---

[1] Report from the Committee on Dr. Jenner's Petition respecting his discovery of Vaccine Inoculation. Appendix, p. 40. Ordered to be printed, May 6, 1802.

[2] Baron's "Life of Jenner," vol. ii., pp. 13, 14.

failures had begun to multiply, and one of Jenner's correspondents, who was seriously alarmed for his reputation, wrote a long letter full of doleful anticipations of the ill effects likely to arise from the "sinister rumours propagated by the anti-vaccinists," and advised him to come forward and vindicate his doctrines. The cases which made the most stir were those communicated by Mr. Goldson to the Portsmouth Medical Society. He wrote a pamphlet[1] on the subject, and concluded with the following sensible remarks (p. 62):—

"It is far from my wish to provoke controversy. I only ask for further investigation. Vaccine inoculation must stand by its own merits, or fall from its own immediate defects. To suffer zeal for the discovery to shut their eyes to conviction, and, by deeming every failure spurious, to conceal it, is beneath the dignity of the profession." The reviewer in the *Medical and Physical Journal*[2] observed, that "the objections of Mr. Goldson, if valid, would go to the entire abolition of vaccine inoculation taken from the human subject."

These cases were the starting point of a very determined opposition to vaccination, and even Jenner's faithful henchman, Dunning, admitted that some of the failures looked "ugly," and it required all Jenner's ingenuity to keep him true to the cause.[3] "But while I am fighting the enemy of mankind, it will be vexatious to see my aides-de-camp turn shy. Among the foremost in the field, I have always ranked *Richard Dunning.*

---

[1] "Cases of Small-pox subsequent to Vaccination." William Goldson, M.R.C.S. Portsea. 1804.

[2] *Medical and Physical Journal*, vol. xii., p. 85. (July, 1804.)

[3] Letter from Jenner to Dunning, October 25, 1804. Baron's "Life of Jenner," vol. ii., p. 341.

No one has been more obedient to the commands of his general, or wielded the sword against the foe with greater force and dexterity. But shall I live to see my friend dismayed at the mere shadow of fortune on the side of the enemy; will he who has led such hosts into the field, and found them invulnerable, start if, in the continuation of the combat, he should see a man fall? Enough of metaphor. The moral of all this is, that I see you are growing timid."

The failures in Goldson's practice were such, however, as were beginning to be reported all over the country. Thus Mr. William Forbes,[1] of Camberwell, contributed the case of Stephen Brown, a young man, who was vaccinated in December, 1802. The vaccination, we are informed, must have been perfect, because matter taken from his arm produced the same disease in another case from whom two children were vaccinated, whose arms exhibited "beautiful" specimens of the cow-pox. Stephen Brown took the small-pox in February, 1805, and had a considerable number of small-pox eruptions, though of a mild kind. Mr. Forbes, who appears in ingenuity to rival Jenner himself, attributed the failure not "to a defect in the preventive power of the vaccine virus, but to the circumstance of his constitution not having undergone that change which is necessary to secure it from the future contagion of the small-pox, notwithstanding the perfect appearance of the pustule upon his arm."

In the same journal,[2] Mr. John Ring mentioned a "clear case" of small-pox two years after one of his

---

[1] *Medical and Physical Journal*, vol. xiii., pp. 517-520. (June, 1805.)

[2] *Ibid.*, vol. xiv., p. 6. (July, 1805.)

own vaccinations. On examination he found that there were the remains of a pustular eruption, which appeared to be variolous, and was in some degree confluent ; he explained the case by saying, that when the child was vaccinated it was suffering from ringworm, which prevented the cow-pox from producing the full effect on the constitution.

Mr. Blair,[1] surgeon to the Lock Hospital, also reported the case of a child vaccinated on May 7, 1803 ; the vaccination left a cicatrix on each arm. On June 3, 1805, he was asked to see the child, whom he found "covered with a distinct variolous eruption, small in size, but fairly maturated." Dr. Adams, of the Inoculation Hospital, agreed that it was certainly a case of small-pox.

In the same number[2] (July 1805), Mr. T. M. Winterbottom, of South Shields, related four cases of small-pox after supposed vaccination, as occurring in the practice of a Mr. G——, surgeon in the town.

John Gait was vaccinated on the 5th of December, 1804. The arm inflamed regularly, and the pustules were full, leaving an indelible mark. He took confluent small-pox on March 3, 1805 — that is to say, three months after vaccination—and died on March 14.

Robert Thompson, vaccinated on March 5, 1804. The inflammation and other symptoms were regular. On the 10th March, 1805, he took discrete small-pox of a mild type.

Richard Hall, vaccinated on December 17, 1804. The vaccination was regular, and he had four or five pustules on other parts, caused by scratching. Small-

[1] *Medical and Physical Journal*, vol. xiv., pp. 21, 22. [2] *Ibid.*, pp. 23, 24.

pox developed on February 24, 1805; he had a large number of pustules, but they were not confluent.

—— Elder was vaccinated on December 20, 1804, and took small-pox of a confluent and bad kind in April, 1805.

What failure could be more conclusive than these four cases? One took the small-pox two months after vaccination, and had a large number of pustules; another, three months, and died of it; a third, four months after vaccination, with a confluent and bad kind of small-pox; while the fourth, who had been vaccinated a year, had a mild variety of the disease.

In the *Medical and Physical Journal*[1] for October, 1805, are two cases recorded by Mr. Richard Dunning. The first, two and a half years old, was vaccinated by Mr. Dunning on October 8th, 1803, the cicatrix on one arm being distinctly if not strongly marked. In less than two years (29th July, 1805,) the patient was attacked with small-pox, the pustules amounting to many hundreds, and were situated principally on the face and extremities. In the other case he had vaccinated the child more than two years previously, and the patient had from fifty to one hundred pustules. In this case Mr. Dunning was not satisfied with the vaccination, as the child had torn both the vaccine vesicles on the seventh or eighth day with its nails, although he observed that nothing could be more regular and correct than the progress of the early vesicles, and the cicatrices on the arms were not unusually small, and were in many respects satisfactory.

In the November number of same volume (pp. 403,404),

[1] *Medical and Physical Journal*, vol. xiv., pp. 308-310.

Mr. John Ring mentioned the cases of two children vaccinated by him who had slight attacks of small-pox afterwards, and also a case in the practice of a Dr. Nelson; and he explains: "I am now inclined to believe that these, and some other well-authenticated cases of a similar kind, are to be ascribed to the greater susceptibility of small-pox in some habits than in others."

In the journal[1] for December, 1805, Mr. Walter Drew related the case of a child whom he had vaccinated in the spring of 1804. The arm, we are informed, exhibited all those criteria by which vaccination is recognised, such as the hardened phlegmonic base, and inflammatory areola encompassing the pustule from the ninth to the eleventh day, and its gradual change to a dark brown prominent scab, which adhered a long time, and left behind an indelible impression on the arm, such as in appearance to "enable me to warrant safety from small-pox influence." In September, 1805, however, the child was seized with an eruptive fever to a very high degree, and this was followed by a small-pox eruption of the distinct kind.

A number of cases are recorded in the eleventh volume of the *Medical and Chirurgical Review*. The editors[2] say "the late failures (real or supposed) of the vaccine inoculation to secure the constitution against future small-pox have, as was to have been expected, excited a great sensation in the public mind, and which is not likely to be allayed till the subject has undergone the fullest and most impartial investigation.

---

[1] *Medical and Physical Journal*, vol. xiv., p. 537.

[2] *Medical and Chirurgical Review*, vol. xi., p. lxii. (January, 1805.)

Speaking abstractedly, it is of no moment in which way the question respecting the vaccine practice is ultimately determined, but it is of infinite importance that the true state of the case be made out, whether it tell for or against the practice."

The following case, taken partly from the minutes of the Vaccine-Pock Institution, appears in pp. xxx. (September, 1804,) and lxv., lxvi. (January, 1805,) of the eleventh volume of the *Review*. The child, about five years of age, was vaccinated on each arm in October, 1803; both places took well, and mahogany scabs were formed, which, on separating, left pits. In July, 1804, nine months after vaccination, the child was taken ill with small-pox; the pustules were distinct and attended with purple spots, and it died on the eighth day of the disease. The two medical men who vaccinated the patient saw it before death, and were satisfied that it was a case of small-pox.

The *Review*[1] gives two cases which were also very thoroughly investigated—*viz.*, the children of Mr. Hodges, stay-maker, residing in Fulwood's Rents, Holborn. Both children were vaccinated by Mr. Wachsel, the resident surgeon at the Small-pox Hospital. He witnessed the appearance of the vaccinated parts, and expressed himself as perfectly satisfied of their regularity, and of affording permanent security against future variolous infection. In the younger child (two and a half years vaccinated), the small-pox was mild; but in the elder (vaccinated four years previous to attack), the eruption was very generally over the body, face, and limbs, and proceeded

[1] *Medical and Chirurgical Review*, vol. xi., pp. liii.-lvi. (November, 1804); and pp. lxiii.-lxv. (January, 1805).

in the customary manner of small-pox to maturation and scabbing. The patient was very ill, and for some hours delirious; the eruption was exceedingly copious, some of the pustules running together; there was swelling of the face, occasioning temporary blindness, and the patient was much pitted.

The editors[1] also related five cases of small-pox after vaccination, and pledged themselves for the accuracy of the statement in every material point (see opposite page).

In the *Medical and Chirurgical Review*, further instances are recorded, some of these being extracted from the minutes of the Vaccine-Pock Institution. Dr. Pearson,[2] at the request of Dr. Benjamin Moseley, an opponent of vaccination, examined a case of small-pox in a patient who had been vaccinated fifteen months previously, and on whom a distinct scar was left as the result of the operation. There were several hundred eruptions, in greater proportion on the face, and Dr. Pearson had no doubt of its being a case of small-pox, although Mr. Griffiths, and Dr. Willan, who also saw the child, supposed it to be chicken-pox; it is to be noted, however, that another child was inoculated from this patient, and the local result was described by Dr. Pearson as "unambiguously variolous" (p. xxi.) The editors[3] furnish particulars of seven instances of failure on their own responsibility; the disease was caught between two and six years of vaccination. None of the cases were described as mild, and several of the patients were very ill; one, who took the disease two years after

---

[1] *Medical and Chirurgical Review*, vol. xi., pp. cxxv.-cxxviii. (May, 1805.)
[2] *Ibid.*, vol. xii., pp. xvi., xvii. (July, 1805.) [3] *Ibid.*, pp. xxiv.-xxvii.

Name.	Age.	Vaccination.	Nature of the Small-pox.
Thomas Bainbridge	5	Vaccinated in two places on February 24th, 1800, by Mr. Wacksel, at the Small-pox Hospital. The vaccination regular and satisfactory. Scabs fell off about the twenty-sixth day and left "cicatrices as strongly marked as usual."	Developed confluent small-pox on March 2nd, 1805, and died March 19th.
Harriet Bainbridge	3	Vaccinated at Small-pox Hospital in October, 1802. Cicatrices strongly marked, and child declared secure from future small-pox.	Inoculated with variolous matter on March 12th, 1805. Thirty or forty eruptions appeared, which ripened into pustules, in every respect resembling small-pox, though of small size.
Mary Hart -	3	Vaccinated at Small-pox Hospital in October, 1802. Went regularly through the disease with the usual scars.	In March, 1803 (five months after vaccination) took small-pox in the natural way. About forty pimples appeared, several of which maturated.
John Kay - -	4	Vaccinated when three months old by Mr. John Ring, who declared the vaccination to be satisfactory.	Inoculated with variolous matter on March 16th, 1805. There was considerable constitutional disturbance, with eruption of pimples, some maturating.

The fifth case in the practice of Mr. Forbes, Surgeon, of Camberwell, was that of a young man who took small-pox "in a considerable degree" when inoculated with variolous matter two years after vaccination.

vaccination,[1] "had it very full, so as to leave many marks" (p. xxvii).

The reports of failure at length became so numerous, that it was found necessary to take action. In a letter to Mr. Dunning[2] in reference to Dr. Benjamin Moseley's publication of failures, Jenner expresses the opinion that nothing would "crush the hissing heads of such serpents at once" but a general manifesto with the signatures of men of eminence in the profession, unless Parliament had a mind to take the matter up again. It was about London where the "venom of these deadly serpents" chiefly flowed.[3] "I know very well," Jenner said, "the opinion of the wise and great upon it (vaccination); and the foolish and the little I don't care a straw for;"[4] and therefore he turned to those in authority. He had a conference with Lord Henry Petty, afterwards Chancellor of the Exchequer, at Hampstead, who expressed his determination to bring the subject forward in the ensuing session. Consequently, in 1806, an address was voted to His Majesty by the House, praying "that His Majesty will be graciously pleased to direct his College of Physicians to inquire into the state of vaccine inoculation in the United Kingdom, and to report their opinion and observations upon that practice, the evidence which has been adduced in its support, and the causes which have hitherto retarded its general adoption; and that His Majesty will be graciously

---

[1] The progress of the vaccine pock was deemed regular by Mr. Nicholson, apothecary at St. Bartholomew's Hospital, and it left the ordinary mark on the arm.

[2] Baron's "Life of Jenner," vol. ii., p. 354.

[3] *Ibid.*, p. 352. [4] *Ibid.*, p. 14.

pleased to direct that the said report, when made, may be laid before this House."[1]

The College reported favourably, and Jenner was awarded £20,000 (the sum total he received being £30,000), and the National Vaccine Establishment was founded with a Vaccine Board of eight, each having a salary of £100 a-year. Although the profession and Parliament had been practically committed to vaccination at the time of Jenner's Petition (1802), this was the first instance of the establishment and endowment of the practice, and the natural tendency was to stifle opposition; indeed, it may be said that one of the principal functions of the National Vaccine Establishment was to explain away the failures of cow-pox to protect from small-pox.

In some towns the failures were such as to lead to a discontinuance of the practice; thus, in the appendix of Dr. Willan's book,[2] is a report on vaccination by Dr. Rutter, physician to the Liverpool Dispensary, who gives Dr. Robinson's account of the state of vaccination at Preston. "Vaccination was first practised in this town by one or two gentlemen in the year 1798 or 1799, soon after its introduction by Dr. Jenner. A few children only were inoculated at that time, but they were supposed to have gone through the disease in the regular way.

"The practice afterwards became more general, until the small-pox raged epidemically. It was then observed

---

[1] Hansard's Parliamentary Debates, first series, vol. vii., pp. 883 and 899. (July 2, 1806.)

[2] "On Vaccine Inoculation." Appendix, p. xxvi. Robert Willan, M.D., London. 1806.

that many of the children who had been previously vaccinated, and were supposed to be secure, caught the complaint; some of whom died, and others recovered with difficulty. The frequent occurrence of these untoward events alarmed the public mind, and prejudiced the vulgar against the practice so entirely, that for a time it was nearly laid aside, except among the more enlightened." Thus, we have an early admission of the fact, which can no longer be denied, that against epidemic small-pox vaccination is of little or no avail."[1]

Sir Isaac Pennington,[2] Regius Professor of Physic at Cambridge, laid before the Royal College of Physicians an account of twenty-five cases of small-pox after vaccination, which he had visited in the town of Cambridge. Most were strongly marked, six only being mild. In some, the vaccination had been of seven or eight years' standing; and in others, not of so many weeks. In all, the cicatrix was very distinguishable; and at the time they were vaccinated, the inoculator declared they had gone through the disease in a proper manner. Sir Isaac said he had not seen any fatal cases where he had reason to suppose the vaccination had succeeded properly.

In 1808, about ten years after the introduction of vaccination, the opposition became very strong, the opponents being men of education, and many of them belonging to the medical profession. Discussions on the subject took place in public, and according to

---

[1] See extracts from recent official sanitary reports from India, quoted by Dr. Collins and Mr. Picton. Royal Commission on Vaccination, Dissentient Commissioners' Statement, section 227.

[2] Letter from Sir Isaac Pennington. *Medical Observer*, vol. iv., p. 246. (December, 1808)

Jenner, many professional men, some holding important public stations, were concerned in diffusing "wretched and pernicious trash," and we also learn from Baron that "the walls of London" were placarded with "falsehoods."[1] About a year later we find him writing that "Jenner and vaccination were again to be put upon their trial."[2]

In the *Medical Observer*[3] for November, 1809, the editor selected cases of failure from those formerly published and known to be authentic. Of 113 instances given, 16 died, or a case mortality of 14·2 per cent. The details given in fourteen[4] of the fatal cases are as follows :—

1. A child was vaccinated by Mr. Robinson, surgeon and apothecary, at Rotherham, towards the end of the year 1799. A month later it was inoculated with small-pox matter without effect, and a few months subsequently took confluent small-pox, and died.

2. A woman-servant to Mr. Gamble, of Bungay, in Suffolk, had cow-pox in the casual way from milking. Seven years afterwards she became nurse to the Yarmouth Hospital, where she caught small-pox, and died.

3 and 4. Elizabeth and John Nicholson, three years of age, were vaccinated at Battersea in the summer of 1804. Both contracted small-pox in May, 1805, and died. They were attended by Dr. Moseley and Mr. Roberts.

5. Mr. J. Adams, of Nine Elms, contracted casual cow-pox, and afterwards died of confluent small-pox.

6. The child of Mr. Carrier, Crown Street, Soho, was vaccinated at the Institution in Golden Square, and had small-pox three months afterwards, and died.

---

[1] Baron's "Life of Jenner," vol. ii., pp. 110, 111. [2] *Ibid.*, p. 128.

[3] *Medical Observer*, vol. vi., pp. 387-398.

[4] Two of the deaths have been described elsewhere in this chapter.

7. Mary Finney's child, aged one year, died of small-pox in July, 1805, five months after vaccination.

8. The child of Mr. Blake's coachman, living at No. 5 Baker Street, died of small-pox after vaccination.

9. Mr. Colson's grandson, at the "White Swan," Whitecross Street, aged two years, was vaccinated by a surgeon at Bishopsgate Street, in September, 1803. He died of confluent small-pox in July, 1805.

10. Mr. Brailey's child, aged two years and eight months, was vaccinated at the Small-pox Hospital, and forty weeks afterwards died of confluent small-pox.

11. Mr. Hoddinot's child, No. 17 Charlotte Street, Rathbone Place, was vaccinated 1804, and the cicatrix remained. In 1805 it caught small-pox, and died.

12. C. Mazoyer's child, No. 31 Grafton Street, Soho, was vaccinated at the Small-pox Hospital. Died of small-pox in October, 1805.

13. The child of Mr. R—— died of small-pox in October, 1805. The patient had been vaccinated, and the parents were assured of its security. The vaccinator's name was concealed.

14. The child of Mr. Hindsley at Mr. Adam's office, Pedlar's Acre, Lambeth, died of small-pox a year after vaccination.

In five of these fourteen deaths (Nos. 2, 5, 8, 12, 13), the length of time which had elapsed since vaccination is not given. In No. 2 the small-pox was contracted seven or more years afterwards; in No. 8 the patient was a child; and Nos. 12 and 13 were both children, and as they took small-pox in 1805, it is not possible this could have supervened more than five or six years after vaccination. Of the nine remaining deaths, eight,

with one possible exception (No. 11), were affected with the disease within a year of vaccination, and the remaining death (No. 9) was within two years of the operation.

In 1809, Brown,[1] of Musselburgh, published notes of forty-eight cases of small-pox, all of which had occurred within nine years of vaccination, most of them within much shorter periods. Brown was originally a convert to the Jennerian doctrine, but he says (pp. 279, 280):—"I am also convinced, from what has passed under my own observation for the last three or four years, that we have been *all* guilty of rejecting evidence that deserved more attention, in consequence of the strong prepossessions which existed, from the very persuasive proof of its (vaccination) resisting inoculation and exposure to the epidemic, and from our judgment being goaded and overpowered with the *positive* and *arbitrary* opinions of its abettors. I am now perfectly satisfied, from my mind being under the influence of prejudice, and blind to the impression of the fairest evidence, that the last time the small-pox was prevalent, I rejected, and explained away many cases which were entitled to the most serious attention, and showed myself as *violent* and *unreasonable* a partisan as any of my brethren in propagating a practice which, I have now but little doubt, we must ere long surrender at discretion."[2]

Brown allowed that it might keep off small-pox for a time, and that there was reason to believe it tended

---

[1] "An Inquiry into the Anti-variolous Power of Vaccination." Thomas Brown, surgeon, Musselburgh. Edinburgh. 1809.

[2] Brown somewhat modified his opinions in a later work published in 1842.

to make the disease milder; in fact, he held what would be about the average medical opinion of to-day. Of course he was hopelessly before his time, and came in for a great deal of abuse. Jenner, writing to Baron, and referring to a letter written by Brown to one of the London papers, says:—"His letter, under the veil of candour and liberality, is full of fraud and artifice, for he knows that every insinuation and argument he has advanced has been refuted both by the first medical characters in Edinburgh and Dublin, and, indeed, by many others."[1] The more reasonable of Brown's opponents, however, ultimately adopted his views, for in the *Edinburgh Medical and Surgical Journal*[2] of July, 1818, we read:—"Before we conclude, we must, in justice to ourselves, pay the *amende honorable* to Mr. Brown, of Musselburgh, whose opinions we strenuously controverted in 1809, because we did not think them supported by the evidence then brought forward, or consistent with our knowledge of vaccination at that time; and to which we now, in 1818, confess ourselves partly converts, in consequence of increased experience and observation."

The *Medical Observer*[3] for August, 1810, states that at Witford, Hertfordshire, the poor of the parish were vaccinated some time previously by Mr. Farrow, apothecary at Hadham, with matter procured from Dr. Walker of the London Cow-pox Institution. During the prevalence of the variolous epidemic, of the sixty-nine vaccinated, twenty-nine contracted small-pox, nine of

---

[1] Baron's "Life of Jenner," vol. ii., p. 47.

[2] *Edinburgh Medical and Surgical Journal*, vol. xiv., p. 387.

[3] *Medical Observer*, vol. viii., pp. 81, 82.

whom died. The editor gives the names and ages of those who died, as follows :—

Name.	Age.
William Barton	5 years.
Mary Catmore	13 years.
Ann Catmore	13 years.
Emma Prior	6 months.
Martha Wrenn	6 years.
William Catmore	3 years.
Charles Wybrow	6 months.
John Fitstead	1 year.
James Thoroughgood	2 years.

Thus these vaccinated cases of small-pox in the parish of Witford had a fatality of 31 per cent., and seven of the nine deaths (78 per cent.) were under ten years of age. This can hardly be regarded as a successful experience of the protective or mitigating powers of vaccination ; and to make matters worse, two of the children originally vaccinated were reported to have died from the effects of the operation.

The *Edinburgh Medical and Surgical Journal* for July, 1810, refers to the Third Report of the Nottingham Vaccine Institution, in which it is stated, that "during the virulence of the epidemic, one of the subjects whose case was marked in the register as perfect or satisfactory, fell a victim to the small-pox."[1] The boy was operated on in September, 1806, the vaccination being dismissed as satisfactory. On the 31st of January, 1809, he contracted small-pox, and died on the eighth day.

About this time several failures took place in high life, and consequently attracted much attention. The case of the Hon. Robert Grosvenor[2] was an instance in

[1] *Edinburgh Medical and Surgical Journal*, vol. vi., p. 385.

[2] See Baron's "Life of Jenner," vol. ii., pp. 155-158.

point; he took confluent small-pox and nearly died, ten years after vaccination by Jenner's own hands. This was very awkward, especially as the case got noised abroad; but the National Vaccine Establishment were quite equal to the occasion, and issued a special report on this and other cases, from which it appeared that the boy would have died outright had he not been vaccinated.

The Grosvenor case evidently made some impression, for we find Jenner admitting, in a letter to a correspondent, that it was "a speck, a mere microscopic speck on the page which contains the history of the vaccine discovery,"[1] and in a letter to Baron, about this time, we find the following:—"The noise and confusion this case has created is not to be described. The vaccine lancet is sheathed; and the long concealed variolous blade ordered to come out. Charming! This will soon cure the mania. The town is a fool, an idiot; and will continue in this red-hot, hissing-hot state about this affair, till something else starts up to draw aside its attention. I am determined to lock up my brains, and think no more *pro bono publico*, and I advise you, my friend, to do the same; for we are sure to get nothing but abuse for it. It is my intention to collect all the cases I can of small-pox, after supposed security from that disease. . . . The best plan will be to push out some of them as soon as possible. This would not be necessary on account of the present case, but it will prove the best shield to protect us from the past, and those which are to come."[2]

Here we have a new doctrine which was brought forward by Jenner to repel failures, *viz.*, that cases of

[1] Baron's "Life of Jenner," vol. ii., p. 158. [2] *Ibid.*, p. 161.

small-pox after small-pox were not uncommon, and that vaccination could not be expected to do more than small-pox itself. In a letter to Mr. James Moore,[1] we find the extraordinary statement that "thousands (of such cases) might be collected, for every parish in the kingdom can give its case." It is important to note that this admission—that small-pox takes place after small-pox — although undoubtedly true, was only brought forward when the failures of cow-pox to protect had become so numerous and notorious that it was impossible to invent further excuses.

Another case was that of the son of Sir Henry Martin. The medical man, Mr. Arthur Tegart, who vaccinated and also attended the boy, gives a description of the case in the *Medical and Physical Journal*[2] for September, 1811. With regard to the vaccination, Mr. Tegart says, "A strong and marked eschar now remains on the arm vaccinated, and Sir Henry Martin tells me, that an eminent professional gentleman saw the child during its progress through the disorder, and considered it as a very fine specimen of the complaint." The disease attacked him ten years after vaccination; at first the eruption conveyed to Mr. Tegart the idea of an aggravated kind of chicken-pox, but afterwards he says, "I began (reluctantly enough, I admit,) to consider the disease as the small-pox." There were upwards of a hundred pustules on the face, and about twice that number on the extremities. Dr. Heberden, who was called into consultation, hesitated but little in pronouncing the disease to be small-pox; but Mr. James

---

[1] Baron's "Life of Jenner," vol. ii., p. 363.

[2] *Medical and Physical Journal*, vol. xxvi., pp. 177-181.

Moore, director of the National Vaccine Establishment, entertained "some doubts" on the subject.

In February, 1812, opposition apparently ran rather high, for we read that Jenner "was particularly annoyed by the atrocious falsehoods of the anti-vaccinists;"[1] and some friends were inclined to urge him to seek redress in a court of law. Again, later in the year, in a letter to James Moore, we read that "the *anti-vacks* are assailing me, I see, with all the force they can muster in the newspapers. The *Morning Chronicle* now admits long letters."[2]

The *Medical and Physical Journal* for August, 1812 (vol. xxviii., pp. 111-114), gives extracts from the minutes of the Vaccine-Pock Institution regarding cases in one family who were vaccinated at the Institution, and visited by Drs. Domeir and Pearson. (See opposite page.)

Dr. Pearson remarks (p. 114), "It does not appear that the children had the subsequent small-pox mitigated in any proportion to the degree of affection by vaccination." Apparently Dr. Pearson did not have a high opinion of vaccination at this time, for Jenner, in a letter dated November 18, 1812, refers to his "insinuations that vaccination is good for nothing."[3]

In consequence of the revival of small-pox inoculation, Lord Borington, in 1813, at the instance of the National Vaccine Board, brought in a bill to check this practice. Lord Ellenborough, the Lord Chief Justice, after ridiculing some of the provisions of the bill, made some remarks on the subject of vaccination. "No doubt," he observed, "it was of some use, but he did not concur in all the praise bestowed upon it in this bill; but if the

---

[1] Baron's "Life of Jenner," vol. ii., p. 181. [2] *Ibid.*, p. 383. [3] *Ibid.*

Name.	Age.	Vaccination.	Nature of the small-pox.
Mary Ann Ancell -	12	Vaccinated on March 31st, 1801. Went through the vaccination in a regular manner with one fine large vesicle.	Small-pox eruption appeared on April 26th, 1812. Eruptions very numerous, but distinct. On May 12th "the scabs having fallen off, it now appears that she has one very distinct scar upon the left arm from vaccination."
Lucy Ancell - -	7	Vaccinated on September 3rd, 1805. Had six well characterised vesicles, viz. :—three on each arm. There were two subsequent distinct scabs.	Small-pox eruption appeared on April 29th, 1812. She had a larger number of pustules than her sister. The pocks, which were confluent on the face and arms, were of a vesicular or bladdery kind, and in several parts bags of lymph hung from them. The face was swollen and the eyes closed up for a day or two. On May 12th "three scars from vaccination are now perceivable upon the left arm and one on the right."
John Ancell - -	9	Vaccinated on January 24th, 1804. There were four distinct vesicles and the usual satisfactory scabs.	Developed small-pox on April 27th, 1812. Not more than thirty eruptions ; in other respects pretty well. On May 12th "three distinct scars on the left arm from vaccination are now seen."

An unvaccinated child in the same family, George Ancell, aged four years, contracted small-pox and died.

noble lord considered it a complete preventive of the small-pox, he differed with him in opinion. At the same time he had shewn his respect for the discovery, for he had had eight children vaccinated. He believed in its efficacy to a certain extent; it might prevent the disorder for eight or nine years, and was desirable in a large city like this, and where there was a large family of children."[1] Lord Ellenborough also remarked that vaccination was "perhaps, sometimes, apt to introduce disorders into the constitution."[2] The bill was withdrawn, but the remarks of the Lord Chief Justice, which tended to damn vaccination with faint praise, were annoying to Jenner, and it was also unfortunate that this was the opinion of one of the "wise and great," and consequently Jenner felt the matter somewhat acutely. "I have seldom," said Baron, "seen Jenner more disturbed than he was by this occurrence, and not certainly because he had any fears that the unsupported assertion of his lordship would prove correct, but because it unhappily accorded with popular prejudices, and when uttered by such a person, in such an assembly, was calculated to do unspeakable mischief."[3]

Mr. Thomas Hugo, of Crediton, in the *Journal*[4] for December, 1814, said that at Crediton the cases of failure became at length so numerous and decisive that they could not fail to excite alarm, and to engage the serious attention of medical practitioners. He instanced twenty-five cases of small-pox in persons who, from the

[1] Baron's "Life of Jenner," vol. ii., p. 196.

[2] Hansard's Parliamentary Debates, first series, vol. xxvi., p. 989. (June 30, 1813.)

[3] Baron's "Life of Jenner," vol. ii., p. 197.

[4] *Medical and Physical Journal*, vol. xxxii., pp. 478-481.

regular progress of the vaccine vesicles, were considered secure. He alluded only to those cases attended by medical practitioners, and where the evidence was considered in all respects conclusive. The fever, we are told, in its attack and progress was commonly violent; the heat was excessive, the pulse very quick, universal languor, pain in the head and loins, frequent vomiting, occasional delirium in the night, and sometimes convulsions. These symptoms, after having occasioned considerable alarm for three or four days, were succeeded by a distinct and mild eruption, which dissipated all apprehension of danger. Mr. Hugo adds (p. 480), "I believe that vaccination has nowhere been practised with more scrupulous attention to the characteristic appearance of the vesicle, and I have in no case which had been entrusted to my own care, neglected to ascertain the constitutional affection, by the test of a second vaccination. It is impossible, I conceive, therefore, to explain these unsuccessful cases on the supposition that the preceding vaccination had been spurious and irregular."

In the *London Medical Repository*[1] for April, 1816, a case of failure is given in a girl, nine years of age, who was vaccinated in Batavia, and, as far as could be judged from the cicatrices on the arms as well as from the account of her mother, in a manner quite satisfactory. The eruptive fever was exceedingly violent, and the eruption, though distinct, was very considerable.

In the *Medical and Physical Journal*[2] for January, 1817, Mr. Thomas Harrison, of Kendal, contributes some cases from the practice of Mr. M. Redhead, Ulverston (pp. 5-7).

---

[1] *London Medical Repository*, vol. v., pp. 295, 296.

[2] *Medical and Physical Journal*, vol. xxxvii., pp. 2-12.

No.	Name.	Age when vaccinated.	By whom.	Age when infected with small-pox.	Nature of the small-pox.
1	Robert Jones's two children - -	Infants	Mr. Redhead - -	10 and 8	Small horny pox, which continued out only five or six days; were not seen by a medical man. One child had considerable fever during four days previous to the eruption.
2	Elizabeth James -	Infant	Mr. Harrison - -	12	Very feverish. Pustules distinct. A well-marked case of small-pox.
3	Joseph James -	Infant	Mr. Redhead - -	15	Very feverish, and thought dangerously ill for a few days. Eruption not so full as with Elizabeth.
4	William James -	Infant	Mr. Carter - -	8	Had them (eruptions) milder than the two former. Continued out a few days.
5	William Parker -	4	Mr. Close, Dalton -	18	Delirious two days before the eruption appeared. Pustules numerous, and continued out seven or eight days.
6	Elizabeth Fell- -	3	Mr. Briggs - -	12	Considerable fever previous to the eruption, which was of the distinct kind.
7	Maria Stable - -	10	Mr. Carter - -	19	Feverish before the eruption, which was of a small horny kind, and soon disappeared.

8	Mary Stable - -	Infant	Mr. Edmondson, Keswick - -	14	Had slight eruption, and was soon well. Began about fourteen days after her sister Maria.
9	Charles Hodge -	Infant	Mr. Harrison - -	9	Fever, with slight delirium, succeeded by a great number of fine pustules.
10	John Briscoe - -	3	Mr. Redhead - -	16	A few small horny pox, which continued out about five days.
11	Thomas Briscoe -	Infant	Mr. Redhead - -	9	Small horny pox.
12	Mary A. Briscoe -	Infant	Mr. Redhead - -	6	Small horny pox. Began to be ill about a fortnight after her brother Thomas.
13	Betty Turner - -	Infant	Mr. Redhead - -	6	Feverish three days, with delirium. Face full of pustules, and many on her body; small horny kind, which disappeared in five or six days.
14	Alice Turner - -	Infant	Mr. Redhead - -	12	Feverish. Not so much indisposed as Betty; had fewer pustules, but larger.
15	Rob. Braithwaite's daughter - -	Infant	Mr. Carter - -	14	Very feverish. Had a full crop of small horny pox. Face swelled. Blind three days.
16	Mr. Rawlinson's son	—	Mr. Briggs - -	—	Much fever. Very full of pustules, and is much marked.
17	Ellen Physaclea -	Infant	Mr. Redhead - -	13	Very feverish. Had large distinct pox. Has marks on the face.

No.	Name.	Age when vaccinated.	By whom.	Age when infected with small-pox.	Nature of the small-pox.
18	Mary Long - -	4	Mr. Carter - -	10	Much fever, with delirium three days, succeeded by small horny pox. The pox disappeared on the fifth day, and left marks on the arms and legs.
19	William Baines -	Infant	Mr. Redhead - -	3	Had three days' illness, succeeded by horny pox, which encrusted in six days.
20	William Monkhouse	2	Mr. Carter - -	—	Not much indisposed. Pustules of the horny kind. Became infected four or five weeks after vaccination.
21	Betty Clark - -	Infant	Mr. Carter - -	7	Feverish three days, Eruption full, but distinct, and went through the regular stages of small-pox.
22	John Nicholson's daughter - -	—	Mr. Harrison's assistant - -	—	Slight degree of fever. Small number of pox. Favourably indisposed.
23	Rob. Woodhouse's daughter - -	Infant	An old woman -	13	Very feverish several days. But few pustules, and speedy recovery.
24	William Tyson -	2	Mr. Briggs - -	9	At the height in seven days.
25	John Kirkby - -	Infant	Mr. Briggs - -	11	Indisposed two or three days. Horny eruption, disappeared in a few days.

26	Wm. and Benjamin Kirkby - - -	5 and 3	Mr. T. Carter - -	—	The eruption on William was larger, and continued longer than the rest. These two children were infected four weeks after vaccination. Pustules of the horny kind.
27	Joseph Kirkby -	Infant	Mr. Redhead - -	5	Got easily through the complaint.
28	Sarah Bond - -	Infant	At Liverpool - -	12	Much fever, with delirium. Had many pustules of the horny kind, which soon disappeared.
29	Jane Ellis - -	Infant	Mr. Lodge, Ingleton	11	Had a remarkably full crop; in fact, was one complete cake of incrustation. Recovered pretty well, but is much marked. Was about a month confined.
30	Betsy Walters -	Infant	Mr. Harrison - -	14	Had a small crop of distinct pustules.
31	Isabella Dixon	Infant	Mr. Harrison - -	10	Had a full crop. Is marked, but recovered well.
32	Margaret Dixon -	Infant	Mr. Redhead - -	12	Not very full. Pustules perfectly distinct. Recovered well.
33	Betty Garnet - -	Infant	Mr. Carter - -	14	Distinct pustules. Was at the height in eight days, and recovered well
34	Christ. Troughaire's four children -	—	Mrs. Dixon - - Mr. Carter - - Mr. Briggs - -	—	Had them (eruptions) favourably of the distinct kind. One had a full crop.

Although there are no deaths in this list, the cases are by no means all of the mild variety, and in five of the number the patients were pitted. Again, they do not support the theory that the severity is in proportion to the length of time elapsed since vaccination. Let us compare cases in the same family which would probably be under much the same conditions.

William James (No. 4), who had been vaccinated about eight years, had a milder attack than the other two James's (Nos. 2 and 3), vaccinated twelve and fifteen years. In the case of Maria Stable, however, vaccinated only nine years before attack, the small-pox was certainly not milder than that of her sister Mary, vaccinated fourteen years before attack (Nos. 7 and 8). Then, in the three children, John, Thomas, and Mary Briscoe (Nos. 10, 11, and 12): in John, who had been vaccinated thirteen years, the disease was as mild, if not milder than in the other two, vaccinated nine and six years. Also, Betty Turner (No. 13), six years after vaccination, took small-pox more severely than her sister (No. 14), vaccinated twelve years previously. In the four Kirkbys (Nos. 25, 26, and 27): although Joseph and John had been vaccinated five and eleven years, the eruptions were larger and continued longer in William, who was infected four weeks after vaccination. Lastly, there were the two Dixons (Nos. 31 and 32). Isabella, ten years after vaccination, had a full crop of pustules, and was marked; whereas, in the case of Margaret, vaccinated twelve years prior to attack, the disease was not so severe.

Taking all these cases in conjunction, they afford no support to the theory that the disease is modified in

proportion to the proximity of the vaccination; nor does the incidence of small-pox seem to be regulated in this manner, for the National Vaccine Board says:—"It appears to us to be fairly established, that the disposition in the vaccinated to be thus affected by the contagion of small-pox, does not depend on the time that has elapsed after vaccination; since some persons have been so affected who had recently been vaccinated; whilst others, who had been vaccinated eighteen and twenty years have been inoculated, and fairly exposed to the same contagion with impunity."[1] This evidence is, I venture to suggest, more valuable than present-day experience, for these theories of prevention and mitigation had not then obtained the same hold on the medical mind.

Mr. Redhead also gives several instances of small-pox being taken by means of inoculation after vaccination. One of these, James Shepherd, was vaccinated at fifteen months of age by Mr. T. Carter, and when a year and a half old, *i.e.*, three months after vaccination, was inoculated with matter from Elizabeth James, above-mentioned. Mr. Redhead notes that the patient was very feverish, the arm much inflamed, but the pustules not very large.

Mr. Harrison, in referring to Mr. Redhead's cases, says (p. 10):—"We cannot but feel our confidence in the preventive power of the cow-pox to be somewhat shaken." He also relates three instances in one family; these excited considerable interest among medical men, from one of them having been vaccinated at a public institution in London by Jenner himself, who, after having inspected the vaccination, pronounced the child secure from small-pox.

[1] Report of the National Vaccine Establishment for 1819.

There is every reason to believe that about this time vaccination was rapidly falling into disrepute. Thus, Jenner's old friend, Gardner, writing to him from Frampton, on May 21, 1817, says:—"From some unaccountable causes, the fame of vaccination seems to decline in this part of the country: I find my offers of gratuitous service very frequently rejected even by those whose former children have undergone the operation."[1]

In the *London Medical Repository* for July, 1817, the editors, Dr. G. M. Burrows and Mr. A. T. Thomson, in their observations on prevailing diseases, say: "*Variola*, above all, continues and spreads a devastating contagion. However painful, yet it is a duty we owe to the public and the profession to apprise them, that the number of all ranks suffering under *small-pox* who have previously undergone *vaccination*, by the most skilful practitioners, is at present alarmingly great. This subject is so serious, and so deeply involves the dearest interests of humanity, as well as those of the medical character, that we shall not fail in directing our utmost attention to it."[2]

In the August number the editors remark: "Generally, the diseases of last month partake of that nature usual to the season; hence there is nothing but *variola* particularly demanding notice. *Small-pox*, however, still forces itself upon our observation. It has, we believe, been more prevalent than for many years past, and has assumed a more than usually virulent character; many of the cases having been of the confluent kind. This may in some degree account for so many, who

[1] Baron's "Life of Jenner," vol. ii., p. 203.

[2] *London Medical Repository*, vol. viii., p. 95.

had previously undergone vaccination, being infected by small-pox, as we remarked in our last report; and we are concerned to find, from the increasing testimonies of medical practitioners, that these instances have been much and widley extended. So little modified has the disease in some cases appeared to have been by the influence of the vaccine inoculations, that death has ensued; an effect which, as far as our information goes, was never before produced by small-pox, after the patient had been subject to the action of the vaccine virus."[1]

Baron informs us that in 1818 "there was great clamour about the prevalence of small-pox after vaccination," and that "the greatly exaggerated statements on the subject of the vaccine failures, and the hesitating manner in which respectable individuals spoke on the subject, threatened to lead to a considerable abandonment of the practice."[2]

About this time we even find failures recorded by the National Vaccine Establishment, coupled with ingenious but far-fetched explanations. Thus, in the report of 1818, we read:—"Five cases have been reported to the Board, of vaccinated persons who have subsequently died of small-pox. In one of these cases, it was clearly ascertained, that the only vaccine vesicle which had been excited, was disturbed and broken in its progress, which there is great reason for believing has been a frequent cause of the insecurity of vaccination; in the other cases, no detail respecting the vaccination could be obtained, and they were, moreover,

[1] *London Medical Repository*, vol. viii., p. 183.

[2] Baron's "Life of Jenner," vol. ii., pp. 237, 238.

all vaccinated at a period of time when the mode of vaccination, and the management of the vesicle, were not well understood."

In the report of 1819 it is stated :—"The testimonies of some of our correspondents in this country, are by no means so favourable. They concur in showing, that great numbers of persons who had been vaccinated, have been subsequently seized with a disease presenting all the essential characters of small-pox; but that in the great majority of such cases, the disease has been of comparatively short duration, unattended by symptoms of danger. In several of these cases, however, the malady has been prolonged to its ordinary period; and in eight reported cases it has proved fatal."

In the *London Medical Repository*[1] for August, 1819, Mr. William Gaitskell, surgeon of Rotherhithe, was "truly sorry to report two cases of malignant small-pox subsequent to vaccination." The first, a stout young man, eighteen years of age, contracted small-pox two years after vaccination, and died on the twelfth day, a mass of putrefaction. The second, about twenty-two years old, took small-pox of a very malignant description, twelve years after vaccination, but recovered. Both patients were supposed to have gone through a regular vaccination; they were pronounced safe (according to their own statement), and presented distinct impressions of the disease on their arms.

In the *Medical and Physical Journal*[2] for July, 1820, Dr. Macleod, physician to the Westminster General Dispensary, contributed a communication, entitled,

---

[1] *London Medical Repository*, vol. xii., pp. 113, 114.

[2] *Medical and Physical Journal*, vol. xliv., pp. 1-12.

"Remarks on the Small-pox, as it has occurred in London subsequent to Vaccination." He gives the following cases (pp. 10-12) illustrating some of the appearances assumed by small-pox after vaccination. (See next page.)

Dr. Macleod says (p. 6):—"I have seen too many instances of small-pox in children vaccinated in London, where that process was carried on in the way which the National Vaccine Establishment has recommended as the most efficacious, to retain much faith in its preventive powers, in whatever manner conducted." Again he remarks (pp. 8, 9):—"The history of vaccination altogether forms a severe satire upon the mutability of medical doctrines. In the first ardour of discovery, not contented with its blessings to mankind, its benefits were also extended to the brute creation. It was to annihilate small-pox, prove an antidote to the plague, to cure the rot in sheep, and preserve dogs from the mange. These good-natured speculations, however, were soon abandoned; and more recently all had agreed in acknowledging its anti-variolous powers, which, we were told, were as well established as anything human could be.

"But the present epidemic shows too clearly the mortifying fallibility of medical opinions, though founded on the experience of twenty years, and guaranteed by the concurring testimony of all the first physicians and surgeons in the world."

In 1820 we have also further official admission of vaccine failures. "It is true, indeed, my Lord, that we have received accounts from different parts of the country, of numerous cases of small-pox having

Name.	Age when infected.	Vaccination.	Nature of the small-pox.
Thomas Lucas -	5	Vaccinated when six months of age.	Smart fever, followed by copious pustular eruption on face, neck, chest, and limbs.
Selina Dove	9	Vaccinated when seven years of age, at the Jennerian Institution in Holborn.	Attacked with fever, headache, and delirium. Copious pustular eruption on face, chest, and extremities. Eruption particularly crowded on the face.
Henry Oldfield -	7	Vaccinated at the Small-pox Hospital when a few months old, had a perfect cicatrix on the arm.	Considerable fever, and pustular eruptions on the face, chest, and back.
Lucy Stillwell -	22	Vaccinated 14 years previous to attack, and had a perfect cicatrix on the arm.	Small-pox ushered in with considerable fever, but the number of pocks was inconsiderable.
William Pyrhe -	8	Vaccinated at the Small-pox Hospital when a few months old, and had a perfect cicatrix on the arm.	Violent fever, headache, and delirium, accompanied by extreme restlessness and fits of screaming. A copious pustular eruption appeared on different parts of the body. On the face the eruptions were confluent round the mouth and under the eyes, and coherent in other parts. Many of the pocks on the forearms were surrounded with a narrow purple areola, giving the appearance of pustules arising from the centre of petechiæ. Several of the pocks were filled with a purple fluid.
Robert Page -	21 months	Vaccinated, and supposed to have had the disease in a satisfactory manner.	The disease ushered in with fever, and followed in several days by a rash resembling measles. The child continued restless and feverish, and vesicular eruptions, with central depressions, appeared on the back. The vesicles were first of a pearly appearance, and afterwards became more opaque. The constitutional symptoms did not abate, and occasional convulsions supervened; these became more severe, and the child died about the tenth day of the illness.
— Page - -	3	Vaccinated, and supposed to have had the disease in a satisfactory manner.	Was affected in a similar manner to his brother, but disease milder.

occurred after vaccination; and we cannot doubt that the prejudices of the people against this preventive expedient are assignable (and not altogether unreasonably perhaps) to this cause. These cases the Board has been industriously employed in investigating; and though it appears that many of them rest only on hearsay evidence, and that others seem to have undergone the vaccine process imperfectly, some years since, when it was less well understood, and practised less skilfully than it ought to be, yet, after every reasonable deduction, we are compelled to allow that too many still remain on undeniable proof, to leave any doubt that the pretensions of vaccination to the merit of a perfect and exclusive security in all cases against small-pox, were admitted at first rather too unreservedly."[1]

It was the small-pox epidemic of 1817-19 which, however, demonstrated the failure of vaccination on a large scale, for a majority of the cases were admittedly "protected." Dr. John Thomson writes:—"It is to the severity of this epidemic, I am convinced, that we ought to attribute the greatness of the number of the vaccinated who have been attacked by it, and not to any deterioration in the qualities of the cow-pock virus, or to any defects in the manner in which it has been employed. Had a variolous constitution of the atmosphere, similar to that which we have lately experienced, existed at the time Dr. Jenner brought forward his discovery, it may be doubted whether it ever could have obtained the confidence of the public."[2]

---

[1] Report of the National Vaccine Establishment for 1820.

[2] "Historical Sketch of Small-pox," p. 394. John Thomson, M.D., F.R.S.E. London, 1822.

Dr. Thomson's publications on the subject called forth an article in the *Edinburgh Review*, which opens thus:—"Vaccination, we are perfectly persuaded, is a very great blessing to mankind; but not quite so great a blessing, nor so complete a protection, as its early defenders conceived it to be. The proof of this has been admitted with great reluctance; but it has unfortunately become too strong for denial or resistance. The first answers given to the instances of failure, with which the friends of vaccination were pressed, were, either that the disease which had occurred after vaccination was chicken-pox, and not small-pox; or that the process of vaccination had been unskilfully or imperfectly conducted; or that it was one of those very rare cases which occurred in the times of inoculation, and from which vaccination itself did not pretend to be wholly exempt."[1]

This does not appear to be strongly condemnatory of vaccination, but apparently Jenner was much disconcerted. "I have an attack," he says, "from a quarter I did not expect, the *Edinburgh Review*. These people understand literature better than physic; but it will do incalculable mischief. I put it down at 100,000 deaths at least. Never was I involved in so many perplexities."[2] About two weeks after writing this, the unhappy man died in the midst of his difficulties.

Dr. William Maxwell, in a paper read before the Dumfries Medical Society, remarked that "it must be allowed, that the world has been grievously disappointed,

---

[1] *Edinburgh Review*, vol. xxxvii., pp. 325, 326. (November, 1822.)

[2] Letter from Jenner to Gardner, dated January 13, 1823. Baron's "Life of Jenner," vol. ii., p. 433.

in the hope that this discovery (vaccination) would be perfect security against variolous disease."[1]

In a communication from the Admiralty, which was printed with the Report of the National Vaccine Establishment for the year 1825 (pp. 10-13), is a report by Dr. W. Burnett, one of the Medical Commissioners of the Victualling Board, relating to an outbreak of small-pox on His Majesty's ship "Phaeton" in her passage to America. Amongst other cases is one of a patient, J. Munns, aged twenty-seven, who was vaccinated on June 24, 1825, attacked with small-pox on July 8, *i.e.*, fourteen days after vaccination, and who nearly died of the disease.

Two others, J. Sutton and T. Avenall, aged twelve and thirteen respectively, who were vaccinated in May, 1825, presented perfect cicatrices, and contracted small-pox on the 7th of July, *i.e.*, about two months after vaccination; but they "completed the stages in a very mild manner."

In the case of John Reid, A.B., aged nineteen, vaccinated on the 24th of June, who was attacked with small-pox on the 4th of July, and who died on the 30th of the same month, it may be objected that the patient was vaccinated during the incubation of small-pox; but no possible objection can be raised to the three instances previously mentioned.

The *Sunday Times* of February 12, 1826, furnishes an account of a meeting of the Governors of the London Small-pox Hospital, with the Duke of York in the chair. The number of admissions in 1825, and the particulars of

---

[1] *Edinburgh Medical and Surgical Journal*, vol. xxii., p. 9. (April, 1824.)

each case, were read. The account stated that in the last year twelve persons had died of small-pox whose deaths were *presumed* to be subsequent to vaccination. The Duke of York here interposed, and observed that the fact of the cases having previously been vaccinated was distinctly stated in copy of the report sent to him; and the Home Secretary, Mr. Peel, who was also present, said that, after reading his copy of the report, he became uneasy about his own children, all of whom had been vaccinated.

Dr. Gregory, the physician to the hospital, stated that the copies alluded to by his Royal Highness had been sent before they had been finally settled by him. He wished to add notes, but finding that the copies had been made, and that the words could not be introduced without the making of fresh copies, he did not think the omission of any great consequence, and therefore he let them go as they were. He regretted he had not inscribed the word "*presumed*," but one reason was that it was not a term generally used by the profession.

It is fairly evident what Dr. Gregory thought of the cases. They were, however, the subject of inquiry by the National Vaccine Establishment,[1] and, as we might have expected, the result was so satisfactory "as to leave no cause to doubt that these individuals had not been properly vaccinated."

From this time onwards medical criticism became less acute, but neither then nor at any other time has it subsided, and there was a strong undercurrent of scepticism amongst able and trustworthy observers at

---

[1] Baron's "Life of Jenner," vol. i., pp. 273, 274.

the period with which we are engaged. Thus, in a letter from Mr. Edward Greenhow, of North Shields, to the *London Medical Gazette* of February 2, 1833, vol. xi., p. 590, we read :—"And not only is the small-pox after vaccination becoming much more frequent, but it is becoming also much more virulent. It is true, in the greater number of cases, the disease is modified, often turning on the fifth and sixth day ; but cases are by no means rare where the disease is confluent, and runs its full course, unmitigated by the previous vaccination, and death occasionally ensues.

"From what I have above stated, it would appear that vaccination is losing its protective influence ; and it becomes a matter of serious consideration to ascertain to what causes we are to attribute this failure. Is it that its protective power wears out after a certain number of years, and that it becomes necessary to repeat the operation? Or is it that the vaccine virus loses wholly, or in part, its virtues, by passing so repeatedly through the human system? The latter is the opinion that has forced itself upon my conviction, because the disease has principally attacked young persons, and such as have been vaccinated within the last ten or twelve years, and by far the largest portion have been done much within that period, so that the numbers attacked are in the inverse ratio to the number of years which have elapsed since they were vaccinated." I may observe that the age-incidence of this disease did not begin to alter very much until after the epidemic of 1837-38, which would account for the large proportion of young persons attacked at an earlier date. The same fact was noticed by one of Dr.

John Thomson's correspondents, Mr. William Gibson,[1] in his experience at New Lanark, where, of 251 vaccinated cases of small-pox, 191, or 76·1 per cent., took the disease at intervals up to ten years after vaccination. In 1837 the reviewer in the *British Annals of Medicine*, in criticising certain statements about vaccination, pertinently inquired, "Will it not be better to collect facts patiently, and to remain a little longer in suspense, than assume a dogmatical tone, or assert a blind belief, and thus silence inquiry?"[2]

Sir Henry Holland, in his "Medical Notes and Reflections,"[3] writes (p. 401)—"Not only in Great Britain, but throughout every part of the globe from which we have records, we find that small-pox has been gradually increasing again in frequency as an epidemic; affecting a larger proportion of the vaccinated; and inflicting greater mortality in its results." Again he says (p. 414)—"It is no longer expedient, in any sense, to argue for the present practice of vaccination as a certain or permanent preventive of small-pox. The truth must be told, as it is, that the earlier anticipations on this point have not been realised."

Dr. George Gregory was also known to be somewhat sceptical as to the merits of vaccination, and this fact comes out clearly in his writings. In 1823 he wrote,

---

[1] Letter from Mr. William Gibson to Dr. John Thomson, dated January 11, 1819. "An account of the varioloid epidemic which has lately prevailed in Edinburgh, and other parts of Scotland," pp. 251-258. John Thomson, M.D., F.R.S.E. London, 1820.

[2] "British Annals of Medicine, Pharmacy, Vital Statistics, and General Science," vol. i., p. 235. (February 24, 1837).

[3] "Medical Notes and Reflections." Henry Holland, M.D., F.R.S. London, 1839.

"The acknowledged frequency of cases of small-pox subsequent to vaccination, in all parts of the country, is such as to have excited, in no inconsiderable degree, the fears of many, and the anxieties of all. No one can look back upon the history of the last few years without feeling sensible that these unpleasant occurrences are on the increase."[1] In 1837 he says, "Many of the physicians and surgeons who flourished at the commencement of this century, and to whose generous efforts in behalf of vaccination the world is deeply indebted, are passed from this scene. A few still survive, who, when they call to mind the strong hopes which were held out, in their day, of the ultimate extermination of small-pox, will probably be surprised to find that, after the lapse of thirty-six years, small-pox still prevails; that the same necessity exists now as formerly for studying its various aspects; and that the benevolent anticipations of 1800 receive no countenance from the facts of 1836. It is impossible to deny, and useless to conceal, that these bright prospects were originally built upon very slender foundations. The wish was father to the thought."[2]

In 1840 Dr. Gregory writes:—"It is often noticed that persons (vaccinated persons, for instance) who resist small-pox in common years, though fully exposed to the contagion, are attacked by it in years of epidemic prevalence. These and other facts, which bear on the epidemic origin and diffusion of small-pox, were overlooked by those sanguine pathologists, who

---

[1] "Medico-Chirurgical Transactions," vol. xii., p. 324. 1823.

[2] "British Annals of Medicine, Pharmacy, Vital Statistics, and General Science," vol. i., p. 193. (February 17, 1837.)

imagined that in vaccination nature had provided us with means adequate for the complete extermination of small-pox from the earth."[1]

Increased experience does not appear to have modified Dr. Gregory's views, for twelve years later we find him writing, "When we look around us,—when we observe the quantity of small-pox, now (at the close of the first half century from the promulgation of vaccination) diffused through this and other countries, —when we see the practice of revaccination almost universal on the continent of Europe, and greatly increasing in this country, we are led irresistibly to the conclusion, that these broadly-urged claims in favour of vaccination have not been substantiated. Small-pox does invade the vaccinated, and the extirpation of that direful disorder is an event as distant now as when it was first heedlessly (and, in my humble judgment, most presumptuously) anticipated by Jenner."[2]

In the Report of the Vaccination Section of the Provincial Medical and Surgical Association, it is stated, "It will be observed in subsequent parts of our Report, that failures are noticed at all periods, from a few weeks after vaccination up to thirty or more years. It has been supposed that they are most common at and after the age of puberty; but this is certainly not the opinion of our correspondents in general. Some, it must be admitted, do affirm that small-pox has more frequently occurred in persons

---

[1] Article by Dr. Gregory on "Small-pox" in Tweedie's "Library of Medicine," vol. i., p. 310. London, 1840.

[2] *Medical Times and Gazette.* New series, vol. iv., p. 633. (June 26, 1852.)

recently vaccinated, than in those at a remote period, while others assert that time makes no difference."[1]

Even the *Lancet*, which has generally been known as a thorough-going advocate of vaccination, reluctantly writes:—"In the public mind extensively, and, to a more limited extent, in the profession itself, doubts are known to exist as to the efficacy and eligibility of the practice of vaccination. The failures of the operation have been numerous and discouraging. It has failed frequently by producing no effect at all; it has failed by producing a vesicle by no means clearly indicative of the existence of the vaccine disease; and it has failed in protecting persons so vaccinated from a future attack of small-pox."[2]

Thus, in the early epidemics, the cases of small-pox after vaccination were numerous; but, in estimating the number, we must take account of some of the cases which have been ascribed to chicken-pox. Sir Thomas Watson, writing in 1848, said, "These mild and irregular forms of variola, both parents and medical men, wishing, I suppose, to believe nothing in disparagement of the protecting power of vaccination, are very apt to consider, and to call chicken-pox."[3] In the early days, however, it was by no means only the mild cases that were thus designated.

In a report on the cow-pox inoculation from the practice at the Vaccine-pock Institution, during the

---

[1] "Transactions of the Provincial Medical and Surgical Association," vol. viii., pp. 35, 36. (1840.)

[2] The *Lancet*, May 21, 1853. (Vol. i., p. 476.)

[3] "Lectures on the Principles and Practice of Physic," vol. ii., p. 805. Third edition. 1848.

years 1800-02, we read (pp. 19, 20):—"It may be also useful to notice that we have been alarmed two or three times with the intelligence of the small-pox occurring several weeks or months after our patients had undergone the cow-pock. We thought it our duty to visit and examine these patients, and also to inquire into their history among their attendants, and by these means we obtained the completest satisfaction that the pretended small-pox was generally the chicken-pox." They gave the following instance as an illustration in which the eruptions were, by their resemblance, mistaken for small-pox by the friends of the patient, and even by a medical practitioner, "who accordingly gave a representation of the case by no means advantageous to the Institution." The child was vaccinated on April 1, 1800; a genuine vaccine scab was formed, which fell off and left a cicatrix. Four months afterwards the child was attacked with fever, followed by an eruption, which when seen at the Institution, presented over one hundred eruptions of blackish scabs and red spots, "apparently the chicken-pox, in the scabbing state." Small pits were observed some months afterwards.

Dr. John Walker,[1] the resident vaccinator of the Royal Jennerian Society, related that a father called on him and informed him that, of two children he had vaccinated the previous spring, one was now covered with small-pox, and the other sickening, and that he (the father) was advised to advertise it. On consulting the register, Dr. Walker found both the cases marked perfect, and he told the father that it was impossible for

---

[1] *Medical and Physical Journal*, vol. xii., p. 543. (December, 1804.)

either of the children to be infected with small-pox ; he then called on the vice-president, Mr. John Ring, and challenged him to come and detect his (Dr. Walker's) failure. "He had the goodness to accompany me, and on our seeing the child, he immediately declared it chicken-pox."

Dr. William Farquharson, Mr. James Bryce, and Mr. A. Gillespie, of Edinburgh, in a joint letter to Dr. Walker,[1] remark on many children who had passed regularly through the process of vaccination, but on whom eruptions appeared at different periods afterwards, which by some ignorant people were supposed to be variolous; but which, upon investigation, uniformly turned out to be chicken-pox. In some of these cases the eruptive fever was very severe, sometimes even attended with convulsions; and the consequent eruptions very numerous, and in a few cases the last of the pustules did not disappear until the fifth or sixth day. "These cases," they add, "were repeatedly visited by many medical practitioners of this place, as well as by ourselves, and none of them entertained any doubt of the disease being chicken-pox."

A case is recorded in the *Medical and Chirurgical Review*.[2] A child was operated on by Mr. Ring in May, 1804, who expressed himself as perfectly satisfied with the progress of the vaccination, saying that "he would forfeit a hundred guineas if the child ever took the small-pox afterwards." A distinct scar was left on each arm as the result of the operation. In October or

---

[1] *Medical and Physical Journal*, vol. xiii., pp. 286, 287. (March, 1805.,

[2] *Medical and Chirurgical Review*, vol. xi., pp. cvi.-cviii. (March) 1805.)

November of the same year it was taken ill, and the pustules were pretty numerous, particularly on the scalp, two of them leaving pits; the patient was seen repeatedly during the progress of the eruption by Mr. Ellis, apothecary, of Drury Lane, who asserted it to be small-pox. The child was next taken to Mr. Soley, apothecary, in Bloomsbury Square, about the ninth day. He declared immediately, and without hesitation, that it was undoubtedly small-pox, and he chided the mother for not having taken means to prevent it by vaccination. She replied that she had done all in her power by having the child vaccinated by Mr. Ring. "Then," said Mr. Soley, "it cannot be small-pox, for small-pox never occurs after cow-pock. It must be a rank kind of chicken-pox;" and he sent her to Mr. Ring. On calling at Mr. Ring's house, she first saw his assistant, who declared it to be small-pox, and upbraided the mother for not having had the child vaccinated. When Mr. Ring was informed of this unusual circumstance, and on seeing the child, he remarked that it could not be small-pox, for this disease was never attended by itching, nor did it appear in clusters, as in this case. He told the mother she might rest satisfied that it was not small-pox, and he begged her to say nothing about it, as it might excite alarm. In a foot-note on p. cvii., the editors remark on the above case:—"This attempt to conceal everything that appears unfavourable, so frequently resorted to by certain pretended friends of vaccination, cannot be too much reprobated. It shows the business to have got into very bad hands. Were truth their only object, they would court investigation, not endeavour to suppress it."

Mr. John Ring, in the *Medical and Physical Journal*,[1] gave a description and drawing of a case of confluent chicken-pox in a boy four years of age, who had been vaccinated some time before. He added: "When the chicken-pox broke out in so formidable a manner, it was mistaken for the small-pox."

In the *Medical and Physical Journal*[2] for November, 1805, Mr. R. Hall, of Clement's Inn, related instances in the family of a Mr. Ross. An eruption appeared on two of his children, one of whom had been vaccinated about a year before. In both cases, the eruption was extremely copious, but the pustules were much larger and more confluent in the one which had not been vaccinated. Mr. Hall says: "In both, the pustules so exactly resembled—in form, figure, and other circumstances—those of small-pox, that, had we founded our opinion on the external character alone, we should most unquestionably have deemed them both cases of genuine small-pox; but, as they neither went through the regular course, nor were attended with any of those symptoms which uniformly accompany violent cases of small-pox, ... we did not hesitate to consider them as cases of confluent varicella."

In the twentieth volume of the *Medical and Physical Journal*, on pp. 257, 258 (September, 1808), Mr. Thomas Hardy relates the case of a patient who, four years after he had vaccinated her, was much indisposed, and had a considerable eruption, which he supposed to be the chicken-pox, until the fourth day of the eruption,

---

[1] *Medical and Physical Journal*, vol. xiv., pp. 141, 142. (August, 1805.)

[2] *Ibid.*, pp. 410-412.

when the phenomena, both local and general, induced him "reluctantly" to alter his opinion.

Dr. Richard Pew, of Sherborne,[1] also saw a post-vaccinal case, in which the pustules "bore so *general* a *resemblance* to real small-pox, that anyone acquainted with the subject must immediately acknowledge them to be a *branch of the same family*."

In 1818 there was published the *Substance of a Correspondence between the Directors of the Cow-pock Institution, Sackville Street, Dublin, and their subscribers or other medical practitioners; and also with the Irish Medical Staff and Militia Surgeons, being replies to certain queries circulated by the Directors, occasioned by alleged failures in vaccination.* A number of the replies testified to the occurrence of chicken-pox after vaccination.

Mr. Heron, of Lucan, remarked "that in the summer and autumn of 1810 a very bad kind of pustular eruption made its appearance among the children about Banagher and its neighbourhood, which many of the practitioners in these places took for small-pox, and inoculated with matter from it as such. From observations, however, then made, it appeared to Mr. Heron to be nothing more than a malignant chicken-pock, of which some died."[2]

Dr. Little, of Ballina, stated that, "about three years ago, the regiment to which he belonged, being quartered in Tuam, a very severe form of confluent varicella prevailed epidemically, and he was repeatedly called

---

[1] *Medical and Physical Journal*, vol. xxi., p. 250. (March, 1809.)

[2] "Historical Sketch of Small-pox," p. 252. John Thomson, M.D., F.R.S.E. London, 1822.

upon to see children as well of the townspeople as the soldiers, whom he had vaccinated, and who were marked in his journal as having gone regularly through the disease; but in no instance could he hesitate as to the nature of the disease, which, though often of a mixed nature, was genuine, and of the conoidal form, as described by Dr. Bateman."[1]

Dr. P. Mudie, in a letter to Dr. Thomson, dated October 18, 1818, freely acknowledges a bias in his own mind with regard to the prevalence of small-pox after vaccination. "Of late years," he says, "I have remarked, that the disease called chicken-pox has been much more severe than it used formerly to be, and many of the cases, occurring after vaccination, so much resembled *small-pox*, that if my mind had not been prejudiced against the possibility of such an occurrence, I would have pronounced the eruption to have been of a variolous nature."[2]

Thus there were a large number of vaccine failures in the early years of the century; and, if we include some of the chicken-pox patients, there must have been thousands of such cases in the epidemic of 1817-19. Secondly, these failures took place at all periods after vaccination, even within a few weeks or months of the operation. Thirdly, post-vaccinal small-pox, according to these early records, did not seem to be an especially mild disease; and lastly, there did not appear to be any

---

[1] "Historical Sketch of Small-pox," pp. 252, 253. John Thomson, M.D., F.R.S.E. London, 1822.

[2] An account of the varioloid epidemic which has lately prevailed in Edinburgh and other parts of Scotland, p. 240. John Thomson, M.D., F.R.S.E. London, 1820.

relation between the severity of the disease and the length of time which had elapsed since the operation.

Vaccination was first made compulsory in 1853. It is difficult at this day to understand how the promoters of vaccination managed to get this Act on our Statute Books, except on the assumption that the overwhelming evidence of the early failures of vaccination had been overlooked or forgotten.

Mr. George Canning declared, in 1808, that although he considered the discovery (vaccination) to be of the very greatest importance, he could not figure any circumstances whatever that could induce him to follow up the most favourable report of its infallibility, which might be brought forward, with any measure of a compulsory nature.[1]

We have it on the authority of Mr. T. S. Duncombe, M.P. for Finsbury, that in 1840, Sir Robert Peel, being urged to make vaccination compulsory, expressed his opinion that such a course would be repugnant to the habits and feelings of the British people, and to that freedom of opinion and action to which they were well accustomed.[2] Mr. Duncombe quotes Sir Robert as saying that:—"The proposal to make it compulsory was so contrary to the spirit of the British people, and the independence in which they rightly gloried, that he would be no party to such compulsion."[3] Sir Robert Peel, however, died in 1850, and in 1853 a measure involving an enormous curtailment of the liberty of the

---

[1] Hansard's Parliamentary Debates. First series, vol. xi., p. 844. (June 9, 1808.)

[2] *Ibid.*, third series, vol. cxliii., p. 552. (July 10, 1856.)

[3] *Ibid.*, vol. clxiv., p. 674. (July 10, 1861.)

subject, without any demand for such legislation, and without previous inquiry, was passed through both Houses of Parliament with very little discussion.

Lord Lyttelton introduced the Bill into the House of Lords, and, on the motion to go into Committee, explained that, having no scientific knowledge of the subject himself, he was indebted for almost all his information to some able and learned members of the Epidemiological Society. "It was unnecessary," he informed the House, "to speak of the certainty of vaccination as a preventive of the small pox, that being a point on which the whole medical profession had arrived at complete unanimity."[1]

If we refer to the Return on "Small-pox and Vaccination,"[2] prepared by the Committee of the Epidemiological Society, and from which Lord Lyttelton obtained his information, we find certain extraordinary and wholly unwarrantable statements (p. 4). "Small-pox is a disease," say the authors, "to which every person is liable, who is not protected by a previous attack or by vaccination." Again: "Every case of it is a centre of contagion, and every unvaccinated or imperfectly vaccinated population is a nidus for the disease to settle in and propagate itself."

---

[1] Hansard's Parliamentary Debates. Third series, vol. cxxv., p. 1002. (April 12, 1853.)

[2] Copy of "Letter from Dr. *Edward Seaton* to Viscount *Palmerston*, with enclosed Copy of a Report on the State of Small-pox and Vaccination in *England* and *Wales* and other Countries, and on Compulsory Vaccination, with Tables and Appendices, presented to the President and Council of the Epidemiological Society by the Small-pox and Vaccination Committee, the 26th day of March, 1851." Parliamentary Paper, No. 434. Ordered, by the House of Commons, to be printed, 3rd May, 1853.

The two latter propositions, we are seriously informed, "do not admit of being controverted." We will suppose, for the sake of argument, that none of these propositions are capable of refutation. We then read: "If it admit of doubt, how far it is justifiable in this free country to compel a person to take care of his own life and that of his offspring, it can scarcely be disputed that no one has a right to put in jeopardy the lives of his fellow-subjects."

Here the question presents itself, if vaccination is a preventive of small-pox, as asserted by Lord Lyttelton, how could the unvaccinated put in jeopardy the lives of their protected fellow-subjects? Thus, there is no argument for compulsion, even if it be admitted that vaccination protects for life; if vaccination does not protect for life, and it is evident from the numerous cases I have quoted, that it does not do so, then the profession should show how long its protective value lasts. Of the various medical experts who have been examined before the recent Vaccination Commission it is important to remember that none have endorsed the opinion of Jenner, Sir John Simon, and others, that vaccinated persons are for ever afterwards secure from the infection of small-pox. Although some have maintained that vaccination protects for considerable intervals, one prominent official expert, Dr. William Gayton, thinks that "primary vaccination is a very fleeting protection indeed. As to the time that that primary protection lasts, I do not know, but I think it is a very short time" (Q. 1,755). Another authority, Dr. R. A. Birdwood, with an experience of 12,000 cases of small-pox, emphatically stated that vaccination cannot

be relied on as an absolute protection up to any age whatever (Q. 31,191). And lastly, there have been witnesses of the very highest professional standing and scientific attainments, who have maintained that vaccination exerts no specific protective influence at all. When the profession are agreed on this important point, then the vaccinated will be able to make themselves secure by periodical re-vaccinations, and their lives will not be placed in peril by anti-vaccinists.

It is interesting to note that the first compulsory Act of Parliament entirely failed to remove the honest doubts of some distinguished members of the medical profession. Thus Dr. James Copland expressed the opinion that vaccination "will never be generally adopted, and that, if it were so adopted, it could never altogether banish small-pox, nor prove a complete or lasting preventive of variolous infection."[1]

Again he writes (p. 829):—"At the time of my writing this, just half a century has elapsed since the discovery and introduction of vaccination; and after a quarter of a century of most transcendental laudation of the measure, with merely occasional whisperings of doubt, and, after another quarter of a century of reverberated encomiums from well-paid vaccination boards, raised with a view of overbearing the increasing murmurings of disbelief among those who observe and think for themselves, the middle of the nineteenth century finds the majority of the profession, in all latitudes and hemispheres, doubtful as to the preponderance of

---

[1] "A Dictionary of Practical Medicine," vol. iii., part ii., p. 831. James Copland, M.D., F.R.S. London, 1858.

advantages, present and prospective, to be obtained either from inoculation or from vaccination."

I now propose to show that the unvaccinated when exposed do not necessarily take small-pox, and also, that since the population has been more largely "protected," it is the vaccinated who form not only an overwhelming proportion of the sufferers, but in a large number of instances they are the means of propagating the disease.

Some very remarkable cases are recorded by Dr. William Baylies in his little book, entitled, "Facts and Observations Relative to Inoculation in Berlin" (1781, pp. 132-144). The King of Prussia having given his sanction to inoculation in February, 1775, eight orphan children were chosen to commence the series, and only those were selected who were perfectly free from all marks or signs of their having gone through the small-pox before; a thread was used, which had been charged with fresh variolous matter at the London Small-pox Hospital; the matter was inserted into both arms of the patients, and Dr. Baylies had not the least doubt the disease would come on as it ought to do; yet we are informed that "neither fever nor any other symptom followed in consequence of it, though the arms of two of them, on the third or fourth day from the operation, had a degree of inflammation for a day or two" (p. 138).

He then used a thread of much older matter, and re-inoculated these eight children, and also inoculated, for the first time, four others, with a similar result; and lastly, having learnt that the child of a baker was down with the disease, he resolved to inoculate them with fresh

variolous matter. The twelve children before-mentioned, with seven others, were conducted to the baker's house, and they were all inoculated with warm fluid matter from ripe pustules, and for nearly an hour the children were kept in the infected atmosphere, and "not one of all the nineteen children manifested the least symptom of the disease in consequence of it" (p. 143).

As Dr. Baylies was a practised inoculator, we are forced to the conclusion that either the children had had small-pox before — the conclusion arrived at by Dr. Baylies himself—or that they were naturally immune to the disease; but, considering that the most careful examination was made for marks of small-pox, the latter view appears to be the more probable.

In this connection some remarks made by Dr. Michael Underwood, in his work on the diseases of children, are not without interest. Dr. Underwood observes:—"Though the small-pox is a complaint so incident to the early part of life, that comparatively few children living to the age of eight or ten years, are found to escape it, yet it is not so readily communicated, in the state of *early infancy*, as hath been generally imagined, unless by immediate infection. The poor furnish frequent instances of the truth of this observation. I have attended where children born in an air, saturated as it were, with the miasma (or infectious particles) of this disease (as well as of the measles), and even lying continually in a cradle in which another child has died a few days before, have, nevertheless, escaped the disease, and sometimes, when they have slept together in the same bed with one loaded with it. Hence it appears, that highly tainted

air, and even personal contact, are often insufficient to communicate the poison. Yet we know that infants are very easily infected, receiving the small-pox by inoculation as readily as adults; though neither are at all times equally susceptible of it."[1]

In the *Medical and Physical Journal*[2] for April, 1803, Mr. C. Dennett, of Soho Square, related the following instances:—In August, 1800, Mr. —— had two children who were laid up with confluent small-pox, one of whom died; an infant, three weeks old, was exposed to the infection the whole time, being always in the same room, and sometimes in the same bed. Mr. Dennett says he could not persuade the parents to have the baby inoculated, and to vaccination they positively objected. It did not take the infection; later in the year, the child was inoculated with fresh variolous matter without effect, and this was repeated three times with no better success.

Another child in the same family, born later, escaped the disease, although it had slept in the same bed with the former child, who had now contracted confluent small-pox. Mr. Dennett inoculated the infant on four separate occasions with small-pox matter without effect. These cases were evidently not very uncommon, for Mr. Dennett remarked that "every practitioner must have met with cases when, under some peculiar constitution, the habit is not susceptible of the disease, either by infection or inoculation" (p. 364).

---

[1] "A Treatise on the Disorders of Childhood, and Management of Infants from the Birth," vol. i., pp. 299-301. Michael Underwood, M.D., Physician to Her Royal Highness the Princess of Wales. London, 1797.

[2] *Medical and Physical Journal*, vol. ix., p. 365.

Dr. Lionel Beale gives the following on the authority of the Lady Superior of St. John's House :—"S. L., aged 13, Westminster, took the small-pox in March, 1871. The rash was fully out all over face and body March 10th. The mother and baby of a week old slept in the same bed and continued to do so. The baby has never been vaccinated, and is now nine weeks old, and has been sleeping in the bed night and day. The mother was vaccinated as a child thirty-five years ago. The other children in the room had been vaccinated. The father has never been vaccinated at all, and slept in the same room. No other member of the family has had the small-pox."[1]

Dr. W. N. Thursfield, Surgeon to the Wellington Dispensary, refers to the following cases in the *Lancet* of June 1, 1872 (vol. i., p. 754) :—"On the 25th of March of this year, I was sent for to see a Mrs. W——, a lady I had attended in her confinement five months previously, and whose child had not been vaccinated in consequence of the express prohibition of both parents. I found the lady suffering from a severe attack of small-pox. The eruption, which was said to have appeared four days previously, was then in the pustular stage. She had not discontinued nursing the infant, and it was taking the breast at the time of my visit. The child was at once removed from the mother, but not from the house, where it remained throughout. Before Mrs. W—— could be said to have completely recovered, she, in spite of remonstrance,

---

[1] "Disease Germs; their Nature and Origin," p. 441. Second edition. Lionel S. Beale, M.B., F.R.S. London. 1872.

resumed suckling the child, and continued to do so for some time. At the present date (May 20th) the child is quite well, and has had no eruption or feverish symptoms whatever, and is still unvaccinated. This lady's husband contracted small-pox during his wife's illness; both had been vaccinated in infancy, and both recovered.

"In another case, a young man, lodging in a house near to where small-pox had been for some time, was taken with a moderately severe attack of the disease, and came under my care as a dispensary patient on Good Friday last. The old woman of the house, who nursed and looked after the patient, was bringing up by hand an illegitimate infant, then ten weeks old, which had been put out to nurse with her. This infant had not been vaccinated; and, though in constant contact with the nurse, and sleeping with her in the room next to the small-pox patient, did not take the disease, and through the neglect of the woman to take it to the public vaccinator, it remained unvaccinated. About five weeks after the recovery of the young man, the nurse-child died of general debility. I kept it under my observation until its death, and know that it had not small-pox.

"In both these cases, there certainly was no error in diagnosis, nor was either of the infants vaccinated or out of my personal observation at any time."

In the Sheffield Report (p. 46, foot-note), Dr. Barry, in referring to the case of Mary P., aged twenty-four, who took small-pox after vaccination, says:—"Of five other children in this family, three, aged eleven, fifteen, and sixteen, who had been vaccinated in infancy, all suffered from small-pox; the last two were badly pitted.

Two other persons, aged fourteen and twenty, who had never been vaccinated, and who slept with the others, did not contract small-pox."

The above instances appear to show that immunity in the unvaccinated, even when strongly exposed to small-pox, is not nearly so rare as has been generally believed. It is also instructive to note that Dr. Coupland,[1] in his report on the Leicester outbreak, shows, with regard to 193 invaded households, that at several specified age-periods, the small-pox attack-rates were much the same, although, according to his census of the inmates, the proportion of the unvaccinated at these age-periods vastly differed. The figures cited are as follows :—

Age-periods.	Total inmates [2]	Of the total inmates, the percentage.	
		Unvaccinated.	Attacked.
Under 1 year	33	91·0	21·2
1-10 years	328	74·0	28·9
10-30 years	534	15·5	28·1
30 years and upwards ...	330	2·7	20·5

With these figures before him, it is not surprising that Dr. Coupland should have come to the conclusion that "the natural liability to small-pox, unaffected by vaccination, was not so great as has been supposed."

To resume our inquiry into the question as to whether vaccination prevents small-pox, the following cases, extracted from the Sheffield Report, are of importance as showing that recent vaccination of the most approved fashion will not secure immunity from this disease. (See next page.)

---

[1] Final Report, Royal Commission on Vaccination, Appendix vi., p. 3.

[2] In nine of the inmates the age was not ascertained.

Page of Report.	District.	No.	Name.	Age when attacked.	Vaccination.	Results of vaccination.	Character of small-pox.
41	Brightside - -	27	Mary H. - -	10 months	Vaccinated in infancy	Five foveated cicatrices, two-thirds square inch in area.	Very slight, not pitted.
41	Brightside - -	41	Sarah C. - -	6 months	Vaccinated in infancy	Four foveated cicatrices, one-half square inch in area.	Very slight, not pitted.
42	Brightside - -	102	Sarah Ann L. -	10 months	Vaccinated in infancy	Four plain cicatrices, one-half square inch in area.	Very slight indeed, not pitted.
62	North Sheffield -	79	Ernest C. - -	9 months	Vaccinated in infancy	Four foveated cicatrices, one-half square inch in area.	Very mild, one pit.
97	South Sheffield -	29	Gertrude Hoskins M. -	2 months	Vaccinated when 6 weeks old	One plain cicatrix, one-eighth square inch in area.	Slight, not pitted.
150	Nether Hallam -	18	Frank S. - -	6 months	Vaccinated when 6 weeks old	Four foveated cicatrices, two-thirds square inch in area.	Very slight, played about all the time, not pitted.
150	Nether Hallam -	57	Hedley V. H. -	8 months	Vaccinated in infancy	Three foveated cicatrices, one-third square inch in area.	Very mild, not ill at all, not pitted.

Examples of more absolute failure to protect could hardly be imagined than these seven cases contracting small-pox from a fortnight to seven or eight months after vaccination of the most correct type. Altogether there were about 450 vaccinated cases under ten years of age at Sheffield in the 1887-88 epidemic, and yet a prominent defender of compulsory vaccination deliberately maintained that "vaccinated children under ten years of age are . . . wholly and entirely immune from small-pox, and cannot be infected."[1]

Since writing the above, it appears that the editor of the *British Medical Journal* has somewhat shifted his ground, for in a recent article on "Vaccination as a Branch of Preventive Medicine," he maintains that in certain epidemics (referred to) "vaccinated children under ten have been almost immune from death by small-pox,"[2] which I venture to suggest is a considerable modification of his original statement. It is a pity that Mr. Ernest Hart did not have an opportunity of consulting Dr. John MacCombie's article on "Small-pox" in the same volume (Allbutt's "System of Medicine," vol. ii.), for he would then have discovered the following figures (p. 221):—

	Vaccinated.		
Age periods.	Cases.	Deaths.	Fatality per cent.
Under 5 years	385	30	7·8
5-9 years	1,468	59	4·0

It must also be presumed that Mr. Hart's attention has not been arrested by the following experience of the

---

[1] Letter of Mr. Ernest Hart to the *Times* of August 31, 1894.

[2] Allbutt's "System of Medicine," vol. ii., p. 664. London. 1897.

Metropolitan Asylums Board[1] in the epidemic of 1870-72:—

Age-periods.	Vaccinated. Number admitted.	Number of deaths.	Fatility per cent.
Under 5 years	195	38	19·5
5-10 years	786	60	7·6

These two tables prove that "vaccinated children" under five years of age (let alone ten years) are not even "almost immune from death by small-pox."

What could be more emphatic than the following experience of Mr. T. Massey Harding?[2]—"All practitioners are acquainted with cases disproving the immunity of the vaccinated, such as the following:—I attended a man, aged 40, with confluent small-pox, of which he died. He had been vaccinated twice, according to his own statement. In the house were his sister, her husband, and two children, all unvaccinated. I vaccinated them all, and it took effect. In three weeks from the day of vaccination, the woman, Mrs. G., and one of her children had small-pox, distinct, but slight."

Nor can it be truthfully said that epidemics originate with the unvaccinated, for in a number of notable instances the first unvaccinated case is a long way down the list. Thus, at Neuss, in Germany, from 1865-73, there were 247 cases of small-pox, all of

---

[1] "Report of the Committee appointed on the 1st June, to collate and report upon the Returns obtained from the several Hospitals of the Managers, with regard to the cases of Small-pox treated therein." Presented to, and adopted by, the Managers of the Metropolitan Asylum District, at their meeting on the 13th July, 1872. P. 5; Table 2.

[2] *British Medical Journal*, November 21, 1857, p. 974.

them vaccinated; at Bromley, in 1881, 43 cases, all vaccinated; and in the 1870-72 epidemic at Bonn, the first unvaccinated case was forty-second on the list.[1]

The following table shows the large proportion of vaccinated cases in some well-vaccinated districts:—

Small-pox epidemics.	Years.	Attacks.[2]	Vaccinated attacks.	Percentage of attacks vaccinated.
Bavaria [3]	1871	30,742	29,429	95·7
Berlin [4]	1871-72	20,391	17,038	83·6
Cologne [4]	1871-73	2,282	2,248	98·5
Neuss [4]	1865-73	247	247	100·0
London Small-pox Hospital [5]	1852-67	13,581	10,661	78·5
Metropolitan Asylums Board Hospitals [6]	1870-86	50,668	41,061	81·0
Bromley [7]	1881	43	43	100·0
Sunderland [8]	1884	100	96	96·0
Sheffield	1887-88	7,066	5,891	83·4
Warrington	1892-93	674	601	89·2
Birmingham	1893-94	2,945	2,616	88·8
Willenhall	1894	828	739	89·3

In an epidemic, it is not possible, on any theory of protection, for the population to be vaccinated to any

---

[1] "Beiträge zur Beurtheilung des Nutzens der Schutzpockenimpfung," p. 143. Berlin. 1888.

[2] Cases in which there was a doubt about the vaccinal condition of the patient have been excluded.

[3] Second Report Royal Commission on Vaccination. Q. 1,489.

[4] "Beiträge zur Beurtheilung des Nutzens der Schutzpockenimpfung," pp. 152, 154, 168. Berlin. 1888.

[5] Report from the Select Committee on the Vaccination Act (1867) 1871, p. 237.

[6] Third Report Royal Commission on Vaccination, Appendix, p. 204. Table L.

[7] *Lancet*, August 27, 1881, vol. ii., pp. 372, 373.

[8] *Lancet*, February 23, 1884, vol. i., pp. 363, 364.

lesser extent than the cases of small-pox, or it would show that small-pox picked out the vaccinated for its victims. The figures for Bavaria and Cologne, with 95·7 and 98·5 per cent. of the cases vaccinated respectively, hardly leave any margin for the population to be vaccinated to a greater extent. Considering that in these two instances the proportions approximate so closely, there is every reason for scrutinising very carefully any estimate of the vaccination of the population which differs largely from the ratio of the vaccinated cases of small-pox.

Such estimates have been made for Sheffield by Dr. Barry, and for the houses invaded by small-pox at Warrington, Dewsbury, and Leicester, by medical men appointed by the Vaccination Commission. As, in the latter instances, there was no opportunity for examination of these experts, it will be more satisfactory if I confine myself to the case of Sheffield.

In his report on the Sheffield epidemic, Dr. Barry estimated that 97·9 per cent. of the population was vaccinated. It was pointed out to him before the Royal Commission, that the house-to-house inquiry, on which his estimate was based, was taken after the epidemic had reached its height, during the course of which a transfer had been taking place from the unvaccinated to the vaccinated class. A new estimate was therefore made, which is included in the Report of the Royal Commission, at 97·3 per cent.; but even this cannot be justified. In his examination before the Royal Commission, Dr. Barry admitted that in the Sheffield Union, the house-to-house inquiry was enumerated by men under the supervision of the vaccination officers

(Q. 2,389), and that its primary object was to secure, as far as possible, the discovery of all unvaccinated children (Q. 2,390). These were reported to the vaccination officers, whose duty it was to take steps to secure their vaccination (Q. 2,391). The "census," Dr. Barry informs us, was a "secondary affair" (Q. 2,390). This inquiry, therefore, was instituted in order to hunt up the unvaccinated, and it is obvious that a census conducted on these lines could not have the slightest pretension to accuracy. It would have been the simplest matter in the world for the householder to omit the mention of the unvaccinated, and, as the inquiry lasted nearly six weeks, to evade the enumerators, who, in the Sheffield Union, were not even supplied with the names of the occupiers. Moreover, in 764 houses, information was altogether refused, and 11·8 per cent. of the population, or over six times the "unvaccinated enumerated," were left out of the calculation altogether. For these and other reasons, it is impossible that the population could have been vaccinated to the extent that was claimed; and, therefore, the calculations that are based on this estimate are misleading.

It has been shown that the unvaccinated may be exposed to small-pox without taking the infection, and also that the most recent and efficient vaccination of individuals will not prevent the complaint, and considering that such a large proportion of sufferers are among the vaccinated, who, in most instances, start and spread the epidemic, the statement so often promulgated that an unvaccinated individual is a source of infection and a danger to the community, is

erroneous. It has also been pointed out, that even if vaccination was a complete protection against small-pox, this would be no argument for legislation; for, in the words of Dr. J. H. Bridges, "non-vaccinated people are not a source of injury to their neighbours; for their neighbours can get themselves vaccinated."[1] It follows, therefore, that the law which was first passed on the assumption that the unvaccinated are a danger to society—even if there were no other evidence against vaccination—should be immediately abrogated.[2]

---

[1] *Positivist Review*, vol. iv., p. 226. (November, 1896.)

[2] If vaccination mitigates small-pox, as maintained by some, it is no argument for compulsion. The medical officer of health to the City of Birmingham (Report for 1893, p. 45) alleges that one of the causes of the rapid spread of small-pox in the recent epidemic was due to "the mildness and modification of the attacks in vaccinated persons, making it most difficult in some cases to decide the nature of the illness, and causing it to be mistaken for chicken-pox and other trivial affections, and arousing no suspicion of its being small-pox until severer forms of the disease subsequently appeared in the same family."

CHAPTER VI.

THE MITIGATION THEORY.

WHEN it was discovered, in the epidemic of 1817-19, that small-pox attacked such a large number of the vaccinated, the theory of mitigation was promulgated. From the cases detailed in the last chapter, it does not appear that small-pox was very conspicuously mitigated by vaccination in the early years, nor does there appear to have been any relation between the severity of the attack and the length of time which had elapsed since the operation. It will be profitable to proceed to enquire whether the later experience shows results more favourable to the mitigation theory.

Dr. George Gregory has indicated the measure of the modifying powers, which, in his opinion, may be attributed to vaccination. "Vaccination," he says, "does not appear to lessen the violence, or shorten the duration, of the first or eruptive stage of fever, which is generally as severe, and even sometimes severer and longer in its duration than that of the casual confluent small-pox. It does not appear in like manner to influence the *quantity* of eruption upon the skin, so much, at least, as has been generally imagined. It is true, that, in many cases of small-pox, subsequent to vaccination, the eruption has been very scanty; but, in a large number also, I have seen it very copious, more particularly about the

face, breast, and upper extremities, and occasionally fully equal, in point of *quantity*, to what is seen in the worst kinds of confluent or coherent natural small-pox."[1] The great power of vaccination, he thought, consisted in modifying the progress of inflammation in the variolous eruption on the skin and in the throat; but he added: "It is curious to observe that it does not always affect the course of the disease, when the variolous poison fixes itself on other parts, more particularly on the brain. It is, in this manner, that small-pox, after vaccination, occasionally proves fatal."[2] In a foot-note on p. 331, he explains that "the eruption on the skin and throat is only one of the effects of the poison. Another, at least equally important, both with reference to pathology and practice, is that which is excited upon the brain and nervous system; the chief evidences of which are delirium, inflamed eyes, stupor or restlessness, and disposition to erysipelas and gangrene."

There are several ways of testing the mitigation question, one of which would be to compare the case-mortality or fatality of small-pox before and after the introduction of vaccination. In the Appendix will be found a table taken from Dr. Creighton's "History of Epidemics." It consists of censuses of small-pox epidemics during the years 1721-30, the fatality ranging from 9·1 to 36·4 per cent., there being in all 13,192 cases, with 2,264 deaths, or an average fatality of 17·2 per cent.

The principal objection that has been raised to these

---

[1] "Medico-Chirurgical Transactions," vol. xii., pp. 328, 329. (1823.)
[2] *Ibid.*, pp. 330, 331.

statistics is, that in the censuses of small-pox epidemics passing under the name of Jurin, which largely dominate the figures in Dr. Creighton's list, Jurin is said to have "not knowingly set down any deaths under two years old as due to small-pox, . . and that some of his correspondents, in furnishing him with statistics, followed the same rule."[1]

The ostensible grounds for this assertion are :—

1. That the Aynho census, to which I have referred in a previous chapter (pp. 43, 44), contains no cases under two years of age.

The Aynho census, a copy of which is to be found in the archives of the Royal Society, was made by the rector of the parish, and the cases are given in the order of time, just as they occurred over a period of some fifteen months, three in one family, two in another, and so on. There is no suggestion of infants being excluded, and the fact that there were only three aged two years, and four aged three years, out of a total of 132, makes the absence of cases in infants not only credible, but probable. The epidemic was mainly among young people and adults, and was quite intelligible for a country place where epidemics took place infrequently.

2. The other ground of objection is founded on an argument used by Jurin in his letter to Dr. Cotesworth.[2] "It is notorious, that great numbers, especially

---

[1] Article on "Small-pox and Vaccination," by John C. M'Vail, M.D., in Stevenson and Murphy's "Treatise on Hygiene and Public Health," vol. ii., p. 399. London. 1893.

[2] A Letter to the learned Caleb Cotesworth, M.D., p. 11. James Jurin, M.D., Secretary to the Royal Society. London. 1723.

of young children, die of other diseases, without ever having the small-pox," etc.

The statement that a number of young children died of other diseases, without ever having the small-pox, has no reference to the censuses which were taken to show the fatality-rate of natural small-pox as contrasted with the inoculated. It was part of an argument to show that the real hazard of dying of small-pox in London was greater than the Bills of Mortality showed, inasmuch as the excessive London infantile mortality cut off an immense number from other causes (such as convulsions, infantile diarrhœa, etc.) before small-pox could attack them. But Jurin admits (p. 12) that in all probability some infants, "very young children, or at most not above one or two years," went through the small-pox, which is sufficient evidence that he had no intention of counting them out, or ignoring them, in the percentages of fatalities to attacks. His argument, such as it was, applied only to London, but there were no statistics for London in the censuses, which are all from the provinces, many of them made by Nettleton of Halifax, and none of them made, nor even controlled, by Jurin himself.

The incidence of small-pox in the eighteenth century, as pointed out in a former chapter, was almost entirely on the young; for instance, at Chester,[1] in 1774, of 1,385 cases, 202 died, or a fatality of 14·6 per cent., the ages at death being as follows (p. 150; Tables II. and IV.):—

---

[1] "Philosophical Transactions," vol. lxviii., p. 151. (Dr. Haygarth's Observations on the Population and Diseases of Chester in the year 1774.)

Under 1 month	0
Between 1 and 3 months	3
„ 3 and 6 „	4
„ 6 and 12 „	44
„ 1 and 2 years	38
„ 2 and 3 „	42
„ 3 and 5 „	49
„ 5 and 10 „	22
Over 10 years	0
Total	202

The contention, therefore, that the last century fatality of 17 or 18 per cent. is lower than it should be, because of the deliberate omission of young children from the censuses, is groundless, and ought never to have been raised.[1]

Let us now see what is the fatality of small-pox since a large proportion of the cases have been vaccinated. Dr. Collins and Mr. Picton[2] quote the experience of the Metropolitan Asylums Board's Hospitals, where, from 1870 to 1894, 60,855 cases were treated, with a fatality of 16·7 per cent., and among 50,668 of these admissions, the vaccinated were 41,061, or 81 per cent.

During this period the figures have varied considerably. In the year 1896, the fatality was 4·01 per cent.; whereas, from December 1, 1870, to February 3,

---

[1] The Royal Commission say (section 53)—"It has been urged that the deaths of those dying under two years of age were excluded from Jurin's statistics, and that this must have led to the omission of many deaths, as the mortality in that class was high. The evidence relied on to show that cases under two years of age were excluded certainly cannot be regarded as establishing it."

[2] Royal Commission on Vaccination, Dissentient Commissioners' Statement, section 97.

1871, it was as high as 20·81 per cent. This high fatality in the earlier years may in part be due to the limited accommodation at the hospitals, when the tendency would be to admit the more serious cases. In this epidemic (1870-72), however, the fatality was high, for the *Lancet* of July 15, 1871 (vol. ii., p. 94), estimated the fatality of small-pox at 17·5 per cent.; and hence, the large proportion of vaccinated cases[1] does not appear to have diminished the severity of the disease, as compared with the last century.

The other method of testing the question is to compare the fatality in the two classes. Dr. Davies, the medical officer of health for Bristol, in the *Bristol Mercury* of April 2, 1896, states the case thus: "The unvaccinated die at the rate of thirty or forty deaths per hundred cases, the vaccinated at something less than five per hundred cases." This agrees approximately with Mr. Ernest Hart's figures[2] in his summary of different towns during recent epidemics. The claim is that vaccination mitigates small-pox in the bodies of those who have taken the disease, and this is practically the whole case for the observance of the operation; and the evidence is chiefly to be derived from the reports of medical officers of health and others in official position, from which the following have been taken :—

---

[1] In the epidemic of 1870-72, a total of 14,808 cases of small-pox were admitted into the hospitals of the Metropolitan Asylums Board. Of these, 11,174, or 75·5 per cent., were in vaccinated persons.

[2] *British Medical Journal*, March 2, 1895, vol. i., p. 487.

Unvaccinated Fatalities—1836-96.

Report of Hospital or Medical Officer of Health.	Years.	Cases.	Deaths.	Fatality per cent.
Highgate	1836-51	2,654	996	37·5
Highgate[1]	1871	74	49	66·2
Dublin (Hardwicke Hospital)[2]	Feb. 1871 to March 1872	70	55	78·6
Homerton	1871-77	1,243	570	45·9
Hampstead	1876-78	847	397	46·9
Dublin (Cork Street) ...	1876-80	448	288	64 3
Fulham	1877-79	374	176	47·1
Deptford	1878-79	258	121	46·9
Sheffield	1887-88	1,173	392	33·4
Birmingham	1893-94	329	107	32·5
Gloucester	1895-96	781	317	40·6

Hence, in these instances, the proportion of deaths to attacks among the unvaccinated is stated to have ranged from 78 to 32 per cent. Most of these figures are, however, impossible, for the simple reason, that in the last century, as already shown, before the introduction of vaccination, the average fatality of small-pox was only about 17 or 18 per cent.

In making a critical examination of the fatality statistics in the two classes, it is obvious that their accuracy would depend on whether the statement as to vaccination could be absolutely relied upon; and secondly, on whether the two classes were perfectly comparable in every respect; and to do this it is necessary to say a word or two about the different types of small-pox, and also the method of classification.

---

[1] *British Medical Journal*, February 10, 1872, vol. i., p. 171.

[2] *Ibid.*, p. 682, June 22, 1872. These figures include four doubtful cases.

A prominent feature in medical and official publications advocating vaccination[1] has been to paint the horrors of small-pox in its natural state in the most vivid colours. I have already dwelt on the fact that, in the last century, the average fatality of small-pox was only about 17 or 18 per cent. of those attacked, and in many epidemics the proportion was much less. Different forms of small-pox have been distinguished from the time of Rhases,[2] and it may be said that Sydenham's main success in his treatment of the disease was due to the fact that he recognised a discrete and confluent variety, in the former of which the patient, if left alone to Nature, invariably recovered.

The following quotations from Sydenham bear on this point:—"As it is palpable to all the world, how fatal that disease (small-pox) proves to many of all ages, so it is most clear to me, from all the observations that I can possibly make, that if no mischief be done, either by physician or nurse, it is the most slight and safe of all other diseases."[3]

Sydenham observes that in 1669 small-pox "appeared

---

[1] See Mr. Ernest Hart's "Truth about Vaccination," pp. 2-8 (1880), and also "Facts concerning Vaccination for Heads of Families," a tract "revised" by the Local Government Board, and "issued with their sanction," in which it states (p. 4)—"The disease (small-pox) used to rage unchecked, killing a very large proportion of those whom it attacked, and maiming, blinding, and disfiguring those whose lives it spared."

[2] "A Treatise on the Small-pox and Measles." Translation from the original Arabic by Dr. W. A. Greenhill, and printed for the Sydenham Society, 1848, pp. 71-73.

[3] Letter to Mr. Robert Boyle, dated Pall Mall, April 2, 1688. The Works of Thomas Sydenham, M.D. Translation from the Latin Edition of Dr. Greenhill, with a life of the author, by R. G. Latham, M.D. Printed for the Sydenham Society, 1848, vol. i., pp. lxxii., lxxiii.

in some few places, but in a mild and manageable form."[1]

"Now, the confluent small-pox is as much worse than the *distinct*, as the plague is worse than the confluent."[2]

"As for the distinct sort, even if it can be seen beforehand, bed is so much out of the question, that injunctions against it are superfluous. The scanty number of the exanthemata makes matters safe either way."[3]

"With few pustules, and those of the distinct sort, the treatment is immaterial; provided there is no gross error. The disease is a slight one. The ignorance of the physician, who aims at nothing so much as the promotion of heat, can alone make it dangerous. Dangerous, too, it has been made; since in such cases the doctor, though unconsciously, helps the disease."[4]

In referring to the treatment of small-pox, "all this applies to the confluent small-pox only. With the distinct sort, they have nothing to do. Those who boast about curing cases where the rash has been scanty, deceive themselves and others. If they really wish to test their skill, let them take a confluent case in a young subject who has drunk hard; and not so far blunder as to fancy that, in their easier practice, they have saved the lives of patients whom it would have been a hard matter to have killed."[5]

Other authorities testify to the mildness of some forms of the disease. Thus Wagstaffe, in a letter to Dr.

---

[1] "Medical Observations." Printed for the Sydenham Society, 1848, vol. i., p. 160.

[2] Letter to Dr. Cole. *Ibid.*, vol. ii., p. 58.

[3] *Ibid.*, p. 65. [4] *Ibid.*, p. 71. [5] *Ibid.*, p. 79.

Freind, observes—"There is scarcely, I believe, so great a difference between any two distempers in the world, as between the best and worst sort of small-pox, in respect to the danger which attends them. . . . So true is that common observation, that there is one sort in which a nurse cannot *kill*, and another which even a physician can never *cure*."[1] Sir Richard Blackmore, in his remarks on the treatment of small-pox, says :—"In the most favourable sort of the distinct small-pox, which are few in number and mild in quality, Nature herself, as I have before observed, is able to cure the distemper, and needs not call the physician in aid."[2] Isaac Massey, the apothecary to Christ's Hospital, thus gives his experience:—"Here in the *natural small-pox, but one in forty-nine died*, and, I can assure the reader, that upon a strict review of thirty years' business, and more, not one in forty small-pox patients of the younger life have died, *i.e.*, about five, and under eighteen."[3] Mr. John Mudge, a surgeon, of Plymouth, writing in 1777, says—"There is not perhaps a disease to which the human race is exposed, that differs more from itself at different times than the natural small-pox. We sometimes see this disorder so mild and benign, as scarcely to expose the patient to more danger than a common cold ; and at others, exasperated by a degree of malignity and

---

[1] A Letter to Dr. Freind showing the danger and uncertainty of inoculating the Small-pox, pp. 9, 10. W. Wagstaffe, M.D., F.R.S. London. 1722.

[2] "A Treatise upon the Small-pox," p. 42. Sir Richard Blackmore, M.D., F.R.C.P. London. 1723.

[3] "Remarks on Dr. Jurin's Last Yearly Account of the Success of Inoculation," p. 7. Isaac Massey. London. 1727.

virulence, little, or perhaps not at all, inferior to the plague itself."[1]

The matter has also been alluded to by Jenner. Of course Jenner never dreamt in the first ardour of his discovery, that the advocacy of vaccination would be reduced to a mere plea for mitigation, and thus we obtain the following interesting confirmation of the painstaking and carefully recorded experience of Sydenham. "There are certainly more forms than one," he says, "without considering the common variation between the confluent and distinct, in which the small-pox appears in what is called the natural way.—About seven years ago a species of small-pox spread through many of the towns and villages of this part of Gloucestershire: it was of so mild a nature, that a fatal instance was scarcely ever heard of, and consequently so little dreaded by the lower orders of the community, that they scrupled not to hold the same intercourse with each other as if no infectious disease had been present among them. I never saw nor heard of an instance of its being confluent."[2]

More recently also we have the corroboration of Mr. Marson, who says—"The death-rate from distinct small-pox among the unvaccinated is only four per cent., and even those four per cent. die of convulsions, or some other disease to which children are liable."[3]

---

[1] "A Dissertation on the Inoculated Small-pox," pp. 1, 2. John Mudge, Surgeon. London. 1777.

[2] "An Inquiry into the Causes and Effects of the *Variolæ Vaccinæ*," p. 54. Edward Jenner, M.D., F.R.S. London. 1798.

[3] Q. 4,316, Report from the Select Committee on the Vaccination Act (1867). 1871.

And Dr. William Gayton,[1] medical superintendent of the North-Western Fever Hospital, has admitted that discrete small-pox is a comparatively mild disease even in the unvaccinated.

Another variety of small-pox, *viz.*, malignant or hæmorrhagic, is of a different type. Regarding this, Dr. MacCombie[2] states (1) That it is by no means rare; (2) that the majority of attacks occur in vaccinated persons; and (3) that recovery does not take place. This last statement accords with the experience of Dr. Gayton, who informed the Royal Commission (Q. 1,818), that malignant or hæmorrhagic small-pox was almost uniformly fatal whether the person had been vaccinated or not. The following table, compiled from the hospital reports by Mr. Wheeler,[3] demonstrates this point conclusively:—

Malignant Small-pox.

		Vaccinated.			Unvaccinated.		
	Years.	Attacks.	Deaths.	Fatality per cent.	Attacks.	Deaths.	Fatality per cent.
Homerton ...	1871-77	163	139	85·3	153	153	100·0
Hampstead ...	1876-78	127	105	82·7	127	115	90·6
Fulham ...	1877-79	26	18	69·2	44	39	88·6
Deptford ...	1879	21	21	100·0	10	10	100·0
Dublin (Cork Street)	1876-80	163	113	69·3	103	93	90·3
Total ...		500	396	79·2	437	410	93·8

[1] Q. 1,816, Second Report, Royal Commission on Vaccination.

[2] Allbutt's "System of Medicine," vol. ii., pp. 203, 204. London. 1897.

[3] Third Report, Royal Commission on Vaccination, Appendix, p. 206 Table Q.).

As vaccination apparently has no influence on this form of the disease, Dr. Grieve, medical superintendent of the Hampstead Small-pox Hospital, was probably correct when he stated that it was "but too common in people who had lived in defiance of all sanitary laws, or who by intemperance have debilitated their constitutions."[1]

Another particularly fatal, but rare variety, termed corymbose small-pox, has been observed. This was described by Mr. Marson[2] as presenting two or three patches or clusters about the size of the palm of a hand, upon which the eruption is as thickly set as it possibly can be, while the skin around for some distance is almost, if not entirely free. Mr. Marson gives the figures for 104 cases of this variety, which came under his observation: 29 were unvaccinated, of these 13 or 44·8 per cent. died; and 74 were vaccinated, of which 32 or 43·2 per cent. died. Thus, the fatality in the two classes of this variety of the disease, is practically identical.

The only remaining type of the disease for us to consider is the confluent, and from the above it will be evident that the huge difference in the rates of the vaccinated and unvaccinated must take place in cases of this description. In this variety of the disease, the pustules coalesce, so as to render the features hardly recognisable, and it can easily be understood that marks of vaccination may be and are readily obscured, so that

---

[1] "An Analysis of 800 cases of Small-pox." The *Lancet*, March 18, 1871, vol. i., p. 371.

[2] Article on "Small-pox," by Mr. J. F. Marson. Reynolds' "System of Medicine," vol. i., p. 438. London. 1866.

it is impossible to determine from an examination of the arm whether they exist or not.

This difficulty has been recognised by the leading authorities. Thus, Dr. Gregory says—"Great difficulties were necessarily experienced in determining who had been really vaccinated, of those who assumed to have undergone that process. The cicatrix was our chief guide, but this often failed us, from the swollen and pock-covered condition of the arm at the time of the patient's admission."[1] Dr. James B. Russell remarks—"Sometimes persons were said to be vaccinated, but no marks could be seen, very frequently because of the abundance of the eruption. In some of those cases which recovered, an inspection before dismissal discovered vaccine marks, sometimes 'very good.' Those who died, or who were not so examined, are placed in a separate column as 'said to be vaccinated, but V.M. not visible.' I do not observe in the reports on small-pox, as observed in London and Dublin, any allusion to this difficulty. Even the best vaccine mark is readily obscured, or even hidden, by a copious eruption, and unless such special means, as I have described, are adopted, it is impossible accurately to ascertain the facts of small-pox in the vaccinated."[2]

Not only may the scars be obscured by eruption, but there is no doubt also that they may wear out. Dr. George Gregory says—"The absence of a cicatrix is not decisive against either the present or prior existence of vaccine energy in the system, because in many cases,

---

[1] "Medico-Chirurgical Transactions," vol. xxii., p. 97. 1839.

[2] *Glasgow Medical Journal*, vol. v., p. 6 (November, 1872).

the specific inflammation is moderate, and the resulting scar wears out in the progress of life, as other scars do which are not the result of a specific poison."[1] In his "Observations on the *Variolæ Vaccinæ*," Mr. Robert Ceely, of Aylesbury, says—"Inspection of many scars, caused by this lymph, shows that in a few months little is to be learned in many subjects, with thin skins, of the degree to which the vaccine influence has been exerted on them."[2]

A Committee appointed by the Epidemiological Society (Epidem. Soc. Trans., vol. v., p. 153, 1885-86) recognised that "not every cicatrix which is once foveated will always retain its condition of foveation, and, further, that not every cicatrix will permanently exist." Dr. Savill in his report on the Warrington outbreak has also called attention to the fact that vaccination scars tend to become obliterated with age, and to alter in character with time.[3]

Let us now see what has been the practice with regard to the classification of small-pox patients. Mr. Francis Vacher, Medical Officer of Health for Birkenhead, candidly observes—"The mere assertions of patients or their friends, that they were vaccinated, counted for nothing, as about 80 per cent. of the patients entered in the third column of the table ('unknown') were reported as having been vaccinated in infancy."[4] Mr. Marson informs us—"Patients were

---

[1] *London Medical Gazette*, vol. xxv., pp. 289, 290 (November 15, 1839).

[2] "Transactions of the Provincial Medical and Surgical Association," vol. viii., p. 416, foot-note. 1840.

[3] Final Report, Royal Commission on Vaccination, Appendix v., p. 42

[4] "Notes on the Small-pox Epidemic at Birkenhead in 1877," p. 9.

never entered in the register as vaccinated, unless the account of the vaccination was a tolerably clear one."[1] And Dr. William Gayton, in the Homerton Report for 1875, observes (p. 58)—"I have always classed as 'vaccinated' those upon whom any mark supposed to result from vaccination has existed, and as 'unvaccinated' when no scar presumably arising from the effects of vaccine lymph could be discovered. Individuals are constantly seen who state that they have been vaccinated, but upon whom no cicatrices of any description can be traced. In a prognostic and statistic point of view it is better, and, I think, necessary, to class them as unvaccinated."

The fallacies of this method of classification have been pointed out by Dr. Birdwood and Dr. Ricketts.

Dr. Birdwood, with an experience of twelve thousand cases of small-pox, stated, before the Royal Commission, that in his opinion the evidence of primary vaccination, collected in small-pox hospitals, should not be relied on. Because—

"(1) On the outbreak of an epidemic there is necessarily much administrative confusion, and many untrained observers. The early observations are incomplete and faulty.

"(2) In the worst instances the eruption may be sufficient to, and does obscure the scars.

"(3) The statement of parents as to primary vaccination, and of adult patients as to re-vaccination, should be accepted even when scars are not seen.

---

[1] "Medico-Chirurgical Transactions," vol. xxxvi., p. 374. 1853.

[2] Sixth Report, Royal Commission on Vaccination. Q. 31,221.

"(4) Scars produced in infancy grow with the growth of the body; as was pointed out, I understand, by Sir James Paget.

"(5) In such statistics insufficient allowance is made for other circumstances, such as occupation, intemperance, and the existence of other diseases. An altogether different death-rate might be anticipated if small-pox broke out in a public school, or in the infirm and aged wards of a workhouse. A typhoid fever patient, or an ill-fed baby, catching discrete small-pox and dying, would be counted a death from small-pox, obviously neither vaccination nor its neglect having anything to do with it.

"(6) The accurate observation and record of clinical details is one of the most difficult duties required of medical men employed in hospitals for infectious disease."

Dr. Ricketts says—"In some of the earlier statistics on vaccination only two classes of cases were considered, *viz.*, those vaccinated and those unvaccinated; apparently the only evidence as to vaccination that was accepted being the presence or absence of scars. An absolute reliance, however, ought not to be placed on this evidence. There is no doubt that cases occur in which vaccination has been successfully performed, although cicatrices are not present when the attack of small-pox supervenes. There is a small class, too, but naturally a very fatal class, in which the rash is too abundant over the upper part of the arm for an assertion to be made that scars are absent." On Table

---

[1] Report of the Metropolitan Asylums Board for 1893, p. 136.

B, pp. 144, 145, he gives twenty-six cases, with thirteen deaths, in which the absence of scars could not be asserted because of the abundant eruption; and in twenty-five of these, the patient was stated to have been vaccinated.

Let us see how Dr. Ricketts' figures work out. On Table II.*c*, pp. 185-188 of the same report, there are forty-two vaccinated deaths, and forty-four in which there is "no evidence" as to cicatrices. On p. 138, he describes an age-distribution he has made of the "no evidence" cases. He puts it in the form of a diagram, and on comparing it with similar diagrams for the vaccinated and for cases in which the vaccination cicatrix was "absent," he finds that the diagram corresponds much more nearly with the former than the latter. There were ninety-four deaths in which the vaccination cicatrix was "absent," but it will be noticed that forty-four of these are in the first three years of life, in which there are no cases or deaths in the other two classes. In all fairness these should be therefore struck off; we then get fifty deaths in this class, and if we add the "no evidence" deaths to the vaccinated (I am aware that I am slightly overstating the case), we have eighty-six vaccinated deaths, and fifty in which the cicatrix was "absent." Thus, over three years of age, there are, if we include the "no evidence" cases with the vaccinated, 63·2 per cent. of the deaths vaccinated.

But there are further allowances to be made, for on p. 134, Dr. Ricketts says of his class, in which the vaccination cicatrix was "absent," that he is not able to describe these cases as all "admittedly unvac-

cinated." Another source of fallacy is pointed out in the *British Medical Journal* of October 23, 1880 (vol. ii., p. 672). The editor says—"It is probable that a larger proportion of unvaccinated persons is to be found among the ignorant, dirty, and wretched inhabitants of the slums of London, and very few indeed among the educated and better fed members of society." And Dr. Gayton admitted before the Royal Commission (Q. 1,843) that this would be likely to operate detrimentally by way of raising the unvaccinated mortality. This applies to all places vaccinated up to the usual average. When allowance is made for these fallacies, it will be found that the proportion of deaths vaccinated will not be very largely different from that of the vaccinated population, which in London, from the amount of default that has taken place in recent years, would not be very high.

It is only fair to mention that other reports agree in not assigning such a large proportion of deaths to the unvaccinated. In the *Glasgow Medical Journal* of November, 1872 (vol. v., p. 12), Dr. Russell classifies his cases according to the eruption. He found that in discrete cases the fatality in both classes was *nil*, and in confluent small-pox the fatality of the vaccinated exceeded that of the unvaccinated. Thus, among seventy-one vaccinated confluent cases there were forty-nine deaths, or a fatality of 69 per cent., and of one hundred and sixteen unvaccinated confluent cases, sixty-four, or 55·2 per cent., died.

But the most striking figures come from Prussia, and they show that up to ten years of age there is practically no difference in the fatality in the two

classes. The following table gives the figures for Berlin[1] in the 1871-72 epidemic :—

	Vaccinated.			Unvaccinated.		
Ages.	Cases.	Deaths.	Fatality per cent.	Cases.	Deaths.	Fatality per cent.
0- 1	259	136	52·5	977	570	58·3
2- 5	1,244	437	35·1	1,359	564	41·5
6-10	737	163	22·1	251	77	30·7

If the difference between 52 and 58 per cent. is all the mitigation that can be fairly claimed on behalf of vaccination within a year of the operation, even the most enthusiastic champions of vaccination will agree that we must look to other and more scientific methods for the extirpation of small-pox.

To recapitulate the facts briefly :—Figures have been put forward showing an enormous difference in the rates of the vaccinated and unvaccinated. It has been shown that these are open to suspicion, because the rates in the unvaccinated considerably exceed those of the last century before vaccination was discovered. When we come to analyse them, we find that the disparity obtains principally in cases of confluent small-pox, in which, according to the leading authorities, the vaccination marks are readily obscured ; and when it is remembered that it has been the practice to classify the cases according to marks, whether discernible or not, it is evident that the results have been largely fallacious.

Other sources of fallacy are the different conditions under which the two classes labour, and also the age. Of course, when the different ages are separated as

[1] "Beiträge zur Beurtheilung des Nutzens der Schutzpockenimpfung," p. 168. Berlin. 1888.

in the reports of the Metropolitan Asylums Board, this objection would not hold, but in the majority of instances, all ages are taken together, or separated only into those under and over ten; and considering that the unvaccinated more largely consist of young infants, who normally have a high small-pox fatality, this method naturally raises the rates for this class.

The Government returns of small-pox deaths would appear to be one way of settling the question, but here we are met with the difficulty that in death-certificates of cases of small-pox, medical men in a large proportion of instances make no statement about the vaccination, although they have been repeatedly urged to do so by the Registrar-General, and also by the medical press. In England and Wales, in 1892-95, there were 2,931 deaths from small-pox, of which 391, or 13·3 per cent., are reported in the vaccinated; 596, or 20·3 per cent., in the unvaccinated; whereas, in 1,944, or 66·3 per cent. of the whole, there is no statement as to whether the patient was vaccinated or not. The following from the *British Medical Journal* of March 17, 1877 (vol. i., p. 330), appears to throw some light on the matter:—"It may not be generally known that the Registrar-General, during the epidemic of small-pox in London in 1871-72, attempted to obtain more complete information as to the vaccination of persons dying of small-pox than was furnished in medical certificates. Then, as now, no information as to vaccination was given in a large proportion of medical certificates.

"The Registrar-General, therefore, requested the local registrars, in cases where the medical certificate was

silent on the point, to endeavour to ascertain from the informants of the deaths (almost invariably relatives), and to insert in the Register, whether the deceased had or had not been vaccinated.

"Information derived in this way certainly yielded results very similar to those obtained by the anti-vaccinationists themselves; relatives almost invariably asserted that the deceased had been vaccinated; but, as inquiries of the medical attendants in a large number of these 'not stated' cases elicited the fact that the deceased, the statements of relatives notwithstanding, bore no marks of vaccination, registrars were subsequently instructed to insert in the Register no facts as to vaccination unless certified under the hand of a registered medical practitioner."

It need hardly be said that this inquiry of the Registrar-General is very important. In these "not stated" deaths, the medical men presumably are unable to decide the fact of vaccination. The difficulty no doubt is great, for as Dr. Savill has pointed out in his report on the Warrington epidemic, "in nearly all fatal cases the eruption is profuse and tends to hide the vaccination scars if they exist."[1] Dr. Birdwood, as I have shown, is also alive to the difficulty, and recommends that the statements of parents as to primary vaccination should be accepted. The relatives in the cases I am referring to almost invariably asserted that the patients had been vaccinated, and thus I cannot help thinking that the most important part of the case for vaccination has been given away, for if in the recent

[1] Final Report, Royal Commission on Vaccination, Appendix v., p. 34.

epidemic (1892-95), we add the "not stated" cases to the vaccinated, nearly 80 per cent. of the total deaths from small-pox will be found in the vaccinated class.

It seems a pity that the vaccinal condition of patients suffering from small-pox has not more often been determined by reference to the vaccination register.

Dr. Birdwood informed the Royal Commission (Q. 31,250-51) that the Metropolitan Asylums Board used to forward a list of patients to the Local Government Board for this purpose, but that he knew of no published results of their inquiries. If the Local Government Board would undertake investigations of this nature, they would doubtless receive the cordial co-operation of both parties in the vaccination controversy, and the results would prove interesting, if not instructive.

It has been urged that the protection afforded by vaccination is in proportion to the number and the quality of the marks. In the first place, cicatrices resulting from the same lymph of good quality vary considerably. They may be smooth, striated, puckered, pitted, and so on; in fact, a French observer, Decanteleu, has figured no less than seventy different varieties of scars.[1] Dr. Savill points out that "the foveation of vaccination scars does but follow the same laws which govern other lesions involving only the superficial layers of the skin;"[2] and he figures the arm of a girl to show

[1] Professor Crookshank's Evidence. Fourth Report, Royal Commission on Vaccination. Q. 11,892.

[2] Final Report, Royal Commission on Vaccination, Appendix v., p. 42.

the similarity of foveate texture in a scar resulting from a superficial burn on the shoulder, and in some primary vaccination cicatrices. Thus, it would appear that the texture of the vaccination cicatrix depends on the amount of the local inflammation, on the method of performing the operation, on the age, surroundings, and general health of the individual, and on other factors.

It is also worthy of notice that in classifying cases of small-pox according to vaccination marks, different methods are adopted by different observers. Thus Dr. Gayton informed the Royal Commission (Q. 1,700-06) that when he found one good mark and three imperfect ones, he might class them as a case of two good marks, or he would ignore the three imperfect marks, and class the case as one of a single good mark. Of 10,403 cases of small-pox admitted to the hospitals of the Metropolitan Asylums Board during 1870-84, Dr. Gayton[1] classified 2,085, or 20 per cent., as "vaccinated with good marks;" whereas, at another hospital of the same Board, during the years 1880-85, Dr. Sweeting[2] placed only 39 out of 2,584, or 1·5 per cent., in the category of "good vaccination." The Dissentient Commissioners, Dr. Collins and Mr. Picton, observe (Section 129)—"It is evident that such a difference indicates a wide margin for personal discrimination as to what is and what is not 'good vaccination.'" It is, therefore, not altogether surprising to learn, on the authority of Dr. M. D. Makuna, when medical superintendent of the Fulham

[1] Second Report, Royal Commission on Vaccination, Appendix, p. 245.
[2] *Ibid.* Q. 3,689.

Small-pox Hospital, that "what one will call an indifferent mark, another will call fair, a third moderate, and a fourth bad, and so on, till the confusion is worst confounded."[1]

The following testimonies appear to show that even "good vaccination" is far from securing a perfect immunity against small-pox. Thus, Dr. J. J. Bigsby, in an epidemic of small-pox at Newark, found that "some of the worst cases (of small-pox) had remarkably good scars."[2] In the *British Medical Journal* of April 1, 1871, Dr. Atthill is reported to have stated that "he did not think that a good mark insured protection more than an ill-defined one."[3]

Dr. B. Browning, medical officer of health to Rotherhithe, gives particulars of 469 cases of post-vaccinal small-pox, of which 100, or 21·3 per cent., died. "Many of these sufferers," he says, "showed good vaccine marks of the kind that would be deemed worthy of an extra grant from the Government Inspector (at least I used formerly to receive such grants for doing similar looking work), and yet they took small-pox—some within six days, some within six months, and some within six years of their vaccination date."[4] And lastly, I may quote the valuable testimony of Dr. John MacCombie, who, on June 12, 1878, stated before the Epidemiological Society that "the evidence afforded by the cases admitted into

---

[1] Report of the Fulham Small-pox Hospital for the year 1878, pp. 11, 12.

[2] *London Medical Gazette*, Sept. 28, 1839, vol. xxv., p. 18.

[3] *British Medical Journal*, April 1, 1871, vol. i., p. 352.

[4] Transactions of the Society of Medical Officers of Health (Session 1881-82), p. 29.

the Asylum Boards Hospitals goes to show that the good and bad marks are equally protective against attacks of small-pox,"[1] and he further remarks that "good vaccination protects absolutely against no form of small-pox."[2]

In considering the theory that the protection is in proportion to the number of marks, it may be mentioned that, if we are to be guided by Jenner, "a single cow-pox pustule is all that is necessary."[3] But this, as well as other theories promulgated by Jenner, has been discarded, and the orthodox number of marks at the present time is four. It is not pretended that this theory has any scientific basis, but it appears to rest mainly on certain figures compiled by Mr. Marson,[4] surgeon to the London Small-pox Hospital. The results he obtained are given in the following tables :—

	Cases.	Deaths.	Fatality per cent.
Unvaccinated	2,883	1,006	34·89
Vaccinated (no scars) ...	259	102	39·38
Vaccinated (scars) ...	10,293	685	6·66
1 scar	2,584	357	13·82
2 scars	3,138	242	7·71
3 scars	2,139	65	3·04
4 scars	2,432	21	·86

[1] Paper on "Comparison of Small-pox Statistics, Epidemics 1871 and 1876," by John MacCombie, M.A., M.B., Medical Superintendent to the Deptford Small-pox Hospital. Transactions of the Epidemiological Society (Sessions 1877-78 and 1878-79), vol. iv., part 2, p. 190.

[2] *Ibid.*, p. 192.

[3] "Further Observations on the *Variolæ Vaccinæ*, or Cow-pox," p. 38. London. 1799.

[4] Pages 236, 237, Report from the Select Committee on the Vaccination Act (1867). 1871.

Scars.	Indifferent scars. Cases.	Deaths.	Fatality per cent.	Good scars. Cases.	Deaths.	Fatality per cent.
1	1,530	328	21·44	1,054	29	2 75
2	1,838	224	12·19	1,300	18	1 38
3	1,151	55	4·78	988	10	1·01
4	1,179	20	1·70	1,253	1	08
Total ...	5,698	627	11·00	4,595	58	1 26

To obtain the above figures, Mr. Marson deducted deaths for superadded disease, thus :—

	Total deaths.	Deaths deducted.	Percentage of deaths deducted.
Unvaccinated ...	1,043	37	3·5
Vaccinated (scars)...	790	105	13 3

Scars.	Indifferent scars. Total deaths.	Deaths deducted.	Percentage of deaths deducted.	Good scars. Total deaths.	Deaths deducted.	Percentage of deaths deducted.
1	353	25	7·1	34	5	14·7
2	252	28	11 1	24	6	25·0
3	65	10	15·4	14	4	28 6
4	37	17	45 9	11	10	90 9
Total ...	707	80	11·3	83	25	30·1

This shows that he deducted a larger proportion of deaths for the vaccinated than for the unvaccinated, for good scars than for indifferent scars, a larger proportion for two scars than one scar, for three scars than two scars, and for four scars than three scars, the climax being reached with four good scars, in which class, with eleven deaths altogether, he deducted ten before making his calculations, and these, forsooth, are the figures on which the notorious marks theory largely depends!

Mr. P. M. Davidson, the medical officer of health to Congleton, has drawn attention to the strange conclusions to which we should be driven were we to accept some of the figures in Dr. Barry's Sheffield Report. Table CXIV. (p. 212) shows the fatality and type of disease with one, two, three, and four or more scars in cases treated at the Borough Hospital, Winter Street.

Condition as to vaccination.	Under 20 years of age.			Above 20 years of age.		
	Cases.	Deaths.	Fatality per cent.	Cases.	Deaths.	Fatality per cent.
No visible primary cicatrix, or 1 cicatrix only	22	0	0 0	73	13	17 8
2 primary cicatrices	94	3	3 2	165	21	12·7
3 primary cicatrices	187	3	1·6	185	18	9·7
4 or more primary cicatrices	67	0	0·0	32	2	6 2

With regard to the type of disease under twenty years of age, there was one confluent case, and that had four marks. The only conclusion to be deduced from these figures is, that under twenty years of age, no visible mark, or one mark only, secures the greatest immunity from death and severe disease; whereas when a person reaches the age of twenty and upwards, one-mark cases have the greatest fatality, the fatality gradually diminishing with two, three, and four marks, and thus twenty years must elapse before the influence of plurality of marks comes into play. Dr. Barry surely did not intend us to believe that this was the case, but it is unquestionably what his figures tend to show. Again in Table CXV. (p. 214), Dr. Barry gives statistics for the Ecclesall Bierlow Union Workhouse Hospital at all ages, as follows :—

Scars.	Attacks.	Deaths.	Fatality per cent.
1 or 2	14	7	50·0
3 or more	118	2	1·7

These percentages are seriously set forth to show the alarming difference in fatality between one or two and three or more marks, Dr. Barry and those who supplied him with the statistics apparently forgetting that the fatality he gives for one or two marks is nearly three times the average fatality of the unvaccinated in the last century, and even much larger than the figures he himself gives for his own unvaccinated class, and if they show anything at all they show that the one-mark vaccination which was fashionable during the first half of the century was provocative of a fatal issue if attacked, and that most of the private vaccination at the present time is in the same plight, and that Mr. Ernest Hart is giving the best of advice when he says—"Better by far let such applicants (for one or two small insertions) depart with their children unvaccinated than place them in a state of false security."[1]

Mr. P. M. Davidson, besides criticising Dr. Barry's figures, has given us the result of his own painstaking and valuable experience of a small outbreak he had to deal with at Congleton, and the following has been extracted from a table he gives of these cases, on p. 27 of his report.[2]

---

[1] Allbutt's "System of Medicine," vol. ii., p. 676. London. 1897.

[2] Special Report on the Recent Outbreak of Small-pox in Congleton. 1889.

No.	Name.	Age.	Results of vaccination.	Character of small-pox.
1	George T. -	18	Five deeply pitted scars, one and one-third square inch in area.	Semi-confluent, severe, numerous pits.
2	Henry B. -	43	One superficial scar, one-third square inch in area.	Discrete, very mild, no pitting; worked throughout illness.
3	George W. -	26	Three scars (one deeply pitted, two pitted), one and one-quarter square inch in area.	Semi-confluent, very few pits.
4	Emma B. -	40	Two superficial scars, two-thirds square inch in area.	Discrete, very mild, no pitting; had only about twenty spots; never in bed.
5	Annie S. - -	25	Four scars (two pitted, two superficial), one-half square inch in area.	Discrete, very mild, no pitting.
6	Randel B. -	32	Four scars (three deeply pitted, one pitted), two-thirds square inch in area.	Confluent, severe, pitted deeply, extensively, and permanently; face completely covered.
7	Harry B. - -	26	Eight scars (two pitted, six superficial), one square inch in area.	Confluent, pitted considerably.
8	John P. - -	19	Two deeply pitted scars, one-third square inch in area.	Confluent, extensively and permanently pitted.

9	Daniel C. -	27	Three scars (one pitted, two superficial), one-fifth square inch in area.	Discrete, very mild, no pitting.
10	James C. - -	20	Four scars (two deeply pitted, one pitted, one superficial), three-quarters square inch in area.	Discrete, some pitting.
11	John C. - -	19	Four scars (two deeply pitted, one pitted, one superficial), one square inch in area.	Confluent, severe, much pitted.
12	William T. -	25	Four pitted scars, one-third square inch in area.	Discrete, a few slight pits.
13	Thomas S. -	55	Three scars (one deeply pitted, one pitted, one superficial), one-third square inch in area.	Semi-confluent, slightly pitted.
14	Annie P. - -	18	Three scars (one deeply pitted, two superficial), four-fifths square inch in area.	Discrete, very mild, two or three pits.
15	Mrs. C. - -	43	Two deeply pitted scars, three-quarters square inch in area.	Discrete, severe, slightly pitted.
16	Margaret T. -	40	Four deeply pitted scars, three-quarters square inch in area.	Confluent, hæmorrhagic, pitted extensively ; the most severe case.
17	Sarah A. - -	27	One deeply pitted scar, one-third square inch in area.	Discrete, very mild, no pitting ; mildest of all except Cases 2 and 4.

Thus five of the cases (Nos. 6, 7, 8, 11, and 16) were confluent, three semi-confluent (Nos. 1, 3, and 13), and nine discrete (Nos. 2, 4, 5, 9, 10, 12, 14, 15, and 17). All the confluent cases, except No. 7, had well-pitted vaccination scars. One of them (No. 7) had eight scars, three (Nos. 6, 11, and 16) had four scars, and the remaining one (No. 8) two scars; the average number of scars being four and one half, and the average superficial area three quarters of a square inch.

Of the three semi-confluent cases, No. 1 had five scars, and this was the most severe; and the remaining two (Nos. 3 and 13) had three scars each; the average number of scars being three and two thirds, and the average superficial area one square inch.

Of the nine discrete cases, three (Nos. 5, 10, and 12) had four scars, two (Nos. 9 and 14) three scars, two (Nos. 4 and 15) two scars, and the remaining two (Nos. 2 and 17) one scar each; the average number of scars being two and two thirds, and the average superficial area one half of a square inch. The following table gives a summary:—

	Average number of scars.	Average superficial area, in square inches.
5 confluent cases	$4\frac{1}{2}$	... $\frac{3}{4}$
3 semi-confluent cases ...	$3\frac{2}{3}$	... 1
9 discrete cases	$2\frac{2}{3}$	... $\frac{1}{2}$

Mr. Davidson adds (p. 15)—"Comment on this is superfluous, and I leave it to anyone caring to consider the matter to judge for himself what he is to expect from scars and superficial areas in this part of the country. If they teach anything, it is that the more you have of them, and the larger and deeper they are, the more severe will be your small-pox."

The best way to test the question is to compare the incidence of small-pox following vaccination by public and private practitioners, for the public vaccinators are bound by their regulations to work up to a certain standard. In the Sheffield epidemic (1887-88) it was found that 358, or 79·4 per cent., of the 451 vaccinated cases of small-pox under ten years of age had been vaccinated by public vaccinators, who had only performed 63 per cent. of the successful primary vaccinations for the ten-year period up to the epidemic;[1] hence it follows that small-pox picked out the work of the public vaccinators, whose skilful and successful performances had qualified each operator for a Government grant. Again, Sheffield Park, North Sheffield, and West Sheffield—the districts of the borough which were the most seriously afflicted with small-pox—had the largest percentage of their successful primary vaccinations, for the ten years previous to the epidemic, performed by public vaccinators; whereas Ecclesall and Upper Hallam, with the smallest percentage, came off the lightest of all the districts of Sheffield.

The large proportion of three or four-mark cases of small-pox in very efficiently vaccinated towns, as in the case of Willenhall, strongly condemns the theory. Of the 681 vaccinated persons attacked in which the number of scars was known, 374, or 54·9 per cent., had four marks, and 536, or 78·7 per cent., had three or four marks, while the one-mark cases only amounted to 24, or 3·5 per cent. of the whole.

---

[1] Report on an Epidemic of Small-pox at Sheffield (1887-88), pp. 185, 187; Tables xcvii., xcix.

Before concluding the chapter, the opinion of Dr. George Gregory, the distinguished predecessor of Mr. Marson at the London Small-pox Hospital, is worth recording. In the twenty-fourth volume of the Medico-Chirurgical Transactions (1841, pp. 23, 24), after detailing several cases, he says:—"It follows, I think, from these cases, that the cicatrix cannot be relied on as affording any certain test of the degree to which the constitution has imbibed an anti-variolous influence."

Another authority (Dr. Fleetwood Churchill) observes:—"For some years I have only made one (puncture), on account of the severe inflammation which sometimes results from two or more, nor have I had any reason to suppose that my object was not as completely attained."[1]

The more recent authorities also deprecate the "mark theory." Thus, Dr. Birdwood observes that, in regard to primary vaccination, he advocates "the production of one vaccine vesicle only;"[2] and Dr. Ricketts writes—"Considering that scars vary in size and in appearance in the course of years, and that vaccinia must be regarded as a specific fever, it is not at first sight apparent what the characteristics of the inoculation cicatrices have to do with the amount of protection afforded. But, after all, it is a question of fact, which, provided proper observations are made, ought to be, and can be settled in course of time by such statistics."[3]

---

[1] "The Diseases of Children," p. 821. Third edition. Fleetwood Churchill, M.D. Dublin. 1870.

[2] Sixth Report, Royal Commission on Vaccination. Q. 31,221.

[3] Report of the Metropolitan Asylums Board for 1893, p. 134.

Some observers, besides those already mentioned, obtained equivocal results. Dr. Dalton[1] gives the following experiences :—

Marks.	Cases.	Fatality per cent.
1	126	2·4
2	171	5·3
3	177	2·8
4	140	0·7
5 or more	93	2·2

Also Dr. Coupland,[2] who gives the following for the Dewsbury epidemic :—

Marks.	Cases.	Deaths.	Fatality per cent.
1	34	0	0·0
2	175	10	5·7
3	210	0	0·0
4 or more	42	1	2·4

There is thus very slender evidence to show that the protection depends upon the number or character of marks, and the little that exists is mainly afforded by the earlier statistics, such as Marson's, which it is obvious are inaccurately founded.

From the foregoing facts it is evident that the mitigation attributed to vaccination depends largely upon the elimination of cases from the vaccinated lists, rather than to any real modification of the disease, and this is borne out by the fact that the fatality of small-pox in 1871-72, when a large proportion of the cases were admittedly vaccinated, was as great as the average fatality of the last century.

---

[1] "Small-pox in its Relation to Vaccination," p. 23. J. H. C. Dalton, M.A., M.D., B.C. (Reprinted from the *Medical Chronicle*, October, 1893.)

[2] Final Report, Royal Commission on Vaccination, Appendix iii., p. 115.

CHAPTER VII.

RE-VACCINATION.

THE admission that re-vaccination is necessary, is a departure from the original position taken up by the profession. It was not only Jenner who was so positive about the lifelong protection afforded by vaccination, but his opinion has been endorsed by the highest authorities at a later period. Sir John Simon says:— "On the conclusion of this artificial disorder (vaccination), neither renewed vaccination, nor inoculation with small-pox, nor the closest contact and cohabitation with small-pox patients, will occasion him (the vaccinated person) to betray any remnant of susceptibility to infection."[1]

When this theory, upon which all vaccination legislation was initiated and justified, was discovered untenable, that of re-vaccination was introduced. Instances of both mild and severe attacks of small-pox taking place at all periods after re-vaccination are numerous. I propose to give a few of these. Mr. Badcock, the celebrated small-pox cow-pox vaccinator, relates his own personal experience: "Towards

---

[1] "Papers relating to the History and Practice of Vaccination," p. xiv. 1857.

the end of the year 1836, I suffered severely from a dangerous attack of small-pox, which happened but a few months after re-vaccination."[1] We also have the experience of Mr. Justice Grantham:—"He impressed on the anti-vaccinators the peril they were incurring to themselves and their neighbours by their opposition to inoculation, and in support of his arguments as to the effect of vaccination, stated that he, after having been twice inoculated, had an almost miraculous recovery from an attack of small-pox, which, in its incipient stages, was as bad as it could be."[2]

The following case shows the complete failure of three successful vaccinations to prevent a severe attack of small-pox. It is recorded by Dr. T. C. Wallace in the *American Medical Times* of March 1, 1862 (vol. iv., p. 122). The patient, Charles Nichols, aged thirty-five, had an "extraordinarily severe" attack of confluent small-pox, and Dr. Wallace observed that he had never seen anyone so completely covered with pustules. The man had a large scar on the right arm, resulting, he informed Dr. Wallace, from vaccination when a child, and a similar one on the left arm, due to vaccination three years prior to attack. He was again vaccinated on the 24th of December, 1861, the vesicle being "fully formed, large, and well filled," the vaccination being accompanied by some slight constitutional symptoms. He was attacked with small-pox

---

[1] "A Detail of Experiments confirming the power of Cow-pox, etc.," p. 11. John Badcock, Chemist. Brighton. 1845.

[2] *Sussex Daily News*, April 9, 1896.

on the 8th of January, 1862, just fifteen days after the third vaccination.

The *British Medical Journal* of December 7, 1872 (vol. ii., p. 643), reports a meeting of the Medical Society of the College of Physicians in Ireland, when Dr. Darby furnished statistics of small-pox cases treated in the Rathdown Union Hospital; thirteen of the cases were re-vaccinated, with one death. At the same meeting, Dr. Grimshaw alluded to three re-vaccinated cases of small-pox admitted to the Cork Street Hospital, one of which was fatal.

In a letter to the *British Medical Journal* of December 9, 1876 (vol. ii., p. 774), Mr. R. G. Kellett wrote that, during an epidemic at Bilston, Staffordshire, in 1871-72, he re-vaccinated himself, his wife, and his two servants. Although the vaccination took well in all, each in turn developed small-pox, "certainly of a most abortive form, not more than a dozen spots or so appearing on any of us, but still it was small-pox."

The same journal[1] also reports some cases of small-pox, which came under the observation of the Health Department of Brooklyn, the statistics being furnished to the *Brooklyn Eagle*, by Dr. J. H. Raymond, the Health Commissioner. Among these is that of a child, aged three, who died of small-pox notwithstanding that she had been well vaccinated in infancy and once later.

In the Homerton Hospital Report for 1878 (pp. 23-25), Dr. Gayton gives six cases of small-pox after re-vaccination, with the following particulars :—

---

[1] *British Medical Journal*, May 20, 1882, vol. i., p. 749.

1. "Kate King, aged twenty, admitted February 18, 1878, three imperfect marks; eruption very discrete; was placed on 'Full Diet' February 22, 1878, and discharged March 14, 1878. The re-vaccination was stated to have been performed five years ago, with success. The patient did not remember upon which arm it was done, therefore the cicatrices observed may have been due to either the primary or the secondary operation, as no others were visible."

2. "John Wist, aged twenty-seven, two good marks; admitted March 7, 1878, with discrete small-pox. The patient reported that he had been vaccinated three times in the course of his life; the first in infancy, the operation succeeding; the second at the time of joining the Metropolitan Police, at twenty-two years of age, and that this took 'very slight;' the third and last time, six months before becoming a patient, by a medical man in Whitechapel, but without effect. He was also positive that the two cicatrices seen upon the left arm were the result of the primary operation, as the sore left by the secondary one soon healed up and left no marks."

3. "Samuel Fish, aged twenty-three, admitted March 21, 1878, three imperfect marks; eruption confluent, general symptoms very severe. Discharged cured June 17, 1878. Was vaccinated in infancy, and again when ten years old. The certificate of re-vaccination in this case was produced, but it could not be satisfactorily determined to which operation the cicatrices were to be attributed."

4. "James Connelly, aged thirty-nine; admitted March 30, 1878, with five marks, three good and two

imperfect, the eruption being discrete. He was put on 'Full Diet' on April 1, and transferred April 13, 1878. The patient, an old soldier, stated that he was re-vaccinated when in India about four years ago, and that the operation was very successful. There were three well foveated cicatrices close together, the extent of surface being about the size of a shilling."

5. "Ellen Clark, aged twenty-one, with one imperfect mark, admitted April 10, 1878, with small-pox of the hæmorrhagic form, and died April 12, 1878, was said to have been re-vaccinated, and arm to have been slightly sore for three or four days, but no cicatrix, except the one referred to, could be traced."

6. "E. Williams, aged three years, admitted April 25, 1878; eruption discrete. On April 27 had ordinary diet, and on May 18 discharged; was stated by parents to have been 'vaccinated when an infant,' one imperfect mark being now visible as the result. Six weeks ago, in consequence of small-pox having occurred in the house, she was again vaccinated in four places, all of which were attended, apparently, by some result. The marks seen, reddish-brown in colour, were small in size, and *not* indented."

In the Deptford Report for the period from April, 1878, to December, 1879, Dr. John MacCombie details the following experience (pp. 7, 8):—

1. "William W., *æt.* nineteen; admitted May 13, 1878. Three imperfect marks of primary vaccination; re-vaccinated *æt.* sixteen, two re-vaccination marks; discrete attack; discharged June 10."

2. "Matilda B., *æt.* twenty; admitted May 31, 1878. Two imperfect marks of primary vaccination; re-

vaccinated *æt.* sixteen, three re-vaccination marks; discrete attack; discharged June 20."

3. "Caroline P., *æt.* twenty-three; admitted July 11, 1878. Five imperfect marks of primary vaccination; re-vaccinated *æt.* ten and sixteen. She stated that she had a 'sore arm' on both occasions, but there were no re-vaccination marks; discrete attack; discharged August 22."

4. "Emma S., *æt.* twenty-one; admitted July 25, 1878. Two good marks of primary vaccination; four marks of re-vaccination performed at the age of nine or ten; discrete attack; discharged August 31."

5. "Lucy H., *æt.* forty-two; admitted August 5, 1878. Two imperfect marks of primary vaccination; re-vaccinated *æt.* twelve; one re-vaccination mark; discrete attack; discharged August 22."

6. "Sarah H., *æt.* thirty-six; admitted August 13, 1878. Three imperfect marks of primary vaccination; three marks of re-vaccination performed at the age of sixteen; attack confluent; discharged July 23, 1879."

7. "Fanny C., *æt.* thirty-three; admitted March 11, 1879. One imperfect mark of primary vaccination; re-vaccinated *æt.* twenty-one, on left arm in two places. There were no re-vaccination marks, but patient stated that her arm was sore, and that the medical man to whom she showed it a week after the operation was performed said 'it was doing all right.' She died of black small-pox on March 14."

8. "Sarah P., *æt.* twenty-one; admitted April 18, 1879. Said to have been vaccinated in infancy, but there were no marks. Has three marks of re-vaccination

performed at the age of eighteen; discrete attack; discharged May 5."

9. "Fanny L., *æt.* thirty-six; admitted October 13, 1879. Three imperfect marks of primary vaccination; two marks of re-vaccination performed at the age of thirty-one; discrete attack; discharged November 8, 1879."

10. "James H., *æt.* twenty-seven; admitted November 8, 1879. One good mark of primary vaccination; re-vaccinated *æt.* fifteen. Stated that he had a 'sore arm' after re-vaccination. No marks; discrete attack; discharged December 12."

Elsewhere Dr. John MacCombie says—"For myself, I am inclined to believe that small-pox after successful re-vaccination is not infrequent."[1] Apparently an extended experience has not modified his views, for quite recently he says—"Some persons who have been successfully re-vaccinated do, however, contract small-pox. Of such cases observed by me the time intervening between the re-vaccination and the attack of small-pox varied from one to twenty-five years; the average being ten years."[2] And further on in the same work he makes further admissions when he says "it is impossible in all cases to promise immunity from attack or even from death after vaccination and re-vaccination."[3]

In the Homerton Hospital Report for 1881 (p. 11), Dr. Collie gives details of three cases after re-vaccination.

---

[1] Transactions of the Epidemiological Society, vol. iv., part ii., p. 193. Sessions 1877-78 and 1878-79.

[2] Allbutt's "System of Medicine," vol. ii., p. 207. London. 1897.

[3] *Ibid.*, p. 222.

1. "Henry P., *æt.* nineteen, admitted November 11. Primary vaccination in infancy; re-vaccination six years ago; three marks on right arm, two on left, but patient cannot differentiate them; all imperfect. Transferred to 'Atlas' December 7. Mild discrete attack. (Admitted from City and sent in City ambulance.)"

2. "Emma P. (sister of above), *æt.* twenty-two, admitted November 26. Primary vaccination in infancy; five imperfect marks; re-vaccination six years ago; no marks, but said to have taken well; again re-vaccinated on morning of November 5 (first symptoms of small-pox on November 21), seems to have taken well. Transferred to 'Atlas' December 7. Mild discrete attack. (Admitted from City and sent in City ambulance.)"

3. "Ada J., *æt.* twelve, admitted December 12. Primary vaccination in infancy; two imperfect and doubtful marks; re-vaccination six months ago; patient says it took well; one imperfect and doubtful mark. Mild discrete attack. (Sent by Hampstead in Hampstead ambulance.)"

These cases, together with those recorded by Dr. Gayton and Dr. MacCombie, have, through the courtesy of the Clerk, Mr. Duncombe Mann, been copied verbatim from the reports of the Metropolitan Asylums Board. I wish to commend them to those who affirm that compulsory re-vaccination would effectually extinguish small-pox.

The following cases of small-pox, within short periods of re-vaccination, are given in the Sheffield Report.

Page of Report.	District.	No.	Name.	Age when attacked.	Vaccination and re-vaccination.	Results of vaccination and re-vaccination.	Character of small-pox.
139	Ecclesall - -	65	Elizabeth A. H.	29	Vaccinated in infancy.	Three well-marked cicatrices, three-quarters square inch in area.	Alleged to have suffered from small-pox in December, 1887; eruption only on the right hand; no spots anywhere else.
					Re-vaccinated October, 1887.	One cicatrix, one-sixth square inch in area.	
87	Sheffield Park -	12	Elizabeth J. -	18	Vaccinated in infancy.	Three good-class cicatrices, area over one square inch.	Small-pox in February, 1888, very mild attack, ten spots, did not feel ill.
					Re-vaccinated Sept., 1887.	Two well-marked cicatrices, one-third square inch in area.	
72	North Sheffield -	45	William F. -	27	Vaccinated in infancy.	Three well-marked large cicatrices, one and one-half square inches in area.	Mild attack of small-pox in November, 1887; not pitted.
					Re-vaccinated in 1886	Two small cicatrices.	
71	North Sheffield -	5	Sarah G. -	12	Vaccinated in infancy.	Three well-marked cicatrices, three-quarters square inch in area.	Extremely mild attack of small-pox in October, 1887; not pitted, ill fourteen days.
					Re-vaccinated in 1884.	One cicatrix one-sixth square inch in area	
101	South Sheffield -	8	Fanny C. -	7	Vaccinated in infancy.	Four fairly well-marked cicatrices, one-third square inch in area.	Very mild attack of small-pox in 1888, about twenty spots, no pitting.
					Re-vaccinated in 1885.	One small cicatrix.	
101	South Sheffield -	3	Joseph W. -	29	Vaccinated in infancy.	Three well-marked deep cicatrices, three-quarters square inch in area.	Severe attack of small-pox in December, 1887, badly pitted.
					Re-vaccinated in 1882.	Two well-marked cicatrices.	

In the Report of the Metropolitan Asylums Board for 1890 (pp. 55-57), we learn that, during the year, twenty-six patients were admitted for small-pox, and two of these died. The first, aged twenty-six, had been unsuccessfully vaccinated at nine months of age, and successfully vaccinated when about ten years of age, and the scars were obscured by the eruption. The other death was in a man aged forty-four, who had been three times successfully vaccinated, once in infancy, and again at seven and twenty-one years of age. Five of the twenty-six patients were unvaccinated, and none of these died.

Dr. Dalton,[1] in his critical examination of 1,000 cases of small-pox, gives a list of sixty-one persons taking the disease from one to forty years after re-vaccination. Of these, seven, or 11·5 per cent. died, or a higher fatality than that for his 1,000 cases (8·5 per cent.).

If any further evidence were required to demonstrate the futility of re-vaccination, it is furnished by the Army and Navy Reports. Staff-Surgeon T. J. Preston informed the Royal Commission (Q. 3,270) that in 1883 "three cases occurred in the 'Audacious,' which were contracted at Shanghai. All three men had been successfully re-vaccinated—one in 1880, one in 1881, and the third in 1882. The disease was of a very mild form, and the men were but slightly marked."

On p. 63 of the "Statistical Report of the Health of the Navy for the year 1881," dated 1882, there is a reference to nine cases occurring on the "Eclipse," on

---

[1] "Small-pox in its Relation to Vaccination," p. 25. J. H. C. Dalton, M.A., M.D., B.C. (Reprinted from the *Medical Chronicle*, October, 1893.)

the East Indies Station. "The first case, in the person of a leading seaman, aged thirty-one, was contracted at Rangoon where small-pox had been lately prevalent, and proved to be a severe case of the confluent form of the disease. The patient had been re-vaccinated two years before. He was taken ill on the 19th April; there was a copious confluent eruption, with high fever and delirium. On the arrival of the ship at Trincomalee, he was landed at a bungalow on Sober Island, where he died on the next day, 28th April. On the 29th April, a second case appeared, in the person of an able seaman, aged twenty-seven, who was at once landed in the temporary hospital; in his case the eruption was also confluent, and he died on the eleventh day of the disease. He is said to have been successfully re-vaccinated four years previously." There were seven other cases, several of which were severe, and all of them vaccinated and re-vaccinated.[1]

With regard to the army, the tract[2] before alluded to informs us that the men are always re-vaccinated on entering the force, and it states (p. 7) that "official experience in England and abroad has shown that soldiers who have been re-vaccinated can live in cities intensely affected by small-pox without themselves suffering to any appreciable degree from the disease."

Brigade-Surgeon Nash, when examined before the Royal Commission, also agreed (Q. 3,559) that in the

---

[1] Second Report, Royal Commission on Vaccination. Q. 3,284.

[2] Facts concerning Vaccination for Heads of Families. (Revised by the Local Government Board, and issued with their sanction.)

army vaccination and re-vaccination was as perfect as endeavours could make it, and yet he handed in a list of 3,953 small-pox cases, with 391 deaths, for the years 1860-88. In 1889, among the troops in Egypt, there were 42 cases of small-pox, with 6 deaths. These, on the strength (3,431), give an attack-rate of 12,241, and a death-rate of 1,749 per million; the attack-rate being six times that of Leicester, and five times that of Keighley, and the death-rate fifteen times that of Leicester and eight times that of Keighley in the recent epidemics in these notoriously unvaccinated towns.

The Army Medical Report for 1889 states (p. 190):—"A detachment of the 1st Battalion Welsh Regiment was stationed at Assouan during the latter part of 1888 and the early part of 1889; during that time an outbreak of small-pox occurred among the native population, and the disease broke out among the troops; two cases also occurred on the voyage from Assouan to Cairo. Notwithstanding all the precautions taken in Cairo, and due regard having been paid to vaccination and re-vaccination, the disease kept on the increase, and in the month of May presented signs of doing so still further. The Welsh regiment, which suffered most, was in Kasr-el-Nil barracks, which are situated near a crowded thoroughfare and on the banks of a navigable river. It being more than probable that the disease was derived from natives, the Welsh regiment, on the recommendation of the Principal Medical Officer, was removed to Abbassiyeh, where the situation is healthier and intercourse with the natives could be prevented. Small-pox, the Principal Medical Officer, Deputy-Surgeon General

Jameson, remarks, is always more or less prevalent among the natives in Cairo, and, indeed throughout Egypt, and as there exists no means of segregating affected cases, it is certain that patients in various stages of the disease are permitted to walk about, and to frequent bazaars and streets to the great danger of the public."

If we take the figures over a long period, the results are the same.[1] Thus, in Egypt, in the fourteen years, 1882-95, there were 233 cases and 25 deaths from small-pox among the troops, or an average annual attack-rate of 3,004, and a death-rate of 322 per million. The Indian army, during the same period, furnished 691 cases and 68 deaths, the rates being 768 and 76 per million respectively; while in Leicester the rates were only 204 and 13 per million (446 cases and 29 deaths). I may mention that the comparison is unfair to Leicester, for the army consists of picked men living at a comparatively insusceptible period of life.

The following cases extracted from a report by Surgeon I. Boulger,[2] of the Army Medical Staff, relate to the small-pox which prevailed among the troops at Cairo in 1885 :—

"Private A. W—, 2nd East Surrey Regiment, age twenty-three; service, three years. Marks, three right (good). Re-vaccinated on enlistment; modified. Admitted, 4th December, 1884; discharged, 8th January, 1885—thirty-six days. This was a mild case;

---

[1] See Appendix.

[2] "Report of a series of cases of small-pox which occurred amongst the British troops in Cairo from January to October, 1885." Appendix to the Army Medical Report for 1885, pp. 443-450.

symptoms preceding eruption were well marked, such as lumbar pain, vomiting, pyrexia; but the eruption was scanty; discrete throughout; slight secondary fever; no pitting."

"Private F. A—, 2nd East Surrey, age twenty-three; service, three and a quarter years. Marks, one right (good), three left (fair). Re-vaccinated on enlistment; modified. Admitted, 2nd February, 1885; discharged, 15th May, 1885—one hundred and three days. Patient had been under treatment in hospital for a month with secondary syphilis, when symptoms of small-pox appeared. The attack was most severe, of the confluent type. Convalescence was delayed by large boils on legs, and for a long time he was in a very anæmic state. Skin much pitted."

"Private J. K—, 2nd East Surrey, age twenty-eight; service, five and a half years. Marks, two right (good), one left (faint). Re-vaccinated on enlistment; modified. Admitted, 2nd February, 1885; discharged, 22nd March, 1885—forty-nine days. Was of the confluent variety. Temperature before eruption appeared, 103° Fahr. Patient very robust; there was a large quantity of eruption, and it went on to maturation, though without much secondary fever. No complications; throat was sore."

"Sapper J. H—, Royal Engineers, age twenty-five; service, three years. Marks, two right (good). Re-vaccinated on enlistment; modified. Admitted, 2nd February, 1885; discharged, 22nd February, 1885—twenty-one days. Very mild; discrete; eruption scanty, but went on to maturation; no complications; no pitting; desquamation rapidly completed."

"First-class Staff-Sergeant E. F—, Medical Staff Corps, age thirty-two; service, fourteen years. Marks, two left (good); two right (fair). Re-vaccinated, 18th August, 1870; failed. Re-vaccinated, 2nd March, 1876; perfect. Admitted, 2nd February, 1885; discharged, 21st February, 1885—nineteen days. Very mild case; very little eruption, and it never went beyond the vesicular stage; had most severe initial symptoms. The lumbar pain was intense, and twenty-four hours before eruption appeared, he had a well-marked attack of dry pleurisy on the left side; the friction sound was very marked, and the temperature, 103° Fahr."

"Private F—, 2nd Royal Sussex, age twenty-two; service, three years. Marks, two right and two left (faint). Re-vaccinated, 2nd February, 1882; perfect. Admitted, 22nd February, 1885; discharged, 13th March, 1885—eighty-two days. Very severe; initial symptoms, vomiting, lumbar pain, pyrexia very marked; eruption preceded by a scarlatinous prodromal rash over pubes, and at flexures of joints. Eruption copious, confluent on face and forehead; went on to suppuration, but there was not much secondary fever. Large, soft crusts formed on face when the pustules ruptured, and convalescence was long delayed owing to the adherence of these crusts."

"Private P—, 2nd Royal Sussex, age twenty-one; service, two years. Marks, two left (fair). Re-vaccinated 24th May, 1883; modified. Admitted 21st March, 1885; discharged, 4th May, 1885—forty-five days. Severe case. Eruption confluent, with marked nervous symptoms; eruption went on to pustulation;

secondary fever high ; extensive crusts formed on face ; desquamation was long delayed ; slight pitting."

"Private C—, 2nd Royal Sussex, age twenty-three ; service, four and a third years. Marks, two left (good). Re-vaccinated, 2nd December, 1881 ; modified. Admitted 24th March, 1885 ; discharged, 2nd May, 1885—forty days. Case of average severity ; semi-confluent. Eruption plentiful, and went on to pustulation. No complications ; desquamation slow."

"Lance Corporal S—, 2nd Royal Sussex, age twenty - three ; service, three and a quarter years. Marks, two right (good), four left (fair). Re-vaccinated, 1881 ; modified. Admitted, 25th March, 1885 ; discharged, 21st April, 1885—twenty-eight days. Very mild case ; eruption scanty ; no secondary fever of any consequence ; pustules formed and soon dried up ; desquamation rapid."

"Private M—, 1st Yorkshire Regiment, age twenty ; service, two years. Marks, three right (good). Re-vaccinated on enlistment ; modified. Admitted, 16th April, 1885 ; discharged, 16th May, 1885—thirty-one days. Case of average severity. Eruption copious, but discrete ; went on to suppuration. No complications, except severe sore throat."

"Private O—, 2nd Royal Sussex, age twenty ; service, two years. Marks, three left (good). Re-vaccinated, 25th August, 1883 ; modified. Admitted, 29th April, 1885 ; discharged, 5th June, 1885—thirty-eight days. Case of average severity ; initial symptoms severe. Eruption copious, but discrete ; went on to pustulation ; not much secondary fever. No complications or pitting ; desquamation tedious."

"Private A—, 2nd Royal Sussex, age twenty; service, two years. Marks, three right (good). Re-vaccinated, 25th May, 1883; perfect. Admitted, 11th May, 1885; discharged, 22nd June, 1885—forty-three days. Case of average severity. Eruption copious, but discrete; went on to formation of pustules; very little secondary fever. No complications; desquamation much prolonged."

"Private MacF—, 1st Gordon Highlanders, age twenty-six; service, five and two thirds years. Marks, three left (very faint). Re-vaccinated, 10th October, 1879; modified. Admitted, 20th May, 1885; died 28th May, 1885—nine days." (Man contracted small-pox while under treatment for syphilis at the hospital.)

"Private J—, 2nd Duke of Cornwall's Light Infantry, age twenty-four; service, four years. Marks, two left (good). Re-vaccinated on enlistment; modified. Admitted, 24th June, 1885; discharged, 21st July, 1885—twenty-five days. Very mild case; but the eruption went on to pustulation. Eruption scanty and discrete everywhere; no secondary fever; desquamation rapid."

"Private S—, 1st Royal West Kent, age twenty-two; service, three years. Marks, three left (good). Re-vaccinated, 1882; modified. Admitted, 27th June, 1885; discharged, 12th August, 1885—forty-seven days." (Muscular pains, followed by vomiting and rise of temperature. Copious discrete eruption all over body, rapidly going on to pustulation; desquamation tedious.)

"Private F—, 2nd Oxford Light Infantry, age twenty; service, two years. Marks, two left (good). Re-vaccinated, July, 1883; perfect. Admitted 15th July, 1885; discharged, 12th August, 1885—twenty-nine

days. Mild case; usual initial symptoms, and which were well marked. Eruption appeared on 17th; was scanty, and principally on forehead and face; discrete everywhere. Papular became vesicular on 19th, and then proceeded no further, but rapidly dessicated. No secondary fever. Case was complicated with slight sore throat; desquamation rapid."

"Lance-Corporal G—, Mounted Police, age twenty-six; service, six years. Marks, four left (faint). Re-vaccinated, 25th September, 1879; modified. Admitted, 30th July, 1885; died, 3rd August, 1885—five days." (Surgeon Boulger here gives details of the case, which appeared to be of the hæmorrhagic variety.)

In the 1870-72 epidemic at Berlin[1] we have figures on a still larger scale. There were 1,036 re-vaccinated cases of small-pox, and of these 162 are reported to have died. This is a fatality of 15·6 per cent., or very little less than the average fatality of small-pox during the last century in England, and over two and a half times that of unvaccinated Leicester in the recent epidemic.

A statement which is always quoted as indisputable evidence of the special protective power of re-vaccination, is the alleged immunity of small-pox hospital attendants.

If re-vaccinated nurses do not take small-pox, as affirmed, abundant evidence has been adduced to show that this is not the case with re-vaccinated soldiers; and hence it is clear that the nurses' immunity

---

[1] "Zeitschrift des Königlich Preussischen Statistischen Bureaux," p. 119. Berlin. 1873.

(such as it is) is rather a function of being nurses than of being re-vaccinated. Moreover, unre-vaccinated attendants have had a like immunity, as shown by the experience of M. Colin at the Bicêtre Hospital—an immunity, it may be noted, which was not shared to so marked a degree by the re-vaccinated. He found that out of nearly two hundred attendants on the hospital staff, almost all of whom had been re-vaccinated under his own eyes, fifteen were attacked with small-pox, with one death; while among the forty doctors and chemists attached to the establishment, and among the forty nuns who took care of the patients night and day, and who lived in the centre of the hospital, none were attacked, in spite of the fact that the greater number of the staff, and a large number of the nuns neglected to get themselves re-vaccinated.[1]

Examples of immunity, even when strongly exposed to small-pox, have also been observed in the un-vaccinated; these have been alluded to in an earlier chapter. The following personal experience, detailed in a letter, dated March 10, 1897, from one of the Managers of the Metropolitan Asylums Board, is a case in point:—

"In answer to yours of the 2nd inst. I was elected as Manager to the Metropolitan Asylums Board in March, 1892, and placed on the Small-pox Hospital Ships Committee at once. This Committee meets at the Ships every fortnight, except during holidays; a surprise committee visits the Ships in the intervals between the Committee meetings. I generally visit

---

[1] *La Variole*, pp. 84, 114. Léon Colin. Paris. 1873.

the wards, speak to the patients, examine the bed-cards to ascertain the vaccinal state of the patients. The number of patients, according to the Annual Reports, admitted to the ships from 1892 to 1896 inclusive is 4,952; and I have no doubt that I have seen from 3,000 to 4,000 patients suffering from small-pox, and some of these cases twice or thrice. My case is stronger than you put it. I have not even been vaccinated, or had small-pox to my knowledge; the reason I was not vaccinated, I understand, being that I was too delicate in my young days to be subjected to the operation."

Apparently small-pox is not the only zymotic disease in which an immunity of hospital attendants has been observed, for Dr. James Cantlie, in his interesting report on the recent outbreak of bubonic plague in Hong Kong, specially alludes to the fact that "no nurse, male or female, concerned in attendance at the hospitals devoted to plague, contracted the disease."[1]

It is not quite manifest why persons frequently exposed to contagion should be immune. M. Colin, a strong advocate of vaccination, felt called upon to give some explanation of the cases coming under his notice, and he suggested that a certain tolerance was acquired by repeated exposures. Of course, this may or may not be true; but whether the theory be accepted or not, it is clear that some other explanation of the alleged immunity of the hospital attendants, than the one usually given, must be sought for to meet all the facts of the case.

---

[1] *British Medical Journal*, August 25, 1894, vol. ii., p. 425

Reference is often made to the German army. Sir Joseph (now Lord) Lister, at the annual meeting of the British Association in 1896, is reported to have said that small-pox "is absolutely unknown in the huge German army, in consequence of the rule that every soldier is re-vaccinated on entering the service."[1]

In a letter to the *Times* of September 23, 1896, Mr. Trobridge pointed out that the ordinance enforcing re-vaccination on all recruits, came into force on June 16, 1834, and that it provided for at least ten insertions being made in each arm; and he quoted the evidence of Dr. Arthur F. Hopkirk, who informed the Royal Commission that he believed the law was always obeyed; and those men who refused were tied down and vaccinated by force (Q. 6,799).

The following are the figures for small-pox in the German army since 1825[2]:—

Year.	Small-pox. Cases.	Deaths.	Year.	Small-pox. Cases.	Deaths.
1825 ...	?	12	1836 ...	130	9
1826 ...	?	16	1837 ...	94	3
1827 ...	?	23	1838 ...	111	7
1828 ...	?	35	1839 ...	89	?
1829 ...	?	33	1840 ...	74	2
1830 ...	?	27	1841 ...	59	3
1831 ...	?	108	1842 ...	99	2
1832 ...	?	96	1843 ...	167	3
1833 ...	?	108	1844 ...	69	3
1834 ...	619	38	1845 ...	30	1
1835 ...	259	5	1846 ...	30	1

[1] The *Times*, September 17, 1896.

[2] "Beiträge zur Beurtheilung der Nutzens der Schutzpockenimpfung, pp. 23, 24. Berlin. 1888.

Year.		Small-pox. Cases.	Deaths.	Year.		Small-pox. Cases.	Deaths.
1847	...	5	0	1868	...	97	1
1848	...	22	1	1869	...	108	1
1849	...	62	1	1870[1]	...	41	0
1850	...	176	1	1870-71[2]	...	2,879	164
1851	...	246	3	1871[3]	...	828	34
1852	...	87	1	1872	...	389	12
1853	...	138	1	1873[4]	...	26	2
1854	...	121	3	1873-74[5]	...	22	1
1855	...	12	0	1874-75	...	26	0
1856	...	21	0	1875-76	...	20	0
1857	...	35	1	1876-77	...	19	0
1858	...	64	0	1877-78	...	12	0
1859	...	58	2	1878-79	...	15	0
1860	...	44	3	1879-80	...	7	0
1861	...	56	4	1880-81	...	23	0
1862	...	25	1	1881-82	...	16	0
1863	...	90	0	1882-83	...	9	0
1864	...	120	1	1883-84	...	7	0
1865	...	69	1	1884-85	...	7	1[6]
1866	...	91	8	1885-86	...	6	0
1867	...	188	2	1886-87	...	7	0

It will thus be seen that since the year 1834, there have been 7,505 cases and 291 deaths from small-pox in the German army, and hence Lord Lister's statement is obviously inaccurate. On March 31, 1897, at a meeting presided over by the Duke of Westminster for the

---

[1] From January to June, 1870.

[2] From July, 1870, to June, 1871.

[3] From July to December, 1871.

[4] From January to March, 1873.

[5] From April 1, 1873, to March 31, 1874.

[6] The above death was in a man who was twice unsuccessfully re-vaccinated when recruited.

purpose of raising a fund for a national memorial to Edward Jenner, Lord Lister took occasion to modify his original statement. He excused his previous utterance by saying that he had "quoted from memory after reading an authority on the subject," and added that "if he had stated that 'fatal' small-pox was absolutely unknown in the German army he should have been speaking the literal truth."[1] With an exception in 1884-85, it is quite true that there have been no deaths from small-pox in the German army since 1874-75; but Lord Lister must be aware that "in consequence" is usually held to imply an effect following on a cause, and that it is scarcely clear, without further explanation, why we should wait for half a century for the alleged effect of something which commenced to operate as an alleged cause in 1834. In other words, Lord Lister in order to make good his case, even as amended, should account for the small-pox deaths in the German army since 1834, and more particularly the 210 deaths in 1870-72, for whatever the vaccinal condition for some years subsequent to the enactment in 1834, all authorities agree that the German army was a thoroughly well re-vaccinated body in 1870-72. The decline of small-pox and other zymotic diseases in recent years in the German army is due no doubt, as Mr. Trobridge has suggested, to the "great wave of sanitary reform which spread throughout the newly-formed German Empire in 1872, and which has reduced the general death-rate from 29 per 1,000 living in that year to 24 per 1,000 in 1887."

---

[1] The *Times*, April 1, 1897.

Another statement which is frequently appealed to is, that during the Franco-Prussian war, 23,469 died from small-pox in the French army, whereas the German army only lost 263 from this disease, the difference being attributed to want of re-vaccination in the French army. In 1883 Dr. W. B. Carpenter refers to the subject thus—"In Germany, vaccination is compulsory in children under a year old; and every man on his entrance into the army is re-vaccinated. In France, on the other hand, vaccination is not compulsory, and re-vaccination is not enforced on army-recruits. During the Franco-German war of 1870-71 the total number of deaths from small-pox in the German army was 263, while in the French army it was 23,469, or very nearly *ninety* times as great."[1]

On June 19, 1883, Sir Lyon, now Lord Playfair, triumphantly reproduced the statistic with great effect in the House of Commons, in a speech which is reputed to have influenced more votes than any speech ever made in Parliament. Mr. Ernest Hart gives us the authority for the statement. "Total deaths from small-pox in German army (where re-vaccination was rigorously enforced), 263; in the French army (where re-vaccination was neglected), 23,469. Cf. Colin: *La Variole.*"[2]

Now, there does not appear to be any authority for saying that re-vaccination was not enforced in the French army, and exception must also be taken to

---

[1] A Letter to the Right Hon. Lyon Playfair, C.B., M.P., F.R.S., p. 8. William B. Carpenter, C.B., M.D., F.R.S. London. 1883.

[2] *British Medical Journal*, June 23, 1883, vol. i., p. 1217, foot-note.

the 23,469 French soldiers reported to have died of small-pox. Mr. Alexander Wheeler followed up this statement as soon as it was uttered, and he received assurances from the French War Office that there were no official medical statistics taken out during the period of the war in 1870-71.

According to the "Wiener Medizinische Wochenschrift,"[1] this figure (23,469) would appear to have been taken from a French source of information; and Dr. Hopkirk informed the Royal Commission that it had been recently confirmed from Paris (Q. 1,543), that he believed the confirmation was official (Q. 1,654), and, moreover, an "absolute fact" (Q. 6,774); but when he was confronted with the French official records, in which it was stated that the medical statistics[2] in 1871-72 were wanting (Q. 6,778-6,782), he was obliged to admit that he was not aware of any figures on which the calculation was based (Q. 6,787).

It appears that the statistic rests on certain figures given by M. Colin for the garrison at Paris. He estimated that there were about 1,600 small-pox deaths on an effective strength of 170,000 men, indicating a small-pox mortality of ·94 per cent.[3] The number 23,469, it is said, was obtained by applying this ratio to the whole army of France.[4]

When Dr. Carpenter found that the statement he had made was incorrect, he most honourably retracted it

---

[1] "Wiener Medizinische Wochenschrift," August 31, 1872, p. 896.

[2] See also "Rapport sur la Vaccine," p. 47. Proust. 1889.

[3] "La Variole," p. 58. Léon Colin. Paris. 1873.

[4] Letter from Dr. Jeunhomme to Dr. Collins. Sixth Report, Royal Commission on Vaccination, Appendix, p. 727, foot-note.

in the *Daily News* of August 7, 1883. He says, "I requested Earl Granville to obtain what information he could on this point; and, after considerable delay, I have received through Colonel Cameron (military attaché to the Embassy in Paris) an explicit statement that the army medical returns of the Franco-German war are so incomplete as not to supply the total for which I asked."

Mr. Ernest Hart,[1] whom I have also mentioned as giving currency to the statement, has reproduced the discredited statistic quite recently (1897). He refers to "the following utterances of M. de Freycinet when Minister of War in 1890," and then quotes him as follows:—"One now sees, not only in France, but in Algeria, in Tunis, and in Tonquin, the army protected by the strict application of compulsory vaccination. . . . I cannot forget that, in 1870-71, the German army, counting a million vaccinated and re-vaccinated men, only lost 459 men from small-pox in the two years, whereas our army, far less numerous, had, from the same cause, a loss of 23,400 men whom the prescient application of re-vaccination might have saved for the service of France." This quotation from a report by M. de Freycinet, dated June 16, 1882, is apparently taken from the sixth volume of the Royal Commission evidence (Appendix, p. 727), which was published subsequently to Mr. Hart's article, and Mr. Hart has omitted to notice an asterisk at the end of the quotation; this refers the reader to a foot-note containing a letter from Dr. Jeunhomme to Dr.

---

[1] Allbutt's "System of Medicine," vol. ii., p. 662. London. 1897.

Collins, in which Dr. Jeunhomme states that no official documents exist, and he proceeds to explain how the statistics for the whole army have been arrived at by calculation from the estimate given by M. Colin of the small-pox mortality of the army in Paris.

Even if the 23,469 statistic were true, it would be absurd to compare the small-pox mortality of the strong, resolute Germans, conscious of victory, with that of the cowed, worn, starved, and discomfited French. As it happens, the figure is a pure assumption; but no statement has probably ever been quoted with more telling effect, or done such service to the cause of compulsory vaccination.

CHAPTER VIII.

INFLUENCE OF SANITARY MEASURES ON THE INCIDENCE AND MORTALITY OF SMALL-POX.

THE influence of sanitation as regulating the attack and death-incidence of small-pox has already been alluded to in various parts of this work, more particularly in the third chapter, dealing with the causes of the decline of the disease. Since that chapter was written, a resolution has been adopted by the Jenner Society, signed by a large number of medical officers of health, denying the sufficiency of sanitation as a preventive of small-pox, and affirming that "the only trustworthy protection at present known against small-pox, alike for the individual and the community, is efficient vaccination in infancy and subsequent re-vaccination, and that the only effective way of stamping out epidemics of this disease lies in the free use of these agencies." It is necessary, therefore, to deal with this important branch of the subject more fully.

The views of the Royal Commission may be gathered by the following quotations extracted from their Final Report.

"The question how far the behaviour of small-pox in the eighteenth century and earlier was influenced by sanitary conditions, is one rendered difficult by the lack of exact information. We may distinguish between overcrowding as one insanitary

condition and all other insanitary conditions, such as lack of cleanliness and the like. *A priori* we should expect that a dense population, especially one of great internal movement, and one in continual interchange with surrounding populations, by offering greater facilities for the conveyance of contagion, would lead to a greater amount of small-pox." (Section 78.)

"We might *à priori* expect the other acknowledged imperfect sanitary conditions of the eighteenth century to increase the fatality of, and so to a corresponding extent, the mortality from small-pox; but there is no exact evidence to confirm this supposition." (Section 78.)

"In general both the incidence of, and mortality from, small-pox seem to have been far less affected by sanitary conditions than might *à priori* have been expected." (Section 78.)

"Admitting *à priori* that crowded dwellings tend to increase the liability to contagion, and so the prevalence of the disease, while other insanitary conditions tend in addition to increase the fatality among those attacked, so that insanitary conditions as a whole must tend to increase the mortality from small-pox; no evidence is forthcoming which distinctly shows that the dependence of the prevalence of, or the mortality from, small-pox, on the lack of sanitary conditions, was a feature of the history of small-pox during the eighteenth century." (Section 79.)

"Whatever may have been the sanitary improvements during the first quarter of this century in England and some other countries, there seems no ground for supposing that throughout Western Europe the period was marked by great changes in the direction of improved sanitation. Indeed, in many countries down to a recent period, in some it may perhaps be said even to the present time, insanitary conditions have continued to prevail." (Section 81.)

"There is no proof that sanitary improvements were the main cause of the decline of small-pox under discussion. And no adequate evidence is forthcoming to show to what extent such improvements may be considered as a subsidiary cause." (Section 82.)

"We have already pointed out that small-pox tends at times to become epidemic, *i.e.*, to spread more readily than at other times.

The occurrence of the conditions, whatever they may be, which cause the disease to be thus epidemic has of course no relation to the state of the population as regards vaccination, even conceding to the full that it has a protective effect. The only result of widespread vaccination, in a case where small-pox became epidemic, could be to render the extent of the epidemic more limited, and its fatality less than it would otherwise be." (Section 144.)

"It is beyond doubt that an infectious disease like small-pox is, other things being equal, more likely to spread in towns than in country districts, and more likely to spread in crowded town districts than in others not so densely populated; so that we should expect a lessened proportion of overcrowded dwellings, by diminishing the opportunities for contagion, to check the prevalence of the disease and consequently to render its mortality less." (Section 147.)

"We have already pointed out that on *à priori* grounds it is reasonable to think that improved sanitary conditions would tend to diminish the fatality of, and so to a corresponding extent the mortality from, small-pox. And there can be no doubt that the period with which we are dealing has been characterised by an improvement of this description. There has been better drainage, a supply of purer water, and in other respects more wholesome conditions have prevailed." (Section 151.)

"We do not mean to indicate an opinion that sanitary improvements have been without an effect on small-pox mortality, but only that when all the changes which have occurred are considered, it cannot be asserted that they afford an adequate explanation of the diminished mortality from small-pox." (Section 153.)

"We fully recognise that sanitary improvements have had an effect in reducing the mortality from small-pox as from the other diseases to which we have just been referring." (Section 166.)

If these various quotations and fluctuating opinions are summed up, they amount to this. The Commission state (144) that the occurrence of the conditions which cause small-pox to be epidemic has no relation

to the state of the population as regards vaccination. They also imply (481[1]) and admit (494[1]) that some other reason than vaccination must be sought for to explain the decline of small-pox. They allow that overcrowding, which is distinctly an insanitary condition, accentuates the disease (78, 79, 147). They also admit that other insanitary conditions have some influence (78, 79, 151, 153, 166). They say that sanitary improvements act especially in the direction of diminishing fatality (79, 151), although there is no proof that they are the main cause (82), and that they cannot be asserted to form an adequate explanation of the diminished mortality from small-pox (153).

I am not at all sure that those who favour the view that sanitary measures are responsible for the diminution of small-pox will be disposed to quarrel with these conclusions; my own reading of the Report is that the Commissioners, in their desire to state the case fairly, have been obliged, somewhat reluctantly, to admit sufficient to seriously discredit the point of view for which they are arguing. I do not know that it has ever been seriously maintained that the amelioration of insanitary conditions is the only cause of the decline of small-pox, as others have been suggested, to which I have alluded in my third chapter, but that insanitary conditions are among the principal causes of the prevalence and mortality of this complaint must, I think,

---

[1] In Section 481 the Commissioners refer to the experience of Leicester; and in Section 494 to the recent decline of small-pox in the Metropolis, and they add—"We think it is impossible to attribute this change to vaccination."

be allowed. The purport of the present chapter is to supply further evidence under this heading.

A prominent feature of small-pox is that it has been confined almost exclusively to the lower stratas of society, or among those who live in the least favourable sanitary conditions. In Austria, small-pox is called the "beggars' disease," and in this country it is largely spread by tramps, who not only live under unhealthy circumstances, but are frequently deprived of the common necessaries of life.

Mr. John Cross found that at Norwich, in 1819, the small-pox epidemic was "confined, almost exclusively, to the very lowest orders of the people."[1]

In the *Provincial Medical and Surgical Journal* for December 22, 1852, in an article entitled, "Report on Small-pox, as it occurred during three Epidemics in the practice of the Canterbury Dispensary between the years 1837 and 1848," Mr. Rigden says, concerning the third epidemic (p. 682), that "The most severe cases, and the greatest number, existed, generally speaking, in the districts most thickly populated by the lower orders, and most badly drained."

In the debate on the Compulsory Vaccination Bill of 1853, Lord Shaftesbury confessed that it was perfectly correct "that the small-pox was chiefly confined to the lowest class of the population, and he believed that with improved lodging-houses the disease might be all but exterminated."[2]

---

[1] "A History of the Variolous Epidemic which occurred in Norwich in the year 1819," p. 7. John Cross, M.R.C.S. London. 1820.

[2] Hansard's Parliamentary Debates. Third series, vol. cxxv., p. 1012. April 12, 1853.

The *Medical Times and Gazette* of February 11, 1871 (vol. i., p. 159), in referring to mistakes in diagnosis, indicates very plainly the class of people and the miserable environment of those who took small-pox in the 1871-72 epidemic, and observes: — "Medical men cannot be too cautious in such a matter; but when it is considered that the diagnosis has often to be made under most unfavourable circumstances, in dark corners of ill-lighted rooms, amidst the discomforts of squalid surroundings, chattering women, and squalling children, often by candle-light, and upon individuals where the dirt upon the skin is apt to obscure otherwise distinct signs, while the patients are too stupid to reply clearly to questions, the drift of which they are at a loss to comprehend, one cannot altogether wonder at occasional occurrence of error."

Likewise at Birkenhead, in 1877, Mr. Francis Vacher, the Medical Officer of Health, noted that "an overwhelming majority of the sufferers in this epidemic (consisting of 603 cases of small-pox) were derived from the labouring class, and the remainder—six only excepted—from the artizan class."[1] The six exceptions alluded to were two professional men, two clerks, an insurance agent, and a shipbroker.

Dr. Savill,[2] in his report on the Warrington epidemic for the Royal Commission, has pointed out that all but eleven of the 455 infected houses were rated at less than £16 per annum, and 406 of them at £8 or lower;

---

[1] "Notes on the Small-pox Epidemic at Birkenhead in 1877," p. 16.

[2] Final Report, Royal Commission on Vaccination, Appendix v., p. 87.

and Dr. Coupland[1] found that at Dewsbury the incidence of the disease with but few exceptions fell upon members of the working class community.

On the other hand, it has been observed that in industrial dwellings, where the poor are aggregated under strict sanitary supervision, there has been a marked immunity from small-pox. Thus Dr. Southwood Smith observed that "There has been in the improved dwellings complete exemption from typhus, cholera, and it may be added small-pox; yet it must be admitted, that other forms of zymotic disease—scarlet fever, measles, whooping-cough, and diarrhœa—have occurred, though rarely, and these maladies have in no instance spread."[2] Dr. Collins and Mr. Picton also report that they learn from the secretary of the Improved Industrial Dwellings Company that in 1880-82 there were but 2 deaths from small-pox among more than 15,000 tenants, while there were 3,268 small-pox deaths in those years in London with a population of 3,800,000.[3]

In the Fifth Annual Report of the Registrar-General, dated 1843, will be found replies from Metropolitan Registrars relative to the sanitary state of their districts. A number of these testify to the occurrence of small-pox and other zymotic diseases in the poorest and most filthy parts of their districts, from which I have taken the following :—

---

[1] Final Report, Royal Commission on Vaccination, Appendix iii., p. 28.

[2] "Results of Sanitary Improvement," p. 17. Southwood Smith, M.D. London. 1854.

[3] Royal Commission on Vaccination, Dissentient Commissioners' Statement, section 231.

The Registrar of the north-east district of Chelsea remarked that the crowded buildings in his district are more fatal to the first four classes of cases (small-pox, measles, scarlatina, and whooping-cough) than to any of the others (p. 486).

The Registrar of the Hanover Square district of St. George, Hanover Square, reports (pp. 487, 488) that the districts which suffered most from contagious and epidemic diseases were Oxford Buildings, Brown Street, Hart Street, Toms Court, George Street, Grosvenor Market, Grosvenor Mews, and Thomas Street. "Toms Court," he says, "contains eight houses; inhabitants in a wretched state in many cases, partly from want of employ, partly intemperance. Small-pox and epidemics have raged here."

The Registrar of the Rectory division of Marylebone stated (p. 498) that the greatest number of deaths from small-pox, measles, and scarlet fever occurred in York Court and Calmell Buildings. He further stated that York Court, Calmell Buildings, and Gray's Buildings appeared to be the unhealthiest portions of the district. He added that the drainage of York Court was bad, that of Calmell Buildings "good; or rather middling;" the inhabitants complained of the inefficiency of the water supply, and the districts were anything but cleanly. According to the previous year's census, the inhabitants of one house ranged from fifteen to seventy, the greatest number known to sleep in one room being eleven. He remarked that Calmell Buildings, which was principally inhabited by the Irish poor, was a narrow court about twenty-two feet in breadth, and the houses, three storeys high, were surrounded and overtopped by

the adjacent buildings; the drainage was carried on by a common sewer running down the centre of the court, and the lower apartments, especially the kitchens, which were underground, were damp and badly ventilated, light and air being admitted through a grating on a level with the court. At all times, but especially in warm weather, most offensive effluvia were perceptible everywhere. According to the previous year's census, there were 944 inhabitants, and the number of persons in one house varied from two to seventy (p. 499).

The Registrar of the St. Mary division of Marylebone stated (p. 501) that "the few cases of small-pox which occur in my district are invariably amongst the poor," but that the other zymotic diseases named were not confined disproportionally to any parts or class of inhabitants.

The Registrar of the Gray's Inn Lane division of St. Pancras remarked that small-pox, measles, and whooping-cough had been most prevalent in certain districts, which included Battle Bridge, comprising Britannia, George, Charlotte, Field, and Paradise Streets, with many small courts and places leading therefrom. He stated that in the Battle Bridge district[1] the condition was extremely bad, the streets being unpaved and impassable, occasioned by quantities of rubbish and filth thrown thereon. The water supply was generally very good, but drainage very bad in many places, and great want of cleanliness universally.

---

[1] The district known as Battle Bridge formerly occupied the site on which King's Cross Station now stands.

He forwarded the accompanying statement, which bears upon the subject under consideration (p. 506). "I beg to state," he says, "that I adopted the plan of searching all the register books from November, 1837, to the present time. I made columns, headed by the names of the several diseases, and as they appeared in the books, placed the names of the streets in which deaths occurred; this plan gave me at once the means of ascertaining amongst what particular classes the several diseases most prevail. I found between 50 and 60 cases of small-pox, the whole of which, with two exceptions only, are confined to the occupants of the lowest habitations; between 15 and 20 cases of typhus, occurring only amongst the lower classes; 60 or 70 cases of measles, in the proportion of about two to one amongst the lower classes; of whooping-cough between 80 and 90, occurring in about the same proportion as the measles; of scarlatina between 70 and 80, which appeared to prevail without regard to circumstance or place; very few cases of diarrhœa, dysentery, cholera, and influenza, and those not confined to any particular part. The population of my district is 22,149."

In the St. Anne division of the Strand the Registrar observes (p. 523)—"Of small-pox in 1838 there were thirty-one cases; in 1839, none; in 1840, two; in 1841, five; and in 1842, eight. Of those in 1838, three were in Falconberg Court, three in St. Anne's Court, and four in Crown Street. These are poor places, and densely peopled; in Falconberg Court and Crown Street there are some Irish. The remaining cases are dispersed over the parish."

The report of the Registrar of the Goswell Street

division of Clerkenwell is of interest as illustrating the effect on small-pox and other zymotic diseases of a good system of drainage, combined with abundant open spaces. The Registrar found that there had been no epidemic prevalent in his district since the commencement of registration (July 1, 1837). This is the more remarkable as the opening years of registration were occupied with one of the most disastrous small-pox epidemics of the present century. "The whole district," he remarks, "with the exception of about a hundred houses, has been built on since the year 1806; it is bounded on the south and west by spacious streets; on the north and east by two great roads, and through its centre runs the high road to Islington. It contains three large squares, with the vast area occupied by the New River-head. The whole district belongs to four great proprietors, namely, the Marquis of Northampton, the New River Company, the Brewers' Company, and the Skinners' Company, who secured by their building leases as perfect a system of drainage as can probably be found in any part of the Metropolis" (p. 527).

The Registrar of the north-west division of the City of London observed that at "Christ's Hospital (occupied by eight hundred Blue-coat boys) there are not more than one or two deaths in a year, the diet and hours being regular, and the wards lofty and cleanly" (p. 542).

The Registrar of the St. Leonard's division of Shoreditch, reported (p. 547)—"The whole of my district has been particularly healthy during the last twelve months, except in the winter of 1840 and 1841, when small-pox prevailed with great fatality in New Court and Old Court, Hackney Road. They were the only

unhealthy parts of my district, the small-pox having been introduced into the place by travelling gypsies and other vagrants occupying the huts in these courts; since which time they have been well cleansed and purified by the parish authorities, and have since been in a very healthy state, and are well supplied with water."

In the Church division of Bethnal Green the Registrar stated that the greatest number of deaths in the unhealthy parts of his district took place from small-pox, measles, scarlatina, whooping-cough, diarrhœa, influenza, and typhus; these places were entirely without drainage; there was a great want of cleanliness, and with regard to the water supply there was but one hand-cock to many houses. He observes that in many cases six persons occupied a room of ten feet square by eight feet high (p. 551).

The Registrar of the Borough Road division of St. George, Southwark, observed that there was scarcely a street or court in his district which had not been visited by small-pox, measles, or whooping-cough. The supply of water was plentiful, but drainage very deficient, cleanliness little attended to by a great number, and there was extreme overcrowding (p. 580).

The Registrar of the Kennington district of Lambeth stated that small-pox was most rife in Wandsworth Road, Spring Place, and the poor streets of South Lambeth. The water supply was good, but drainage bad and the district dirty, and in winter frequently inundated. The neighbourhood was also thickly populated, from three to five persons sleeping in a room. In Hamilton Street in the Wandsworth Road was a

filthy open ditch called the Corporation Common Sewer, which the Registrar considered to be very unhealthy (pp. 586, 587).

The Report of the Registrar-General on the state of the public health in different parts of England and Wales, during the year 1856, shows how the minds of otherwise sensible people may overlook facts and be unconsciously warped by the vaccination dogma. The Registrar of Bury South ascribes the entire absence of small-pox "to the attention paid to vaccination," and the freedom from other zymotic diseases "to the great improvement which has taken place in the last ten years in the sewering, paving, and cleansing the streets, and to the regulations under the Improvement Bill for common lodging-houses."[1]

In the Twentieth Annual Report of the Registrar-General, it is stated (p. xxiv.) that "the deplorable neglect of sanitary measures, and the extent to which the lives of the poor people of Dudley are sacrificed, may be inferred from this one appalling fact: 'small-pox was fatal in *fifty-one* cases.'" The Twenty-second Report (p. xxiv.) states that "In the South Western division, Wilts, Dorset, and Devon suffered an unusually high rate of mortality; scarlatina, diphtheria, and small-pox have proved fatal in many cases. 'Sanitary arrangements are far from good in many houses,' not only of Abbotsbury, where three deaths occurred in one house over drains in the worst possible condition, but it is to be feared in many other parts of these great counties."

---

[1] Nineteenth Annual Report of the Registrar-General, p. xxxiv.

In 1864 the Registrar of the St. Helen's sub-district of Prescot writes to the Registrar-General thus:—"The deaths exceed the average considerably. The mortality has been greatest amongst children in consequence of the prevalence of scarlatina and small-pox. One hundred and twenty deaths occurred from scarlatina, and twenty-four from small-pox. Small-pox is most prevalent in that part of the town noted for its defective sanitary arrangements, and inhabited principally by the Irish. In this portion of St. Helen's, the evils arising from want of sewers, unpaved streets, small and unhealthy dwellings, are still further increased by the crowding of several families in one house, and an entire absence, apparently, of all ideas of cleanliness."[1]

In 1855, or about two years after vaccination was made compulsory, we have the following notable words from Dr. Southwood Smith:—"Overcrowding, for example, we can prevent; the accumulation of filth in towns and houses we can prevent; the supply of light, air, and water, together with the several other appliances included in the all-comprehensive word Cleanliness, we can secure. To the extent to which it is in our power to do this, it is in our power to prevent epidemics. The human family have now lived together in communities more than six thousand years, yet they have not learnt to make their habitations clean. At last we are beginning to learn the lesson. When we shall have mastered it, we shall have conquered epidemics."[2]

---

[1] Twenty-seventh Annual Report of the Registrar-General, p. lxiv.

[2] Two Lectures delivered at Edinburgh in November, 1855, entitled, "Epidemics considered with relation to their common nature, and to climate and civilisation," p. 23.

In 1871, during the great small-pox epidemic, several important testimonies crop up in favour of the view that small-pox is controllable by sanitary measures. Mr. Henry Carr, in a letter to the *Times* of February 9, 1871, under the heading, "How small-pox is propagated," writes—"I pray your insertion of the following report of one visit of inspection among the habitations of the poor in Westminster:—St. James's Court, St. Ann's Street. This is a blind court, no thoroughfare and no through ventilation; the entrance a narrow archway, three feet wide; the houses, two rooms each, opposite; the space between the opposite houses not more than five feet; at the end of the court a dead wall, dust-heap, etc. No back windows or doors. Only one closet for the whole court, and that at times in most foul condition. At present in this court there are sixteen families—sixty-five persons." Then follows a minute description of insanitary horrors, coupled with abounding small-pox as the natural result. From a later issue of the *Times* (February 15, 1871) it appeared that the authorities inspected St. James's Court, and that the whole court was condemned as unfit for human habitation.

In the *Lancet* of January 14, 1871 (vol. i., p. 63), under the heading of "Small-pox in Belfast," is the following:—"From a circular lately issued by the Poor-Law Commissioners of Ireland relative to the spread of small-pox in Belfast, we find that seventy-nine cases have occurred there, resulting in nine deaths since March, 1870. The Commissioners point out to the Guardians of the Belfast Union that, when the disease had been imported into other parts of Ireland, it has

either not spread or quickly died out, and that its breaking out into an epidemic at Belfast is probably owing to two causes—namely, the dangerous sanitary condition of parts of the town, and the very defective state of the vaccination."

In the same volume, under the date March 18, is an article by Dr. Grieve, medical superintendent to the Hampstead Small-pox Hospital. In some concluding remarks Dr. Grieve observes (p. 372)—"Bad as this epidemic when upon us may appear to be, let us hope that it will bear fruits of good result. Already under its pressure our sanitary reformers are on the move; and the report of the Sanitary Commission just comes in time. It is to be hoped that this epidemic of small-pox will be the last of its kind; that it will prove to be, as it were, the boundary-stone placed to mark the place where the old rule of complete local self-mismanagement was replaced by that of a proper centralisation under a competent head; and that the reign of confusion, in which Boards of Guardians, Vestries, Local Boards, and other intractable bodies have to be coaxed and wheedled into doing their duty, is fast drawing to an end. We look forward with pleasurable anticipation to that time when under the firm rule of a Minister of Public Health, sanitary measures will be judiciously and vigorously enforced, and zymotic diseases—small-pox among the number—will be driven out of our island as effectually as St. Patrick banished reptiles from Ireland."

Even from the writings of so pronounced a vaccine propagandist as Mr. Ernest Hart is the following admission regarding an epidemic of small-pox at Douglas,

Isle of Man, in 1877:—"The disease spread very rapidly, especially in the filthy purlieus of the old town, until, between July 8, 1877, and March 11, 1878, no less than 257 cases occurred."[1] It is true that Mr. Ernest Hart observes that there was no system of compulsory vaccination in the Isle of Man, and thus a number of the sufferers may well have been among the unvaccinated, which only shows from what class the unvaccinated are usually drawn, and how absolutely unfair it is to compare their small-pox incidence and mortality with that of the better fed, better housed, and more cleanly vaccinated population.

One of the greatest sanitary reformers, Dr. William Farr, has said that "healthy sanitary condition as to food, drink, and cleanliness of person, house, and city, stands first in importance; after it, but subordinately, come quarantine, vaccination, and other preventives, as means of subduing mortality; for the mere exclusion of one out of many diseases appears to be taken advantage of by those other diseases, just as the extirpation of one weed makes way for other kinds of weeds in a foul garden."[2]

Another eminent sanitarian, Sir Edwin Chadwick, maintained "that cases of small-pox, of typhus, and of others of the ordinary epidemics, occur in the greatest proportion, on common conditions of foul air, from stagnant putrefaction, from bad house drainage, from sewers of deposit, from excrement-sodden sites, from filthy street surfaces, from impure water, and from over-

[1] *British Medical Journal*, July 17, 1880, vol. ii., p. 78.

[2] Supplement to the Thirty-fifth Annual Report of the Registrar-General (1875), p. xli.

crowding in foul houses. That the entire removal of such conditions by complete sanitation and by improved dwellings is the effectual preventive of diseases of those species, and of ordinary as well as of extraordinary epidemic visitations."[1]

The two following statements, printed within about six months of each other, if taken together, almost entirely concede the case. The *British Medical Journal* stated that "all sanitarians are agreed that insanitary conditions greatly favour the spread of small-pox,"[2] and Dr. W. B. Carpenter admitted "that in the general mitigation of the type of this disease (small-pox), and in the enormous reduction in its mortality which have taken place during the last hundred years, the improved sanitary condition of our population (evinced by a reduction in the *general* death-rate) has had a large share."[3]

Another authority, Dr. August Hirsch, maintained that "small-pox, as well as typhus, takes up its abode most readily in those places where the noxious influences due to neglected hygiene make themselves most felt."[4]

With reference to sanitation in Europe generally, the reader who is interested in the subject may with advan-

---

[1] Printed copy of address on "Prevention of Epidemics," pp. 22, 23. Delivered by Mr. Edwin Chadwick, C.B., at Brighton Health Congress, December 14, 1881.

[2] *British Medical Journal*, October 21, 1882, vol. ii., p. 801.

[3] *The Nineteenth Century*, April, 1882, p. 527.

[4] "Handbook of Geographical and Historical Pathology," vol. i., p. 481, by Dr. August Hirsch. Translation by Dr. Charles Creighton. London. 1883.

tage consult a work by Dr. T. M. Legge on the Public Health in European Capitals.[1]

It is claimed by Dr. Edwardes, Dr. Charles Drysdale, and Mr. Ernest Hart, with endless reiteration, that the notable reduction of small-pox in Germany during the last two decades is due to vaccination and compulsory re-vaccination. On page 38 Dr. Legge observes that, prior to 1872, the drainage in Berlin was of the most primitive description; privies were in nearly every house; open drains, badly built, and with insufficient fall, ran through many of the streets, and discharged their contents into the Spree, the pollution of which became well-nigh intolerable. On page 10 he informs us that between 1871 and 1892 the Corporation of Berlin spent on buildings connected with public health, including waterworks, drainage, sewage farms, hospitals, asylums, abattoirs, disinfecting stations, night shelter, infirmary, and public baths, nearly £9,500,000, or, on an average, about £450,000 a-year. This large outlay appears to have been judiciously expended, for on page 41 Dr. Legge says that, since the introduction of the drainage works, the total mortality has declined from 32·9 per 1,000 in 1875 to 20·2 in 1892, and he also points out the enormous reduction in the mortality from typhoid fever during the period under review.

From the foregoing it is evident that neglect of sanitary measures is very largely responsible for the prevalence and mortality of small-pox as well as of other zymotic diseases. As the late Sir B. W. Richardson

---

[1] "Public Health in European Capitals." Thomas Morison Legge, M.A., M.D. (Oxon.), D.P.H. London. 1896.

most aptly puts it—"If by some magic spell, England could wake up to-morrow clean, she would wake up pure also in spirit and godly in the comprehensiveness of goodness. Cleanliness covers the whole field of sanitary labour. It is the beginning and the end. Practised in its entirety it would banish all disease from the world."

Another cause of the lessened fatality of small-pox is that better methods of treatment are now in vogue than those which prevailed formerly. Anyone reading the pages of Sydenham cannot fail to have been struck with the distressing results of the treatment practised in his time. This was known as the hot regimen. The patient was put to bed, the blankets were piled up over him, every breath of fresh air and all light was carefully excluded from his room, and he was plied with hot cordials.

This distinguished medical reformer protests against this treatment, and says—"We must take especial care, lest the ebullition rise too high. This it may do under the weight of blankets, under the over-heated state of the air in the apartment of the patient, or under the use of heating medicines and cordials;"[1] "From the use of your vaunted cordials, and from your hot treatment," he says, "the pustules may be crowded together and rendered confluent."[2] Again he observes—"Had they (pustules) been left to their own pace they would merely have been discrete, and the chances would have been better."[3]

---

[1] "Medical Observations." The Works of Thomas Sydenham, M.D. Translation from the Latin edition of Dr. Greenhill, with a life of the author, by R. G. Lathom, M.D., vol. i., p. 134. Printed for the Sydenham Society. 1848.

[2] *Ibid.*, p. 135. [3] *Ibid.*, p. 139.

In speaking of his own more rational method of treatment:—"This is the true and genuine method of treating this sort of small-pox, and however much it may be opposed by the great and unfounded prejudice of the partisans of an opposite practice, it is the method which will prevail when I am dead. I will not deny that many have been treated on a different principle, and that under such treatment they have recovered. On the other hand, it must be confessed that many have died under it. And this, when we consider that the disease of the distinct sort is in no wise dangerous of itself, is a sad reflection."[1]

Sydenham must have felt saddened at the prevailing ignorance when he wrote—"Considering the practices that obtain, both amongst learned and ignorant physicians, it had been happy for mankind, that either the art of physic had never been exercised, or the notion of malignity never stumbled upon."[2]

Sydenham was greatly in advance of his age,[3] and consequently was subjected to the unmeasured opprobrium of his contemporaries.

---

[1] "Medical Observations," vol. i., p. 142. Printed for the Sydenham Society. 1848.

[2] Letter to Mr. Robert Boyle, vol. i., p. lxxii.

[3] Sydenham's writings are full of appeals to his colleagues to trust more to Nature in the cure of disease. "Frequently, however, it is less from the character of the morbific virus than from the effects of unskilful treatment that such severity has occurred. We often attend too little to the intentions of Nature in the cure of disease, and set up on insufficient grounds some different method of cure. From this arises a perturbation of the whole bodily economy, and, this being upset, a melancholy state of things, worse than that of the original disease, is induced." (Vol. i., p. 98.)

In referring to the pleasant sensations produced among his patients by

"To crown my misfortunes," he observes, "it has sometimes happened that, after the standers-by had rejected my advice throughout the whole disease, I have still been held answerable for the loss of the patient; and this has happened after I have talked myself hoarse against the heating treatment of the friends and nurses. For reasons like this, I have often thought that it would be better for me never to undertake a case of small-pox, than to oppose the insuperable prejudices of the ὅι πόλλοι."[1]

In spite of the teachings of Sydenham, these barbarous methods of treatment continued to prevail, for in the eighteenth century we find much the same state

---

the cool regimen, he observes—"This has often made me draw a difference between the deceptions of reason (so-called) and the realities of our senses; from whence I infer that—provided that they be not absolutely unreasonable, and deadly—much more than is usually given should be allowed to the appetites and sensations of the patients themselves. These are better than the treacherous rules of art. *E.g.*, a fever-patient ardently longs for cooling drinks freely bestowed. Art denies them. Art has a theory of its own. Art has an end and aim of its own. Art assumes that cool liquors are adverse to its doctrines; and so starves an appetite, giving a cordial instead. The same patient loathes all food, unless accompanied by diluent drinks. Art — the art of nurses and lookers-on—contends that he must eat. After a long languor, he probably asks for something absurd, or prejudicial, and asks earnestly. Art is again in the way, and threatens death in case of disobedience—unless, indeed, the artist be wise enough to remember Hippocrates:—*More bad than good, whether food or drink, if palatable, is preferable to more good than bad, if unpalatable.* . A man of moderate medical practice, but of diligent observation, will freely own, that many patients who have spurned physic and followed their own inventions, have been the better for doing so." (Vol. ii., pp. 67, 68.)

[1] Letter to Dr. Cole. The Works of Thomas Sydenham, vol. ii., p. 66.

of things recorded. Buchan,[1] in his "Domestic Medicine," remarks on the practice of confining the patient too soon to bed and plying him with warm cordials and sudorific medicines, thereby increasing the number of pustules and tending to make them become confluent. "The good women," he says, "as soon as they see the small-pox begin to appear, commonly ply their tender charge with cordials, saffron, and marigold-teas, wine, punch, and even brandy itself. All these are given with a view, as they term it, to throw out the eruption from the heart." Buchan also comments on the practice of crowding patients together, which reminds us of the disgraceful state of things which prevailed at the Gloucester Hospital in the recent epidemic. He says—"Laying several children who have the small-pox in the same bed, has many ill consequences. They ought, if possible, never to be in the same chamber, as the perspiration, the heat, the smell, etc., all tend to augment the fever, and to heighten the disease. It is common among the poor to see two or three children lying in the same bed, with such a load of pustules that even their skins stick together. One can hardly view a scene of this kind without being sickened by the sight. But how must the effluvia affect the poor patients, many of whom perish by this usage?"

In a foot-note he remarks—"This observation is likewise applicable to hospitals, workhouses, etc., where numbers of children happen to have the small-pox at the same time. I have seen about forty children cooped

---

[1] "Domestic Medicine," pp. 241-244. William Buchan, M.D. Tenth edition. London. 1788.

up in one apartment all the while they had this disease, without any of them being admitted to breathe the fresh air. No one can be at a loss to see the impropriety of such conduct. It ought to be a rule, not only in hospitals for the small-pox, but likewise for other diseases, that no patient should be within sight or hearing of another. This is a matter to which too little regard is paid. In most hospitals and infirmaries, the sick, the dying, and the dead are often to be seen in the same apartment." On the other hand, Buchan had seen poor women travelling in the depth of winter, and carrying their children afflicted with small-pox along with them, and had frequently observed others begging by the wayside, with infants in their arms covered with the pustules; yet, he says, "I could never learn that one of these children died by this sort of treatment." He also observes—"A very dirty custom prevails amongst the lower class of people, of allowing children in the small-pox to keep on the same linen during the whole period of that loathsome disease. This is done lest they should catch cold; but it has many ill consequences. The linen becomes hard by the moisture which it absorbs, and frets the tender skin. It likewise occasions a bad smell, which is very pernicious both to the patient and those about him; besides, the filth and sordes which adhere to the linen being resorbed, or taken up again into the body, greatly augment the disease."

Writing in the early part of the present century, Mr. John Cross,[1] in his history of the Norwich small-pox

[1] "A History of the Variolous Epidemic which occurred in Norwich in the year 1819," pp. 11, 12. London. 1820.

epidemic, stated that the disease was often aggravated and made to assume its worst characters by the most injudicious treatment. This was as follows:—"At the commencement, to set the object before a large fire, and supply it plentifully with saffron and brandy to bring out the eruption; during the whole of the next stage, to keep it in bed covered with flannel, and even the bed-curtains pinned together to prevent a breath of air; to allow no change of linen for ten or more days, until the eruption had turned; and to regard the best symptom to be a costive state of the bowels during the whole course of the disease."

The effect of fresh air—which the current practice excluded—in the treatment of small-pox is illustrated by the following singular incident. In 1731 a fire took place at Blandford, in Dorset. This was so violent and rapid that few had time to save much, and many could save nothing. "The calamity," we are informed, "was heightened by the small-pox raging in about sixty families; none of the sick perished in the flames, but were removed under hedges in the fields, gardens, and under the arches of the bridge, and but one died;—a strong argument for the cool regimen."[1]

I should here like to quote the words of a lady who has probably done as much for the mitigation of disease and human suffering as any person now living. I refer to Miss Florence Nightingale, and the axiom I wish to impress is contained in the following notable words:—"The very first canon of nursing, the first and the last

---

1 "The History and Antiquities of the County of Dorset," vol. i., p. 76. John Hutchins, M.A. London. 1774.

thing upon which a nurse's attention must be fixed, the first essential to the patient, without which all the rest you can do for him is as nothing, with which I had almost said you may leave all the rest alone, is this: *to keep the air he breathes as pure as the external air, without chilling him.*" [1]

There cannot be the shadow of a doubt that the displacement of the obsolete and deadly methods described by Sydenham and others, by the fresh air and judicious nursing which accompany the modern treatment of small-pox, and in which Miss Florence Nightingale was such a distinguished pioneer, have had a potent influence on its mitigation in recent years, although, for some occult reason, vaccination (which, by the way, has been sensibly diminishing) has managed to obtain all the credit.

One word with reference to the blindness produced by small-pox. We have always been taught to believe, and statistics are ingenuously arranged to show, that the diminution has been brought about by vaccination. Apparently this is not so. One of the greatest authorities on small-pox informs us—"As to corneal ulceration, this affection is probably not a part of small-pox, but is accidentally associated with it. It occurs late in the disease, both in the vaccinated and the unvaccinated, the prevention of permanent eye mischief resulting more from altered methods of treatment, improved nursing, and hospital hygiene, than from vaccination." [2]

---

[1] "Notes on Nursing," p. 8. Florence Nightingale. London. 1876.

[2] Dr. Birdwood's Evidence. Sixth Report, Royal Commission on Vaccination. Q. 31,146.

CHAPTER IX.

THE INJURIOUS RESULTS OF VACCINATION.

VACCINATION has been advocated and its enforcement recommended not only as an absolute protection against small-pox, but as a safe and even benign operation, and attended with no more danger than "the scratch of a pin," or, as a well-known authority would have us believe, "it is not more harmful than piercing the ears to place rings in them."[1]

In his petition to the House of Commons (1802), Jenner claimed that cow-pox "admits of being inoculated on the human frame with the most perfect ease and safety, and is attended with the singularly beneficial effect of rendering through life the persons so inoculated perfectly secure from the infection of the small-pox."[2]

In the Report on Small-pox and Vaccination[3] prepared by the Committee of the Epidemiological Society, the report, it may be added, on which the first compulsory Act of Parliament was based, it is stated (p. 4)—"We are ourselves satisfied, and it is the concurrent and unanimous testimony of nearly two thousand

---

[1] "A Manual of Animal Vaccination," p. 153. E. Warlomont. Translation by Dr. Harries. London. 1885.

[2] Baron's "Life of Jenner," vol. i., p. 490.

[3] Parliamentary Paper 434. Ordered by the House of Commons to be printed, 3rd May, 1853.

medical men, with whom, as we have already stated, we have been in correspondence, that vaccination is a perfectly safe and efficient prophylactic against this disease."

Sir John Simon has identified himself with this position when he says that against the "vast gain" by vaccination "there is no loss to count. Of the various alleged drawbacks to such great advantages the present state of medical knowledge recognises no single trace."[1] Again he says—"I must say that I believe it to be utterly impossible, except under circumstances of gross and punishable misconduct, for any other infection than that of cow-pox to be communicated in what pretends to be the performance of vaccination."[2] Elsewhere, Sir John candidly gives it as his opinion that, "If Government could not reasonably guarantee that it gave pure vaccine lymph, it should not force the public to accept it."[3]

Now, if it can be shown that there is no such thing known or obtainable as pure lymph, setting on one side the question of its supposed protective value, compulsory vaccination is totally unjustifiable.

Let us see what precautions the Government take to secure the purity of lymph. Mr. Farn, of the National Vaccine Establishment, when under examination before the Royal Commission, furnished some interesting details, as follows :—

Q. 4,130. You are not a medical man, are you?—No.

---

[1] "Papers relating to the History and Practice of Vaccination," p. lxvii. 1857.

[2] *Ibid.*, p. lxiii.

[3] Report from the Select Committee on the Vaccination Act (1867), 1871. Q. 3,458.

Q. 4,133. Have you made any special study of microbes?—No.

Q. 4,154. With such (microscopic) power as you are able to employ would you be able to recognise or distinguish any micro-organisms which might be present?—No, I should not.

Q. 4,155. Have any micro-organisms been identified, or stated to have been identified, for such a disease as erysipelas and so on?—I am afraid you are going rather out of my depth as a non-medical man.

Q. 4,159. Is there any disease within your experience whose cause you can identify with such microscopical power as you employ?—Not that I am aware of.

Q. 4,173. Having regard to what you have told us, do you think it would be possible, from the microscopical examination you made, to guarantee that any lymph was pure?—No; I should not undertake to say whether it would be a guarantee that the lymph was pure. I do not know that you could do it.

Q. 4,200. Are we to understand that, as a matter of fact, you have ever guaranteed lymph?—No.

It seems, therefore, that there is no such thing known or obtainable as pure vaccine lymph, and it is very significant that as long ago as 1883 the Grocers' Company, by reason of the numerous disasters following vaccination, offered a prize of £1,000 for the discovery of any vaccine contagium cultivated apart from an

animal body, but up to the present time the award has not been made. The matter has, however, been settled beyond all dispute by the Royal Commission itself. They say :—"It is established that lymph contains organisms, and may contain those which under certain circumstances would be productive of erysipelas" (Section 410).

With regard to the dangers attending vaccination, in the official tract, entitled, "Facts concerning Vaccination for Heads of Families," is the following (p. 3):—"As to the alleged injury from vaccination, all competent authorities are agreed that, with due care in the performance of the operation, *no risk of any injurious effects* from it need be feared."

That vaccination produces injurious results of a definite kind can be shown from a very early period in the history of vaccination. The disease cow-pox itself, as Dr. Edward Ballard has pointed out, is one that is not to be "trifled" with. In describing the complaint in milkers, Jenner says :—"The system becomes affected—the pulse is quickened; and shiverings, with general lassitude and pains about the loins and limbs, with vomiting, come on. The head is painful, and the patient is now and then even affected with delirium. These symptoms, varying in their degrees of violence, generally continue from one day to three or four, leaving ulcerated sores about the hands, which, from the sensibility of the parts, are very troublesome, and commonly heal slowly, frequently becoming phagedenic, like those from whence they sprung."[1] And,

[1] "An Inquiry into the Causes and Effects of the *Variolæ Vaccinæ*," p. 5. London. 1798.

in referring to the case of Sarah Wynne, he remarks:—"She caught the complaint from the cows, and was affected with it (cow-pox) in so violent a degree that she was incapable of doing any work for the space of ten days."

Again, in the case of Thomas Edinburgh, described by Dr. Pearson:—"He was so lame from the eruption on the palm of the hands as to leave his employ, in order to be for some time in a public hospital. . . According to the patient's description, the disease was uncommonly painful and of long continuance."[2]

That vaccination is, indeed, a serious matter has been fully recognised by the late Dr. Ballard,[3] one of Her Majesty's Inspectors of Vaccination. "Medical men and parents alike should drive from their minds the idea so prevalent, that vaccination is but a trivial operation at the most. . . . They should keep in mind that in the act of vaccination they are not merely imparting a protection, not merely performing a sort of magic rite, but that they are engaged, in very truth, *in implanting the seeds of a disease.*" The results have been described by the Royal Commission as follows:—"The introduction into the system of even a mild virus, however carefully performed, is necessarily attended by the production of local inflammation and

---

[1] Taken from Jenner's original paper, which was forwarded to the Council of the Royal Society, and afterwards returned to him. See Crookshank's "History and Pathology of Vaccination," vol. i., p 275.

[2] "An Inquiry concerning the History of the Cow-pox," p. 15. London. 1798.

[3] "On Vaccination: its Value and Alleged Dangers," p. 362. A Prize Essay. London. 1868.

of febrile illness" (Section 409). Elsewhere in the Report the Commissioners affirm that "it is not open to doubt that there have been cases in which injury and death have resulted from vaccination" (Section 399), and that the admission that some risk attaches to the operation is one "which must without hesitation be made" (Section 379).

Sir James Paget wrote in 1863 :—"The progress of the vaccine or variolous infection of the blood shows us that a permanent morbid condition of that fluid is established by the action of these specific poisons upon it. And although this condition may, so far at least as it protects the individual from any further attack of the same disease, be regarded as exercising a beneficial influence upon the economy, yet it is not the less to be looked upon as a morbid state. In forming an estimate of the persistent changes produced in the blood by these and similar infectious diseases, we must not lose sight of the influence which the tissues, themselves altered by the inoculation, exercise upon the blood. They will necessarily re-act upon it, so as to assist materially in preserving a permanent morbid, though beneficial condition."[1] It is not altogether clear how a permanent morbid condition of this vital fluid can be beneficial to the animal economy, but it is worthy of notice that one of our greatest living English surgeons has put it on record that the principle of inoculation involves an unhealthy as distinguished from a healthy state of the system.

---

[1] "Lectures on Surgical Pathology," pp. 39, 40, foot-note. James Paget, F.R.S. London. 1863.

The general symptoms accompanying vaccination have been given in some detail by Dr. Acland in his valuable contribution on vaccinal injuries to Allbutt's "System of Medicine." Dr. Acland says:—"These are commonly unimportant; sometimes a slight rise of temperature is noted about the third day after inoculation; this may be followed by remissions, and the pyrexia, if any occur, reaches its maximum generally before the eighth day. These slight disturbances are often the only evidence of a general diffusion of the virus, although eruptions such as erythema, roseola, or urticaria may accompany even the mildest and most favourable cases of vaccination. These rashes, which may develop early in children who are unusually susceptible to the vaccine virus, may occur within four or five days of inoculation, or they may develop during the period of maturity and subsidence of the pocks; they have no special significance, and, as a rule, are not harmful except in so far as they produce irritation and consequent restlessness. Amongst the more usual complications which occur at or about the period of the full development of the pocks are those which are common in all the acute exanthems: they consist in headache (in adults and in elder children), lassitude, irritability, sleeplessness, disturbances of the digestive system—such as anorexia, vomiting, catarrhal diarrhœa; and possibly, during the onset of the vaccinal fever, rigors may occur in adults and in the re-vaccinated, and convulsions in children. In relation to these indications of a general infection in some instances there will be evidence of a corresponding disturbance of the circulatory or respiratory apparatus, as shown by increased

rapidity of pulse and respiration, bronchial catarrh, or slight temporary albuminuria."[1]

I wish especially to draw attention to the possibility of convulsions in children supervening on vaccination, to which Dr. Acland has alluded; and although it is difficult to prove in all cases that this condition is the direct result of vaccination, the occurrence, and that not unfrequently after vaccination, has led to a belief that they are often in some way related to the operation. (See fatal cases in Appendix ix. to Final Report of the Royal Commission, more epecially Nos. vi., lv., cii., clviii., clxx., 45, 119, 123, E.G. (p. 334), 216, and 223.)

Another result of ordinary vaccination is enlargement of glands, sometimes giving rise to an abscess in the armpit. According to Dr. Louis Frank, "*Adenitis* is quite a common complication of an otherwise normal course of vaccination, and needs but a passing mention."[2] As this condition appears to be of such frequent occurrence, one would like to feel a little more certain that scrofulous affections do not sometimes arise in this way, as they are admitted to do in connection with glandular enlargement associated with other diseases such as measles.

Although it appears to be thought by many that injurious results from vaccination are only of comparatively modern occurrence, a study of the older writings on vaccination proves that this is very far from being the case.

In the year 1800 some cases of injury with one

---

[1] Allbutt's "System of Medicine," pp. 562, 563. London. 1897.

[2] *Journal of Cutaneous and Genito-Urinary Diseases*, New York, April, 1895, vol. xiii., p. 144.

death were reported as having taken place in Thunderbolt Alley, Clapham.[1] According to the narrative, the parents of some of the children were "much prejudiced, full of invective, and refused to converse reasonably." In a report signed by certain medical men, the symptoms produced were extensive erysipelas rapidly spreading from the inoculated parts, accompanied in many instances by considerable constitutional disturbance, and followed in most by an immediate ulcerative process, and in some cases even a tendency to gangrene. Then, as now, vaccination had its apologists. On this occasion Dr. Lettsom, a leading London physician, undertook the office. "The disease," he said, "was not the cow-pock, but morbid ulceration, originating from the purulent matter formed under the scab or dried pustule of the cow-pock."

Mr. B. Maddock, of Nottingham,[2] in bringing forward cases of injury, wrote that he would be sorry to excite prejudices against the introduction of vaccination as a substitute for small-pox inoculation, but he had to lament that its advantages were somewhat overrated when it was said, on respectable authority, that it was a disease free from danger. "It is a great misfortune," he said, "that proselytes to new systems do not always carefully examine into opinions handed down from high authority, but give them implicit credit; and it is equally unfortunate, that, in the recommendation of any new doctrine, the unfavourable symptoms are too

---

[1] *London Medical Review and Magazine*, January, 1801, vol. v., pp. 276-289.

[2] *Medical and Physical Journal*, February, 1801, vol. v., p. 161.

frequently placed in the background, and only the more pleasing ones exposed to public view."

In November, 1805, the editors of the *Medical and Chirurgical Review*,[1] in referring to cases of injury recorded in the minutes of the Vaccine-pock Institution, observe:—"This case, with others to be found in these reports, serves to show that constitutional affection makes an essential part of the vaccina as well as of variolous inoculation; it proves also that the disorder is occasionally severe, contrary to what some have asserted."

Dr. Robert Willan, a supporter of vaccination, in an early work on the subject, also noticed that the results of the new inoculation were occasionally severe. He writes:—"There may also be a few in which the inoculation excites a new mode of action, terminating in erysipelas, phagedenic ulcer, or other morbid appearances not necessarily connected with the specific disease. Several of these anomalies or exceptions to the general rule have occurred, but certainly not so often as was expected by those who considered the subject, from the first, dispassionately, nor have they been in sufficient number to form any serious objection to the practice founded on Dr. Jenner's discovery."[2]

On December 15, 1806, the Royal College of Surgeons[3]

---

[1] *Medical and Chirurgical Review*, vol. xii., p. lxxvii., footnote.

[2] "On Vaccine Inoculation," pp. 20, 21. Robert Willan, M.D. London. 1806.

[3] Report of the Royal College of Physicians of London on Vaccination, with an Appendix, containing the opinions of the Royal Colleges of Physicians of Edinburgh and Dublin; and of the Royal Colleges of Surgeons of London, of Dublin, and of Edinburgh, pp. 10, 11. Ordered to be printed, 8th July, 1807.

addressed a letter to their members on the subject of vaccination, among other questions asking them for the number of vaccinations they had performed, and for information about any injurious results in their practice. The replies, when summarised, showed that out of 164,381 vaccinated there were 66 cases of skin eruptions and 24 cases of inflammation of the arm, of which 3 proved fatal. The College reported that in the Metropolis vaccination was on the decrease, and they assigned the following reasons:—

(1) Imperfect vaccination.
(2) Instances of small-pox after vaccination.
(3) Supposed bad consequences.
(4) Publications against the practice.
(5) Popular prejudices.

Sir John Simon, in his classic "Papers relating to the History and Practice of Vaccination," while printing the College of Physicians' report, which was strongly favourable to vaccination, omitted any reference to the appendix containing the report of the Royal College of Surgeons.

In 1808 Dr. Richard Reece wrote—"Even if the cow-pox did afford a certain security against small-pox infection, as Dr. Jenner has represented it, it would still remain a question whether the human race would really be benefited by its universal adoption, since the cutaneous eruptions that have followed have in many instances proved more fulsome than even small-pox itself. That those eruptions do occur after cow infection must be allowed by its most strenuous advocates, being perfectly *novel*, of a nature unknown before the

introduction of vaccination, and *peculiar* to those who have been vaccinated, and often so inveterate as more than to counterbalance the trivial advantages that we were first led to expect from its introduction." Again he says—"It must be allowed that the local inflammation excited by the inoculation with this matter, is of a very unfavourable nature, and often ends in a deep sloughing, frequently producing such an adhesion of the muscles of the arm, as very much to confine its motions; and some instances have occurred of the mortification spreading, so as to destroy the life of the child; an instance of which happened in St. George's Fields. The child was inoculated at the Cow-pox Institution, Salisbury Square, Fleet Street; the inflammation of the arm exceeded its usual boundary; on the sixth day mortification ensued, which proved fatal to the child."[1] In the *Medical Observer*[2] for September, 1810, Dr. Charles Maclean gives a list of sixty cases of vaccinal injuries, with the names and addresses of ten medical men, including two professors of anatomy, whose families had suffered from vaccination. In the *London Medical Gazette* for December 21, 1833, Mr. Charles Fluder reported that "Five children were recently vaccinated from the arm of a healthy child, which had been vaccinated about a week previously. Each of these children became the subject of much constitutional disturbance almost immediately; their arms were enormously swollen and œdematous; one

---

[1] See Article on "Cow-pox," in "A Practical Dictionary of Domestic Medicine." Richard Reece, M.D. London. 1808.

[2] *Medical Observer*, vol. viii., pp. 195-197.

child had convulsions; in two of them abscesses formed; and in all there was an alarming degree of febrile excitement."[1]

The *Lancet* for July 15, 1854 (vol. ii., p. 35), remarks in a leading article:—"There is a belief—it may be denounced as a prejudice, but it is not the less a deeply-rooted conviction, and one not confined to the poor or the ignorant—that if the vaccine disease may be transmitted by inoculation, other diseases less beneficial may be propagated in the same manner, and by the same operation. Many a parent of high and low degree dates constitutional disease in her offspring to vaccination with 'bad matter.' Who shall say that this etiological conclusion is always false?" In the number for October 28, 1854 (vol. ii., p. 360), it is stated:—"The poor are told that they *must* carry their children to be vaccinated by medical men who may be strangers to them. They apprehend—and the apprehension is not altogether unfounded, or unshared by the educated classes—that the vaccine matter employed may carry with it the seeds of other diseases not less loathsome than the one it is intended to prevent." On November 11, 1854 (vol. ii., p. 404), it says:—"So widely extended is the dread, that along with the prophylactic remedy something else may be inoculated, lest the germ of future diseases may be planted, that few medical practitioners would care to vaccinate their own children from a source of the purity of which they were not well assured."

In 1869 Dr. Felix von Niemeyer writes:—"It cannot be denied that it (vaccination) sometimes endangers life,

---

[1] *London Medical Gazette*, vol. xiii., pp. 440, 441.

and in other cases leaves permanent impairment of health, especially cutaneous eruptions, and other scrofulous affections."[1]

In 1880 Dr. Benjamin Bell writes as follows :—"Every man," he says, "who has seen much of the kind of persons who apply to dispensaries and vaccine institutions must have an impression, perhaps indefinite, but still reasonable, that hereditary disease may be communicated by the channel of vaccination. Children are brought very properly to such institutions, manifesting distinct indications of *syphilitic* and *scrofulous* disease. Are these indications always recognised? And is lymph never taken from the arms of such children? My own belief is, that many mothers speak correctly when they tell us that their child was poisoned when it took the cow-pock. I have seen such cases, and their existence cannot be doubted since the publication of Mr. Jonathan Hutchinson's valuable series of cases."[2]

In 1880 a Select Committee of the Legislative Assembly of the Colony of Victoria was appointed to inquire into the subject of vaccination. After recording the "conflicting and contradictory" testimonies of medical men examined by them with regard to length of time vaccination protects, the requisite number of marks, etc., the Committee came to the conclusion that "Greater unanimity prevailed on the question of the communication of extraneous diseases, such as syphilis and scrofula by vaccination; although some of the

---

[1] Dr. Felix von Niemeyer's "Text-Book of Practical Medicine," vol. ii., p. 557. Translation by George H. Humphreys, M.D., and Charles E. Hackley, M.D. New York. 1869.

[2] *Edinburgh Medical Journal*, May, 1880, vol. xxv., p. 976.

witnesses maintained that there would be no liability to such transmission unless blood were drawn during the operation. Dr. Beaney and Dr. Sparling, however mentioned instances, that came under their observation, of syphilis and erysipelas being communicated to children from purely colourless vaccine matter which contained no trace of blood." [1]

That the disease—cow-pox in itself—is sufficient to cause death to a weakly child, is shown by the fatality due to calf lymph recorded by Dr. Farrar, in the *British Medical Journal* of October 13, 1894 (vol. ii., p. 807). After describing the case, Dr. Farrar says:—"I consider her death to have been due to a constitutional *malaise*, induced by vaccinia in a poorly nourished child." Dr. Farrar very rightly publishes the case as a warning to vaccinators to avoid vaccinating weakly children; and if it be dangerous to vaccinate weakly children, it is surely so in the case of the newly-born; and yet this objectionable practice is in vogue in workhouses, and moreover, it is encouraged by the Local Government Board, as will be seen from the following letter.

"Local Government Board, Whitehall, S.W.,
"27th January, 1881.

"Sir,—I am directed by the Local Government Board to state that their attention has been called, in connection with the state of vaccination and the present prevalence of small-pox in the Metropolis, to the large proportion of children who, having been born in workhouses, are discharged with their mothers before

[1] Report from the Select Committee upon Vaccination Law, together with the Proceedings of the Committee, Minutes of Evidence, and Appendices. Ordered by the Legislative Assembly to be printed, 24th March, 1881.

being vaccinated, and many of whom escape vaccination altogether because the vaccination officer has no means of tracing them.

"1. The Board are desirous of being informed as regards the several workhouses and poor law infirmaries in the Metropolis, how many children were born in each during the year 1880, and how many of those so born were discharged before being vaccinated or before the vaccination has been ascertained to be successful, and I am to request that you will have the goodness to furnish the Board with this information as respects any such poor law establishments under the control of the Guardians.

"2. I am at the same time to state that some Boards of Guardians have passed a resolution requiring the medical officer, subject to the exercise of his judgment as to making exception in particular cases, to secure the vaccination of all children born in the workhouse as soon as possible after birth, and it has been found practicable as a rule to vaccinate the children when six days old and to inspect the results on the thirteenth day, as the mothers in such cases rarely leave the workhouse within a fortnight after their confinement. The Board would be glad to learn whether the Guardians have directed the adoption of this practice.

"3. The Board also request that they may be informed whether a specific fee is paid to the medical officer of each workhouse or infirmary for every vaccination or re-vaccination successfully performed by him.

"I am, Sir,

"Your obedient Servant,

"JOHN LAMBERT, Secretary."

The following is a case in point. At an inquest held on December 8, 1882, on the body of Lilian Ada Williams, born in St. Pancras Workhouse, and vaccinated on the seventh day after birth, the jury found "that the death was caused by suppurating meningitis, following ulceration of vaccine vesicles on the arm, and they were of opinion from the results of the post-mortem examination that the vaccination of the child ought to have been postponed."

Such instances are by no means rare, as disclosed in Appendix ix. to Final Report of the Royal Commission, one of the most flagrant cases there reported being a fatal one of pyæmia in a "puny and probably syphilitic" seven months child weighing 4lbs. 2ozs., and vaccinated when less than two days after birth. (No. cxxi.)

With regard to the most suitable age for vaccination, the profession does not appear to be altogether unanimous. The following from one of the leading authorities of the last century, with reference to the best age for inoculation, may possibly be of interest in guiding us at the present day. Dr. Percival, in citing arguments against the inoculation of children in early infancy, remarked that "Nature, weak and feeble as she then is, can scarcely struggle with the diseases to which she is ordinarily exposed; it is therefore equally cruel and unjust, to add to the number with which she is already oppressed."[1] It is also interesting to notice that in a communication from the Government of Norway, appended to Sir John Simon's "Papers," it is stated:—"Experience has taught us that in the great majority of cases vaccination may be performed without danger in the earliest infancy; but the experience of the Committee, as well as that of several other medical men, has also shown, on many occasions, that infants, after vaccination, do not unfrequently become sickly in various ways. As it hardly ever happens that the first case of epidemic small-pox occurs in a child, the

---

[1] Article on the "Arguments against the Inoculation of Children in Early Infancy," by Thomas Percival, M.D., F.R.S. *Gentleman's Magazine*, vol. xxxviii., p. 162. London. 1768.

Committee (particularly on account of the difficulty of control), in their proposal for a new law on vaccination, have not hesitated to recommend deferring it until school-time begins."[1]

The Vaccination Commissioners are not quite so accommodating, but their recommendations are in the same direction, and it is certainly rather significant that after forty-two years with a compulsory age-limit of three months the Commission recommend extending the time to six months. The reasons they give are unassailable. "Looking at the circumstance that the tenure of life in children of a very early age is frail, and that where a disease supervenes upon vaccination the ability to battle against it may determine whether the result is fatal or not, or to what degree injurious, we should *à priori* think that the chances of death or injury from such a cause would be less, looking at the matter as a whole, when the age of the child was more advanced." (Section 438.) And they further think that, provided the children coming within the range of the present compulsory law could be vaccinated on the occasion of the introduction of small-pox into the district, the "age might be advantageously extended to one year from the date of birth, and that the number of cases in which death was, whether correctly or not, attributed to vaccination would then much diminish." (Section 440.)

Vaccine Généralisée.

This name has been given to a widely-spread eruption of vaccine vesicles on different parts of the body, the

[1] "Papers relating to the History and Practice of Vaccination," Appendix, p. 187. 1857.

lesions being identical in character with the typical vesicle, and containing an inoculable fluid. Some of these are doubtless cases of auto-inoculation from the original sore, but the remainder are examples of true, specific generalised cow-pox eruption. A case is related by Dr. Martin, of Boston, in the *Medical Record*[1] of April 15, 1882, where there were four hundred clearly defined, perfectly circular, invariably umbilicated vesicles. According to Dr. Prince A. Morrow, numerous examples of generalised eruption have been recorded by experienced vaccinators, and we also have it on his authority that "French vaccination literature, especially, abounds in cases of this character."[2]

In this country, apparently, the complication is not so common, but a few cases are given in Appendix ix. to Final Report of the Royal Commission. (See Nos. li., clxii., cxciv., 109, 173, and 214.) Anyone wishing to see how serious this disease may really be will do well to consult the coloured drawing of the fatal case figured by Dr. Acland in the Transactions of the Clinical Society.[3] (No. 214 of Vaccination Commission Cases.)

Skin Diseases.

Of the various diseases alleged to be induced by vaccination, skin disease takes an important place. How common is the mother's remark that the child never had a blemish until it was vaccinated! And,

[1] *Medical Record*, vol. xxi., p. 393. New York.

[2] *Journal of Cutaneous and Venereal Diseases*, vol. i., p. 173. New York, March, 1883.

[3] Transactions of the Clinical Society, vol. xxvi., p. 114. London. 1893.

according to Dr. Robert Lee,[1] it appears that there is some foundation for the allegation. He found, from an experience of three thousand cases of skin disease treated at Great Ormond Street Hospital, that in three hundred, or 10 per cent, the mothers attributed the rash to vaccination, and Dr. Lee thought that we were not justified in pooh-poohing the notion; and there can be but very little doubt that Dr. Lee is correct in his surmise, and for this reason, *viz.*, that a secondary rash, as in syphilis, is not unfrequently part and parcel of the disease cow-pox. Mr. Robert Ceely, in describing the casual disease in milkers, says:—"Papular, vesicular, and bulbous eruptions, are occasionally seen attendant on casual cow-pox, especially in young persons of sanguine temperament and florid complexion, at the height or after the decline of the disease. They are generally of the same character as those known to attend the inoculated disease."[2] Again, in writing about the inoculated disease when primary lymph is used — "about this stage of the areola, especially on children, small supernumerary vaccine vesicles in miniature often appear within its limits, sometimes on the shoulder, and still more rarely on the face and body. The well-known papular, vesicular, and bulbous eruptions, occurring in such subjects are frequently observed."[3]

With regard to cutaneous affections, the Vaccination Commissioners say (Section 418)—"It is to be freely admitted that vaccinia, like varicella, does occasionally

---

[1] Sixth Report, Royal Commission on Vaccination, pp. 564, 565.

[2] The Transactions of the Provincial Medical and Surgical Association, vol. viii., p. 337. 1840.

[3] *Ibid.*, p. 346.

cause an irritable condition of the skin, which may last long."

The complication of skin disease, and that not unfrequently, was noticed very early in the history of vaccination. Thus, Mr. Thomas Wainwright, in the *Medical and Physical Journal* for November, 1805 (vol. xiv., p. 435), in reviewing a vaccination experience of three thousand cases, observes that "Various kinds of obstinate cutaneous eruptions are not unfrequently consequent to the vaccination of young children; but they very rarely take place in those who have the cow-pock at the age of ten years, or at any later period." We also have it on the authority of Dr. Robert Willan that "during the progress of the vesicle some disorder takes place in the constitution, and there is frequently on the arms and back a papulous eruption resembling some forms of the lichen and strophulus." [1]

Mr. Ross, in a paper read before the Medical Society of London, on February 7, 1857, drew the attention of the profession to the occurrence of secondary eruptions following vaccination. These generally appear after the eighth day. "No experience," Mr. Ross concludes, "on this matter can be worth much that is limited to an observation of the pock on the eighth day,[2] as is the ordinary practice in public institutions. Hence I do not regard as of any weight the objections of those gentlemen who, with such an experience, have denied

---

[1] "On Vaccine Inoculation," p. 10. Robert Willan, M.D., London. 1806.

[2] See also remarks by Dr. Hugh Thomson at the Birmingham meeting of the British Medical Association, *British Medical Journal*, November 29, 1890, vol. ii., p. 1231.

the existence of a special secondary eruption. Being Public Vaccinator for an extensive district, I vaccinate a considerable number of children every week, at the present time, yet from never watching the cases after the eighth day, I rarely hear of instances of secondary eruption; but I have not the slightest doubt that I should discover them, as frequently as heretofore, if I followed the cases up as I did when I was conducting these investigations. I think that I have now adduced evidence sufficient, if not to convince absolutely, at least to induce a strong presumption in the mind of an unbiased man, that vaccinia, under certain circumstances, is followed by a secondary eruption, special in its nature, though various in forms, which observes fixed periods of evolution, and is an integral part of the original affection." [1]

A considerable discussion followed the paper, and, in reply, Mr. Ross observed that the "external character of the eruptions differed, but in their nature he believed they were specific—in fact, *sui generis;* that they were directly caused by the vaccination, and were evolved by the actions going on in the economy, though it might be difficult to explain those actions."[2] Dr. Louis Frank has testified that "the skin diseases attributed to vaccination are exceedingly numerous," and he adds, "there can hardly be any doubt in the minds of those who have had great experience in vaccination that there exists an intricate connection between vaccination and cutaneous eruptions as a sequel thereof."[3] Dr. William C. Cutler,

---

[1] *Lancet*, February 14, 1857, vol. i., p. 166.

[2] *The Medical Circular*, February 11, 1857, vol. x., p. 68.

[3] *Journal of Cutaneous and Genito-Urinary Diseases*, April, 1895, vol. xiii., p. 142.

in discussing the various forms of injury incident to vaccination, remarks that "vaccine roseola or lichen is so often met with in the practice of all physicians that it hardly needs to be mentioned in this connection."[1] Indeed, Mr. Jonathan Hutchinson has probably not overstated the case, when he says that "the wonder is not that vaccination should sometimes produce an exanthem, but that it should ever be without one."[2]

Dr. P. A. Morrow, in alluding to the frequency of vaccinal eruptions, quotes the experience of Behrend, who only observed them six times in three hundred successive cases, and says—"From the unusually large number of cases reported in the various medical journals within the last few years, I should judge that the proportion was much greater."[3] He remarks that, preceding and accompanying erythematous eruptions, there may be slight febrile reaction, headache, malaise, and other evidences of constitutional disturbance. Dr. Acland has also testified that vaccinal eruptions are "often attended with much irritation, considerable general disturbance, and some pyrexia."[4] Now, if these eruptions are an integral part of the vaccine disease, and often attended with constitutional disturbance and much irritation, even if they are usually characterised by a temporary duration, as stated by Dr. Acland, I

---

[1] Annual Report of the Health Department of the City of Baltimore, for the year 1883, p. 62.

[2] "Lectures on Clinical Surgery," vol. i., p. 18. Jonathan Hutchinson, F.R.C.S., London. 1879.

[3] *Journal of Cutaneous and Venereal Diseases*, vol. i., p. 176. New York, March, 1883.

[4] Allbutt's "System of Medicine," vol. ii., p. 564. London. 1897.

cannot help thinking that all this offers a somewhat serious objection to the practice of vaccination.

Occasionally these eruptive disorders may prove more virulent. Thus, Professor Hardy, of Paris, at the International Medical Congress held in London in 1881, related an unpleasant reminiscence of which he was the subject in 1870. Three days after being re-vaccinated he was attacked by an intense urticaria, developed on the skin and in the bronchial mucous membrane, in the latter situation exciting attacks of suffocation so serious as to put his life in danger.[1] We have it on the high authority of Drs. Colcott Fox and Louis Frank that this complication of vaccination (urticaria) is not at all uncommon.[2]

With regard to eczema, there can be but little doubt that quite a large number of cases are attributable to vaccination. In an article on "Vaccinal Skin Eruptions" Dr. George Thin says—"All practitioners of any experience must be able to recall cases in which obstinate eczema in infants has first shown itself after vaccination, and other ailments of a general character are probably sometimes produced by the effect of the vaccine virus on the system in delicate persons. During the late epidemic of small-pox in London I had occasion to meet with several cases in which patients attributed a temporary condition of depressed health to re-vaccination.[3]

The following gives the age-distribution of eczema cases during the first year of life coming under the care

[1] Transactions of the Seventh Session of the International Medical Congress, vol. iii., p. 158. London. 1881.

[2] *British Medical Journal*, November 29, 1890, vol. ii., p. 1235; and *Journal of Cutaneous and Genito-Urinary Diseases*, April, 1895, vol. xiii., p. 145.

[3] *Edinburgh Medical Journal*, December, 1881, vol. xxvii., pp. 523, 524.

of Dr. Colcott Fox[1] at the Paddington Green Children's Hospital :—

	Cases.		Cases.
0 – 1 month ...	33	6 – 7 months ...	10
1 – 2 months ...	22	7 – 8 months ...	4
2 – 3 months ...	25	8 – 9 months ...	23
3 – 4 months ...	39	9 – 10 months ...	1
4 – 5 months ...	23	10 – 11 months ...	1
5 – 6 months ...	7	11 – 12 months ...	3

The large proportion under three months of age seems to afford ground for believing that vaccination is not to be held responsible for the majority of cases of infantile eczema. At the same time, as Dr. Acland[2] says, it must be noted that there is definite increase in the numbers in the fourth and in the ninth months, at periods when the irritation of vaccination and teething respectively might be expected to come into play. For cases recorded in Appendix ix. to the Commissioners' Final Report, see Nos. xcix., cxi., 14, 15, 25, 95, 98, 101, B. S. and J. W. (p. 282), 120, 130, 140 (three cases), 192, B. R. (p. 389), 225, A. H. and A. G. (p. 444).

A disease of the skin which has been especially referred to by the Vaccination Commissioners is *impetigo contagiosa*. The frequent occurrence of this malady after vaccination has been remarked on by the late Dr. Tilbury Fox[3] and others. An extensive epidemic of *impetigo contagiosa* was occasioned by vaccination in the Isle of Rügen[4] in 1885 ; 79 children were vaccinated on

---

[1] *British Medical Journal*, November 29, 1890, vol. ii., p. 1235.

[2] Allbutt's "System of Medicine," vol. ii., p. 580. London. 1897.

[3] *British Medical Journal*, May 21, 1864, vol. i., p. 553.

[4] Q. 9,797-9,834, Third Report, Royal Commission on Vaccination.

June 11 with humanised thymos-lymph obtained from a Government establishment at Stettin; all, with three exceptions, were attacked with *impetigo contagiosa*, and, by infection, the disease was spread to 320 out of a population of 5,000 inhabitants. A Commission of Inquiry was appointed by the German Government, who reported that they were unanimously of opinion that the outbreak of the disease had been a direct consequence of vaccination.[1]

Skin eruptions from vaccination are not unfrequently complicated with intense irritation. A case of this nature is recorded by Mr. Jonathan Hutchinson.[2] The patient (aged 13) was vaccinated when nine months old, and the eruption began within a fortnight, and had been increasing ever since (twelve years). Mr. Hutchinson was told that the patient would sometimes lay awake most of the night scratching herself. Weather and seasons made no difference, and "the eruption itched intolerably and incessantly." Mr. Hutchinson adds that the vaccine eruption and that of varicella appear to be alike in their proneness to evoke prurigo. "No year," he says, "passes but brings before me fresh examples of the causation referred to."

---

[1] Extensive outbreaks are also reported by Protze (see "Viertelgahresschrift für Dermatologie und Syphilis," vol. xx., pp. 478, 479, Vienna, 1888); by Melichar in *Allgemeine Wiener Medizinische Zeitung*, December 10, 1889, vol. xxxiv., pp. 581, 582; by Perron, Pourquier, and others. See also Nos. cx., 9, 12, 19, 20, 29, 82, 129, 180, M.C.B. (p. 368), 196, and 230 in Appendix ix. to Final Report of the Royal Commission on Vaccination, and cases at St. Pancras Workhouse in 1890-91, reported in Archives of Surgery, vol. iii., pp. 206-215. January, 1892.

[2] Archives of Surgery, October, 1889, vol. i., pp. 161-162. Jonathan Hutchinson, LL.D., F.R.S.

Syphilis.

With regard to the communication of syphilis by vaccination, Professor Ricord declared in a lecture at the Hotel Dieu that "if it be true that vaccination can transmit syphilis, then vaccination is done for. For who, pray, will run the risk of being affected with the *great* to escape the *small* pox."[1]

These ominous words from the greatest authority on the subject of syphilis may well have occasioned dismay among the promoters of vaccination, and thus we find that medical literature was, and up to quite recent times has been, full of denials of the possibility of such an occurrence. The official tract before referred to informs us (p. 4) that "The fear that a foul disease may be implanted by vaccination is an unfounded one. Such mischief could only happen through the most gross and culpable carelessness on the part of the vaccinator. . . . *The alleged injury arising from vaccination is, indeed, disproved by all medical experience.*"[2]

To illustrate the sceptical attitude of the medical press on this subject, the *British Medical Journal* of December 21, 1861 (vol. ii., p. 666), in referring to a report in an Italian medical journal of children syphilised by vaccination at Rivalta, heads the article "An Absurd Tale," and says in conclusion—"We need hardly add, that our main object in referring to this matter is not so much to warn the profession

---

[1] Lecture delivered at the Hotel Dieu. Translation by Dr. Heron Watson, *Edinburgh Medical Journal*, vol. vii., p. 859. (March, 1862.)

[2] "Facts concerning Vaccination for Heads of Families." (Revised by the Local Government Board, and issued with their sanction.)

against such a tale, as to enable our brethren to give an answer concerning it to those of the ignorant public who may be frightened by it. It is unfortunately true that there are only too many strangely-minded people who will be glad to make capital against vaccination out of such a tale."

But, in spite of all denials in the past, the matter has now been placed beyond dispute by the leading authorities on this subject.

Mr. James G. Beaney, of Melbourne, in his work on "Constitutional Syphilis," says — "And I at once announce at the outset my firm belief that syphilis is in very many instances communicated by means of 'child's vaccine lymph.' This opinion I have deliberately formed, and as firmly defend. The evidences of such being the case have, in my practice, been numerous and well-pronounced; so distinct, indeed, that no doubt whatever could exist as to the nature of the eruptions, and the certainty of transmission."[1]

M. Fournier, Professor of the Faculty of Medicine of Paris, in discussing the subject, remarks—"From that which precedes, it results in the first instance, and quite clearly, that in a general way a real and serious danger is contained in vaccination. But that danger, surely, is quite of a nature to evoke our solicitude for a number of reasons. For (1) every individual is destined to undergo, one or several times in his life, the vaccine inoculation. The danger then of vaccinal syphilis is encountered by all the world once or several times in the course of existence; (2) the excessive and ever-

[1] "Constitutional Syphilis," p. 373. James George Beaney, M.D., F.R.C.S. Melbourne. 1880.

increasing diffusion of syphilis in modern societies will only increase numerically the risks of that danger; (3) the syphilis which attacks subjects quite young (that is to say, which invades the organism at the usual age at which vaccination is practised) is particularly grave, everyone knows it, and grave to the extent of terminating it in a fatal manner on many occasions."[1]

Dr. Edward Ballard, in his "Prize Essay" (p. 344), informs us that "the thing has happened over and over again in cases which may now be counted by hundreds; so that this disposes for ever of the cry of 'impossible,'" and therefore Dr. Charles Drysdale was probably not very wide of the mark when he said—"I think there can be no doubt in the minds of instructed and unprejudiced medical men that syphilis has occasionally been rather widely propagated by means of vaccination."[2]

One of the most serious charges which has ever, probably, been made against vaccination was made by Mr. Brudenell Carter, the well-known oculist. He says—"I think that syphilitic contamination by vaccine lymph is by no means an unusual occurrence, and that it is very generally overlooked because people do not know either when or where to look for it. I think that a large proportion of the cases of apparently inherited syphilis are in reality vaccinal; and that the syphilis in these cases does not show itself until the age of from eight to ten years; by which time the relation between cause and effect is apt to be lost sight of."[3]

---

[1] "Leçons sur la Syphilis Vaccinale," pp. 17, 18. Alfred Fournier. Paris. 1889.

[2] *Medical Press and Circular*, March 8, 1876, vol. i., p. 194.

[3] Mr. Carter's statement was communicated to the North London Medical Society by Dr. Kesteven in a Paper read on May 8, 1877. *Medical Examiner*, May 24, 1877, vol. ii., p. 409.

The following is a list of alleged cases of vaccino-syphilis which have been reported from time to time :—

Alleged Cases of Vaccino-Syphilis.

Year.	Place.	No.	Authority and Reference.
1814	Udine	30	Marcolini. "Annali Universali di Medicina," vol. xxix., pp. 146-150, Milan, January, 1824.
1821	Cremona	40	Cerioli. See "Revue Médicale Française et Etrangère," vol. iii., pp. 54, 55, Paris, September, 1845.
1830	Frederiksborg	7	Ewertzen. "Notizen aus dem Gebiete der Natur und Heilkunde" (Froriep's Notizen), vol. xxxiv., p. 303, September, 1832.
1841	Cremona	64	Cerioli. *Ibid.*
1843	Quers (Haute-Saône)	About 30	Aliès. "La Revue Médicale Française et Etrangère." vol. i., pp. 29-33, January 15, 1865.
1845	Constantine	3	See Layet. Traité pratique de la Vaccination Animale, p. 70, Paris, 1889.
1849	Piedmont	2	Viani. "Gazette Médicale de Paris," 3S., vol. iv., p. 874, November 10, 1849.
1849	Coblentz	19	Wegeler. "Medicinische Zeitung," vol. xix., p. 69, 70, Berlin, April 3, 1850.
1852	Freienfels (Oberfranken)	8	Hübner's Cases. See "Aerztliches Intelligenz-Blatt," vol. i., pp. 166-168, Munich, May 27, 1854; also "Gazette Hebdomadaire de Médecine et de Chirurgie," 1 S., vol. ii., pp. 176-178, Paris, March 9, 1855.
1852	Paris	4	Auzias-Turenne. See "Bulletin de l'Académie Impériale de Médecine," 1S., vol. xxx., p. 467, 1864-65.
1855	Lyons	1	Rodet. See "Bulletin de l'Académie Impériale de Médecine," 1 S., vol. xxx., pp. 466, 467, 1864-65.
1855-7	Czomàd (near Pesth)	34	Glatter. See Bohn's "Handbuch der Vaccination," p. 322, Leipzig, 1875.
1856	Lupara	34	Marone. See "Lancet," May 31, 1862, vol. i., pp. 567, 568; also Lancereaux on "Syphilis," p. 641.
1858	Cherbourg	2	Lecoq. "Gazette des Hôpitaux," vol. xi., p. 598, Paris, December 24, 1859.

Year.	Place.	No.	Authority and Reference.
1860	Rufina (near Florence)	14	Galligo. "Gazette Hebdomadaire de Médecine et de Chirurgie," 1 S., vol. vii., pp. 519, 520, August 10, 1860.
1861	Rivalta	46	Coggiola. See Cerise in "L'Union Médicale," 2 S., vol. xii., pp. 259-264, Paris, November 9, 1861; also "Gazette Hebdomadaire de Médecine et de Chirurgie," 1 S., vol. viii., pp. 779-782, December 6, 1861; and "Lancet," November 16, 1861, vol. ii., pp. 485, 486.
1861-2	Paris	1	Trousseau. See Depaul, "Bulletin de l'Académie Impériale de Médecine," 1 S., vol. xxx., pp. 144-145, 1864-65.
1862	Torre de' Busi	5	Adelasio. "Gazzetta Medica Italiana Lombardia," 5 S., vol. iv., pp. 158-161, Milan, May 1, 1865.
1863	Paris	1	Chassaignac. "Bulletin de la Société de Chirurgie de Paris," 2 S., vol. iv., p. 361. 1864. For drawing of case by R. Druitt, see Trans. Obstet. Soc. Lond. for 1863, vol. v., p. 196, 197.
1863	Paris	1	Devergie. "Bulletin de l'Académie Impériale de Médecine," 1 S., vol. xxviii., pp. 664-669, 1862-63.
1863	Paris	1	Hérard. *Ibid.*, pp. 1189, 1190.
1863	Béziers	1	Sébastian. "Gazette des Hôpitaux," vol. xvi., p. 493, October 22, 1864; also "Gazette Hebdomadaire de Médecine et de Chirurgie," 2 S., vol. ii., p. 41, January 20, 1865.
1863	Bergamo	2	Adelasio. "Gazette des Hôpitaux," vol. xvi., p. 494, October 22, 1864.
	France	2 or 3	Auzias-Turenne. Bulletin de l'Académie Impériale de Médecine, 1 S., vol. xxx., pp. 322, 323, 1864-65.
	Paris	1	Laroyenne. *Ibid.*, pp. 470, 471.
1865	Paris	12 or more	Depaul. *Ibid.*, vol. xxxii., pp. 1048-1056, 1866-67.
1866	Argenta (Ferrara)	27	Gamberini. "Gazette des Hôpitaux," vol. xxi., p. 505, November, 1869.
1866	Rosheim	10	Schuh. See Depaul in "Bulletin de l'Académie Impériale de Médecine," 1 S., vol. xxxii., pp. 1058-1061, 1866-67.

Year.	Place.	No.	Authority and Reference.
1866	Auray (Morbihan)	50 or more	Depaul. *Ibid.*, pp. 201-224 and 1033-1038.
1866	Florida	52	Fuqua. See Joseph Jones' "Medical and Surgical Memoirs," p. 472, New Orleans, 1890.
1866	Cardeillac (Lot)	13	Depaul. See "Bulletin de l'Académie Impériale de Médecine," 1 S., vol. xxxii., pp. 1039-1043, 1866-67.
1869	Prussia	1	Verfasser. See Köbner in "Archiv für Dermatologie und Syphilis," vol. iii., p. 159, Prague, 1871.
1869	Paris	1	Guérin. "Bulletin de l'Académie Impériale de Médecine," 1 S., vol. xxxiv, p. 512, 1869.
	Syra (Greece)	2	Zallonis. See Depaul, *Ibid.*, pp. 1017, 1018.
	Villemaréchal	1	Vicherat. *Ibid.*, pp. 1103-1106.
1869	Schleinitz and St. Veit (Styria)	35	Kocevar. "Allgemeine Wiener Medizinische Zeitung," vol. xv., pp. 266-268, May 24, 1870.
1869 and 1870		2	Köbner. "Archiv für Dermatologie und Syphilis," vol. iii. p. 133, 1871.
1875	New York	1	Taylor. "Archives of Dermatology," vol. ii., pp. 203-209, New York, April, 1876.
1876	Lebus (Prussia)	15	Appendix to Report of German Vaccination Commission, 1884. See Q. 9,961, Third Report, Royal Commission on Vaccination.
1880	Algiers	58	Journal D'Hygiène, vol. vi., pp. 399, 400, Paris, August 25, 1881.
	France	1	Moré. "Bulletin de l'Académie de Médecine," 2 S., vol. xiii., p. 1240, 1884.
1885	Turin	35	Layet. Traité pratique de la Vaccination Animale, p. 74, Paris, 1889.
1889	Marseilles	1	Perrin. "Annales de Dermatologie et de Syphiligraphie," 3 S., vol. i., pp. 654-657, Paris, 1890.
1889	Oise	5	Hervieux. "Bulletin de l'Académie de Médecine," 3 S., vol. xxii., pp. 116-125. 1889.
1889	Motte-aux-Bois	43	Hervieux. *Ibid.*, pp. 230, 496, 517.
1891	Germany	1	Rosenthal. "Deutsche Medicinische Wochenschrift," vol. 18, p. 121, Leipzig and Berlin, February 11, 1892.

Thus we have a total of over 700, without including English cases to be mentioned hereafter.

The cases which first attracted serious attention to the subject in this country are those of Dr. James Whitehead.[1] He made a systematic examination of children brought to the Hospital, and 1,435 out of 1,717 were found to have been vaccinated. In a considerable number of instances the mothers blamed vaccination as the cause of the disease from which the children suffered, and in thirty-four cases Dr. Whitehead thought that the evidence appeared to be sufficiently convincing to warrant the belief that a taint had been communicated; in fourteen he considered the disease to be of true syphilitic character, as shown by the symptoms and by the mode of its derivation; and in the remaining twenty, although the history was less clear, the symptoms so precisely resembled constitutional syphilis that the treatment employed was that commonly used in syphilitic disease, and was in most cases attended with satisfactory results. In the four following cases, described by Dr. Whitehead, the local vaccine vesicles developed into sores, and thus, in these instances at any rate, there can be but very little doubt that the syphilitic symptoms were actually produced by vaccination.

Case 2.—An infant, aged nine months, of a bad habit of body. Copper-coloured blotches appeared after vaccination. When seen, there was a mixed eruption on the face and scalp and extreme irritability of the

---

[1] Third Report of the Clinical Hospital, Manchester. James Whitehead, M.D. London. 1859.

whole surface; the vaccinated spots remained unhealed at the end of five months, presenting a well-formed rupia with excavation. The father and mother are described as apparently healthy.

Case 11.—An infant, aged eleven weeks, of medium habit of body. When seen, there were two deep ulcers with hardened bases where the vaccine vesicles were formed three weeks previously; copper-coloured roseola on the nates and chin, sallow complexion, mucous tubercles round the anus, eruptions and intertrigo behind the ears, coryza, atrophy, and dysentery. The history of the case is that roseola appeared from twelve to fourteen days after the vaccination, at the age of two months; the mucous tubercles nine weeks after, while under treatment, and atrophy four months after. Father said to be healthy; mother feeble, but apparently free from taint.

Case 56.—An infant, aged seven and a half months, of good habit of body. After the subsidence of the vaccination, the vesicles degenerated into ulcers, surrounded by erythema. When seen, there were erythematous blotches of a copper colour on the chest and neck, eczema auris, arthritis of the left elbow joint, and syphilitic pallor. Father said to be healthy; mother apparently healthy.

Case 57.—A child, aged three years and three months, of good habit of body. She was healthy up to the time of vaccination, three months previously. The three vaccinated spots degenerated into three deep ulcerations with hardened bases, which remained open for two months. When seen, there were all over the trunk and limbs flat herpetic-like crusts, with large erythematous

areolæ of copper tint, most numerous on the thighs; the cicatrices of the first-formed patches being of a deep copper colour. The patient suffered from great prostration, inappetence, eneuresis, and dysuria, erythema of the vulva without discharge, chronic blepharitis, photophobia, and syphilitic pallor. The first symptoms were ulceration of the vaccinated spots with copper-coloured blotches. Father and mother apparently healthy.

Mr. Jonathan Hutchinson, on April 25, 1871, made his first communication to the Royal Medical and Chirurgical Society on the subject. Twelve persons (mostly young adults) were successfully vaccinated with lymph from a healthy-looking infant. In all except two, indurated chancres developed in the vaccination scars.

Shortly afterwards, Mr. Waren Tay, one of Mr. Hutchinson's colleagues, came across another series of cases. Two children of the same family, aged four years and sixteen months respectively, had been vaccinated seven weeks before they came to be treated for skin eruption; the vaccination spots were unhealed and indurated at the base. By means of the vaccination register, twenty-four others vaccinated with the same lymph were traced. It was found that nine children, counting the two previously mentioned, had unquestionable symptoms of constitutional syphilis, and there were suspicious symptoms in six others, a certain number entirely escaping. It is important to note that nothing had occurred to excite the vaccinator's suspicions, none of the children having been taken back to him on account of the unhealthy condition of the arm. Two of the patients, however, had been under medical

care, but in not a single instance had the real nature of the disease been suspected.

Mr. Hutchinson's third series consisted of one case only. The patient, aged forty-six, came under his care at the Moorfields Eye Hospital for acute iritis. He had been vaccinated three months previously, and the vaccination spots were the seat of chancrous induration. Mr. Hutchinson called on the vaccinator, who said he had never seen such sores as were displayed on this man's arm, but had not, however, suspected the real nature of the disease. About twelve other persons were vaccinated at the same time, and from the same child, and with the exception of a little trouble in the healing of the sores in one or two of the patients, they had shown nothing peculiar.

In the fourth series, the patient was a woman aged forty-six. Neither the patient nor the surgeon who vaccinated her had suspected she had been syphilised. The fifth series was brought under Mr. Hutchinson's notice by Mr. Waren Tay in April, 1876. A mother and her two children, one an infant and the other a child of two, were found to be suffering from secondary syphilis. The children were vaccinated in September, 1875, and their vaccination sores had reopened and for a long time remained unhealed. The mother had contracted a sore on her nipple from the younger child, and her symptoms were two months behind those of the children. The husband subsequently contracted syphilis from his wife.

Mr. Hutchinson also relates a case of vaccino-syphilis he had seen in a lady recently arrived from India. The vaccination did not take, but a little spot like a

mosquito-bite resulted; this healed, and six weeks afterwards a sore formed. When seen by Mr. Hutchinson she had two indurated and dusky chancres on the arm, and was covered with a syphilitic eruption.

When we consider that in a number of these cases the nature of the complaint had been unsuspected (in some, even by the medical men) until they had come under the care of Mr. Hutchinson or Mr. Waren Tay, it seems more than probable that a large number of cases of vaccino-syphilis remain unrecognised as such, and never come to light at all.

In 1883 questions were addressed to medical men on the subject of vaccination. Among others, it was asked, "What diseases have you, in your experience, known to be conveyed or occasioned or intensified by vaccination?" Three hundred and eighty-four replies were received, and they are published in Mr. M. D. Makuna's "Transactions of the Vaccination Inquiry." The following testimonies have been extracted relative to the occurrence of syphilis after vaccination :—

5. "Syphilis once only."
18. "I have only seen one case of syphilis which I attributed to vaccination from a syphilitic infant."
25. "A certain amount of syphilis, in rare instances."
40. "I have known syphilis in aggravated forms . . . . to follow very speedily the operation."
51. "I only remember one case in my practice in whom syphilis was *intensified*."
52. "I have seen one case of syphilis apparently conveyed."
64. "I have known syphilis . . . . occasioned by it."
93. "I have seen syphilis more than once."

96. "Syphilis once with an incrustated rash."

112. "Syphilis."

114. "Syphilis . . . . having previously been dormant."

120. "I remember one case of syphilis" (intensified by vaccination).

130. "Syphilis."

139 and 140. "Syphilis in two cases."

162. "Occasionally in rare instances it has appeared to convey syphilitic . . . disease. . . . . I cannot recall any such cases in my experience as absolutely proved, although I have had my suspicions aroused."

164. "I cannot quite assent that I have seen syphilis conveyed by vaccination, but I firmly believe I have seen three or four such cases."

175. "One case of death from syphilis in a boy about two years old, who was found afterwards to have been vaccinated from a child born with symptoms of syphilis."

190. Had seen syphilis in other medical men's practice.

192. Had seen syphilis "perhaps once."

211. "Syphilis and death occasioned."

231. "Three cases of syphilis." (Notes of cases lost.)

238. "I have also on two occasions seen among children in London what I thought to be syphilitic eczema, which yielded to mercury."

262. "I have seen syphilis . . . . produced by vaccination."

271. "Syphilis conveyed twice, once by primary, and once by re-vaccination."

274. "Syphilis" (conveyed).

277. "Only one case in which syphilis was suspected."

281. "Very rarely syphilis conveyed by impure vaccination."

282. "I have seen one child die of syphilis, I believe from vaccination."

288. "When a student I have seen syphilis conveyed, but have not details of cases."

291. Two cases, one of which doubtful. (Notes of cases given.)

299. "One case at St. George's Hospital, when I was a pupil twenty years ago, in a young woman, of syphilis."

318. "Secondary or probably tertiary syphilitic symptoms."

326. "I have known two cases where there were good grounds for supposing syphilis was conveyed by vaccination."

331. "Syphilis once."

340. "I remember a case of syphilitic sores on the arms of a boy from vaccination, five years ago."

353. "One case of syphilis."

383. "I have known lymph taken from a syphilitic or scrofulous child communicating analogous disease to the children vaccinated with it."

384. "One case of syphilis."

Quite recently, and before the Royal Commission (Sixth Report, pp. 218, 219), Mr. E. Ward mentioned three cases which had come to his knowledge, two in the practice of Mr. Holmes, of Leeds, in 1871, and the third a very sad case in a young woman of twenty-two. She was vaccinated in 1888, and about four or five weeks afterwards the points of vaccination became indurated. This was followed by the usual phenomena of syphilis, and the case terminated two years afterwards by death with cerebral symptoms.

For further British cases, see the following :—

Alleged Cases of Vaccino-Syphilis.

Year.	Place.	No.	Authority and Reference.
1839		1	Whitehead. "On the Transmission from Parent to Offspring of some Forms of Disease and of Morbid Taints and Tendencies," pp. 174-176. 1851.
1843	Bodmin	2	Haydon. *Medical Times and Gazette*, March 29, 1862, vol. i., p. 316.
1863	Glasgow	1	Buchanan. *Glasgow Medical Journal*, April, 1865, vol. xiii., pp. 60-65.
	London	3	Nayler. "A Practical and Theoretical Treatise on the Diseases of the Skin," p. 279-281. London, 1866.
1866	London	1	Drysdale.[1] *British Medical Journal*, April 25, 1868, vol. i., p. 396.
1866	London	1	Pollock. *Lancet*, April 21, 1866, vol. i., p. 424.
1870	London	1	Smith. Transactions of the Clinical Society, vol. iv., pp. 53-59. 1871.
1872	Belfast	1	Scott. *Medical Press and Circular*, January 29, 1873, vol. i., pp. 84, 85.
1873	London	1	Hulke. *Medical Times and Gazette*, February 8, 1873, vol. i., p. 153.
1883	London	1	Collins.[1] Transactions of the Vaccination Inquiry, p. 63. 1883.

For some time after the publication of Mr. Hutchinson's cases, although the communicability of syphilis by vaccination was admitted, it was stated that this could only take place if the blood of the vaccinifer was taken with the lymph. In this connection it may be mentioned that a committee consisting of Dr. Bristowe, Professor Humphry, Mr. Hutchinson, and Dr. Ballard, in reporting

[1] These cases are also alluded to in the list on pp. 303-305, and are numbered 18 and 291 respectively.

on a well-known case,[1] said—"It is conclusively proved that it is possible for syphilis to be communicated in vaccination from a vaccine vesicle on a syphilitic person, notwithstanding that the operation be performed with the utmost care to avoid the admixture with blood."

All lymph, however, contains blood cells, and this apparently was known as long ago as 1862. Dr. Heron Watson writes—"There is no vaccine matter, however carefully removed from the vesicle, which, on microscopic investigation, will not be found to contain blood corpuscles."[2] This has been corroborated by Drs. Barthélemy[3] and Husband,[4] the latter's statement before the Royal Commission being accepted as final. Thus the Commissioners say (section 430)—"The evidence given by Dr. Husband, of the Vaccine Institution of Edinburgh, established the fact that all lymph, however pellucid, really does contain blood cells."

There is nothing necessarily in the appearance of the vaccine vesicle to lead one to suspect syphilis; and Dr. Ballard informs us that "*The perfect character of the vesicle is no guarantee that it will not furnish both vaccine and syphilitic virus.*"[5]

Again, a vaccinifer may exhibit no signs of the disease.

---

[1] See Supplement, containing the Report of the Medical Officer, to the Twelfth Annual Report of the Local Government Board, pp. 46-51, 1882-83, and for subsequent history of case Allbutt's "System of Medicine," vol. ii., p. 608. London. 1897.

[2] *Edinburgh Medical Journal*, vol. vii., p. 859, foot-note. March, 1862.

[3] See "Leçons sur la Syphilis Vaccinale," pp. 112-114, foot-note. Alfred Fournier. Paris. 1889.

[4] Sixth Report, Royal Commission on Vaccination. Q. 27,327-9.

[5] "On Vaccination: Its Value and Alleged Dangers." A Prize Essay. P. 345. London. 1868.

Mr. Hutchinson, referring to a discussion on the subject, before the British Medical Association at Birmingham, in which he had taken part, observes—"In reference to the possibility of conveying syphilis from a vaccinifer who did not reveal the taint by any visible symptoms or any degree of cachexia, I felt bound in honesty to say that I felt sure of it. No surgeon in his senses would ever vaccinate from a child which showed obvious symptoms. The fact is, however, that a certain number of syphilitic infants look perfectly healthy whilst yet very efficiently contagious. There is no use, and much danger, in denying this important clinical fact."[1]

He then mentions that the child from which the lymph was taken to vaccinate his first series of cases, only revealed a little sore; this was seen by several medical men, including Sir John Simon, who questioned whether it could be considered proof of taint. In the second series, the vaccinifer did not present a single visible symptom, and Mr. Hutchinson concludes that "It is absurd to assert that inherited syphilis is always to be detected, and it is a cruel injustice to imply that all accidents have been the result of carelessness," indeed in a large number of cases, the vaccinifer has presented no trace of syphilitic disease. This brings us face to face with the terrible thought that there may be some relationship between the two diseases—cow-pox and syphilis. In the first chapter of this volume, I have alluded to the misleading name of *variolæ vaccinæ* or small-pox of the cow, given to the disease by Jenner. It is this misleading

[1] Archives of Surgery, October, 1890, vol. ii., p. 104. Jonathan Hutchinson, LL.D., F.R.S.

name that has been, and is, even at the present time, largely responsible for the misunderstanding of the cardinal symptoms of cow-pox, and this has been pointed out by none more forcibly than by the great Dr. Gregory:—"The more I reflect on the phenomena of small-pox after vaccination, the more convinced I am that, so long as the notion of the identity of cow-pox and small-pox thus obstinately prevails in our minds, so long will all just views of vaccine pathology be embarrassed."[1]

In a letter to Stewart, of Kelso, Dr. Gregory writes—"I have never yet addressed anyone in writing on the subject, and I now write to you upon it, because I see that you have considered it well—*that you have thrown off the trammels of Jennerian pathology, and think for yourself.* Observe, I say, *Jennerian pathology*, not Jennerian practice. I feel assured you do not view vaccination as a kind of small-pox. The term *variolæ vaccinæ* was incorrect in pathology. Cow-pock is *a something* that alters the human blood, and indisposes it to take small-pox. But it is not small-pox. A coating of gold secures our salt spoons from the action of chlorine; but gold is not chlorine. Small-pox, after vaccination, is not on a par with double small-pox."[2] The disease that cow-pox most resembles is not small-pox, but syphilis. This view of the analogy of cow-pox with syphilis was held by Auzias-Turenne, and in this country it has been advocated by Dr. Creighton. Auzias-Turenne says—"Between syphilis

---

[1] *London Medical Gazette*, vol. xxix., p. 193 (October 29, 1841).

[2] "An Investigation of the Present Unsatisfactory and Defective State of Vaccination," pp. 106, 107. Thomas Brown, formerly Medical Practitioner in Musselburgh. Edinburgh. 1842.

and cow-pox the analogy may be a long way followed up. The inoculation of cow-pox—a malady with a fixed virus sufficiently well-named pox of the cow (*vérole de vache*)—may, for example, give rise to polymorphic vaccinides, and sometimes to disseminated pathognomonic vesico-pustules, just as the contagion of the mucous patch, symptom of a malady with an equally fixed virus, gives rise to various secondary eruptions, and sometimes to the appearance of disseminated mucous patches. But, happily for the vaccinated, cow-pox passes through a rapid evolution, and does not leave virulent remains for so long a time or so frequently as syphilis."[1]

The difficulty of distinguishing some cases of cow-pox from syphilis has been recognised by the best authorities. Mr. George Berry, ophthalmic surgeon to the Royal Infirmary, Edinburgh, in a communication on cow-pox of the eye-lids, says that the main interest in these cases "consists in the possibility of the inoculation taking place at all, and in the differential diagnosis between vaccinia and a primary syphilitic sore."[2]

Dr. Seaton has also alluded to this difficulty: "Among the sources of fallacy against which we have to be on our guard in cases in which syphilis has been said to have been produced by vaccination, one is an erroneous diagnosis. Persons talk very glibly about sores being syphilitic, and eruptions being syphilitic, as though the characters of syphilitic sores and syphilitic eruptions were so made out that there could never be any mistake

[1] "History and Pathology of Vaccination," vol. ii., p. 552. Edgar M. Crookshank, M.B. London. 1889.

[2] *British Medical Journal*, June 28, 1890, vol. i., pp. 1483, 1484.

about them. Yet such mistakes are daily being made by practitioners in general, and are occasionally made by the very highest authorities. About four years ago one of those amongst us most conversant with syphilis, Mr. Henry Lee, announced to the Medico-Chirurgical Society that he had a case under his care in which a syphilitic chancre had been produced on the arm of a child by vaccination. The case was seen by many members of the profession, some of whom agreed with Mr. Lee, while others saw nothing but a sore arm, the result of a degenerated vaccine vesicle. The subsequent progress of the case quite satisfied Mr. Lee that he had been mistaken in his diagnosis, as he publicly acknowledged."[1]

The accounts of cow-pox in milkers and in the early removes from the cow describe it as consisting of corroding, hard, and painful sores with small disposition to heal, accompanied by enlargement of the neighbouring lymphatic glands. There appeared also considerable constitutional disturbance and secondary eruptions. A contagious disease presenting these characteristics cannot be very far removed from syphilis, and there seems nothing improbable in the suggestion that cases of so-called vaccinal syphilis are merely the reversion of cow-pox to a former type. What is known as the Leeds case is an instance in point.

Emily Maud Child was vaccinated on March 26, 1889, and died at the Leeds Infirmary on July 1 of the same year. At the inquest on July 10, four members of the infirmary staff—Messrs. M'Gill, Ward, Littlewood, and

---

[1] "Handbook of Vaccination," p. 322. Edward C. Seaton, M.D. London. 1868.

Dr. Barrs—gave evidence that the child died from vaccino-syphilis, and the verdict of the jury was that she "died from syphilis acquired at or from vaccination." The case was shortly afterwards made the subject of inquiry by Dr. Ballard, one of the medical inspectors of the Local Government Board, and his conclusions were as stated in Parliament by the President of the Local Government Board, Mr. Ritchie, who used the following words:—"An inquiry has been made by an Inspector of the Board with regard to the case. His conclusions are not the same as those arrived at at the inquest. He states that the child in question was the only sufferer from subsequent syphilis among all the children he reached and whom he saw that had been vaccinated with the same or any other lymph in the whole course of the vaccinator's March vaccinations; and further, that the entire family to which the alleged vaccinifer belonged were, as far as he could discover by examination of them, free from any syphilitic taint or suspicion of such taint. The Report of the Inspector will be at the disposal of the Royal Commission on Vaccination."[1]

This implies that the child died from hereditary syphilis, and I would direct my readers' attention to the following from Mr. E. Ward's evidence before the Royal Commission :—

Q. 23,688. (Dr. Collins). Did you examine the two elder children, the brother and sister of Emily Maud C.?—Yes, on several occasions.

[1] Hansard's Parliamentary Debates. Third series, vol. ccxli., pp. 1330, 1331. February 27, 1890.

Q. 23,689. Did you find them "stunted in growth"?—No, they struck me, the girl particularly, as being remarkably fine children.

Q. 23,690. Did you find the central upper permanent incisors of Eva, the eldest child, notched in the characteristic syphilitic manner?—I do not think it was at all characteristic of syphilis; and I do not think Mr. Hutchinson thinks so.

Q. 23,691. (Chairman). Do you know what was referred to as the "notching"?—Yes, perfectly.

Q. 23,692. (Dr. Collins). Did you get any history of "prolonged snuffles" in the second child, the boy?—No, that is nothing; when I saw the boy he was a little stuffy in the nostrils, but so many children are that—nothing that I should attach any importance to—it was long after any snuffles found in the ordinary course even of congenital syphilis would have disappeared.

Q. 23,701. Would it be true to say that the family was in any sense a "syphilitic family"?—I should say certainly not.

The words within quotation marks were presumably quoted by the Chairman and by Dr. Collins from Dr. Ballard's report to the Local Government Board, and hence there can be no possible doubt of the nature of this report.

The matter would probably have been left at this stage were it not that a Royal Commission was then

sitting. An independent enquiry was, therefore, made by Dr. Barlow on behalf of this body, and he reported that there was no evidence of syphilis in either parent of the child, no evidence of inherited or acquired syphilis in either of the two elder children, nor did the history of the third (deceased) child suggest to him that it was the subject of inherited syphilis. Mr. Hutchinson has also testified to the fact that there is no evidence of syphilis in any of the family. It may be mentioned that Dr. Ballard's report containing this accusation was refused to the parents,[1] but handed over to the Royal Commission, who, for some reason or other, have omitted to publish it in their reports. The conclusion of the Commissioners on the case is that it "may probably be classed with a few others as examples of gangrene and blood poisoning, the direct result of vaccination, which are not to be explained by supposing the introduction of any syphilitic or other poison." (Section 427.) Considering that the case was taken for syphilis by the four members of the infirmary staff, and also by Dr. Ballard, it appears that symptoms presenting all the characteristic phenomena of syphilis can be produced by the vaccine disease itself.

Mr. Hutchinson, in alluding to this and other similar cases, says, "Lastly, the question has to be entertained whether the cases are examples of syphilis in any form. To many I am aware it will seem undue scepticism to doubt this. When such symptoms as snuffles, thrush,

---

[1] Hansard's Parliamentary Debates. Third series, vol. cccliii., p. 881. May 22, 1891.

the eruption on the genitals in infancy are mentioned, not a few will hold that the suspicion is rendered very strong, if not actually proven. In the same way, nodes on the head, bubo in the armpit, phagedænic sores, abscesses and eruptions on the genitals occurring in connection with a vaccination sore which has gone wrong, will be held by many as conclusive proofs that syphilis has been introduced. I cannot but freely admit that they bring with them much suspicion, and that this suspicion is strengthened by the fact that well-experienced surgeons, who saw these various symptoms and examined them carefully, thought that they could be none other than syphilis. Further, there is the fact that two of the infants were thought to have been much benefited by mercurial treatment."[1] Mr. Hutchinson also observed that if syphilis were conclusively proved in any one he would admit it in the others.

On the next page is a list of cases presenting features similar to the Leeds case; in some the symptoms were not so well marked as in others, but the cases may all be said to come under the same category.

---

[1] Archives of Surgery, vol. i., pp. 114, 115. October, 1889.

Authority.	Number.	Reference.
Taylor and Fyson	1	Sixth Report, R.C.V., pp. 196-198.
Lucas	1	Guy's Hospital Reports, 3 S., vol. xxvii., pp. 31-37. 1884.
Hutchinson	1	Illustrations of Clinical Surgery, vol. i., p. 141, plate xxv. fig. 3. London, 1878.
Hutchinson (Dr. E.'s case)	1	Archives of Surgery, vol. i., pp. 98-104, October, 1889.
Hutchinson (Dr. W.'s case)	1	*Ibid.*, pp. 193, 194, Jan., 1890.
Hutchinson (Dr. H.'s cases)	Several	*Ibid.*, pp. 194, 195.
Hutchinson	1	*Ibid.*, pp. 197, 198.
Hutchinson	1	*Ibid.*, vol. ii., pp. 23, 24. July, 1890.
Hutchinson	1	*Ibid.*, pp. 213-215, Jan., 1891.
Parsons	Several	*British Medical Journal*, November 29, 1890, vol. ii., p. 1233.
Local Government Board, Nos. xix., xlii., lix., lx., xciv.	5	Appendix ix. to Final Report, R.C.V.
Royal Commission on Vaccination, Nos. 11, 21, 35, 39, 113, 139, 141, 162, 167, 169, 175, 177, 183, 199, 202, 204, 206, 207, 208, 241, 258, 326, 416.	23 or more	Appendix ix. to Final Report, R.C.V.

It might have been anticipated that some further light would have been thrown on cases of this description by Dr. Acland in his article in Allbutt's "System of Medicine," but he contents himself by quoting the opinion of the Royal Commission that the relationship of cow-pox to syphilis "is a point of speculative, almost it might be said of transcendental pathology," and, although he admits that Nos. 109, 113, 207, and 416, in Appendix ix. to the Final Report of the Royal Commission, are similar to the Leeds case and others described by Mr. Hutchinson, he apparently has nothing

further to add, for he remarks that "it would not be possible here to enter into these cases in detail."[1]

If it be a fact, as maintained by Dr. Creighton, that the phenomena of vaccino-syphilis so-called, are due to the inherent, though mostly dormant natural history characters of cow-pox itself, we should expect the same appearances to take place occasionally in cases of calf lymph; and in this connection the experience recorded by Mr. Hutchinson in the *Archives* for January, 1891 (pp. 213-215), is of interest. He particularises a case of vaccination with calf lymph presenting certain symptoms simulating syphilis.

The child was born of healthy parents in July, 1890; was perfectly healthy at birth; was vaccinated at three months of age with Renner's calf lymph, at the same time as several others who did well; on the eighth day, only one place seemed to have taken, but later on all three looked satisfactory; at the end of three weeks, the arm was inflamed, and there were large black scabs with pus at their edges; a week later a large slough comprised all the vaccination sores and passed deeply almost to the bone, and there was also a pustule on the nose, and three nodes on the skull.

Mr. Hutchinson compares this case with another he had described in an earlier number of the *Archives* (October, 1889, p. 110). These two cases resembled one another, in that in both the infant was perfectly healthy up to the time of vaccination; the lymph used was not taken from the human subject, the skin around the vaccination sores passed into gangrene, with at the time

---

[1] Allbutt's "System of Medicine," vol. ii., p. 604. London. 1897.

a large glandular swelling in the arm-pit. There were also periosteal swellings of considerable size on the skull bones, suspicious sores on the skin; and both patients appeared to be much benefited by mercurial treatment.

Mr. Hutchinson says—"It is obvious that these two cases give mutual support to the belief that no accidental contamination of the calf-lymph by syphilitic secretions occurred. This was a suggestion which, although there was not the slightest evidence in its support, it was difficult to wholly exclude in an isolated case. It is, however, improbable in the highest degree that such an accident should occur in two cases, and in each should be followed by precisely similar results.

"There remains then the question: Were these infants the subjects of a latent inherited taint which vaccination roused into activity? In neither case was there the slightest evidence that either parent had suffered from syphilis, and in neither had the infant prior to vaccination shown any symptoms. In one case the child was a first-born, but in the other there was a healthy elder child.

"The final supposition is that it is possible for vaccination independently of any syphilis, whether implanted or hereditary, to evoke symptoms which have hitherto been regarded as peculiar to the latter malady, and which are apparently greatly benefited by specific treatment. On this point we must hold our minds open to the reception of further evidence."

A case perfectly parallel with the above-mentioned and the Leeds case was that described by Dr. Frederick Taylor and Mr. Edmund Fyson before the Royal Commission (Sixth Report, pp. 196-198). Every possible

precaution appears to have been taken. The infant was in good health. Dr. Renner's calf lymph had been used, and the needle with which the child was vaccinated had never been employed before. Gangrene of the pocks ensued, and also gangrenous spots in other parts, and the case terminated fatally.

When it is said that vaccino-syphilis is rare, it must be remembered that these and other cases similar have only recently been published, and until further information is forthcoming, it would be hazardous to assert that a general introduction of calf lymph would rid us of the danger of vaccino-syphilis; indeed, it remains to be proved that by the repeated transmission through the bovine species, cow-pox will not again acquire much of its old character. Before the Royal Commission, Dr. Cory gave his experience of 32,002 vaccinations performed at the calf lymph station; 323 cases returned for complaint, 260 of which had sore arms,[1] and Dr. Cory gave it as his impression that you got more sore arms after using calf lymph than from the humanised variety. This experience has been borne out by other competent observers.

Before concluding the evidence under the heading of "Syphilis," I wish to allude to the disastrous consequences of vaccination in the American Civil War (1861-65), in which some hundreds of men were affected with a disease presenting all the characters of syphilis. The facts are related by Dr. Joseph Jones, and the conditions described were truly frightful. The sym-

[1] In this class of cases there was unwillingness of the sore to heal, and some induration. Q. 4,377 and Q. 4,380.

ptoms included phagedenic ulcers, with indurated and everted edges, secondary skin affections, ulcerated throats, loss of hair, and other phenomena distinctive of syphilis. In some cases the gangrenous ulcers caused extensive destruction of tissue, exposing arteries, nerves, and bones, in many cases necessitating amputations.

Dr. J. T. Gilmore, in a letter to Professor F. Eve, referring to three hundred cases in the Georgia brigades, remarked—"The cases presented the appearances that are familiar to those of us who were connected with the Confederate army—large rupia-looking sores, sometimes only one; generally several on the arm in which the virus was inserted. In a number of cases these sores extended, or rather appeared on the forearm, and in two cases that I saw, they appeared on the lower extremities. The men suffered severely from nocturnal rheumatism. Several cases had, to all appearances, syphilitic roseola. I saw enough of the trouble to convince me thoroughly that the virus owed its impurity to a syphilitic contamination."[1]

Dr. James Bolton testified that "on careful inspection the ulcers presented the various appearances of genuine chancre. In some instances there was the elevated, cartilaginous, well-cut edge surrounding the indolent, greenish ulcer; in others there was a burrowing ulcer, with ragged edge; in others there was the terrible destructive sloughing process devastating the integuments of the arm. Many of the cases were so situated

---

[1] "Medical and Surgical Memoirs," vol. iii., part 1, p. 466. Joseph Jones, M.D. New Orleans.

that their history could be preserved, and in these secondary symptoms appeared, followed in due time by tertiary symptoms. The chancre was followed successively by axillary bubo, sore throat, and various forms of eruption (*syphilis dermata*), while the system fell into a state of cachexia."[1]

Dr. E. A. Flewellen testified that "while the army of General Bragg was at Tullahoma, I was medical director, and I know that very great complaint was made to me as to the character of the vaccination practised in the army. A large number of men were represented as unfit for duty. I think that one division represented nearly a thousand men as unfit for duty on account of spurious vaccination. I saw a number of cases in the early progress of the vaccination, but they presented nothing abnormal that I could detect. But, as it advanced, the cases seemed to have the appearance very nearly of syphilitic rupia. It diffused itself more or less over the whole surface. A large number of surgeons regarded it as a complication of vaccinia and syphilis. Finally, they settled into the opinion that it was not syphilitic. There never was, I may say, any settled opinion among the surgeons of the Confederate army as to what was the true character of this impure virus."[2]

Dr. George H. Hubbard relates that on November 30, 1863, he arrived at Fort Smith, Arkansas, having been appointed Medical Director of the Army of the Fron-

---

[1] "Medical and Surgical Memoirs," vol. iii., part 1, p. 467. Joseph Jones, M.D. New Orleans.

[2] *Ibid.*, p. 480.

tier. His attention was immediately directed to several hundred men disabled in consequence of "spurious vaccination." A Medical Board was appointed to investigate these cases, and they reported: "At the time we examined the patients, some had well-marked Hunterian chancre; some had large excavated ulcers, with edges everted above the raw and surrounding induration; the centres, when not recently cauterised, were of a brownish hue—some, whose primary ulcers were about healed, had secondary symptoms, such as swelling and ulcerations of the glands in different parts of the body; while others had pain and stiffening of the joints. The disease was brought to the First Arkansas Infantry by deserters from the Confederate Army, and in our opinion is syphilis."[1]

Dr. William F. Fuqua,[2] formerly surgeon of the 7th Florida Regiment, reported fifty-two cases in Confederate soldiers who presented abscesses in the axillary glands, pains in the limbs and joints, ulceration of the throat, buboes, coppery-coloured eruptions, loss of hair, and these symptoms were only relieved by anti-syphilitic treatment. The cases were attributed to inoculation with virus from the arm of a sailor who was labouring under syphilis.

Although the annals of vaccination disasters do not furnish any other records of vaccino-syphilis on so vast a scale as that which occurred in the American Civil War, other disasters have been recorded of

---

[1] "Medical and Surgical Memoirs," vol. iii., part 1, p. 483. Joseph Jones, M.D. New Orleans.

[2] *Ibid.*, p. 471.

sufficient importance to demand special reference. Among these may be mentioned the cases of "spurious vaccination" at Graniteville, related by Dr. W. F. Percival, and included in Dr. Jones' work. Dr. Percival says—"About the last of April, 1866, I was requested to take charge of some cases of spurious vaccination at the manufacturing village of Graniteville. One hundred and fifty cases were presented for examination, men, women, and children of all ages, from fifty years to twelve months. The larger proportion were operatives in the factory, the others engaged in outdoor work. There was every variety of constitution, from the pale attenuated girl, to the hardy and robust labourer. Of the hundred and fifty cases, ninety-three had been previously vaccinated. The appearance of the sore was identical in every case, *viz.*, an excavated ulcer, of circular form, with raised and hardened edges and base. They varied in size, from one half to two inches in diameter, covered with grey or dark sloughy matter, and secreting unhealthy pus. There was no appearance of granulation. In some cases ulcers of a similar character appeared on the arms affected; in others on the opposite arm, and in a few on the lower limbs. In some, abscesses formed on the inside of the arm, and in nearly all the axillary glands were inflamed, and many suppurated. A thick and unhealthy crust would form, to be soon separated by the pus which accumulated beneath. In one case, there was a copper-coloured eruption on the body and limbs; in two or three the hair dropped off. None of these cases were in the primary stage. The disease had existed from three to eight weeks. Most of them

pursued their ordinary avocations, as far as possible, and complained of no constitutional symptoms, or any loss of appetite. The history of these cases, as given to me by the individuals first vaccinated, was that they had obtained the virus from a man whom they afterwards discovered to have had primary syphilis. One was vaccinated from the other, and so it spread. None of the ulcers had evinced any tendency to heal."[1] Dr. Percival adds that the usual treatment for venereal ulcers effected a cure in from three to six weeks.

I may also allude to the disasters resulting from vaccination at Algiers in 1880.

On December 30 fifty-eight recruits of the 4th Regiment of Zouaves were vaccinated from a child which looked perfectly healthy. They were all infected with syphilis, and about half are reported to have died, the remainder being dismissed the service. No blame was attached to the operating surgeon.[2] Another series which created a painful impression on the public at the time was that of fifteen young school-girls who were syphilised by vaccination at Lebus (Prussia) in 1876.

Leprosy.

There is considerable evidence that leprosy has been invaccinated, and the question has been raised as to

---

[1] "Medical and Surgical Memoirs," vol. iii., part 1, p. 478. Joseph Jones, M.D. New Orleans.

[2] Third Report, Royal Commission on Vaccination. Q. 9540, 9736.

whether some part at least of the recent spread of the disease in certain countries is not due to the practice of arm-to-arm vaccination. This has been so fully discussed in a volume entitled "The Recrudescence of Leprosy"[1] that it might be thought unnecessary to re-open the subject, especially as the facts which it is proposed to lay before the reader must be largely a repetition of what has been so exhaustively treated in my father's work. The matter, however, is admittedly of such serious and far-reaching importance that no account of the century's experience of vaccination would be complete which did not deal with the main points of this question.

It is not proposed to discuss the etiology of leprosy, except in so far as to show that it is a communicable disease, and may be communicated by inoculation or by vaccination.

There are instances on record of Europeans contracting the disease in leprous countries, as, for instance, the case of Father Damien in Molokai, Father Boglioli in New Orleans, a French Sister of Mercy in French Guiana, and another in Tahiti; but perhaps the most important case is that related by Dr. Hawtrey Benson.[2]

An Irish soldier returned home from India, where he had resided for twenty-two years; a few months afterwards symptoms of leprosy developed. The patient was under Dr. Benson's care at the City of Dublin Hospital, but ultimately went home, where he died of

---

[1] "The Recrudescence of Leprosy, and its Causation." William Tebb. London. 1893.

[2] *Dublin Journal of Medical Science*, vol. lxiii., pp. 562, 563 (June, 1877).

the disease. During this last period of his life his brother slept in the same bed, and wore the leper's clothes. The brother had never been out of Ireland except once, forty-six years previously, when he spent some time in England. He developed leprosy, and Dr. Benson exhibited the case before the Medical Society of the College of Physicians, Ireland, when the diagnosis was confirmed by those acquainted with the malady. In making his concluding observations before the Society, Dr. Benson pointed out that one fragment of positive evidence on the subject was worth a vast amount of negative evidence.

This case must be regarded as affording absolute proof of the communicability of leprosy from person to person.[1]

An experiment made on the condemned criminal, Keanu, by Dr. Edward Arning,[2] is interesting from the

---

[1] For further testimonies see

Bakewell. Q. 3,656, Report from the Select Committee on the Vaccination Act (1867). 1871.

Tilbury Fox. "Skin Diseases," third edition, p. 322. London. 1873.

Vandyke Carter. "On Leprosy and Elephantiasis," p. 178, foot-note. London. 1874.

Macnamara. "Leprosy a Communicable Disease." London. 1889.

Moore. Journal of the Leprosy Investigation Committee, No. 1, p. 28 August, 1890.

Francis. *Ibid.*, p. 56.

Cayley. *Ibid.*, p. 36.

Murray. *Ibid.*, p. 46.

Hanson. *Ibid.*, No. 2, p. 64. February, 1891.

Report of the Cape of Good Hope Leprosy Commissioners, 1895, vol. iv., p. 101.

Report of the International Leprosy Conference, vol. ii., pp. 191, 192. Berlin. 1897.

[2] Journal of the Leprosy Investigation Committee, No. 2, pp. 132-133. February, 1891.

point of view of the possibility of the invaccination of leprosy. The Hawaiian, who, at the time of the operation, was carefully examined by several physicians and pronounced to be in perfect health and remarkably strong, was inoculated with a portion of a leprous nodule on the left forearm. A month later the man suffered from rheumatic pains in the joints of the left arm, and a painful swelling of the ulnar and median nerves. In the course of six months a small leprous nodule was formed on the keloid spot where the inoculation took place, and leprosy bacilli were detected at the seat of the keloid scar for a period of sixteen months after the operation. Distinct symptoms of leprosy were observed three years after the inoculation, and in another year the disease was at its full height. It may be mentioned that the patient was isolated from the day of the operation for three years afterwards. It has subsequently transpired that a son, a nephew, and a cousin of Keanu's, have shown symptoms of the disease, but Dr. Arning urges that at the time of the operation, Keanu himself was perfectly free from leprosy, and that distinct signs appeared three years afterwards, and at present (1891) furnishes a typical case of general leprosy.

Mr. C. N. Macnamara,[1] in referring to a report on this case by Dr. N. B. Emerson, President of the Board of Health, and Mr. J. H. Kimball, Government physician, Honolulu, says—"This report establishes unequivocally the fact that the inoculated man has become leprous;

---

[1] "Leprosy a Communicable Disease," second edition, p. 45. C. N Macnamara. 1889.

and as he had been inoculated three years previously, there is every reason to believe that the disease is the result of the inoculation."

Keanu has since succumbed to the leprous disease.

The inoculability of leprosy once established, its communicability by arm-to-arm vaccination must be accepted, and in order to throw some light on the subject, Dr. Edward Arning vaccinated a number of lepers. He says — "These experiments lead to the result I anticipated. In cases of extensive cutaneous leprosy, in which skin apparently healthy contains bacilli, these were likewise to be detected in the lymph; but there were no bacilli to be found in the lymph taken from cases of pure *Lepra nervorum*, in which no traces of the bacillus is to be found in the skin."[1]

Other experiments have been recorded by Drs. Beaven Rake and G. A. Buckmaster. Most of these were negative, but we read that "Suspicious looking rods taking fuchsin were seen in one case in vesicles raised over tuberculated ears, and in another case in vesicles over anæsthetic patches."[2] Even if these results had all been entirely negative, it would hardly detract from the value of Dr. Arning's careful investigations. Further evidence of the communicability of leprosy by vaccination is furnished by cases which have been recorded from time to time.

---

[1] Journal of the Leprosy Investigation Committee, No. 2, p. 131. February, 1891.

[2] *Ibid.*, No. 4., p. 34. December, 1891.

The instances which have probably attracted the most attention are those related by Sir William Gairdner in the *British Medical Journal* of June 11, 1887 (vol. i., pp. 1269, 1270) in an article entitled "A Remarkable Experience concerning Leprosy; involving certain Facts and Statements bearing on the Question—Is Leprosy communicable through Vaccination?" The case as stated by Sir William Gairdner is as follows:—

"The time seems to have arrived when, without injury or offence to anyone concerned, it is possible to bring under the notice of my medical brethren some facts, and some inferences arising more or less directly out of the facts, in a case which occurred to me some years ago, but which I have found it necessary hitherto to deal with as involving matters of professional confidence not suitable for publication. Even now I shall deem it expedient to frame this mere narrative in such terms as shall not point to any definite locality, or to any recognisable person, among those chiefly concerned; although, by a formal certificate granted only the other day, I feel, as it were, absolved from the last tie that bound me, even under the most fastidious sense of professional duty, to reticence.

"Six or seven years ago the parents of a young boy, fairly healthy in appearance, but with a peculiar eruption on the skin, brought him to me, and along with him a letter from a medical gentleman whom I had entirely, or almost entirely, forgotten, but who stated himself to have been a pupil of mine in Edinburgh considerably over twenty years before. It is unnecessary to enlarge on the particulars of this case further than to state that, after more than one most careful examination, in which I had the assistance of my colleague, Professor M'Call Anderson, we came to the conclusion which we announced to the parents, that the boy was suffering from incipient, but still quite well-marked, leprosy in its exanthematous form; a diagnosis afterwards amply confirmed. What struck me at the time as most peculiar was, that this case, coming from a well-known endemic seat of leprosy (an island within the tropics) and with a letter involving medical details by a medical practitioner of many years' local

experience; sent to me, moreover, for medical opinion and guidance, should not have been more frankly dealt with by a diagnosis announced even to the parents, before they left the island. The father of the child was a sea-captain constantly engaged in long voyages—for the most part between this country and the island alluded to. Both father and mother were Scotch, and there were several other children, all reported as quite healthy, as also were both the parents. Under these circumstances I wrote to the medical man—who in the sequel may be called, for brevity, Dr. X.—simply stating the diagnosis arrived at, and indicating the line of treatment proposed. The parents were informed that it would be best for the child to live in this country, and his mother agreed to remain with him accordingly. And, as they appeared anxious to have every available suggestion and advice, I mentioned the name of Dr. Robert Liveing as having given much attention to the subject, and offered to write to him if they would take the boy to London, as they appeared desirous of doing. Although I wrote to Dr. Liveing, circumstances unknown to me led to a change in their plans, and, instead of going to London, they went to Manchester, where I believe some physician was consulted, but I do not remember who he was. Ultimately, the mother determined for a while to settle in Greenock, and I placed her accordingly in communication with Dr. Wilson of that town, who for some time thereafter remained in medical charge of the case.

"Meanwhile, the course of post brought me in a few months a reply from Dr. X., not only entirely assenting to our diagnosis as communicated to him, but stating that he had been perfectly well aware from the first of the case being one of leprosy, but had deliberately chosen not to affirm the fact or even to allude to it in any way, either in his communications with the parents or in his letter to me. No reason was assigned for this (as it appeared to me) very remarkable reticence; but, as I did not wish to have the credit of having discovered for the first time what a gentleman so much more familiar with the disease might have been supposed to have overlooked, I took means to inform the parents of Dr. X.'s reply, and of his having been all along of the same opinion with regard to the disease as we were.

"After this the matter passed out of my mind, and for several years I neither saw nor heard of this child except accidentally, and in a way entirely to confirm first impressions. About three years ago, however, while engaged in lecturing on specific diseases, and among others, briefly, on leprosy, I made an effort to find out something more about this patient. The mother had removed from Greenock, and had brought over the whole family to Helensburgh, where, as I learned, they were visited by Drs. Reid and Sewell, and from the latter I now learned that the poor boy had gone steadily to the worse, and was extremely feeble, covered with sores, and in a most deplorable condition physically, but still receiving every attention and care that constant medical treatment, with the most faithful and loving maternal nursing, could afford to lighten his sufferings. I accordingly proposed, within the next few days, a visit to my old patient as a matter of satisfaction to myself. Unhappily there was no other apparent object, either as regards diagnosis or treatment, for a visit which was, nevertheless, very gratefully accepted.

"The case was now in the most advanced stage of leprosy, proceeding to mutilation of the extremities, and accompanied not only by external sores, but presumably by internal lesions, which had reduced the patient to the last stage of emaciation. It was on this visit that the curious particulars now to be related were first brought to my knowledge by Dr. Sewell, and afterwards confirmed by the statement of the mother, showing very clearly, though, of course, upon second-hand information to a certain extent, that Dr. X. had a very special reason for his extraordinary reticence in the first instance. Her husband, who in his frequent voyages had opportunities of coming into communication with Dr. X., had remarked to him how very strange it was that, even in writing to a medical man about the case, he had given no hint of his opinion about it. The doctor's reply to this was, in the end, to the effect that he had kept silence because he did not wish to compromise a boy of his own, whom he (Dr. X.) believed to be a leper, and from whom he believed at the time that the boy he had sent to this country had become infected with the disease. He further explained that he had vaccinated his own boy with virus derived from a native child in a leprous family, and, as I

understood (though perhaps not definitely so stated) that leprosy had declared itself in the native child after the vaccination ; and, further, that (using his own child as a *vaccinifer*) he had vaccinated our patient directly from him. Before sending the last-named patient away with his parents, he had satisfied his own mind not only that his own boy was leprous, but that he had in this way become the source of the disease to another ; but the disease in his own child being in a very mild form, he was anxious not to disclose its existence. Meanwhile Dr. X. had died ; his estate had passed into the hands of trustees; and I was informed that this reputed leper-boy had been, under the instructions of his father and his guardian, placed and retained at a public school well known to me in this country, and that the boy was pursuing the usual course of a public school education, in entire unconsciousness of the disease with which he was supposed to be affected.

"This information, so communicated, placed me in rather a difficult dilemma, namely—was I justified in taking steps to ascertain the truth of the story as regards Dr. X.'s boy, either by personal investigation or, at least, by inquiries conducted so as to result in a well-grounded and scientifically exact opinion as to the facts? And, further, supposing that such opinion should turn out to be that Dr. X.'s boy was a leper, was it a matter of duty on account of others to formally disclose the fact, be the consequences to the boy what they might? It was hardly probable that a boy generally known to be a leper would be retained permanently in any public school in this country, even had it been unquestionably a matter of medical doctrine that such a proceeding was quite safe. On the other hand, the boy was receiving the benefits of an English education at the express wish and on the responsibility of his father and guardian, and without (so far as appeared) any misgivings on the part of anyone. He was an orphan, and in what was to him a foreign land ; his remaining under instruction might be, and probably was, a matter of the greatest possible importance to him. To bring him, therefore, even by an indiscreet inquiry, under the ban which in many or most countries still attaches to leprosy was certainly no part of the business of an outsider, and could only be justified at all by an overwhelming sense of duty to others.

"Under these circumstances I thought it well to consult, privately, one or two of those friends in London whom I believed to know most about leprosy, and among others Dr. Liveing, whom I was able to remind, at this stage, of my previous letter. These friends concurred in assuring me that, in the rather improbable event of their being personally consulted as to the retention of a leper in a public school (it being presumed, of course, that he was physically fit otherwise), they would have no hesitation at all in affirming that the other boys would not be endangered by such proceeding. As I happened to be very well acquainted with one of the medical officers (though not the ordinary medical officer) of the school in question, I communicated these opinions to him, and stated to him at the same time the extraordinary circumstances which had begotten, for me, such a lively interest in the son of Dr. X. In the course of a few days I was informed that an inquiry had been held by the medical staff; that the boy had been sent for and privately examined (though not ostensibly ill in any sense); and that it was, beyond all doubt, considered to be a case of leprosy. The medical authorities decided, however, that under the circumstances it was not their duty to sound the alarm, or in any way to disturb the boy's education.

"From this time onwards (except the death of the first patient soon afterwards) I heard nothing more of these matters till a few weeks ago, when I was asked to see Dr. X.'s son professionally on behalf of the school authorities; and, if so advised, to request Dr. Anderson also to give an opinion as to the present state of health of this young man, who happened at the time to be visiting some friends in Glasgow. It was represented to me that he had maintained, on the whole, fairly good health since I last heard of him through my medical friend, and had not been incapacitated from school work except on account of a contagious eczema which had been prevailing, and with which he had been affected in common with other boys. Apparently, however, the opinion had arisen that his general health was not quite so good, and that in view of a cutaneous affection of this kind, apparently communicable, existing, it was no longer expedient that he should remain at the school. Indeed, I could not but come to the conclusion that his removal, on public grounds, had been practi-

cally settled ; and, with every desire to soften the blow as much as possible to the poor boy, it was felt to be necessary that his guardian, at least, should receive unequivocal and unbiased testimony as to the actual state of the facts and circumstances under which the decision was arrived at. Under these circumstances I saw and examined this boy, and made a report, along with Dr. Anderson, to the effect that the disease was evidently leprosy, though of a remarkably mild type, as shown by discolourations and cicatrices, and also by large anæsthetic areas on the back of one limb. All breaches of surface, however, and all discharge had ceased at the time of our report, and Dr. Anderson felt still in a position to affirm that no danger to others could occur from the boy's remaining at school. On this last point I did not feel able to give an unqualified assent to my colleague's opinion ; but as regards the matters of fact and observation there was no doubt whatever, and our report accordingly on these was substantially as above."

In a subsequent communication, Sir William Gairdner says—"Dr. X. confessedly vaccinated his own child from a leprous family, though probably not from an actual or apparent leper, and then vaccinated the 'sea-captain's boy' from his own."[1]

Mr. C. N. Macnamara, in alluding to these and other cases of a similar kind, remarks that they "seem to render it probable that leprosy may be conveyed from an affected to a healthy person in vaccine lymph ; and in localities where leprosy is endemic, we should be careful as to the source from which vaccine lymph is obtained."[2]

One of the earlier references to the subject was by Sir Ranald Martin, who says, "The dangers to Euro-

---

[1] *British Medical Journal*, October 8, 1887, vol. ii., pp. 799, 800.

[2] Art. on Leprosy in Davidson's "Hygiene and Diseases of Warm Climates," p. 445. London. 1893.

peans arise chiefly from vaccination, and from wet-nursing. I felt that very early in my career in India, and I took the precautions which are here recorded. I saw an English lady last year in a horrible condition (she said), from having been vaccinated from a leprous native child." [1]

Dr. Hall Bakewell, who has occupied the position of Vaccinator-General and Medical Superintendent of the Leper Hospital at Trinidad, also alluded to cases before the Select Committee of the House of Commons in 1871 (Q. 3,564). "I have seen several cases in which it (vaccination) seemed to be the only explanation. I have a case now under treatment of the son of a gentleman from India who has contracted leprosy, both the parents being of English origin. I saw the case of a child last year who, though a creole of the Island of Trinidad, is born of English parents, and is a leper, and there is no other cause to which it is attributable."

Mr. John D. Hillis gives the following cases, in which he says there could be no doubt the disease was produced by vaccination.

"Joseph Francis C—, a fair Portuguese, born in Demerara, now aged twenty years. His parents are alive and healthy. He has been suffering for the last ten years from tuberculated lepra. He has a sister, aged eighteen years, at present (1879) an inmate of the Asylum, suffering from the same form of leprosy. They were both admitted on July 30, 1877, from Murray Street, Georgetown. They have three sisters and one

---

[1] Report on Leprosy by the Royal College of Physicians, Appendix, p. 227. London. 1867.

brother, who are alive and well. Our patient, J. F. C—, and his sister were vaccinated with lymph obtained from a member of a Portuguese family[1] in whom leprosy was afterwards found to exist. They were the only members of the C— family vaccinated with this lymph. Within eighteen months of the performance of the operation by Dr. —— a reddish-brown spot appeared on the inner side of the right thigh, preceded, it is stated, by some constitutional disturbance; this spot was raised and tender, accompanied by profuse sweating all over the body, and remained for some time. Subsequently other spots made their appearance on the right buttock (which disappeared shortly after), between the shoulders, and on each cheek. They were all ushered in by more or less well-marked febrile symptoms. A red patch next appeared on the forehead, and epistaxis set in, periodically occurring to this day. Tubercles then made their appearance on the face, the other patches continuing to increase in thickness and roughness, and forming tubercular infiltration. The latter was removed by gurjun oil, under which treatment many of the symptoms were ameliorated."

"*State and Condition on November 30, 1879.*—He has a light-brown irregular patch on the front of his chest; this has been larger, thicker, and mahogany-coloured, and has evidently undergone partial absorption. There is a patch of tubercular infiltration on the back of the arms, and at the bend of the elbows. The fingers are

[1] Mr. Hillis says, "It is within the knowledge of Dr. Manget, Surgeon-General, and the author, that this family are at present afflicted with tuberculated lepra."

swollen, shining, and dark-looking, a solitary tubercle forming on the back of the hand. The swollen condition of the fingers and hands is very characteristic. There are two tubercles on each cheek, the size of large marbles; the lobes of the ears are thickened, and a tubercle is forming on the upper tip. There is no appearance of hair growing on the face. There are reddish-brown discolorations on the front and back of the legs. There are a few small scattered tubercles on the dorsum of the feet, and the lower part of the legs are swollen and hard to the touch. There are tubercles on the scrotum, an ulcer on the leg where a tubercle has ulcerated, and the larger tubercles are slightly anæsthetic. This young man is one of the carpenters of the institution; he is in hopes the treatment now being adopted may yet arrest the disease, which is however, making slow but sure progress."[1]

Mr. Hillis[2] quotes the following case from a work by Dr. Piffard, of New York:—

"William T—, aged twenty-five years, was admitted into Bell Hospital in May, 1864. He was of English parentage, but was born and passed his early life in British Guiana. After a vaccination performed when young, his arm became greatly swollen and inflamed, and large sloughs separated. Investigation revealed the fact that the vaccine virus had been taken from a negro whose mother was a leper. At the age of seven years some brownish spots appeared upon his back and arms; and at the age of eleven a blister formed on the

---

[1] "Leprosy in British Guiana," pp. 30, 31. London. 1881.

[2] *Ibid.*, p. 208.

palm of the right hand, followed by permanent contraction of the flexor tendons. A few months later he felt a tingling sensation around the nail of the right index finger, followed by a line of suppuration and loss of the nail. The finger soon healed, but the same morbid process separated itself in the other fingers of the same hand. After a few months, according to his statement, the skin of the distal phalanges split, and the flesh shrank away from the bones, leaving them exposed. The bones separated at the joints and the stumps healed. These various processes occupied eighteen months or two years. The disease then affected the distal phalanges of the left hand in the same manner. After this it attacked the right foot, and a slough formed over the lower part of the instep. The great toe then became swollen, the skin split, and its distal bone separated, then, without much regularity, the remaining phalangeal bones of fingers and toes necrosed and came away."

Sir Erasmus Wilson relates a case in the 1867 Report of the Royal College of Physicians (Appendix, p. 235).

Elephantiasis tuberculosa; duration of latent period, two years; total duration, five years; no pains, febrile attack simulating rubeola; vaccinated from a native child.

"A young gentleman, aged sixteen, with fair hair and complexion, and somewhat more youthful in appearance than might be expected of his age, has been afflicted with the tubercular form of leprosy about five years. He was born in Ceylon, is the son of European parents, and one of six children, all of whom are

healthy. His father and mother have always enjoyed good health, the father having resided in Ceylon for twenty years, the mother since her marriage. He was nursed by his mother, but vaccinated with lymph taken from a native child." (For detailed description of symptoms, see Physicians' Report.)

The College of Physicians, in their Report (p. lxxiv., foot-note), refer to the evidence of Sir Erasmus Wilson and Sir Ranald Martin thus: "The question alluded to in the communications from Mr. Erasmus Wilson and Sir R. Martin (*vide* Appendix) as to the transmission of leprous disease by vaccination and wet-nursing, is one of special interest to Europeans resident in India and other tropical countries, and calls for a searching examination."

The following case of *Elephantiasis anæsthetica* is also recorded by Sir Erasmus Wilson.[1]

"A lady, aged twenty-six, the wife of an officer of the Indian army, became affected with *elephantiasis* in 1861. She was born in Calcutta of European parents, and brought to England when two years old; she returned to India in 1853; was married in 1855; has been eight years married, and has now (1863) revisited England for medical treatment, the length of her residence in India being ten years. In 1861, being then in Oude, she was vaccinated from a native child, and shortly after the vaccination 'a slight spot came on her cheek, and increased in size to the diameter of a shilling.' It was hard to the touch, a little raised above the level of

---

[1] "Diseases of the Skin" (sixth edition), pp. 620-622. Erasmus Wilson, F.R.S. London. 1867.

the surrounding skin, and of a dull red colour, without pain or tenderness. The swelling was painted with iodine, and afterwards blistered several times, and the blister kept open; but although somewhat reduced in size, the prominence was not removed. About six months later, dull red flat spots appeared, dispersed over the greater part of her body. Her hands and feet became swollen, and she had pains of some severity in her joints and feet."

The following cases were published in an article by Dr. Daubler in "Monatshefte für praktische Dermatologie," February 1, 1889, vol. viii., pp. 123-129.

Case 1. Mrs. H—, from W—, thirty-six years of age, married, and the mother of a healthy child of twelve. The closest inquiries established beyond doubt that her family was quite free from leprosy. Several years previously, in consequence of an epidemic of small-pox, she was re-vaccinated. During the two months immediately following re-vaccination she experienced attacks of shivering three to five times weekly, was thirsty, but passed less urine than usual; at the same time the vaccine wounds swelled and became brown, and the patient experienced great lassitude. The patient had been vaccinated in three places on each arm over the insertion of the deltoid, and when she saw the medical man two and a half months after vaccination the vaccine wounds were swollen. The swelling had been noticed on the third day after vaccination, and reached its greatest height eight days afterwards. At this time the parts became yellowish, and fourteen days after vaccination around each of the vaccine cuts there was a raised yellowish-

brown discolouration of the skin of the size of a two-shilling piece. These patches gradually became flatter after about five weeks from the date of vaccination, but increased in area, and when seen by her doctor ten weeks after vaccination the skin of the arms and of the upper third of the forearms was brown in colour and wrinkled. The brown spots extended still further, and after three more weeks, during which time she was feverish and ill, the patches became smaller and smaller, but the skin never regained its normal colour. In the fourteenth week after vaccination she had a severe rigor, which was twice repeated during the following week; subsequently the attacks of fever were less frequent and violent. At and shortly after the time of the most severe rigors brownish spots appeared on the forehead and cheeks. Eighteen weeks after vaccination tubercles developed on the brow, and shortly afterwards on the cheeks. Two years later the woman was sent to the leper asylum at Robben Island, where she was seen and photographed by Dr. Daubler, tubercular leprosy having fully developed.

Dr. Daubler here gives a minute description of the symptoms, and with regard to vaccination he says that the old vaccination scars were visible, but there were none from the re-vaccination which took place three and a half years previously, as there were then no pustules formed, but only swelling and discolouration of the skin occurred.

Case 2. R. du Toit, a half-caste girl, aged fifteen, also from W—, and in whose family no cases of leprosy ever occurred. The patient stated that she had always

been healthy till vaccination, which was performed by the same doctor, and at the same time as Mrs. H—. At first the same local appearances were noticed on the arms as in the case of Mrs. H—, but after two months, prominent dark patches appeared on the forehead and cheeks, and after three months more, leprosy was fully developed on the forehead. When seen and photographed by Dr. Daubler, the disease had lasted three and a half years. Inquiries made in W— (the domicile of the two patients), and also from the doctor who performed the vaccinations, showed that the person from whom the lymph was taken to vaccinate these two patients had died a short time previously from tubercular leprosy, other members of the family being leprous, facts of which the doctor was, however, ignorant.

Concerning the question as to whether vaccination is responsible to any extent for the spread of leprosy in certain countries, the following from Dr. Edward Arning is not without interest :—

"Another point which requires our notice regarding the Hawaiian leprosy epidemic, and which was specially raised by the late Dr. Hillebrand—'Has leprosy been spread in that island by means of universal vaccination?'

"There can be no doubt as regards the synchronousness of the diffusion of leprosy and the introduction of vaccination into the Hawaiian Isles ; but it still remains an open question whether it is possible to form a positive causative connection between the two. I find that the first authentic record of leprosy cases dates from the year 1830, though the terrible diffusion of the disease over the whole group of islands occurred twenty-five years later, at a time when a severe small-pox epidemic

was raging. This occasioned universal vaccination which, however, was performed in a careless way, and principally by laymen. And it is this fact that Hillebrand and others consider the foundation for their argument regarding the diffusion of the disease by means of vaccination. We do not desire to overlook this fact of simultaneousness, but we are able to give it a different explanation. When we consider that cases of well-defined leprosy existed in 1830, we must necessarily date the importation of the disease some few years earlier. During the subsequent few years we perceive that the disease gradually expanded around the centre of origin. The explanation of the apparent sudden diffusion of the disease at the beginning of 1850, must lie in the fact that leprosy is essentially a family disease, though possibly neither congenital nor hereditary. A sufficiently long time had elapsed from the time of the importation of the disease down to the period in question, to enable a new generation to spring up; and this new generation formed new families, and from each of these individual centres leprosy was again diffused. Moreover, we must bear in mind the immense influence which from 1830-1850 the introduction of civilisation, and the influx of a great Mongolian and Caucasian population must necessarily have had upon the natives. There is another observation bearing upon the connection between leprosy and vaccination, which I consider of still greater importance. This dates from a later period in which no concomitant factors, as in the above, come into play.

"I am able to state—having excellent authority for so doing, though unfortunately no statistics—that a

very remarkable local accumulation of fresh leprosy cases took place in 1871-72, in a place called Lahaina, on the Island of Mani. This happened about one year after a universal arm-to-arm vaccination, which had been most carelessly performed. About fifty to sixty cases occurred suddenly in this locality, which up to that time had been comparatively free from the disease." [1]

Dr. Arning emphatically condemns arm-to-arm vaccination in leprous countries. He says—

"When in Hawaii I attended a German boy, aged twelve, who suffered from leprosy, from whom when he was seven years old, several white families had been vaccinated. I am not able to assert that leprosy was specially diffused on account of this, but still I consider such a fact to indicate that an arm-to-arm vaccination should be prohibited in countries in which leprosy abounds." [2]

In a recent essay by Dr. James Cantlie, we have further corroboration that in the Sandwich Islands and elsewhere, the spread of leprosy has to a certain extent been caused by vaccination. A series of questions were sent out to a number of authorities in China, Indo-China, Malaya, the Archipelago, and Oceania, and among them it was asked, "Has leprosy increased with the use of vaccination?"

Among the replies are the following important testimonies:—

Dr. Macdonald, of Fatshan, near Canton, says, "I think leprosy is on the increase with the increasing

[1] Journal of the Leprosy Investigation Committee, No. 2, pp. 130-131 (February, 1891).

[2] *Ibid.*, pp. 131, 132.

population of the country, and that vaccination is a slight factor in the increase. Lack of efficient segregation, however, accounts for most of it." [1]

With regard to Swatow, Dr. Anna Scott reports (p. 308), "I answer a most emphatic 'yes' to this question. The increase of leprosy among children is frequently remarked upon by our (mission) people, and I have been forced to the conclusion that vaccination from arm to arm, practised by a class of Chinese (quack) doctors has caused this very marked increase."

Dr. Albricht, of Sourabaya, Java, writes (p. 358)—"I cannot bring decisive proof that there is a connection between vaccination and leprosy, but the tendency of belief is in that direction."

With regard to Hawaii, Dr. C. B. Wood writes (pp. 375, 376)—"A number of years ago, when arm-to-arm vaccination was practised, it undoubtedly helped to spread leprosy. All vaccine now used is imported, hermetically sealed." And Mr. Richard Oliver reports to the same effect (p. 376)—"In years gone by vaccination undoubtedly caused increase of leprosy, owing to the lymph being obtained indiscriminately and carelessly."

With these important testimonies from responsible officials, it is difficult to resist the conclusion that vaccination has acted as a factor in the spread of leprosy.

Erysipelas.

Erysipelas and allied septic conditions are perhaps the most frequent of the more serious complications of

---

[1] "Prize Essays on Leprosy," p. 305. Thompson and Cantlie. New Sydenham Society. London. 1897.

vaccination. The recorded deaths from "erysipelas after vaccination" in England and Wales for the years 1859-80 are as follows. Since 1880 the deaths from "erysipelas after vaccination" have been merged into the general heading of "Cow-pox and other Effects of Vaccination."

Year.	Deaths from erysipelas after vaccination.	Year.	Deaths from erysipelas after vaccination.
1859	5	1870	20
1860	3	1871	24
1861	2	1872	16
1862	3	1873	19
1863	11	1874	29
1864	13	1875	37
1865 ...	10	1876	21
1866	10	1877	29
1867	4	1878	35
1868	9	1879	32
1869	19	1880	39

It must not be assumed that these deaths are all that have occurred from "erysipelas after vaccination" during the period named. This matter will be further discussed in a subsequent part of the present chapter.

The early descriptions of cow-pox seem to show that a certain amount of inflammation is a part of the disease itself. Jenner, in his account of the vaccination of his first case Phipps, describes an efflorescence spreading round the incisions, which had more of an erysipelatous look than was commonly seen when small-pox was inoculated. Again, he says:—"In calling the inflammation, that is excited by the cow-pox virus, erysipelatous, perhaps I may not be critically exact, but it certainly approaches near to it."[1]

---

[1] "Further Observations on the *Variolæ Vaccinæ*, or Cow-pox," p. 61. Edward Jenner, M.D., F.R.S. London. 1799.

Jenner records an instance in which "an extensive inflammation of the erysipelatous kind, appeared without any apparent cause upon the upper part of the thigh of a sucking colt."[1] The disease was communicated to a herd of cows, and thence to milkers; and produced in them true cow-pox. Jenner's writings, however, do not appear to inspire that confidence which we might have anticipated, and thus it may be thought advisable to supplement his evidence. One of the leading German authorities, Bohn, concluded that "the lymph of a true Jennerian vesicle, pure and clear, is therefore endowed with a power of engendering erysipelas."[2] I may also mention that Unna,[3] in his work on the pathology of the skin, in describing a normal vaccination with animal lymph, talks of the contents of the pock on the ninth or tenth day as "seated on a deeply-reddened, erysipelas-like, swollen base."

The following are a few of the cases of vaccinal erysipelas which have been described from time to time:—

In *The American Journal of the Medical Sciences*[4] for October, 1850, Mr. W. Morland, the Secretary of the Boston Society for Medical Improvement, gives extracts from the records of the society, relating to erysipelas following vaccination, and reported on by medical men. Eleven cases were given, three being fatal; of the eight

---

[1] "An Inquiry into the Causes and Effects of the *Variolæ Vaccinæ*," p. 72. Edward Jenner, M.D., F.R.S. London. 1798.

[2] "Handbuch der Vaccination," p. 174. Leipzig. 1875.

[3] "The Histopathology of the Diseases of the Skin," p. 449. By Dr. P. G. Unna. Translation from the German by Norman Walker, M.D., F.R.C.P., Ed. Edinburgh and New York. 1896.

[4] *The American Journal of the Medical Sciences*, N.S., vol. xx., pp. 318-321.

non-fatal ones, four were very severe, of which three were attended with extensive sloughing.

In the *Dublin Medical Press*[1] of April 25, 1860, Dr. J. Smith Chartres related that in the previous October he had under his care four cases of severe phlegmonous inflammation of the upper extremity occurring after vaccination ; in one instance the destruction of the tissues was so extensive as to necessitate amputation.

Mr. J. W. Wells, in the *Lancet* of May 30, 1863 (vol i., pp. 618, 619), relates the case of a lady, aged 55 years, who underwent re-vaccination ; symptoms of phlegmonous erysipelas developed on the following day, and she died four days after the operation.

In 1876 there was an official Inquiry at Gainsborough by Mr. Netten Radcliffe, of the Local Government Board, into cases of erysipelas following vaccination, of which six died ; a searching investigation failed to dissociate the operation from the fatal erysipelas.

In 1882 another Local Government Board Inquiry was held by Mr. Henley and Dr. Airy at Norwich into certain deaths alleged to have been caused by vaccination. It was shown that eight children suffered from erysipelas "due to some abnormal peculiarity or contamination of the lymph ;"[2] of these, four died.

On the 25th May, 1883, sixty-eight recruits[3] were vaccinated at Dortrecht, Holland. Of these seven were

---

[1] *Dublin Medical Press*, 2 S., vol. i., pp. 323, 324.

[2] Copy of "Report to the President of the Local Government Board by the Inspectors Appointed to Inquire into certain Deaths and Injuries alleged to have been caused by Vaccination at *Norwich*," p. 9. Ordered by the House of Commons to be printed, 24th October, 1882.

[3] Q. 9,465-8. Third Report, Royal Commission on Vaccination.

attacked with erysipelas, and three died. In consequence of these cases, the Minister of War, Mr. Weitzel, issued a circular notifying recruits that hereafter revaccination was not obligatory in the Netherlands army.

Before the South Wales and Monmouthshire Branch of the British Medical Association,[1] on November 15, 1883, Dr. C. T. Vachell, of Cardiff, related a series of cases where erysipelas followed vaccination. On November 1, a child, aged three months, and an adult were vaccinated with lymph obtained from London. On the eighth day the arm of the adult was much swollen and red. On the same day the child presented every appearance of having been successfully vaccinated, and five tubes were charged from it. On November 10 five children were vaccinated from these tubes. On the 11th and 12th all these cases were attacked with erysipelas of the arm vaccinated, and, on inquiry, it was found that the child from whom the vaccine lymph had been taken was attacked with erysipelas on November 9.

The *Lancet* of November 24, 1883 (vol. ii., pp. 919, 920), relates on the authority of the *Suffolk and Essex Free Press* that two children named Elliston and Griggs were vaccinated on October 16. They remained well until their visit to the vaccination station on October 23, when one of them supplied lymph for the vaccination of two other children, and was noticed by the mother to have a swollen face at the time of leaving the station. Subsequently the vaccinifer and one of the vaccinees died from erysipelas, as well as the other child vaccinated on the 16th October.

---

[1] *British Medical Journal*, December 15, 1883, vol. ii, p. 1213.

Dr. P. S. Fentem, in the *Lancet* of December 8, 1883 (vol. ii., p. 1010), reports the following :—On October 2 he vaccinated seven children from the same tube of lymph. Three of them developed symptoms of erysipelas about the vaccination marks on the twelfth, thirteenth, and fourteenth days afterwards, and one terminated fatally. He noted that the sanitary surroundings in two of the cases were unsatisfactory, but attributed the erysipelas to a certain kind of soap used to wash the clothes of the three children.

Examples of acute septic poisoning occurred in the course of some vaccinations at Asprières (Aveyron) in the month of March, 1885. An official report was issued, from which it appeared that forty-two infants were attacked, six of whom died. The symptoms of those who died comprised repeated vomiting, diarrhœa, great agitation, and, in two cases, convulsions.[1]

Among the older records of the Local Government Board are the following :—[2]

(1) A series of nineteen cases of erysipelas from vaccination at Warrington, with five deaths, in 1871.

(2) A case of serious erysipelas from vaccination with National Vaccine Establishment lymph at Stoke Newington in 1871, in which inquiry elicited that violent inflammation had occurred in others vaccinated with lymph from the same vaccinifer; the vaccinifer having an inflamed arm on the thirteenth day and a small abscess in the axilla.

---

[1] Third Report, Royal Commission on Vaccination, Appendix, pp. 210-213.

[2] Royal Commission on Vaccination, Dissentient Commissioners' Statement, section 192.

(3) Six cases of serious inflammation and three deaths in a series vaccinated with ninth-day lymph from one vaccinifer at Appleby in 1873.

(4) Several cases of erysipelas and inflammation with five deaths in a series of vaccinations at Chelsea, in 1875.

(5) Twelve cases of excessive inflammation, six of erysipelas with three deaths, two cases of axillary abscess, and one large ulcer in a series of vaccinations at Plomesgate, in 1878.

(6) Ten cases of erysipelas or abscesses with four deaths and several cases of eczema in a series of vaccinations at Clerkenwell in 1879, in which "it is clear that the erysipelatous contagion was imparted at the time of vaccination."

(7) Three cases of extensive erysipelas from vaccination at Blandford in 1883.

(8) Three fatal cases of erysipelas from vaccination at Sudbury in 1883.

Between the 1st of November, 1888, and the 30th of November, 1891, one hundred and thirty-two cases of inflammatory or septic disease (mostly erysipelas) following vaccination and terminating fatally, were the subject of inquiry by the Local Government Board. Numerous cases have also been investigated by the Royal Commission on Vaccination, and are cited in Appendix ix. to their Final Report.

Cases of erysipelas following vaccination are not infrequently objected to on the ground that the disease must have been acquired subsequently to the act of vaccination, and therefore, it is said, preventable.

Doubtless many cases may be attributed to the careless treatment of arms, insanitary surroundings of the

patient, and other conditions not directly related to the operation; but the State which compels vaccination will hardly escape responsibility for these accidents; and, from the conditions under which a number of our poor still live, it may be doubted whether there would not always arise cases of the description under consideration.

Attempts have been made to distinguish these cases from those in which the lymph itself is at fault. It has been suggested that the incubation period will afford a means of settling the difficulty. In certain experiments made by Fehleisen[1] it was found that the incubation period varied from fifteen to sixty-one hours; but it must be remembered, as Dr. Acland has pointed out, that clinical observation gives "much wider limits."[2] The length of the incubation period of erysipelas may vary "in a remarkable degree,"[3] as has been shown by certain series of cases reported on by medical men on behalf of the Vaccination Commission, where several of the children vaccinated at or about the same time have been affected, and thus pointing to a contamination of the lymph.

Thus in a series of cases in some villages near Norwich (No. 23), Dr. Barlow found from his brief provisional investigation that "some septic material had been introduced at the time of the insertion of the vaccine lymph."[4] The inflammation commenced at intervals from the first to the tenth day.

---

[1] "Bacteria in Relation to Disease," p. 283. Edited by W. Watson Cheyne, M.B., F.R.C.S. New Sydenham Society. 1886.

[2] Appendix ix., Final Report, Royal Commission on Vaccination, p. 246, foot-note.

[3] *Ibid.*, p. 294. [4] *Ibid.*, p. 232.

In a series investigated by Dr. Acland (No. 115) there was a still greater range, that is to say, the erysipelas appeared at intervals of six hours, sixteen hours, five days, and nineteen days in four cases where it was almost "a certainty that the infection of the erysipelas was derived from the vaccinifer."[1]

Dr. Acland also records another series (No. 181) of six children attacked in whom "it can hardly be doubted that the abnormal results were due to the quality of the lymph."[2] The period varied from two or three days to more than two weeks. For further testimonies regarding the variability of the incubation period of erysipelas see Tillmanns in *Deutsche Chirurgie* vol. v., pp. 96, 120, 121, Stuttgart, 1880.

It is also argued that if only one or two children suffer out of a certain number vaccinated, that this would exclude the lymph; but it may be pointed out that in cases of syphilis it is unusual for all those vaccinated with the same lymph to be attacked. Thus Trousseau[3] records an instance where only one out of five children vaccinated from the same vaccinifer contracted syphilis; and in the Paris case recorded by Guérin[4] one out of forty infants vaccinated was attacked. Mr. Jonathan Hutchinson[5] remarks that in his first series of cases two out of twelve successfully vaccinated

---

[1] Appendix ix., Final Report, Royal Commission on Vaccination, p. 294.

[2] *Ibid.*, p. 369.

[3] "Bulletin de l'Académie Impériale de Médecine, 1 S. vol. xxx., pp. 144, 145. 1864-65.

[4] *Ibid.*, 1 S. vol. xxxiv., p. 512. 1869.

[5] "Illustrations of Clinical Surgery," vol. i., pp. 129, 130. London. 1878.

wholly escaped, in his second series of about twenty-six cases more than one half escaped, and in the third series only one out of twelve is known to have been attacked, while in the fourth series only one suffered and probably six or eight escaped.

These facts point to the conclusion that the lymph cannot be exonerated by any such criteria as have been suggested.

Tubercle.

In the case of consumption, tubercle, and scrofula, there is not the same amount of unimpeachable evidence of their connection with vaccination as in the diseases before considered. Dr. Acland says—"Although vaccination may be in no way the cause of the disease, it may and must always be difficult in such cases rightly to apportion the precise effect of inheritance, circumstances, and vaccination; especially if, owing to feeble health, degenerate tissues, and bad surroundings, vaccination has been followed by ulceration, glandular abscesses, or some other complication likely to excite febrile disturbance."[1] The Vaccination Commissioners allow (section 417) that "It may, indeed, easily be the fact that vaccination, in common with chicken-pox, measles, small-pox, and other specific fevers, does occasionally serve as an inciting cause of a scrofulous outbreak." In this connection some suggestive figures are given by two French writers, Rilliet and Barthez, who found that in 208 vaccinated children 138 died tubercular and 70 non-tubercular, whereas in 95 children who died unvaccinated 30 were tubercular

[1] Allbutt's "System of Medicine," vol. ii., p. 623. London. 1897.

and 65 not so.[1] Dr. James Copland, who quotes these figures, remarks that "it cannot be doubted that vaccination favours the prevalence of the several forms of scrofula."[2] Again he says—"Notwithstanding the laudation bestowed upon vaccination, I believe that, as the lapse of time allows the fact to be more fully demonstrated, it will be found to be a not unfruitful source of scrofula and tubercles."[2]

Dr. Felix von Niemeyer writes:—"The injurious influence which diseases have on the constitution, and thereby on the tendency to consumption, manifests itself most frequently and in the most lasting manner in earliest infancy. It is fortunate if children escape disease, particularly in the first years of their life, during which by far the most rapid development of the body takes place, and when by favourable or unfavourable external circumstances the foundation is laid, in a great measure, for a strong and robust, or a weak and delicate health. Even vaccination may, by the febrile disturbance preceding the eruption, as well as by that accompanying the suppuration, both of which are never absent, and according to my numerous thermometrical observations sometimes reach a very high degree, considerably weaken, more especially those children who are not very strong, and may leave behind it the germs of a disposition to consumption."[3]

---

[1] "Traité Clinique et Pratique des Maladies des Enfants," vol. iii., p. 116, foot-note. Paris. 1843.

[2] Copland's "Dictionary of Medicine," vol. iii., pp. 740, 741. London. 1858.

[3] "Clinical Lectures on Pulmonary Consumption," p. 22. Translation from the second German edition by C. Baeumler, M.D. The New Sydenham Society. London. 1870.

This eminent authority adds, "I must protest against unconditional compulsory vaccination, particularly during the first two years of life."

Other writers have endorsed Dr. Niemeyer's opinion. Thus, Dr. Rühle, in an article on "Pulmonary Consumption and Acute Miliary Tuberculosis," remarks that "Scrofula also often appears for the first time after recovery from certain diseases, such as the acute exanthemata, and especially measles. Vaccination has also been regarded as a cause, and probably correctly. It does not, however, seem to produce scrofula directly by the inoculation of a 'scrofulous poison,' but by inducing the manifestation of the hitherto latent scrofulous symptoms, through an abnormal course of the vaccine pustule and the active fever accompanying it, in the same way as other febrile diseases of children act."[1]

Dr. Birch-Hirschfeld, in the same work, observes:—"Frequent experience shows that *vaccination* also may not infrequently be followed by a breaking out of scrofulous symptoms"[2]—although he remarks that it is to be supposed that in the majority of these cases vaccination only excites the dormant disease.

Apparently the German Government were fully alive to the danger, for their statute prohibited the taking of lymph from a scrofulous child; but, as Dr. Birch-Hirschfeld says, "This caution, however, becomes illusory, in the majority of cases, so far as first vaccina-

---

[1] Ziemssen's "Cyclopædia of the Practice of Medicine" (English edition), vol. v., p. 485. 1875.

[2] *Ibid.*, vol. xvi., pp. 773.

tions are concerned, because scrofulosis generally does not show itself during the first years of life, and proof for the possible existence of a scrofulous constitution can be found only by an examination of the physical condition of the parents, brothers, and sisters of the child." [1]

It is generally held that tubercle is due to a specific organism, and hence the possibility of its communicability by vaccination must be admitted. The experiments which have a practical bearing on this subject are those of M. Toussaint.[2] He vaccinated a tuberculous cow on the vulva with lymph from a well-formed vaccine vesicle raised on a healthy child of strong parentage. With lymph from the pocks on the cow he vaccinated four rabbits and a pig. Two rabbits killed two months afterwards were found to be suffering from tuberculosis at the point of inoculation, in the glands, and also in the lungs. The pig developed signs of tuberculosis both local and general.

The *Medical Times and Gazette*, in referring to Toussaint's experiments, says, "The significance of these experiments can scarcely be overrated; for, though a judicious vaccinator would not use lymph taken from a child who exhibited already evidence of the disease, the chances of cows in whom spontaneous vaccinia may appear, and whose lymph would at the present time be

---

[1] Ziemssen's "Cyclopædia of the Practice of Medicine" (English edition), vol. xvi., p. 774.

[2] "Comptes Rendus Hebdomadaires des Séances de l'Académie des Sciences," vol. xciii., pp. 322-324. 1881.

eagerly sought after, being, like so many of their species, tuberculous, are great; and it would seem, in consequence, that the dangers of animal vaccination may be greater than those of human, which are supposed to be avoided by having recourse to the cow."[1]

Although Sir Richard Thorne, in his recent report to the Local Government Board, refers to this danger as "very remote," it is evidently one which is apprehended by the Medical Department of the Local Government Board; for, with a view of reassuring the public, he states that the tubercle bacillus, when experimentally added to a mixture of lymph and an aqueous solution of glycerine, rapidly loses its vitality. Considering that the researches of Dr. Arthur Ransome[2] and others have indicated that glycerine favours the growth of tubercle in culture media, it may be anticipated that Sir Richard Thorne's statement will be received with a certain amount of scepticism.

Lupus has occasionally been found growing in the site of vaccination. Mr. Hutchinson[3] has figured a case in a child eight years of age. The disease occurred in and around a vaccination scar, and commenced a few months after the operation. Cases of a like nature

---

[1] *Medical Times and Gazette*, September 3, 1881, vol. ii., p. 291.

[2] "Proceedings of the Royal Society" for 1897, vol. lxii., pp. 187-200. See also Nocard and Roux in "Annales de l'Institut Pasteur" for 1887, vol. i., pp. 19-29; Crookshank in "Transactions of the Pathological Society of London" for 1890-91, vol. xlii., pp. 333-336, and Beevor, *Ibid.*, pp. 344, 345.

[3] "Illustrations of Clinical Surgery," vol. i., p. 141, plate xxv., fig. 1. London. 1878.

have been described by Besnier[1] and Lennander.[2] Dr. Colcott Fox[3] mentions three instances of lupus in vaccination scars. In one case the lupus was left behind when the vaccination lesions healed. A patient was also examined by Dr. Acland on behalf of the Royal Commission on Vaccination (see No. 26, Appendix ix.; also Mr. David Daker's evidence pp. 141, 142, Sixth Report).

Tetanus.

It will have been observed that most of the disasters alleged to be induced by vaccination come under the heading of inoculable diseases; tetanus, or lock-jaw, is no exception to this rule. The following cases have been reported from time to time, and it must not be assumed that they represent the total number of cases of tetanus attributable to vaccination.

Reported by

(1) Dr. Joseph B. Cottman. *New Orleans Medical and Surgical Journal*, 1854-55, vol. xi., p. 783. Negress affected with tetanus following vaccination; period of time not stated. Recovery in two weeks by use of large doses of opium.

(2) Dr. George Ross. *The Southern Clinic*, 1878-79, vol. i., p. 468. Boy, three and a half years old when vaccinated. Tetanus supervened three weeks afterwards with death on the third day. No other lesion beyond vaccination.

---

[1] "Annales de Dermatologie et de Syphiligraphie," vol. x., pp. 576, 577. Paris. 1889.

[2] "Upsala Läkareförenings Förhandlingar," vol. xxv., pp. 65-70. Upsala. 1889-1890.

[3] The *Practitioner*, vol. lvi., p. 500. May, 1896.

(3) Dr. Theodore Dimon. *St. Louis Courier of Medicine*, 1882, vol. vii., pp. 310-312. Boy, nine years old; vaccinated January 6, 1882, with bovine lymph. Tetanus supervened on January 27; no cause discovered except vaccination, which was followed by an irregular shaped ulcer. Boy died on the tenth day.

(4) Dr. H. J. Berkeley. *Maryland Medical Journal*, 1882-83, vol. ix., pp. 241-245. Healthy man, forty years old; vaccinated in the middle of January, 1882. Tetanus supervened on February 7; death on February 13. No lesion discovered except at the point of vaccination, which was occupied by a deep ulcer, with an inflamed and indurated border.

(5) Dr. W. T. C. Bates. "Transactions of the South Carolina Medical Association," 1882, vol. xxxii., p. 105. Mulatto boy, aged five years; vaccinated February 9, 1882, with humanised lymph. Tetanic symptoms supervened on March 8. No other cause but vaccination discovered. Boy lived fifteen days.

(6) Dr. R. Garcia Rijo. "Cronica Médico-Quirurgica de la Habana," 1886, vol. xii., p. 388. White child, two years old; vaccinated in April, 1886; characteristic tetanus appeared in latter part of May. No lesion beyond vaccination discovered. Death followed on the fourth day.

(7) Dr. Zahiroodeen Ahmed. *Indian Medical Gazette*, March, 1889, vol. xxiv., p. 90. Adult, aged twenty-one; the symptoms appeared fourteen days after primary vaccination.

(8) Local Government Board, Case x., Appendix ix. Final Report, Royal Commission on Vaccination. Female, aged two months; vaccinated on September

10, 1889; symptoms of tetanus first appeared on October 2, and patient died on the 5th of October.

(9) Dr. S. W. S. Toms. *Medical News* (Philadelphia), February 24, 1894, vol. lxiv., pp. 209-212. Female white child, five years five months old. Vaccinated November 6, 1893, with bovine lymph on ivory point. Characteristic trismus on November 30, with death on December 5.

For two recent cases of tetanus following vaccination see *Medical Record*, New York, January 22, 1898, vol. liii., p. 129, and *Indian Lancet*, Calcutta, January 1, 1898, vol. xi., p. 42.

Dr. Acland mentions that the case included in the Vaccination Commission Reports (No. x.) is the only one he is acquainted with in more than five million vaccinations in this country.[1] This would tend to show that in England tetanus after vaccination is very rare, as we should expect it to be. It would be more interesting if we had the figures for Calcutta and other parts of India. In an address to the Medical Society of Calcutta on January 5, 1892, Sir Spencer Wells[2] stated that the infant mortality from tetanus in that city during the years 1881-90 almost equalled that for all other infantile diseases added together. Of course, I do not wish to imply that this large mortality is in any way attributable to vaccination; but before deciding the question of the frequency or otherwise of tetanus after vaccination we should have before us the statistics from countries where tetanus is prevalent.

---

[1] Allbutt's "System of Medicine," vol. ii., p. 598. London. 1897.

[2] Report on Sanitary Measures in India in 1891-92, p. 108.

The Amount of Vaccinal Injury.

It is impossible to form any accurate estimate of the total amount of serious and fatal injury produced by vaccination; the following table only gives the deaths recorded by the Registrar-General:—

England and Wales. Deaths from Cow-pox and other effects of Vaccination, from 1881 to 1895.

1881	...	...	58
1882	...	...	65
1883	...	...	55
1884	...	...	53
1885	...	...	52
1886	...	...	45
1887	...	...	45
1888	...	...	45
1889	...	...	58
1890	...	...	43
1891	...	...	43
1892	...	...	58
1893	...	...	59
1894	...	...	50
1895	...	...	56

This shows that in England and Wales, according to medical death-certificates, one child on an average dies every week from the effects of vaccination. This fatal record, however, does not by any means represent the damage done by the operation, as for every death there must be a very large number of children who are injured, but survive for years with enfeebled constitutions.

It has been noticed in the earlier part of the present chapter that in all probability cases of vaccino-syphilis remain unrecognised, and there also seems reason to believe that, even if recognised, a certain number are unreported. In support of this, I may quote from Professor Alfred Fournier's work on vaccino-syphilis. He says—"*There are certainly many more cases of vaccinal syphilis on the cards or in the memories of practitioners than in the columns of our journals.* For myself, had I

up to this day published a single one of the numerous cases of this kind which I have observed, whether in my private practice or in hospital? But how many of my colleagues might say as much? There is more. The same reticence must have sometimes concealed important cases. For myself alone, I had knowledge of two actual *epidemics* of vaccinal syphilis, which have been kept secret, and upon which I have been able to obtain only incomplete information, the affair having been *hushed up*."[1]

The Royal Commission also remark (section 426) that "it is not to be forgotten that a natural reluctance to register deaths as due to syphilis may have prevented some cases where recently vaccinated persons have died from that disease from being made public."

Dr. P. A. Morrow, in referring to eruptions incident to vaccination, observes—"It must be confessed that the profession has manifested a most decided unwillingness to recognise their direct dependence upon vaccination."[2]

Again, in the Local Government Board Inquiries on erysipelas, held by Mr. Netten Radcliffe at Gainsborough, and by Mr. Henley and Dr. Airy at Norwich, before referred to, there were in all ten deaths, and in only one of these was vaccination mentioned on the certificate of death. Also, in an Inquiry, on behalf of the Royal Commission, on a series of injuries from vaccination at some villages in Norfolk, in 1890, Dr. Barlow found, from the brief provisional investigation he was able to

---

[1] "Leçons sur la Syphilis Vaccinale," p. 53, foot-note. Alfred Fournier. Paris. 1889.

[2] *Journal of Cutaneous and Venereal Diseases*, vol. i., p. 176. New York. March, 1883.

make, that some septic material had been introduced at the time of the insertion of the vaccine lymph, and that this was mainly responsible for the untoward results obtained. There were three deaths, and in none of these was the word "vaccination" mentioned on the death-certificate.

In this connection Professor Schaefer, of the Women's Medical College, Kansas City, remarks—"The pathology of vaccination is a subject upon which very little has been written by writers on vaccination. There is no doubt that every experienced physician has seen one or more cases of severe localised sepsis following the operation of vaccination. It will be found, on surveying the field, that such accidents are by no means rare, contrary to the statements of the books, as we have been made to believe." [1]

Dr. Bridges, formerly Inspector of the Local Government Board, gives the following explanation—"Medical statistics cannot be quite trustworthy on this point from the nature of the case. A doctor vaccinating a child will obviously be unwilling to say that vaccination did harm, unless he is a man above the ordinary standard of courage and conscientiousness . . . statistics founded on such uncertain facts—facts dependent not merely on the skill but on the moral courage of the doctor, can have no possible value." [2] It is interesting to notice that history apparently has repeated itself; for Sir Richard Blackmore, writing in 1723 about the pre-

---

[1] *Journal of Cutaneous and Genito-Urinary Diseases*, vol. xiv., p. 399. New York. October, 1896.

[2] *Positivist Review*, November, 1896, vol. iv., p. 225.

varications of the inoculators, says—"It is in vain to give this matter another more favourable turn for the operators, by saying, the patient was of a weakly constitution, and full of ill humours, or that he was of a froward and perverse temper, and died by a fit of peevishness, or that he was carried off by terrible convulsions, and not by the small-pox; for men of the least sagacity must see through these ridiculous evasions invented to cover true history and defeat our inquiry into matter of fact, and to buttress up the reputation of the inoculators."[1]

On the following page he observes—"To say that the small-pox, which the convulsions attended, was not the cause of the patient's death, but the convulsions, is the same thing as to affirm that the axe that cuts off a traitor's head, is by no means the cause of his death, but the effusion of blood and trembling motions of the body, that followed the separation."

The Royal Commission (section 379), while admitting, as they were bound to do, that some risk attaches to vaccination, have attempted to minimise the dangers of the operation by comparing the risk to that of railway travelling; in this they were promptly taken up by Dr. Collins and Mr. Picton in their Statement of Dissent (section 184), who show from the Board of Trade returns that the proportion returned as killed (from causes beyond their own control) to the number carried by railway was 1 in about 35,000,000, while the risk of dying from vaccination to the number vaccinated, according to the death-certificates of medical men, was 1 in 14,159. Of course, these latter figures give no idea

[1] "Treatise upon the Small-pox," p. 93. Sir Richard Blackmore, M.D., F.R.C.P. London. 1723.

of the total risk of vaccination, but they serve to show the bias of the majority of the Vaccination Commissioners in their treatment of this subject.

Animal Lymph.

This new departure, recommended by the Royal Vaccination Commission, amounts to a virtual condemnation of the arm-to-arm system which has been enforced upon the people for half a century. It is therefore important to inquire whether a general introduction of calf lymph, as proposed, would be attended with any diminution in the danger which appears to be inseparable from the practice of vaccination. In the case of syphilis, facts and considerations have been presented to the reader for believing that this disease, or symptoms indistinguishable therefrom, would not necessarily be excluded by the employment of calf lymph; as the *Lancet* observed in criticising an article by Dr. Henry A. Martin—"The notion that animal lymph would be free from chances of syphilitic contamination is so fallacious that we are surprised to see Dr. Martin reproduce it, and so contribute to the perpetuation of the fanciful ideas which too commonly obtain on the origin of vaccino-syphilis."[1]

The remaining diseases which concern us in this country are tubercle, to which I have already alluded in this connection, erysipelas, and other inflammatory complications and skin diseases; and, with regard to these last, there is every reason to believe that the introduction of animal lymph would be a disadvantage as compared with the present system.

---

[1] The *Lancet*, June 22, 1878, vol. i., p. 909.

In the *American Medical Times* for March 8, 1862, Dr. Henry M. Lyman observes—"It is certain that the disturbances, produced by the use of a virus which has been newly derived from the cow, are generally much more marked than the effects which follow the use of a more perfectly *humanised* lymph."[1]

With reference to the irritating effect of animal virus on the skin, we learn, on the high authority of Mr. Robert Ceely, that "those who believe their children will escape cutaneous eruptions when vaccinated direct from the cow, will be greatly mistaken. Many children have skins—all children more or less—prone to throw out eruptions, papular, vesicular, pustular, or exanthematic, upon the excitement of the least increased vascular action. Hence ordinary vaccination will cause what most other febrile and cutaneous irritations produce. Hence more irritating lymph, as it is when direct from the cow, will be more effective in the production of the above results. But there is a special vesicular vaccine eruption attending the acme and decline of the vaccine disease. The Germans have called it 'Nachpocken.' I have often, nay almost always, seen it as a secondary eruption on the teats and udders of the cows immediately before and after the decline of the disease in them. The same I have repeatedly seen in children, especially in the early removes from the cow; and still continue at times to witness it, to the great temporary disfigurement and annoyance of the patient, and the chagrin and vexation of the parent. It is essentially a genuine vaccine secondary eruption. I have witnessed it in

[1] *American Medical Times*, vol. iv., p. 135.

vaccinating the dog. I have coloured illustrations of this secondary eruption in man and animals, and have seen some severe and a few dangerous cases in children where the skin and visible mucous membranes were copiously occupied with it."[1]

It may also be noticed that Professor Depaul, of the Paris Faculty of Medicine, expressed the opinion that calf lymph is more frequently followed by secondary vaccinal eruptions.[2] Ever since Ceely's day numerous authorities have pointed out the greater potency of calf lymph: thus Dr. Henry Blanc,[3] a prominent advocate of this vaccine, in a treatise on "Compulsory Vaccination," remarks on its "greater activity;" and the editor of The *Practitioner*, in reviewing the pamphlet, pertinently observed that "the very argument which Dr. Blanc urges in favour of the superior value of heifer vaccination is a distinct and serious objection to it."[4]

By far the most damaging reports on animal lymph, however, come from those who have had the greatest experience of its effects, *viz.*, the vaccinating surgeons in the United States; for this method of inoculation was adopted in the States much earlier and with much greater fervour than it ever has been in this country, and for the reason that humanised virus was found to be attended with such serious consequences.

In the Sixth Annual Report of the Board of Health

---

[1] *British Medical Journal*, January 7, 1865, vol. i., p. 19.

[2] *Ibid.*, July 3, 1880, vol. ii., p. 22.

[3] "Compulsory Vaccination: An Inquiry into the Present Unsatisfactory Condition of Vaccine Lymph," pp. 16, 24. Henry Blanc, M.D., F.R.G.S. London. 1869.

[4] The *Practitioner*, vol. iii., p. 236. October, 1869.

of the State of New Jersey, Dr. Thomas F. Wood, in answer to certain queries relative to vaccination, says—"Vaccination with bovine lymph has brought to light a series of phenomenal symptoms, except to those medical men who have kept fresh in their minds the descriptions of Jenner and the early writers. Jenner described the disease caused by early removes from the cow, and he consequently gave a picture of only the intensest forms of it, in his 'Inquiry' and 'Further Observations.' A glance at the coloured engravings in Jenner's great work, in Woodville's, Pearson's, Bryce's, Willan's, and all others, shows that the vesicle was larger and the areola more intensely red than in the cases familiar to us up to the time of the introduction of the Beaugency lymph. The reader of the early vaccinographers can hardly believe there was not some exaggeration in their descriptions of the serious constitutional symptoms, and the bad ulcers which sometimes succeeded vaccination; ulcers so bad, indeed, that they had to be treated with solution of white vitriol."[1]

Continuing, he observes that "the degree of sickness is generally greater following bovine vaccination."[2]

Dr. Ezra M. Hunt, Secretary of the New Jersey State Board of Health, observes that "the degree of sickness is, as a rule, greater in a genuine bovine than in a humanised vaccination, and quite corresponds to Jenner's statement, made as to his own cases."[3] With regard to eruptions—"Like the original cow lymph, as used by Jenner, it is more active in its effects, and therefore is

---

[1] Sixth Annual Report of the Board of Health of the State of New Jersey, 1882, pp. 37, 38.

[2] *Ibid.*, p. 39. [3] *Ibid.*, p. 51.

more likely to excite local irritation, and to be the occasion for the appearance of some eruptive disorders, to which the person may be inclined." [1]

Dr. E. L. Griffin, President of the Wisconsin Board of Health, says:—"The constitutional symptoms following the use of pure bovine lymph, and those induced by lymph humanised by a few removes from the heifer, are generally of a like character and degree. In the case of both, these symptoms are sometimes quite severe. The cause is quite often found in the condition of the patient himself. It must be admitted that during the past year an unusual amount of severe constitutional symptoms and local complications have followed the use of bovine lymph." [2] About skin diseases he observes—"The frequency of vaccinal erythema following the use of bovine lymph is a noticeable phenomenon. This constitutional manifestation of the vaccinal disease is seldom observed in the use of humanised lymph of distant removes from the heifer." [3] Dr. Griffin thought the eruption to be of small account, and that it only indicated a thorough saturation of the system with the vaccinal disease.

In the Report of the Oxford Local Board to the New Jersey Board of Health, Dr. L. B. Hoagland, in referring to an epidemic of small-pox, says—"About fifteen hundred persons were vaccinated during its prevalence, one third of them with humanised virus, and the remainder with non-humanised bovine virus, the constitutional effect being much the more marked when the

[1] Sixth Annual Report of the Board of Health of the State of New Jersey, 1882, p. 54.

[2] *Ibid.*, p. 65. [3] *Ibid.*

latter was used. One child, of five years, lost its life by taking cold in her arm; gangrene set in, and she died from septicæmia. Some of the sores were three or four months in healing."[1]

Dr. William M. Hartpence, in the Report of the Washington Local Board, remarks that "Bovine virus was generally used, and our observations lead us to conclude that the constitutional effects were greater in a larger number of cases than we had observed in years past when using humanised virus; and, also, our experience makes us believe that the resulting sores were longer in healing (speaking in general) than with the humanised virus."[2]

Dr. E. J. Marsh, President of the Patterson Board of Health, said that although he had tried both varieties of lymph, "In my use of bovine lymph it was observed that the vaccine vesicle resulting was much larger, the areola and inflammatory induration were more extensive, the crust large, flat and thin, generally ruptured, and came away before the sore was cicatrised. In two instances the inflammatory action was so high that the vesicle sloughed out *en masse*, leaving a deep ulcer."[3]

The Second Annual Report of the State Board of Health of Indiana, for the year ending October 31, 1883, furnishes a list of reports on small-pox and vaccination from the Health Officers throughout the State. The following relate to the effects of animal virus.

Dr. Henry Gers, of Washington, reported that, three

---

[1] Sixth Annual Report of the Board of Health of the State of New Jersey, 1882, p. 180, 181.

[2] *Ibid.*, p. 182.

[3] *Ibid.*, p. 70.

years previously, unpleasant effects were noticed from supposed bovine virus. (P. 185.)

Dr. D. W. Butler, of Connersville, said that bovine virus was used entirely, and some cases of vaccination were unusually ill, with an eruption over the entire body. (P. 186.)

Dr. J. M. Gray, of Noblesville, remarked that in 1872 erythema, as a result of vaccination, was quite common. In his experience bad results were more frequently seen after bovine virus. (P. 186.)

Dr. N. S. Shipman, of Seymour, observed that nothing but bovine virus was used, and "in a few instances we had ulcerous-looking sores, lasting sometimes for six months." (P. 187.)

Dr. J. T. Jones, of Franklin, reported on a great number of bad arms as the result of vaccination with bovine virus. (P. 188.)

Dr. Horace E. Jones, of Anderson, stated that "phlegmonous abscesses and sloughing ulcers frequently occurred" as the result of bovine virus. (P. 190).

Dr. S. H. Pearse, of Mount Vernon, reported that bovine virus only was used, and that he saw no difference between the bovine and human. He observed that a year previously "extensive inflammation" followed the use of bovine in two cases, and he remarks that in consequence of a case of small-pox fourteen people in one house were vaccinated, all of whom had sore arms. (P. 190.)

Dr. George B. Walker, of Evansville, ascertained that the bovine lymph was "more violent and caused troublesome ulceration, and sometimes eruption over the body." (P. 191.)

Dr. C. E. Lining, of Evansville, reported some very bad arms, more following the use of bovine virus.

And, lastly, Dr. J. R. Crapo, of Terre Haute, noted severe dermatitis, and an eruption over the whole body, resembling lichen or eczema, as the result of the use of animal lymph.

In the *Journal of Cutaneous and Venereal Diseases* Dr. Morrow bears out the almost universal opinion of medical men in the United States when he says—"The experience of the profession in this country with bovine lymph shows that it is slower in its development, more intensely irritant in its local and constitutional effects, and more prolonged in its active continuance." [1]

Dr. Alexander Napier,[2] Assistant to the Professor of Materia Medica, Glasgow University, and Physician to the Skin Department, Anderson's College Dispensary, calls attention to a certain remarkable group of skin eruptions, which he finds reported in the American journals, and with scarcely an exception they related to cases where animal lymph was used. He first refers to instances reported by Dr. Rice in the *Chicago Medical Journal and Examiner* for February, 1882, in which that gentleman states that "about one in ten of all vaccinated have bad arms, with a high grade of fever, and eruption resembling somewhat that of *rötheln* or German measles."

Further cases are given in the *Boston Medical and Surgical Journal* for 1882. In the number for March

---

[1] *Journal of Cutaneous and Venereal Diseases*, vol. i., p. 167. March, 1883.

[2] *Glasgow Medical Journal*, June, 1883 (New Series), vol. xix., pp 424-432.

23, 1882, Dr. Alfred H. Holt[1] records eruptions in five successful primary vaccinations with bovine lymph. The rash resembling German measles appeared about nine days after vaccination, was attended with considerable fever, and, when it faded, a brownish stain was left on the skin. Dr. Holt thought it was a reasonable presumption that the eruption was due to vaccination, and remarks (p. 272)—"If such is the case, and this result is going to occasionally follow vaccination with animal virus, it is highly important that the fact be known."

In the *Journal* for April 13, 1882 (p. 356), Mr. Vincent Bowditch recorded three similar cases, the eruption appeared on the ninth day, and was succeeded by brown staining of the skin as in Dr. Holt's cases. In one of the patients there was considerable constitutional disturbance, fever, headache, and malaise, and he remarks that other physicians in the town had similar cases.

Dr. A. I. Lawbaugh, in the issue for April 20, 1882 (p. 384), says that in eight hundred of his own successful primary vaccinations with bovine lymph, sixty-eight were attacked with a similar eruption, which was dusky red, covering nearly the whole surface of the body. The eruption somewhat resembled measles; and there was intense itching, and a brown stain was left which disappeared in a few days. In thirteen successful primary vaccinations with humanised lymph, one remove from heifer, three had eruptions; but there were no eruptions in two hundred successful re-vaccinations. He remarks that his brother practitioners have noticed similar experiences.

---

[1] *Boston Medical and Surgical Journal*, March 23, 1882, vol. cvi., pp. 271, 272.

Dr. Morton Prince, in the number for April 27 (p. 394), observed that, as city vaccinator, since the beginning of the year he had performed seven thousand vaccinations, and that skin eruptions accompanying successful vaccination were so frequently observed that he ceased to regard them as either unusual or accidental. He describes papular and erythematous eruptions, the former being so common as to "cease to attract notice." Dr. Prince furnishes notes of two cases of urticaria with severe constitutional symtoms accompanying vaccination, and one of very marked and widespread erythema. He adds (p. 395)—"Judging from the number of times I have been questioned by anxious parents on the meaning of these eruptions, I believe with Dr. Holt that the fact of their liability to follow vaccination should be widely known."

Dr. Napier's own cases are as follows :—[1]

1. A healthy child vaccinated with calf lymph. Normal course till tenth day, when a plentiful crop of papules appeared on the lower limbs, lower part of trunk, and arms. The eruption disappeared in three days.

2. A child vaccinated with lymph taken from a patient who had been vaccinated with calf lymph eight days previously. Normal course till the eleventh day, when large rings of *erythema exudativum* appeared on arms and thighs; on the following day the eruption spread, and changed from a purplish to a yellowish red; it faded on the third, and completely disappeared on the

---

[1] See *Glasgow Medical Journal*, June, 1883 (New Series), vol. xix., pp. 426-428.

fourth day. The right hand and arm and left foot and ankle were much swollen and deformed. No pain nor irritation ; fever slight. Two other children vaccinated with the same lymph presented nothing abnormal.

3. A sister of the preceding. In this case calf lymph used. Normal course till the tenth day, when a vivid red, papular, measly eruption appeared over the whole body, face, and head. Faded greatly in twenty-four hours, and completely in two days.

4. Calf lymph vaccination. Normal course till the ninth day, when eruption precisely resembling the last case appeared. It faded by the evening of the next day.

5. A doubtful case, which Dr. Napier hesitated to place in the same category, as the interval before eruption appeared was very long. Child was vaccinated with human lymph. On the twenty-eighth day eruption exactly resembling that of measles appeared on the scalp and face, and to a lesser extent on the neck, chest, and upper arms ; it disappeared in five days. There was no catarrh, and no other member of the family was affected.

In summing up these experiences, Dr. Napier remarked (p. 430)—"In nearly every instance I have mentioned in which spontaneous generalised eruptions followed vaccination, the lymph used was animal lymph, not humanised lymph. What does this indicate? That, as Dr. Cameron, M.P., once argued before this Society, the nearer the virus to its original source in the days of Jenner, the stronger it is, and the more efficient the protection it affords? Without venturing to give any opinion as to the greater efficacy of calf lymph vaccination as a prophylactic against small-pox—a

matter which can only be settled on the basis of a wide statistical inquiry—it seems very clear that in animal lymph we have a more powerful material, one which more deeply and obviously affects the system than our ordinary humanised lymph, if the degree of constitutional disturbance is to be taken as an index of the effectual working of the virus."[1]

More recently we find in an article on "Small-pox in San Francisco," by Dr. S. S. Herrick, the following remarks :—"Besides the uncertainty of the bovine virus, there are other features of common occurrence, which are not pleasant and which are not found in the human product. The sores are apt to be quite serious in character ; a considerable eruption on the body is liable to take place ; and the points of vaccination frequently develop a raspberry-like excrescence (sometimes a true ecchymosis) which may remain for weeks, and is often mistaken by the inexperienced for the normal result of vaccination."[2]

Apparently the experience of the profession in this country, as far as it goes, is much the same as has been reported from America. Thus Drs. Acland and Barlow,[3] who investigated cases of vaccinal injury for the Royal Commission, "are of opinion that a certain proportion of children will always suffer after vaccination from various forms of cutaneous eruption. These seem to be more frequent after vaccination with calf lymph, and

---

[1] *Glasgow Medical Journal* (New Series), vol. xix., p. 430.

[2] Tenth Biennial Report of the State Board of Health of California, 1888, p. 139.

[3] Royal Commission on Vaccination, Dissentient Commissioners' Statement, section 186.

are for the most part free from danger, though often giving rise to considerable distress." They also think that "calf lymph as now usually employed tends to produce more severe inflammatory reaction than that which has been humanised."

Lastly, the Commissioners, although insisting that parents should have the option of calf lymph for their children (section 437), apparently do not recommend it with any degree of confidence; for, a little above, on the same page, they inform us that some of the best qualified witnesses have expressed a deliberate preference for arm-to-arm vaccination, believing that the advantages of calf lymph are more imaginary than real. A diminution, therefore, in the mortality and in the amount of suffering can hardly be expected from this new departure in the Jennerian *cultus*.

Glycerinated Lymph.

It has been frequently suggested that some of the most serious of the unfortunate results arising from the use of animal vaccine might be prevented, or at all events mitigated, by improvements in existing modes of its collection and preservation; but, up to the present time, in no country, though much ingenuity has been exercised, has a really safe variety been discovered.

A method, which has recently found favour in official quarters, and seems likely to be adopted as far as public vaccination is concerned, consists in the addition of glycerine to the lymph; it is hardly necessary to observe that this would be an entirely new departure from the present system of public vaccination, which is designed, as far as possible, to secure vaccination with fresh lymph

from arm to arm. The alleged advantages of the admixture with glycerine are, that all micro-organisms, with the exception of the vaccine germ, are thereby rendered inert and innocuous. Now, if it be true that glycerine has this very extraordinary action, we may infer that lymph which has not been glycerinated contains elements of danger. The promoters of glycerinated lymph, *viz.*, the Local Government Board, are to be congratulated on this somewhat tardy admission of a danger which they have for years strenuously denied.[1]

This method of preservation appears to have been suggested in or about the year 1849,[2] and it has been used extensively at one time or another, not only on the continent of Europe, India, and Japan, but also in England.

Dr. Renner, the well-known purveyor of calf lymph, writes to the *British Medical Journal* of October 30, 1897 (vol. ii., p. 1298)—"I have myself prepared and supplied none but glycerinated calf vaccine ever since the year 1883 at my establishment, except 'on points,' which, however, I have discontinued long ago, and I have frequently demonstrated my procedure in all details privately and in public;" and hence we have abundant means of testing whether glycerinated lymph is so very innocuous after all.

In this connection the experience of the late Sir George Buchanan, Principal Medical Officer to the Local Government Board, is of interest. It will be

---

[1] See "Facts concerning Vaccination for Heads of Families." (Revised by the Local Government Board, and issued with their sanction.)

[2] See *Medical Times*, vol. xxi., pp. 227, 248. March 23 and 30, 1850.

remembered that I have adverted to certain vaccinations in the Isle of Rügen in 1885, where of seventy-nine children vaccinated, all but three were attacked with *impetigo contagiosa*, and by infection the disease was spread to three hundred and twenty out of a population of five thousand inhabitants. The Rügen lymph was mixed with glycerine *(glycerinum purissimum)*, and it has been suggested by the late Sir George Buchanan[1] that this was the cause of the untoward occurrences. He handed round to the members of the Epidemiological Society a plan showing the component parts of the "stuff" used by Dr. Ebert in his Rügen vaccinations (p. 115). Sir George had "heard of dilutions of lymph with glycerine, always from people complaining of the lymph" (p. 117). And he concluded his remarks by observing—"It will, I trust, be long before such preposterous adulterations of vaccine give the opportunity of investigating their results in English practice" (p. 118).

It may be mentioned that the Chairman of the Royal Commission,[2] Lord Herschell, when this subject was under discussion, clearly indicated by his questions to my father, when under examination, his opinion with regard to the danger of adulterating lymph with glycerine. This will be seen by the following:—

Q. 9,804. (Chairman.) If there is a practice of mixing the vaccine lymph with foreign

[1] Transactions of the Epidemiological Society, 1885-86 (New Series), vol. v, pp. 114-118.

[2] The Royal Commission say (section 448)—"It was at one time suggested that the introduction of glycerine was likely to be mischievous. The question is one a further investigation of which is obviously desirable."

matters, those foreign matters, if one of them is glycerine, may well be subject to pollution?—The intention is to improve the quality of the lymph—to render it more innocuous.

Q. 9,805. But you may have the best of intentions in that direction, and you may carry them out; but unless the individual who gets the lymph from the Institution uses that lymph just as he gets it, mixing nothing with it, the best of arrangements in the Central Institution will not prevent things going wrong?—That is so.

Q. 9,810. . but, it is surely a point of importance whether it was a result arising from the use of vaccine matter procured from a well-constituted establishment, or whether it arose from the mixture of the vaccine matter with something else by the practitioner who used it. You would admit that, I suppose?—I see that clearly.

Dr. Lürman,[1] of Bremen, gives an account of an epidemic of catarrhal jaundice in 1883-84 in a large shipbulding and machine-making establishment in that town, which is of interest from the fact that the patients had been revaccinated with glycerinated lymph. One hundred and ninety-one persons were attacked. The disease began with symptoms of gastric and intestinal catarrh, which persisted a week or more, until jaundice

[1] *Berliner Klinische Wochenschrift*, vol. xxii., pp. 20-23, January 12, 1885.

appeared. The symptoms comprised epigastric oppression, anorexia, vomiting, faintness, and there was usually constipation. Yellow vision occurred in a few instances. In one case the patient suffered from general dropsy with cerebral symptoms, but none of the cases were fatal. Eighty-seven persons in the establishment, who were revaccinated by other surgeons and other lymph, remained unaffected. Dr. Edwardes, who relates these cases in the *London Medical Record* of April 15, 1885 (vol. xiii., p. 142), remarks that the epidemic "was causally connected with the re-vaccination, in some way or other."

A feature of glycerinated lymph appears to be that, when it takes, great intensity of action is observed, both local and general. Thus Dr. James Cantlie[1] refers to "much constitutional disturbance" produced by Japanese lymph. I may also allude to an article by Dr. Robert J. Carter.[2] He details the results of 319 re-vaccinations with glycerinated calf lymph. He observes that in 106 of the patients the axillary glands were "large, hard, and tender, and in some instances exquisitely painful;" in 3 of the cases the glands above the collar-bone were also affected. In 9 cases lymphangitis was present, the lymphatic vessels being felt as hard, swollen, tender cords along the course of the axillary vessels. In 98 of the patients there was œdema and induration of the arm, and these manifestations were of a "curiously persistent character." Dr. Carter remarked that they were apparently dependent on the intensity of the local inflammation at the site of the vaccination.

---

[1] *British Medical Journal*, October 5, 1889, vol. ii., p. 762.

[2] The *Lancet*, June 12, 1897, vol. i., pp. 1611, 1612.

Abundant evidence of the danger of glycerinated lymph is adduced in Appendix ix. to the Final Report of the Royal Commission. The cases are, of course, mostly erysipelas or of a septic nature; and, without including those of a less severe character, they number 84, and of these no less than 24 were fatal.[1]

In India glycerinated lymph has been a failure in every way. In the first place, the success per centum has been very low, as will be seen from the following figures[2] for Madras Presidency in 1894-95 :—

Animal lymph.	Number vaccinated.	Success per cent.
Direct from calf	378,955	97·4
Preserved in glass tubes or plates	142,899	94·1
Preserved with glycerine	642,296	89·2

In 1895-96 the results are much the same :—[3]

Animal lymph.	Number vaccinated.	Success per cent.
Direct from calf	300,518	97·8
Preserved in tubes	98,703	95·1
Preserved with glycerine	641,181	89·5
Preserved with lanoline	23,193	94 5

This low percentage of successful results is naturally regarded as a very serious objection. In the Memorandum by the Army Sanitary Commission on the Report of the Sanitary Commissioner of Madras for 1894, it is stated:—"In the Madras Presidency, preserved lymph is largely used. No fewer than 642,296 persons were vaccinated with lymph preserved with glycerine. It is, we think, no matter of surprise that of these only

---

[1] See Nos. liii., lxxxii., xcix., cviii., cxii., cxxvii., cxxviii., cxxxiv., cxliv., cxlviii., cl., clxxxi., clxxxix., 21, 81, 122, 168, 207, 208, 218, 221, 236, 237, 244, 249, 251, 258, 312.

[2] Report on Sanitary Measures in India in 1894-95, p. 113.

[3] *Ibid.*, 1895-1896, p. 102.

89·2 per cent. proved successful cases of vaccination This messing with vaccine lymph mixed with glycerine is evidently not only an expensive procedure, but disappointing in its results. Altogether, vaccination in the Madras Presidency seems to us to be capable of improvement."[1]

It appears that the results have been so unsatisfactory generally, that the preparation of glycerinated lymph, after a fair trial, has been entirely discontinued in the Calcutta and Darjeeling Depôts, the principal reason assigned by the Sanitary Commissioner for Bengal being that "Glycerine is a nutritive medium for the growth of putrefactive and other germs, and, being fluid, the germs soon pervade it throughout; and, as a fact, this preparation (glycerinated lymph) in India soon becomes putrid and septically dangerous."[2] And when we consider the stimulating action of glycerine on the growth of the tubercle bacillus, it seems probable that a general introduction of glycerinated calf lymph would add a new and important risk to the practice of vaccination. It appears, therefore, certain that by none of the methods at present in vogue can we lessen the danger and amount of suffering attending the practice; and when the alleged prophylaxy of vaccination is allowed to be so ephemeral by some of its ablest defenders, the State may surely, as in the case of other medical prescriptions, leave the matter to the parent, who, after all, is the most concerned, to say whether his child shall be vaccinated or not.

---

[1] Report on Sanitary Measures in India in 1894-95, p. 217.

[2] *Indian Lancet*, March 1, 1897, vol. ix., p. 221.

CHAPTER X.

SUMMARY AND CONCLUSIONS.

BEFORE summing up my conclusions, a few words concerning the enforcement of vaccination may not be out of place, and my task has been simplified by the Report of the Royal Commission. Four of the Commissioners have recommended that compulsion should be altogether abolished, and the remaining nine, that honest objectors should not be subject to fine or imprisonment for refusal to allow the vaccination of those for whom they are responsible. Those who have studied the evidence given before this important tribunal, and especially the *Blue Book*[1] of 453 folio pages containing the records of vaccinal disasters, will concur in according to the Commissioners their appreciation of these wise and humane recommendations.

The following are the points emphasised in my chapter on this serious aspect of the question :—

1. That the principle and practice of vaccination involves the introduction of a specific disease at least twice, and, according to numerous authorities, many

---

[1] "Papers relating to cases in which death or non-fatal injury was alleged or suggested to have been caused by, or otherwise connected with, vaccination." Appendix ix. to the Final Report of the Royal Commission on Vaccination.

times into the human organism; that this specific disease causes an undeniable impairment of health and vitality, it being a distinctly morbid process.

2. That the operation of vaccination may occasion a definite risk to life, one death on an average being officially registered from this cause every week in England and Wales.

3. That there is good reason to believe that this record greatly underestimates the fatalities and injuries directly resulting from the operation.

4. That no lymph, whether human or animal, or adulterated with other substances, can be guaranteed as free from danger.

5. That there is unimpeachable evidence proving that a variety of inoculable and some incurable diseases are induced by vaccination.

6. That there is no guarantee that syphilis, or symptoms undistinguishable from this malady, may not be induced by the inoculation of either human or animal virus. One of the greatest of our physicians, the late Sir Thomas Watson, in referring to the risk of vaccino-syphilis, says:—"I can readily sympathise with, and even applaud, a father who, with the presumed dread or misgiving in his mind, is willing to submit to multiplied judicial penalties rather than expose his child to the risk of an infection so ghastly." [1]

This outspoken deliverance was written twenty years ago, when very few medical men had ventured to question the justice of compulsion, and is the more valuable,

---

[1] The *Nineteenth Century*, June, 1878, vol. iii., p. 1006.

inasmuch as Sir Thomas Watson was a firm believer in the efficacy of vaccination.

Once admitted that the risk is real, and one which no amount of care can guard against (even if vaccination were a preventive of small-pox), all ground for compulsion vanishes; for it then becomes a question of parental or individual responsibility, as in the case of any other operation or treatment involving risk to life and health. No surgeon would dream of administering chloroform or of performing the most trivial operation without first obtaining the patient's consent; and, therefore, no authority, whether medical or State, has the right to attempt to over-ride a parent's or patient's scruples. The matter should thus be left to the option and good sense of the individual, as in the case of other medical prescriptions. Compulsory vaccination is now even by medical men beginning to be recognised as a grievous and mischievous mistake, and I have not the slightest doubt that the profession would willingly relinquish it to-morrow, if their credit and prestige were not so deeply involved. It seems, therefore, that the agitation for the repeal of the Vaccination Acts must of necessity come, as it always has done, from the people themselves. Parliament, confessing its own incompetency, and relying on medical promises which have been falsified all along the line of a century's experience, has decreed that vaccination should be obligatory. Parliament must, therefore, be persuaded to undo the evil it has unwittingly committed. Unfortunately, the dead cannot be recalled to life, nor can the parents of those who have been injured by the operation be compensated ; nor will the scandalous

and unrelenting persecution of upright and otherwise law-abiding citizens, whose only offence has been a determination to preserve their children's bodies from the risk of inoculated disease, be easily condoned.

The cruel hardship of qualified persons deprived of employment in the public service by reason of their refusal to submit to vaccination and re-vaccination calls for prompt redress. This injustice is acutely felt in the case of pupil teachers in the public elementary schools; and the penalty for non-compliance is immeasurably greater than the payment of a fine and costs. As the Commissioners, after seven years' inquiry, have recommended that all parents who conscientiously object to vaccination shall no longer be subject to penalty, it is manifest that the refusal of employment in the public service to these conscientious nonconformists cannot be logically or fairly defended.

Pending the repeal of the Vaccination Acts, our legislators are in the responsible position of being a party to the enforcement of a surgical operation, proved by the Royal Commission to be attended with danger, on every child born in this kingdom; a compulsion, it may be added, about the expediency of which the people of this country have never had an opportunity of passing an opinion. In the meantime death-certificates of children killed by vaccination are accumulating at Somerset House, and most of these are doubtless a direct consequence of this law.

The more hotly-disputed question of the value of vaccination itself has been considered in the foregoing pages at some length, and it only remains to briefly summarise the various points.

In the early days of vaccination, before it could be put to the test of experience, it appears to have been felt that the inoculation test would furnish absolute proof of the protection afforded by the practice against small-pox. In the first chapter of this volume it has been shown that the lymph which convinced the profession of the efficacy of vaccination was Woodville's "hospital matter," which was unquestionably contaminated with small-pox—hence the immunity which it is claimed resulted from its use may have been an immunity produced by small-pox, which therefore proved nothing in favour of vaccination. The few variolous tests which were performed by Jenner himself have been shown to be inconclusive; and it is significant that Jenner very early discarded the test in favour of that of re-vaccination.

From the earliest days of vaccination numbers of cases have been recorded of every description of small-pox following vaccination, from the mildest to the most severe and fatal, and within the shortest periods of the operation. In the absence of any reliable method of estimating the proportion of the population vaccinated, it is impossible to compare the relative attack-incidence of small-pox in the two classes; but it is important to note that the proportion of vaccinated cases in well-vaccinated districts has ranged as high as 95, 98, or even 100 per cent. A method of comparison free from objection is the attack-incidence of small-pox in different towns. Gloucester in 1895-96 had an attack-rate of 48 per 1,000, or about the same as that for the well-vaccinated town of Willenhall in 1894, and the

unvaccinated towns of Keighley and Leicester in the recent epidemics had only rates of 2·2 and 1·9 per 1,000 respectively.

With regard to the death-incidence, we may compare the death-rates of small-pox at different periods in the history of vaccination, or in different towns; or we may split up the cases of small-pox into two classes, vaccinated and unvaccinated, and compare the case-mortality in each class. In the chapter on mitigation, I have dwelt at some length on the objections to the latter method of procedure; and in my judgment they are so vital that the evidence under this heading, in attempting to arrive at a decision as to the value of vaccination, must be set on one side.

There remains to consider the death-rates from small-pox at different times and places; and, as the protection is admittedly only of a temporary nature, to take into account the proportion of the mortality borne by children. I have shown that the small-pox mortality began to decline about 1781, long before the introduction of vaccination; and it was accompanied by a decline in fever and in deaths from all causes, and was due to the development of sanitary improvements. The decline continued after the introduction of vaccination, and it is almost certain that part of this reduction was due to the cessation of small-pox inoculation.[1]

Since the commencement of registration, the facts laid before the reader show that small-pox has paid no

---

[1] The inoculation of out-patients at the London Small-pox Hospital was discontinued in 1808. Baron's "Life of Jenner," vol. ii., p. 238.

heed to vaccination at all, one of the worst epidemics of the century taking place after seventeen years of compulsion; and quite recently, especially in London, as appears by the figures cited, we have a remarkable decline of small-pox coincident with diminishing vaccination. Neither does vaccination seem to have had any effect on the severity of the disease; the case-mortality being as high in 1871-72, with a large percentage of the cases of small-pox vaccinated, as it was in the last century, before Jenner's discovery. Hence up to the time of this epidemic the diminution of pock-marked faces, as far as any diminution had been observed, cannot have been due to any diminished severity of the disease, but must be attributed rather to a decline in the prevalence of small-pox itself. Since 1871-72, however, there has been a great decline in the severity of the disease, which has, doubtless, resulted from improved hygiene and altered methods of treatment. It may also be noted that since the last century, typhus which is spread in much the same manner, has shown a greater reduction than small-pox, and is now an almost extinct disease.

The death-incidence of small-pox in different towns is another method of comparison not open to objection. Gloucester heads the list of recent epidemics, with a death-rate of over ten thousand per million; but it has been shown that in a list of twenty-four well-vaccinated towns the death-rates have varied from six thousand to nearly ten thousand per million, and hence the figure for Gloucester is deprived of much of its significance. That unvaccinated towns can be kept comparatively free from small-pox is conclusively proved by the ex-

perience of Keighley and Leicester, which had only rates of two hundred and eighteen and one hundred and fourteen per million respectively, in the recent epidemics; and that the most complete vaccination of a district possible will not prevent a serious epidemic, is shown in the case of Mold, which, in spite of the vaccination of every child born and remaining in the district for eighteen years previous to the epidemic, had a small-pox death-rate of 3,614 per million, in 1871-72.

The last argument urged in the defence of vaccination is the change in age-incidence. That this is not brought about entirely, or even principally, by vaccination, is clear, from the fact that a similar change has occurred in the unvaccinated, and therefore independently of vaccination.

Another important matter to which attention has been directed is that, since the commencement of registration, the greatest decline in the infantile share of small-pox deaths took place about 1871-72, and was not associated with a very large increase in the amount of public infantile vaccination; whereas the greatest increase in public infantile vaccination was in the years following the compulsory Act of 1853, and this was accompanied by quite a trifling reduction in the infantile proportion of the small-pox mortality.

The Commissioners appear to attach considerable importance to a comparison they make of the children's share of small-pox deaths in certain vaccinated and unvaccinated towns. Thus they show for recent epidemics that at Leicester and Gloucester the proportion of children's deaths from small-pox under ten years of age was much larger than in the well-vaccinated towns

of Sheffield and Warrington. In my second chapter I ventured to criticise these figures on the ground that the experience was not sufficiently extensive, and I showed that England and Wales in 1871-72, with only 5 per cent. vaccination default, had almost as large a proportion of small-pox deaths under ten years of age as there were at Dewsbury in 1891-92 with a default of 37 per cent., and I also pointed out that Mold and Willenhall,[1] both extremely well-vaccinated towns at the time of their respective epidemics, had a large percentage of their small-pox deaths under five years of age, and I instanced the epidemic in the unvaccinated town of Keighley, with seven small-pox deaths all over five years of age.

Since writing my second chapter I have had the advantage of consulting an important contribution to the age-incidence controversy by Mr. Alexander Paul.[2] He points out from the Commissioners' own figures that the children's percentages of small-pox deaths in the towns specified only show similar variations to their

---

[1] In a foot-note on page 53 the age-incidence of fatal small-pox at Leicester is compared with that of Mold and Willenhall, the proportion of fatal cases under five years of age at Leicester being given at 36·8 per cent. From Dr. Coupland's report I gather that this figure is incorrect, and that if the deaths of those children who suffered from the proximity of the scarlet fever ward to the hospital in which small-pox cases were treated be left out of the calculation, 41·2 per cent. of the total deaths from small-pox at Leicester were under five years of age, which is rather higher than the figures for Mold and Willenhall (34 per cent.).

[2] "A Royal Commission's Arithmetic: A Criticism of Vaccination Statistics, and a Plea for Fresh Figures and Fair Inferences." Alexander Paul. London. 1897.

percentages of small-pox illness; whereas, according to the theories of the Commissioners, the variations should be far greater, for they think that the power of vaccination to modify the character of small-pox is greatest during the years immediately succeeding the operation. The following are the figures[1] for the attacks and deaths placed side by side :—

Epidemics	Children, aged 0-10. Percentage borne by them of total small-pox illness.	Children, aged 0-10. Percentage borne by them of total small-pox deaths.
Warrington, 1892-93	9·83	22·58
Sheffield, 1887-88 ...	12·42	25·60
London, 1892-93 ...	15·21	36·82
Dewsbury, 1891-92 ...	21·64	51·82
Gloucester, 1895-96...	35·67	64·52
Leicester, 1892-93 ...	30·53	71·43 (or 66·60)

Of course the question will be raised, that, granted the deaths only follow in the same proportion as the attacks, that is to say, that no extra penalty must be paid in the shape of death for neglecting vaccination, this will not account for the varying proportions of the children's share of small-pox illness in the different towns, which ranged from 9·83 per cent. at Warrington to 35·67 per cent. at Gloucester.

Mr. Paul explains this—and I think the explanation is a reasonable one—by the varying incidence of small-pox attack on adults and children in the several towns.

---

[1] The figures for the deaths are those given by the Commissioners, those for small-pox illness being calculated from the Final Report of the Royal Commission by Mr. Paul.

Thus, at Warrington, small-pox was mainly spread in the forges near the hospital ; at Gloucester an important factor was the introduction of the disease into the public elementary schools; and at Leicester the proximity of the scarlet fever wards to the hospital where small-pox cases were treated undoubtedly raised the children's share of small-pox illness.

The vaccination hypothesis I believe to be untenable, both for reasons given by Mr. Paul and also because it does not fit in with the experience of the early observers on the relation of small-pox to vaccination. If there is anything at all in the theory that in a vaccinated population the children's share of small-pox illness will be low, and *vice versâ*, it will be admitted that in an extreme case—*i.e.*, where all the patients suffering from small-pox have been vaccinated—the children's share of illness should be very low, indeed lower than the 9·83 per cent. at Warrington ; this is entirely at variance with the experience of vaccinated small-pox in the early days, before the age-incidence of small-pox had commenced to change. Indeed, the large proportion of young or recently-vaccinated cases led Mr. Edward Greenhow and others to suspect that cow-pox was wholly, or in part, losing its virtue ; for he found that the numbers attacked were in the inverse ratio to the number of years which had elapsed since they were vaccinated. One of Dr. Thomson's correspondents, Mr. William Gibson, gives figures for the epidemic at New Lanark (see p. 152), where of 251 vaccinated cases of small-pox, 191 or 76·1 per cent. took the disease at intervals, up to ten years

after vaccination. This high percentage is what we should naturally expect at a period before the age-incidence of small-pox had commenced to change. The only escape I can see for the supporters of vaccination, is to say that all the early operations were ineffectual, which is a dangerous argument for those who urge that the decline of small-pox was due to this prophylactic.

This matter of the varying age-incidence of small-pox in the different towns has been dwelt on so fully because much has been made of it by the Commissioners, but there are other points connected with the subject which have been carefully worked out by Mr. Milnes, and tend to show that the only other diseases at all comparable with small-pox have shown a similar change in their age-incidence, and that it is sanitation to a large extent which must be held accountable, although, for reasons given in my third chapter, another cause has doubtless been at work—that is to say, a shifting of the small-pox mortality on to other diseases, such as measles and whooping-cough, which would thus explain the insignificant reduction which has taken place in the mortality from these complaints.

It may be asked at this juncture, how it is, with the same set of facts before me, I have arrived at a different conclusion to the Commissioners. My readers may perhaps be able to judge for themselves if I put before them the facts which influenced this body to their somewhat halting opinions. The essence of the case which convinced the Commissioners of the efficacy of vaccination was given by their Chairman, Lord Herschell, at a meeting held on March 31, 1897, for the

purpose of raising a fund for a national memorial to Edward Jenner.[1]

After a few preliminary remarks on the terrors of small-pox in the last century, and its decline after the introduction of vaccination, Lord Herschell introduces the statistical case for vaccination, and he deals with three points—the first being the varying age-incidence of small-pox in the six towns, the second the fatality of the vaccinated and of the unvaccinated in these towns, and the third point being an examination into the behaviour of small-pox before and since vaccination was made compulsory. The first two matters have been dealt with so fully in this volume that I think it is hardly necessary to say anything further. With regard to the third point, I will state the case in Lord Herschell's own words. "I am going to invite your attention," he says, "to the figures with reference to the effects of the introduction of compulsory vaccination into this country. It is undoubtedly recognised now that the protection of vaccination is not permanent. It operates most effectually during the earlier years rather than the later after the operation has been performed, and it is probably during the first nine or ten years after vaccination that its operation is most efficient. Bearing that in mind, let me invite your attention to this, that in the years from 1848 to 1854—that is, before the introduction of compulsory vaccination—the deaths of children under five years of age were 1,514 to every million persons living, and that from 1885 to 1894 they were 50 to every

[1] For full report of speech see *British Medical Journal*, May 15, 1897, vol. i., pp. 1247, 1248.

million persons living. Now take the other end of the scale—45 years and upwards. Of course, those of that age would be no more affected by compulsory vaccination between 1885 and 1894—the law having been passed in 1853—than children would be in the year prior to its introduction. In that class the deaths only fell from 24 per million to 19."

These figures have been taken from page 48 of the Final Report of the Royal Commission, and the following table also gives the figures for the intervening year periods :—

Years.	Deaths from small-pox per million living. Under 5.	45 and upwards.
1848-54	1,514 ...	24·0
1855-64	788·8 ...	36·2
1865-74	782·5 ...	87·5
1875 84	127·8 ...	33·9
1885-94	50·2 ...	19·0

I do not gather that Lord Herschell wishes to found any argument from the latter part of his statement with reference to the reduction in the adult mortality from 24 to 19 per million ; but it may be noted that prior to the decline there was a large increase in the adult mortality, which has led Dr. Bridges to doubt if vaccination ever would have been made compulsory if these results had been anticipated. The point, no doubt, to which Lord Herschell wishes to draw attention is the decline in the children's mortality from 1,514 to 50·2 per million. It will be observed that Lord Herschell omits to state that there has also been a large decline in fever during the period under review, nor does he hint that there may be a cause other than vaccination which would act more powerfully in children than in adults—

viz., sanitation—to account for the reduction in the mortality from small-pox.

Let us now examine the facts Lord Herschell has presented. In the first place, exception must be taken to the statement that the years from 1848 to 1854 are before the introduction of compulsory vaccination, for during the year 1854 the public vaccinations in this country reached a higher figure than they have ever touched in any year before or since, owing to the Act of 1853; secondly, it is unfair to put forward the period 1885-1894 as if it were a period during which the vaccination of children had been completely carried out, for, as I have shown, there has been a large reduction in the infantile vaccinations as compared with the period 1875-84, and Lord Herschell's own figures show that coincident with this reduction there has been a decline of 61 per cent. in the children's small-pox mortality. This decline he has placed to the credit of the prophylactic he is defending, and then he says he is "surprised" at the force of the evidence adduced in favour of vaccination.

Although there does not appear to be trustworthy evidence to show that vaccination possesses any influence over the prevalence or mortality of small-pox, it is unfortunate that a too implicit belief in its efficacy has given rise to the pernicious doctrine that sanitary measures are of no avail in preventing this disease. We can quite understand that the owners of filthy rookeries and other insanitary premises are only too ready in their own interests to welcome such a theory, but for a great profession to have become wedded to the doctrine has, I believe, greatly impeded the progress

of sanitary reform; for while outbreaks of other diseases, such as typhus, typhoid, cholera, and scarlet fever, have proved valuable object lessons for municipal sanitary amelioration, each epidemic of small-pox appears to have taught the profession little or nothing but the necessity of repeated vaccinations.

It is true that there have been occasional gleams of light from the more independent thinkers in the medical and lay press, but these have been unequal to direct public authorities towards the only remedial and scientific preventive—personal and municipal sanitation.

Those who have followed the facts presented in this volume concerning the insanitary condition of London in previous centuries can have come to no other conclusion than that this was the chief cause of the large small-pox and typhus death-rates. What else could be expected with the narrow streets, courts, and alleys; the imperfectly-constructed houses with little or no curtilage; the almost total absence of external ventilation, the exclusion of light and air by the operation of the window tax, the dense overcrowding, the almost constant inhaling of putrid excrement, the loathsome effluvia from the intramural burial-grounds, the limited water supply—these, added to the filthy personal and domestic hygiene, cannot have failed to have influenced the spread and mortality from these diseases. Neither is it to be wondered at that the insanitary state of the prisons, as described by Howard, favoured the spread of small-pox and typhus to the "destruction of multitudes." Much the same state of things prevails in parts of Egypt, China, and India of to-day, and it is these districts where insanitary conditions are rife which

demonstrate the utter futility of vaccination to cope with epidemic small-pox.

In the Report on Sanitary Measures in India in 1879-1880, p. 142, it is stated:—"The vaccination returns throughout India show the same fact, that the number of vaccinations does not necessarily bear a ratio to the small-pox deaths. Small-pox in India is related to season, and also to epidemic prevalence; it is not a disease, therefore, that can be controlled by vaccination, in the sense that vaccination is a specific against it. As an endemic and epidemic disease, it must be dealt with by sanitary measures, and if these are neglected small-pox is certain to increase during epidemic times."

Again, in the Memorandum of the Army Sanitary Commission on the Report of the Sanitary Commissioner for the Punjab, for 1879, we read that "Vaccination in the Punjab, as elsewhere in India, has no power apparently over the course of an epidemic. It may modify it and diminish the number of fatal cases, but the whole Indian experience points in one direction, and this is that the severity of a small-pox epidemic is more closely connected with sanitary defects, which intensify the activity of other epidemic diseases, than is usually imagined, and that to the general sanitary improvement of towns and villages must we look for the mitigation of small-pox as of cholera and fever."[1]

Thus it is on sanitation that we must henceforward rely for the prevention and extermination of epidemic diseases. The most necessary measures for the prevention of small-pox must therefore include—

---

[1] Report on Sanitary Measures in India in 1879-80, p. 186.

(1) Demolition of dwellings unfit for human habitation.

(2) Construction of houses to secure adequate external and internal ventilation, and the prompt removal of all filth accumulations from the premises.

(3) Adequate water supply and efficient sewerage systems.

(4) Provision of open spaces in towns.

Another wise method of prevention has been revived in recent years, and this is the separation of the sick from the healthy. This system is mentioned in the writings of Rast, Haygarth, and Faust, in the last century, and was tried experimentally at Chester; but the advent of vaccination, with the confident promises made on its behalf, put a stop to further development of isolation at that time. Attention was again drawn to the subject in 1868, by Sir James Simpson, in a paper entitled "Proposal to Stamp out Small-pox and other Contagious Diseases;" and it was shortly afterwards put to a practical test. Where it has been tried, coupled with sanitation, as at Leicester and in the county of London, it has been pre-eminently successful in reducing the small-pox mortality. At the present time, compulsory vaccination, by paralysing efforts in other directions, blocks the way towards sanitary reform. When the laws are abrogated vaccination must, like all other medical prescriptions and surgical operations, rest upon its own merits, or, in other words, on its inherent persuasiveness, unaided by the arm of the law. The practice will then, in my opinion, in the not very distant future be surely abandoned.

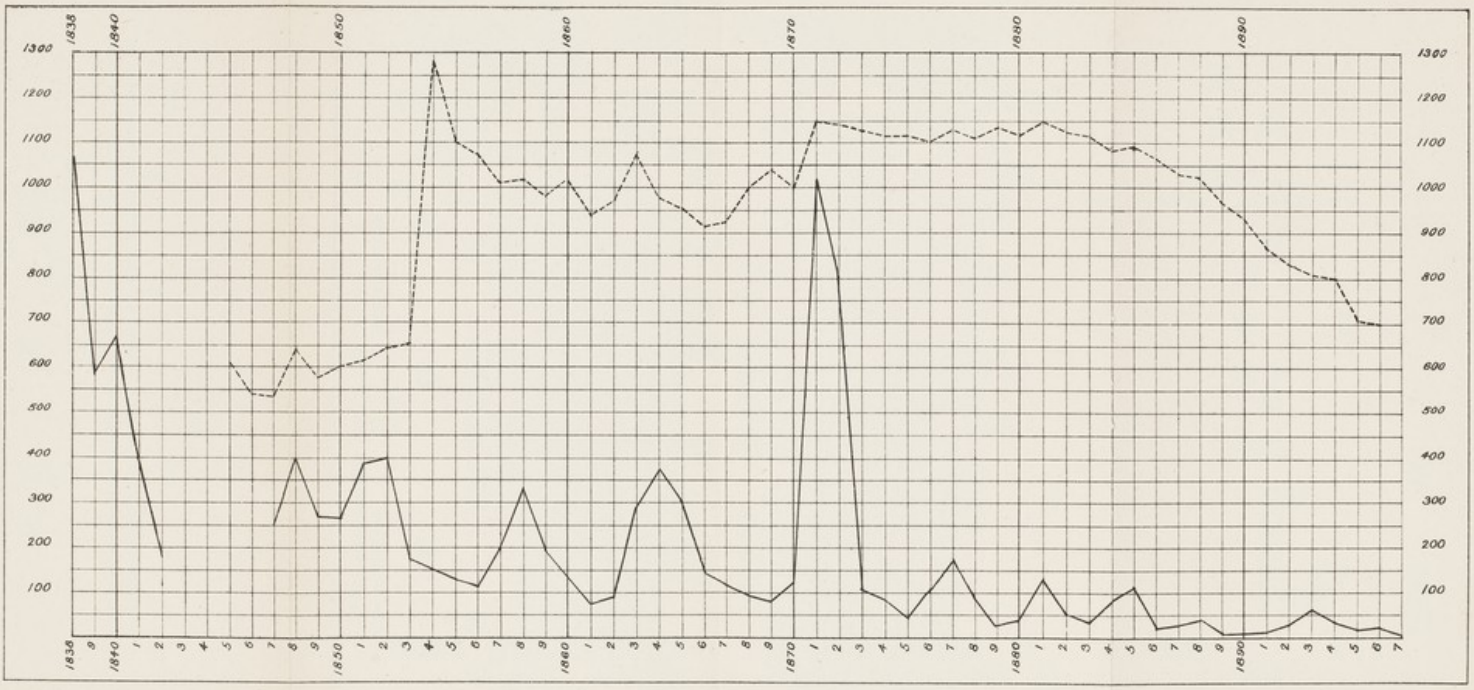
This will prepare the way for a new era of improved

health and human happiness, the result of scientific sanitary amelioration in all departments of our social domestic, and municipal life.

In due course of time the tradition of the dairymaids of Gloucestershire will take its proper place among the legends and folk-lore of the past; and, if allowed to prophesy, I cannot help thinking that another generation will look back with amazement and incredulity that for a hundred years the people of these islands should have worshipped at the shrine of a strange, unreasonable, and mischievous superstition.

This page has been intentionally left blank

DIAGRAM—ENGLAND AND WALES FROM 1838 TO 1897.



Successful Public Vaccinations under one year of age per 2,000 births ... - - - - - -

Small-pox Deaths per 1,000,000 of the living ... ... ———

Years ending September 29.	Number of unions and parishes returned.	Births.	Successful public vaccinations under one year of age.	Percentage of vaccinations to births.
1867	663	766,635	353,308	46·1
1868	658	771,905	385,635	50·0
1869	653	779,039	406,246	52·1
1870	647	785,775	392,869	50·0
1871	647	792,663	455.416	57 5
1872	647	810,291	462,321	57·1
1873	647	832,255	469,538	56·4
1874	647	845.286	470,256	55·6
1875	648	853,049	475,539	55 7
1876	650	881,518	486,031	55·1
1877	649	881,897	498,577	56·5
1878	649	892,823	494,028	55·3
1879	649	884,995	500,646	56·6
1880	649	889,893	494.942	55·6
1881	647	874,474	501,125	57·3
1882	647	888,026	495.374	55 8
1883	647	892,524	495,056	55·5
1884	647	896,179	483.742	54 0
1885	647	899.776	489,815	54 4
1886	647	906,819	480,306	53 0
1887	647	885 860	457,301	51·6
1888	647	880.329	450,069	51·1
1889	647	885,005	427,422	48·3
1890	648	883,647	412,388	46·7
1891	648	898,573	388,285	43·2
1892	648	901,459	375,634	41·7
1893	648	912,325	369,627	40·5
1894	648	884,174	355,788	40·2
1895	648	929,091	326,053	35·1
1896	648	898,114	313,581	34·9

ENGLAND AND WALES.[1]

For Small-pox,[2] the death-rate per million living, from 1838-42, and 1847-97.

Years.	Small-pox death-rate per million living.	Years.	Small-pox death-rate per million living.
1838	1,064	1868	93
1839	589	1869	70
1840	661	1870	116
1841	400	1871	1,015
1842	168	1872	824
1843	?	1873	101
1844	?	1874	91
1845	?	1875	40
1846	?	1876	103
1847	246	1877	178
1848	397	1878	79
1849	264	1879	25
1850	262	1880	29
1851	389	1881	124
1852	401	1882	54
1853	171	1883	39
1854	151	1884	87
1855	134	1885	107
1856	119	1886	13
1857	204	1887	21
1858	332	1888	41
1859	195	1889	4
1860	138	1890	4
1861	66	1891	5
1862	80	1892	19
1863	289	1893	53
1864	367	1894	31
1865	303	1895	10
1866	141	1896	17
1867	116	1897	1

[1] The figures on which these rates are based have been taken from the annual returns of the Registrar-General except for the years 1896 and 1897, which are from the quarterly returns.

[2] Except for the last two years, small-pox includes chicken-pox.

FATALITY OF SMALL-POX, 1721-30.[1]

Locality of the Epidemic.	Period.	Authority.	Cases.	Deaths.	Percentage of Fatalities.
Halifax	Winter of 1721 to April, 1722	Nettleton. Phil. Trans., vol. xxxii., p. 51	276	43	15·9
Rochdale	Winter of 1721 to April, 1722	*Ibid.*	177	38	21·4
Leeds	Winter of 1721 to April, 1722	*Ibid.*	792	189	23·8
Halifax parish, towards Bradford	1772	*Ibid.*, p. 221	297	59	19·9
Halifax parish, another part	1722	*Ibid.*, p. 221	268	28	10·4
Bradford	1722	*Ibid.*, p. 221	129	36	27·9
Wakefield	1722	*Ibid.*, p. 221	418	57	13·6
Ashton-under-Lyne	1722	*Ibid.*, p. 221	279	56	20·0
Macclesfield	1722	*Ibid.*, p. 221	302	37	12·2
Stockport	1722	*Ibid.*, p. 221	287	73	25·4
Hatherfield	1722	*Ibid.*, p. 221	180	20	11·1
Chichester	1722 (to Oct. 15)	Whitaker. *Ibid.*, p. 223	994	168	16·9
Haverfordwest	1722	Perrot Williams. *Ibid.*	227	52	22·9
Barstand, Ripponden, Sorby, and part of Halifax parish, four miles from the town	1722	Nettleton. Jurin's "Account" for 1723, p. 7	230	38	16·5
Bolton	1723 (?)	Jurin's "Account" for 1723, p. 8	406	89	21·6
Ware	1723 (?)	*Ibid.*	612	72	11·7
Salisbury	1723 (?)	*Ibid.*	1,244	165	13·2
Rumsey, Hants	1723 (?)	*Ibid.*	913	143	15·6
Havant	1723 (?)	*Ibid.*	264	61	23·1

Bedford	1723 (?)	Jurin's "Account" or 1723, p. 8	786	147	18·4
Shaftesbury	1724 (?)	*Ibid.* for 1724, p. 12	660	100	15·1
Dedham, near Colchester	1724 (?)	*Ibid.*	339	106	31·3
Plymouth	1724 (?)	*Ibid.*	188	32	17·2
Aynho, near Banbury	September 27, 1723, to Dec. 29, 1724	Rev. Mr. Wasse, rector. *Ibid.* for 1725, p. 55	133	25	18·8
Stratford-on-Avon	September 27, 1723, to Dec. 29, 1724	Dr. Letherland. *Ibid.*	562	89	15·8
Bolton-le-Moors	September 27, 1723, to Dec. 29, 1724	Dr. Dixon. *Ibid.*	341	64	18·8
Cobham	September 27, 1723, to Dec. 29, 1724	Sir Hans Sloane *Ibid.*	105	20	19·0
Dover	September 29, 1725, to Dec. 25, 1726	Dr. Lynch, of Canterbury, in Jurin's "Account" for 1726, p. 17	503	61	12·1
Deal	December 25, 1725, to Nov. 29, 1726	*Ibid.*	362	33	9·1
Kempsey, near Worcester	December 25, 1725, to Nov. 29, 1726	Dr. Beard, in Jurin *Ibid.*	73	15	20·5
Uxbridge	1727	Dr. Thorold, in Scheuchzer's "Account" for 1727 and 1728	140	51	36·4
Hastings	1729-30	Dr. Frewen. Phil. Trans., vol. xxxvii., p 108	705	97	13·7
			13,192	2,264	17·2

[1] "A History of Epidemics in Britain," vol. ii., pp. 518-519. Creighton. 1894.

EGYPT.

The average annual strength of the British army in Egypt, with the number of admissions and deaths from small-pox for the fourteen years 1882-95:—

	Strength.	Small-pox. Admissions.	Small-pox. Deaths.
1882	6,198	3	0
1883	7,897	8	3
1884	6,468	25	1
1885	9,593	52	4
1886	11,062	51	3
1887	5,272	26	4
1888	3,346	14	4
1889	3,431	42	6
1890	3,209	0	0
1891	3,172	1	0
1892	3,102	2	0
1893	5,073	4	0
1894	5,226	0	0
1895	4,504	5	0

INDIA.

The average annual strength of the British army in India, with the number of admissions and deaths from small-pox for the fourteen years, 1882-95:—

	Strength.	Small-pox. Admissions.	Small-pox. Deaths.
1882	57,344	44	4
1883	56,190	105	9
1884	55,252	77	8
1885	57,165	12	0
1886	61,757	22	1
1887	63,942	40	2
1888	68,795	106	10
1889	68,545	152	17
1890	67,456	36	4
1891	66,178	14	1
1892	68,045	18	3
1893	69,865	33	4
1894	70,983	13	3
1895	68,331	19	2

LEICESTER.

The population of Leicester with attacks and deaths from small-pox for the fourteen years 1882-95 [1]:—

	Population.	Small-pox. Attacks.	Small-pox. Deaths.
1882	126,275	29 (25)	5
1883	129,483	12 (9)	3
1884	132,773	6 (3)	0
1885	136,147	8	0
1886	139,606	1	0
1887	143,153	10 (9)	0
1888	146,790	22 (21)	0
1889	150,520	0	0
1890	154,344	0	0
1891	177,353	0	0
1892	180,066	38	6
1893	184 547	308	15
1894	189,136	8	0
1895	193,839	4	0

[1] Up to the year 1889 the figures have been taken from Diagram D facing p. 435, Fourth Report, Royal Commission on Vaccination. In several instances the number of attacks is in excess of those given by the Medical Officer of Health in his report on the Leicester small-pox epidemic, 1892-93. Dr. Priestley's figures, where they differ, are given in brackets.

INDEX.

ABERGAVENNY.

PAGE

Small-pox in 1871-72 - - - - - - 64

Acland, Dr. T. D.

Symptoms accompanying vaccination - - - - 273, 274
Convulsions supervening on vaccination - - 273, 274
Vaccinal eruptions - - - - - - - 289, 290
Vaccine généralisée - - - - - 285
Age-distribution of eczema cases - - - - 291
Relationship of cow-pox to syphilis - - - 316, 317
Incubation period of erysipelas - - - 352, 353
Vaccination and scrofula - - - - - 354
Case of lupus following vaccination - - - 359
Tetanus following vaccination - - - - 361
Calf lymph - - - - - - 377, 378

Adenitis complicating vaccination - - 111, 274, 351, 354, 382

Admiralty.

Vaccination failures on H.M.S. "Phaeton" - - 149

Age-incidence.

Of small-pox (see Small-pox)
Of fever (typhus, typhoid, and simple and ill-defined fevers) 46, 47, 396
Of typhus fever - - - - - - 48, 49, 396
Of typhoid fever - - - - - 49, 396
Of influenza - - - - - - 49, 50
And sanitation - - 75, 76, 396, 398, 399

Ahmed, Dr. Z.

Case of tetanus following vaccination - - 360

Air-spaces in towns.

Salutary effect of - - - - - 61-65, 251

Airy, Dr.

Norwich cases of vaccinal erysipelas (1882) - - 348, 363

Albricht, Dr.

On the spreading of leprosy by vaccination - - 345

Algiers.

Vaccino-syphilis (1880) - - - - 324

PAGE

American Civil War.
Vaccino-syphilis - - - - - - - 319-322

Animal Lymph.
And vaccino-syphilis - - - - - 316-319, 366, 386
And tubercle - - - - - - - - 357, 358
Skin diseases and inflammatory complications from - - 366-378
Mr. Robert Ceely on - - - - - - 367, 368
Dr. Cory's experience - - - - - - 319
Dr. Prince Morrow on - - - - - - 373
Drs. Ackland and Barlow - - - - - 377, 378
Vaccination Commissioners - - - - - 366, 378

Appleby.
Serious and fatal vaccinal injuries (1873) - - - - 351

Army.
Small-pox after re-vaccination - - - - 224-231, 410

Arning, Dr. Edward.
Experiment on condemned criminal, Keanu - - - 326, 327
Results of vaccination of lepers - - - - - 328
On the spreading of leprosy by vaccination - - - 342-344

Asprières.
Cases of septic poisoning after vaccination at (1885) - - 350

Atthill, Dr.
"Good" and "bad" marks - - - - - - 203

Auckland.
Small-pox in 1871-72 - - - - - - 64, 94, 95

Auzias-Turenne, Dr.
Relationship of cow-pox to syphilis - - - 309, 310

Aynho.
Small-pox in 1723-24 - - - - - 43, 44, 181, 409

BADCOCK, MR. JOHN.
Personal experience of small-pox after re-vaccination - 214, 215

Bakewell, Dr. Hall.
Communicability of leprosy - - - - 326
Leprosy and vaccination - - - - - 335

Ballard, Dr. Edward.
Vaccination not a "trivial" operation - - - 270
Vaccino-syphilis - - - - - - - 295
Perfect vaccine vesicle may furnish syphilitic virus - - 307
Report on Leeds case - - - - 312-314

Barker, Mr. J.
Fever epidemic (1741) - - - - - - 38

Barlow, Dr.
Report on Leeds case - - - - - 314
Vaccinal injuries in some Norfolk villages (1890) - 352, 363, 364
Calf lymph - - - - - - - 377, 378

Baron, Dr. John.
PAGE
Eruptions from Woodville's lymph - 21
On Jenner's evasions - 25, 26
Jenner's persistency - 27, 28
Jenner and his medical *confrères* - 106
Reports of vaccination failures begin to multiply (1804) 113, 114
Opposition to vaccination (1808) - 124, 125
Clamour about prevalence of small-pox after vaccination - 143
Hesitation of respectable persons concerning vaccination (1818) 143

Barry, Dr. F. W.
Small-pox at Sheffield, 1887-88 (see Small-pox).
Immunity to small-pox in the unvaccinated - 170, 171
Small-pox after recent vaccination at Sheffield (1887-88) - 171-173
Small-pox after re-vaccination at Sheffield (1887-88) 221, 222
Sheffield "census" 176, 177

Barthélemy, Dr.
On blood being omnipresent in vaccine lymph 307

Barthez, Dr.
Vaccination and tubercle 354, 355

Bates, Dr. W. T. C.
Case of tetanus following vaccination 360

Bavaria.
Small-pox after vaccination (1871) - 175, 176

Baylies, Dr. William.
Immunity to small-pox in the unvaccinated 166, 167

Beale, Dr. Lionel.
Immunity to small-pox in the unvaccinated 169

Beaney, Dr. James G.
Injurious results of vaccination - 281
Vaccino-syphilis 281, 294

Beddoes, Dr. Thomas.
Criticises Jenner's theories 16

Bedwellty.
Small-pox in 1871-72 64, 94, 95

Bell, Dr. Benjamin.
Injurious results of vaccination 280

Bellows, Mr. John.
Experiences in the Franco-Prussian War 83

Benson, Dr. Hawtrey.
Case proving communicability of leprosy - 325, 326

Berkeley, Dr. H. J.
Case of tetanus following vaccination 360

Berlin. PAGE
Insanitary condition prior to 1872 - - - - - - 259
Small-pox in 1870-72 - - - - - 175, 198, 231
Sanitary works at, with decline in mortality - - - - 259

Berlin Leprosy Conference (1897).
Communicability of leprosy - - - - - - - 326

Berry, Mr. George.
Diagnosis between a vaccine sore and syphilis - - - - - 310

Besnier, Dr.
Case of lupus following vaccination - - - - - 359

Bideford.
Small-pox in 1871-72 - - - - - - - - 95

Biggs, Mr. J. T.
Small-pox at Leicester - - - - - - - 88, 411

Bigsby, Dr. J. J.
Scar theory at Newark (1839) - - - - - - - 203

Birch-Hirschfeld, Dr.
On vaccination and scrofula - - - - - - 356, 357

Birdwood, Dr. R A.
Vaccination absolute protection up to no age whatever - 164, 165
On the obscuring of vaccination scars by eruption - - - 194
Fallacy of classifying small-pox cases by vaccination marks 194, 195
Advocates "the production of one vaccine vesicle only" - - 212
Causes of blindness associated with small-pox - - - - 266

Birkenhead.
Small-pox in 1877 - - - - - - - - - - 246

Birmingham.
Park-space and death-rates from zymotic diseases (1870-79) - 62
Small-pox in 1891-94 - - - - - 92, 175, 178, 185

Blackmore, Sir R.
Mild small-pox in the eighteenth century - - - - - 188
Prevarications of the inoculators - - - - - 364, 365

Blair, Mr.
Case of small-pox after vaccination - - - - - - 116

Blanc, Dr. Henry.
Animal vaccination - - - - - - - - 368

Blandford.
Fire and small-pox (1731) - - - - - - - 265
Vaccinal erysipelas (1883) - - - - - - - 351

Blindness.
From small-pox, causes of - - - - - - - 266

Blood.
Omnipresent in vaccine lymph - - - - - - 307

Boddington, Mr. (surgeon).
Letter of remonstrance to Jenner - - - - - - 25

PAGE

Bohn, Dr. H.
Cow-pox and erysipelas - 347

Bolton, Dr. James.
Vaccino-syphilis in the American Civil War 320, 321

Borington, Lord.
Brings in bill to check small-pox inoculation (1813) 132

Boulger, Surgeon I.
Re-vaccinated small-pox in the army at Cairo (1885) 226-231

Bowditch, Mr. Vincent.
Results of animal lymph 374

Bradford.
Park-space and death-rates from zymotic diseases (1870-79) 62

Bremen.
Epidemic of jaundice from glycerinated lymph (1883-84) - 381, 382

Bridges, Dr. J. H.
Advocates alteration of vaccination laws - 45
The unvaccinated not a danger to their neighbours 178
Value of returns of vaccinal injuries 364

Brighton.
Park-space and death-rates from zymotic diseases (1870-79) 62

Bristol.
Park-space and death-rates from zymotic diseases (1870-79) 62

British Annals of Medicine.
Deprecates silencing of inquiry into vaccination question 152

British Medical Journal.
Insanitary surroundings of the unvaccinated 197
Influence of sanitary measures on small-pox 258
Vaccino-syphilis 293, 294

Bromley.
Small-pox after vaccination (1881) 175

Brooke, Dr. F. B.
Report on Gloucester Hospitals (1896) 99-102

Brown, Mr. Thomas (a critic of vaccination).
Cases of small-pox after vaccination 127
Acknowledges his former partiality - 127
Opinion that vaccination must be surrendered - 127
His treatment by Jenner 128

Browning, Dr. B.
Experience with "good" marks 203

Buchan, Dr. William.
Effects of insanitary surroundings 75
Intramural burial-grounds (eighteenth century) 77
Treatment of small-pox (eighteenth century) 263, 264

Buchanan, Sir George.
Refers to glycerine as "preposterous" adulteration of vaccine 380

PAGE

Buckmaster, Dr. J. A.
Results of vaccination of lepers - - - - - - 328

Burial-grounds (intramural).
Influence on mortality - - - - - 76, 77, 400

Burnett, Dr. W.
Small-pox after vaccination on H.M.S. "Phaeton" - - 149

Butler, Dr. D. W.
Animal lymph - - - - - - - - - - 372

CAIRO.
Re-vaccinated small-pox in the army (1885) - - 226-231

Caistor.
Small-pox in 1871-72 - - - - - - - - 94, 95

Calcutta.
Glycerinated lymph tried at, and given up - - - - 384

Calf Lymph (see Animal Lymph).

Cambridge.
Small-pox after vaccination (1808) - - - - - - 124

Canning, Mr. George.
Opinion on compulsory vaccination - - - - - 162

Cantlie, Dr. James.
Immunity of plague attendants - - - - - - 233
Recent Essay on leprosy referred to - - - - - 344
Constitutional disturbance from Japanese (glycerinated) lymph - 382

Cape of Good Hope Leprosy Commissioners.
Communicability of leprosy - - - - - - - 326

Carlisle.
Small-pox in 1779-87 - - - - - - - - 43

Carpenter, Dr. W. B.
Vaccination at Montreal prior to small-pox epidemic (1885) 102, 103
Statistics of small-pox in the Franco-Prussian War - - 237-239
Influence of sanitary measures on small-pox mortality - - 258

Carr, Mr. Henry.
How small-pox is propagated - - - - - - 255

Carter, Mr. Brudenell.
On vaccino-syphilis - - - - - - - - - 295

Carter, Dr. Robert J.
Vaccinal injuries from glycerinated calf lymph - - - 382

Carter, Dr. Vandyke.
Communicability of leprosy - - - - - - - 326

Cayley, Dr.
Communicability of leprosy - - - - - - - 326

Ceely, Mr. Robert.
On vaccination cicatrices wearing out - - - - 193
Animal vaccination and skin eruptions - - - 286, 367, 368

PAGE

Chadwick, Sir Edwin.
Influence of sanitary measures on small-pox and typhus - 257, 258

Chartres, Dr. J. Smith.
Cases of phlegmonous inflammation of the arm after vaccination 348

Chelsea.
Fatal vaccinal injuries (1875) - - - - - 351

Chester.
Small-pox in 1774 - - - 43, 97, 182, 183
System of small-pox prevention (eighteenth century) - 402

Chester-le-Street.
Small-pox in 1871-72 - - - - 64, 95, 96

Chicken-pox.
Deaths, Registrar-General on - - - - - - 45
"Confluent" cases - - - - - 159, 160
"Malignant" cases - - - - - - 160

Christ's Hospital.
Immunity from zymotic diseases - - - - - 251

Churchill, Dr. Fleetwood.
On the requisite number of vaccination marks - - - - 212

Clapham.
Cases of vaccinal injury (1800) - - - - 274, 275

Clerkenwell.
Vaccinal injuries (1879) - - - - - - 351

Colin, Dr.
Immunity of the unre-vaccinated - - - - - 232
Estimates small-pox mortality of garrison at Paris (1871-72) - 238

Collie, Dr.
Cases of small-pox after re-vaccination - 220, 221

Collins, Dr. W. J. (see Royal Vaccination Commissioners).

Cologne.
Small-pox after vaccination (1871-73) - - - 175

Compulsory vaccination 162-164, 178, 356, 384, 386-388, 402

Convulsions supervening on vaccination - - - - 274

Cooke, Mr. Charles.
Case of small-pox after natural cow-pox - - - - 110

Copland, Dr. James.
Thinks vaccination could never altogether banish small-pox 165
"Transcendental laudation" of vaccination - - - 165
"Reverberated encomiums from well-paid vaccination boards" 165
Vaccination and scrofula - - - - - 355

Cory, Dr. Robert.
Experience of calf lymph - - - - - - 319

Cottman, Dr. J. B.
Case of tetanus after vaccination - - - - 359

Coupland, Dr. PAGE
Gloucester small-pox epidemic—causes of extension - 97-99
Immunity to small-pox in the unvaccinated - - - - 171
Scar statistics, Dewsbury (1891-92) - - - - 213
Small-pox at Dewsbury (1891-92) confined to working classes - 247

Cow-pox.
Jenner first interested in - - - - - - - 9
Symptoms - - - - 16, 109-111, 270-274, 276, 311
Deaths, England and Wales (1881-95) - - - - 362
"Spurious" - - - - - 26-29, 108, 109, 111, 114
And erysipelas - - - - - - - 346, 347
Identity with small-pox repudiated - - - - - 30, 309
Relationship to syphilis - - - - - 309-319

Crapo, Dr. J. R.
Animal vaccination - - - - - - - 373

Creighton, Dr. Charles.
Small-pox in the seventeenth century - - - - - 42
Extent of (small-pox) inoculation practised from 1721-28 - - 59
Window-tax - - - - - - - - - 66, 67
Insanitary condition of London in 17th and 18th centuries - 67, 68
Small-pox fatality in 18th century - - - - 180, 408, 409
Relationship of cow-pox to syphilis - - - - 309, 317

Crookshank, Prof. Edgar.
Woodville's cases - - - - - - - - - 22

Cross, Mr. John.
Norwich small-pox epidemic (1819) confined to lower classes - 245
Treatment of small-pox (1819) - - - - 264, 265

Cutler, Dr. William C.
Skin diseases attending vaccination - - - - 288, 289

Dairymaids.
The tradition of the - - - - - - - - 9, 403

Dalton, Dr. J. H. C.
Scar statistics - - - - - - - 213
Cases of small-pox after re-vaccination - - - - - 223

Darby, Dr.
Cases of small-pox after re-vaccination - - - - - 216

Darjeeling.
Glycerinated lymph tried at, and given up - - - - 384

Darlington.
Small-pox in 1871-72 - - - - - - - - 64

Daubler, Dr.
Cases of leprosy after vaccination - - - - - 340-342

Davidson, Mr. P. M.
Scar statistics - - - - - - - - - 207-210

PAGE

Davies, Dr.
Small-pox fatality in vaccinated and unvaccinated - - - 184

Decanteleu, Dr.
Varieties of vaccination cicatrices - - - - - 201

Dennett, Mr. C.
Immunity to small-pox in the unvaccinated - - - 168

Depaul, Prof.
Animal vaccination - - - - - - - 368

Dewsbury.
Small-pox in 1891-92 - - - 52, 213, 151, 247, 393
Small-pox epidemic (1891-92) confined to working classes 247

Dimon, Dr. Theodore.
Case of tetanus following vaccination - - - - 360

Dimsdale, Dr. Thomas (inoculator) - - - - 11, 12

Dortrecht.
Vaccinal erysipelas among recruits (1883) - - - 348, 349

Dover.
Small-pox in 1871-72 - - - - - 94, 95

Drew, Mr. Walter.
Case of small-pox after vaccination - - - - - 118

Drysdale, Dr. Charles.
Vaccino-syphilis - - - - - - 295

Dudley.
Small-pox in 1871-72 - - - - - 64, 94, 95

Dunning, Mr. Richard.
Sceptical about merits of vaccination - - - 114
Reassured by Jenner - - - - 114, 115
Cases of small-pox after vaccination - - 117

Durham.
Small-pox in 1871-72 - - - - - 64, 94, 95

EASINGTON.
Small-pox in 1871-72 - - - - - 64, 94, 95

Eczema after vaccination - - - - 290, 291, 351

Edinburgh Medical and Surgical Journal.
Pays *amende honorable* to Mr. Thomas Brown - - - 128

Edinburgh Review.
Criticism on vaccination - - - - - - - 148

Edwardes, Dr.
On jaundice epidemic at Bremen (1883-84) - - - 382

Egypt.
Re-vaccinated small-pox in the army - - 225-231, 410

Ellenborough, Lord.
On vaccination - - - - - - - - 134

Enteric Fever (see Typhoid Fever). PAGE

Epidemiological Society.
Promote the first Compulsory Vaccination Bill (1853) - 163, 164
Opinion that the unvaccinated are a danger to society - - 164
On vaccination scars wearing out - - - - - - 193
Assertion respecting safety of vaccination - - - 267, 268

Erasmus.
On practice of strewing floors with rushes - - - - 70

Erysipelas.
Vaccinal - - - - - - - - - 281, 345-354
And cow-pox - - - - - - - - 346, 347
Incubation period variable - - - - - - 352, 353

Evelyn, John.
Small-pox in his family - - - - - - - - 42

Farn, Mr. (of National Vaccine Establishment).
Cannot guarantee purity of vaccine lymph - - - 268, 269

Farr, Dr. William.
Small-pox and fever death-rates (1629-1835) - - - 57, 58
Zymotic diseases replace each other - - - - - 85
Influence of sanitary measures - - - - - 257

Farrar, Dr. Reginald.
Fatality from calf lymph - - - - - - - 281

Fehleisen, Dr.
Incubation period of erysipelas - - - - - - 352

Fentem, Dr. P. S.
Cases of erysipelas after vaccination - - - - - 350

Fever (typhus, typhoid, and simple and ill-defined fevers).
Death-rates (1629-1835) - - - - - - - - 57
Death-rates (1838-95) - - - - - - - - 40
Registrar-General on cause of decline - - - - 41, 42
Age-incidence - - - - - - - - - 46, 47

Flewellen, Dr. E. A.
"Spurious" vaccination in the American Civil War - - 321

Fluder, Mr. Charles.
Vaccinal injuries (1833) - - - - - - - 278, 279

Forbes, Mr. William.
Case of small-pox after vaccination - - - - - - 115

Fosbrooke, Rev. T. D.
"Spurious" cow-pox - - - - - - - 110, 111

Fournier, Professor.
Vaccino-syphilis "a real and serious danger" - - - 294
Vaccino-syphilis cases more numerous than recorded 362, 363

Fox, Dr. Colcott.
PAGE
Urticaria complicating vaccination - - - - - - 290
Age-distribution of eczema cases - - - - - 291
Three cases of lupus following vaccination - - - - 359

Fox, Dr. Tilbury.
Impetigo contagiosa following vaccination - - - 291
Communicability of leprosy - - - - - - 326

Francis, Dr.
Communicability of leprosy - - - - - - 326

Franco-Prussian War.
And small-pox mortality - - - 80-83, 237-240

Frank, Dr. Louis.
Adenitis complicating vaccination - - - - - 274
Vaccination and skin diseases - - - - - - 285
Urticaria complicating vaccination - - - - - 290

Freycinet, M. de.
Statistics of small-pox in the Franco-Prussian War - 239

Fuqua, Dr. William F.
Vaccino-syphilis in the American Civil War - - - 322

GAINSBOROUGH.
Erysipelas after vaccination (1876) - - - - 348, 363

Gairdner, Sir William.
Cases of leprosy following vaccination - - - 329-334

Gaitskell, Mr. William.
Malignant small-pox after vaccination - - - - 144

Garceau, Dr.
Causes of Montreal small-pox epidemic (1885) - - 103

Gardner, Mr. Edward.
On vaccination falling into disrepute at Frampton (1817) - 142

Gateshead.
Small-pox in 1871-72 - - - 64, 95, 96

Gatti (French inoculator) - - - - - - - 11

Gayton, Dr. William.
Primary vaccination "a very fleeting protection indeed" - - 164
Mild small-pox in the unvaccinated - - - - - 190
Fatality of malignant small-pox in vaccinated and unvaccinated 190
His method of classifying cases of small-pox - - 194, 202
Causes of high small-pox fatality in the unvaccinated - 197
Cases of small-pox after re-vaccination - - - 216-218

German army.
Small-pox in - - - - - - 234-236

German Laws.
PAGE
Prohibit taking lymph from a scrofulous child - - - - 356

Gers, Dr. Henry.
Animal lymph - - - - - - - - - 371, 372

Gibson, Mr. William.
Age-incidence of vaccinated small-pox - - - - 152, 395

Gilmore, Dr. J. T.
Vaccino-syphilis in the American Civil War - - - - 320

Glasgow.
Mortality from small-pox, measles, whooping-cough (1783-1812) 84

Gloucester.
Small-pox in 1895-96 - - 51-53, 96-102, 185, 263, 389, 391-395

Gloucester Hospital (1896).
Sanitary administration "shockingly neglected" - - - 100
Treatment of patients compared with that of last century - - 263

Glover, Dr. J. G.
Leicester system of small-pox prevention - - - - 90, 91

Glycerine.
Action of, on the growth of the tubercle bacillus - - - 358
Alleged advantages of its addition to vaccine lymph - - 379

Glycerinated lymph.
Suggested in 1849 - - - - - - - - - 376
Used extensively in Europe, India, and Japan - - - 379
Promoted by the Local Government Board - - - - 379
Condemned by Sir George Buchanan - - - - 379, 380
Lord Herschell's opinion of - - - - - - 380, 381
The Royal Commission on - - - - - - - 380
Epidemic of jaundice "causally connected" with - - 381, 382
Injuries from, detailed by Dr. Robert Carter - - - 382
Injuries and fatalities from (Royal Commission cases) - - 383
Given up at Calcutta and Darjeeling - - - - - 384
In India soon becomes "putrid" and "septically dangerous" 384
And tubercle - - - - - - - - - - 358, 384

Goldson, Mr. William.
Cases of small-pox after vaccination (1804) - - - - 114
Pleads for further investigation of vaccination question - 114

Graniteville.
Cases of "spurious" vaccination at - - - - - 323

Grantham, Mr. Justice.
Personal experience of small-pox after re-vaccination - - 215

Gray, Dr. J. M.
Animal lymph - - - - - - - - - 372

Greenhow, Mr. Edward.
On small-pox after vaccination (1833) - - - - - 151
Age-incidence of vaccinated small-pox - - - - 151, 395

PAGE

Gregory, Dr. George.
On Jenner's first publication - 17
Jenner's "presumption" - 154
On the "sanguine pathologists" of 1800 - 153
Repudiates identity of cow-pox with small-pox - 30, 309
On the "trammels of Jennerian pathology" - 309
Fatal small-pox after vaccination (1825) - 149, 150
On "acknowledged frequency" of small-pox after vaccination - 153
On the mitigating power of vaccination - 179, 180
On the obscuring of vaccination scars by eruption - 192
On vaccination scars wearing out - 192, 193
Vaccination cicatrix as a measure of protection - 212

Grieve, Dr.
Class of patients who take malignant small-pox - 191
Influence of sanitary measures on small-pox - 256

Griffin, Dr. E. L.
Results of animal lymph - 370

Grocers' Company.
Offer prize of £1,000 for a pure vaccine lymph (1883) - 269, 270

Grosvenor, Mr. John.
Cases of small-pox after vaccination (1801) - 113

Guy, Dr.
War as a cause of disease - 79, 80

HACKNEY.
Small-pox in 1871-72 - 94, 95

Hadwen, Dr. Walter.
Small-pox fatality at Gloucester Hospital (1895-96) - 97

Hall, Mr. R.
"Confluent" chicken-pox - 159

Hanson, Dr.
Communicability of leprosy - 326

Harding, Mr. T. M.
Cases of small-pox after vaccination - 174

Hardy, Mr. Thomas.
Attributes a case of small-pox to chicken-pox - 159
Afterwards "reluctantly" alters his opinion - 160

Hardy, Prof.
Unpleasant reminiscence of re-vaccination - 290

Harris, Dr. Walter.
Small-pox in the seventeenth century - 42, 43

Harrison, Mr. E.
Case of small-pox after vaccination - 112

Harrison, Mr. Thomas.
Cases of small-pox after vaccination - 141

PAGE

Hart, Mr. Ernest.
On pre-Jennerian small-pox - - - - - - 57, 58
Leicester system of small-pox prevention - - - 88, 89
On immunity of vaccinated children - - - 173, 174
Small-pox fatality in vaccinated and unvaccinated - - 184
Statistics of small-pox in the Franco-Prussian War - 237, 239, 240
Small-pox at Douglas (1877-78) - - - - 256, 257

Hartlepool.
Small-pox in 1871-72 - - - - - - - - 64

Hartpence, Dr. W. M.
Results of animal lymph - - - - - - - 371

Haygarth, Dr.
System of small-pox prevention at Chester (18th century) - 402
Judicious counsels respecting vaccination - - - 106, 107

Heron, Dr.
Cases of "malignant" chicken-pox - - - - - 160

Herrick, Dr. S. S.
Results of animal lymph - - - - - - - 377

Herschell, Lord.
His opinion of glycerinated lymph - - - - - 380, 381
On vaccination - - - - - - - - - 396-399

Hillis, Mr. John D.
Cases of leprosy following vaccination - - - - 335-337

Hirsch, Dr. August.
Habitat of small-pox - - - - - - - - 258

Hoagland, Dr. L. B.
Animal lymph - - - - - - - - - 370, 371

Holland, Sir Henry.
Non-realisation of earlier anticipations about vaccination - 152

Holmes, Mr.
Cases of vaccino-syphilis - - - - - - - 305

Holt, Dr. Alfred H.
Results of animal lymph - - - - - - - 374

Hooper, Dr. R.
Fatal case of small-pox after natural cow-pox - - - - 110

Hopkirk, Dr. Arthur F.
Re-vaccination Law in the German army (1834) - - 234
Statistics of small-pox in the Franco-Prussian War - - - 238

Houghton-le-Spring.
Small-pox in 1871-72 - - - - - - - - 64, 95

House of Commons.

Committee (1802).
Accepts Jenner's "spurious cow-pox" theory - - - 29
Endorses Jenner's opinion respecting value of vaccination - 105

House of Commons.
Committee (1871). PAGE
Chairman compares mortality of small-pox with that of the plague 31
On Vaccination Act (1867) 33
Howard, John.
Insanitary condition of prisons (18th century) 73-75
On window-tax in prisons 74
Hubbard, Dr. George H.
"Spurious" vaccination in the American Civil War 321, 322
Hugo, Mr. Thomas.
Small-pox after vaccination at Crediton (1814) 134, 135
Hull.
Park-space and death-rates from zymotic diseases (1870-79) 62
Hunt, Dr. Ezra M.
Animal lymph 369, 370
Husband, Dr.
On blood being omnipresent in vaccine lymph 307
Hutchinson, Mr. Jonathan.
Vaccination and skin diseases 289
Vaccination prurigo 292
Vaccinal *impetigo* at St. Pancras Workhouse 292
Cases of vaccino-syphilis 301-303
On syphilitic infants sometimes looking perfectly healthy 308
Leeds case 314
Cases similar to Leeds case 316
Diagnosis between the Leeds case and syphilis 314, 315
Calf lymph and vaccino-syphilis 317, 318
Escape of co-vaccinees in vaccino-syphilis cases 353, 354
Case of lupus following vaccination 358

IMMUNITY.
To small-pox in the unvaccinated 166-171, 232, 233
Of small-pox hospital nurses 231-233
Of plague attendants 233
To zymotic diseases in improved dwellings 247
Impetigo Contagiosa.
And vaccination 291, 292
India.
Small-pox and vaccination 401
Re-vaccinated small-pox in the army 226, 410
Glycerinated lymph a failure 383, 384
Indian Lancet.
Case of tetanus following vaccination 361
Influenza.
Age-incidence 49, 50
Ingenhousz, Dr.
Cautions Jenner 108

Inoculation (small-pox). PAGE
Popular in Turkey - 10
Dr. Timoni's letter on - 10
Introduced into England by Lady Mary Wortley Montague (1721) 10
Condemned criminals experimented upon 11
Secures Royal patronage (1722) 11
Progress impeded by severity of results 11
Practice almost ceased (1728) - 11
Revived (1740) 11, 59
Made gratuitous (1746) 59
Sanctioned by Royal College of Physicians (1754) 11
Reformed by Gatti, Sutton, and Dimsdale (1763) 11, 12
Diffused small-pox - 58-60
Prohibition in Paris (1763) 58, 59
Effect of its displacement by vaccination - 58-61, 86, 390
Inoculation Test (see Variolous Test).

Jacobs, Mr.
Personal experience of cow-pox 108, 109
Jaundice.
Epidemic at Bremen, from glycerinated lymph (1883-84) 381, 382
Jenner, Dr. Edward.
First interested in cow-pox 9
On the "Tradition of the Dairymaids" 9
On the symptoms of cow-pox in milkers - 270, 271
On the immunity of cow-poxed milkers to small-pox 10
First vaccination (1796) 14
Method of applying variolous test 13, 14
Variolous test failures 15
Cautioned by Royal Society 106
Theories criticised by Dr. Beddoes - 16
His "presumption," Dr. George Gregory on 154
And his medical *confrères* 106
Has no lymph (end of 1798) 16
Uses Woodville's lymph - 21
On Woodville's lymph finally assuming the nature of vaccine 61
Abandons variolous test (1804) 26, 389
Coins term "spurious cow-pox" 26
Assertions respecting permanent value of vaccination 105, 164, 214, 267
Assertion respecting safety of vaccination 267
Disregards Dr. Haygarth's counsels 107
Cautioned by Dr. Ingenhousz - 108
In 1804 advised to come forward and vindicate his doctrines 114
Reassures his friend Dunning, who had become sceptical 114, 115
Conference with Lord Henry Petty 122
Rewarded by Parliament 123
Jenner and vaccination "again to be put upon their trial" (1809) 125
Accuses Brown of "fraud and artifice" - 128
On Grosvenor case 130
Brings forward new doctrine to repel failures 130, 131

Jenner, Dr. Edward. PAGE
Annoyed by the *anti-vacks* 132
Also by Lord Ellenborough's remarks on vaccination (1813) 132, 134
Disparaging remarks on his discovery by Dr. Thomson (1822) 147
Disconcerted by criticism in the *Edinburgh Review* 148
On the requisite number of vaccination marks 204
On mild small-pox in the eighteenth century 189
On cow-pox and erysipelas 346, 347

Jenner Society.
Small-pox and sanitation 241

Jeunhomme, Dr.
Statistics of small-pox in the Franco-Prussian War 238-240

Jones, Dr. Horace E.
Results of animal lymph 372

Jones, Dr. J. T.
Results of animal lymph 372

Jones, Dr. Joseph.
Vaccino-syphilis in the American Civil War 319, 320

Jones, Mr. William.
Experiences in the Franco-Prussian War 82, 83

Jurin's statistics.
Of small-pox fatality in the eighteenth century 180-183, 408, 409
Criticised by Dr. M'Vail 181
The Royal Commission on 183

KEIGHLEY.
Small-pox in 1893 53, 91, 97, 225, 390, 392, 393

Kellett, Mr. R. G.
Cases of small-pox after re-vaccination in his family 216

Kilmarnock.
Small-pox in 1728-63 43

LAMBETH.
Small-pox in 1871-72 95, 96

Lancet.
Vaccination failures "numerous and discouraging" (1853) 155
Fatality of small-pox (1871) 184
Pock-marked faces (1872) 56
On the propagation of inoculable diseases by vaccination 279
Cases of erysipelas after vaccination 349
Calf lymph and vaccino-syphilis 366

Langworthy and Arscott, Messrs.
Experiments, referred to 23, 24

Lawbaugh, Dr. A. I.
Results of animal lymph 374

PAGE

Lebus.
Cases of vaccino-syphilis at (1876) - - - - - - 324

Lee, Dr. Robert.
Skin diseases attending vaccination - - - - - 286

Leeds.
Park-space and death-rates from zymotic diseases (1870-79) - 62
Case of "vaccino-syphilis" - - - - - - - 311-319

Legge, Dr. T. M.
Sanitary works at Berlin, with reduction in mortality - - 259

Leicester.
Park-space and death-rates from zymotic diseases (1870-79) - 62
Small-pox epidemic, 1892-94 (see Small-pox).
System of small-pox prevention - - - - - - 88-91
Vaccination returns (1885-95) - - - - - - - 87

Lennander, Dr.
Case of lupus following vaccination - - - - - 359

Leprosy.
Communicability of - - - - - - - - 325, 326
Inoculation of - - - - - - - - 326, 327
In-vaccination of (cases) - - - - - - 329-342
Whether spread by vaccination - - - - - 342-345

Lettsom, Dr.
Vaccinal injuries at Clapham (1800) - - - - - 275

Lining, Dr. C. E.
Animal lymph - - - - - - - - - - 373

Lister, Lord.
Small-pox in the German army - - - - - 234-236

Little, Dr.
Cases of "confluent" chicken-pox - - - - - 160, 161

Liverpool.
Typhus in 1839 - - - - - - - - - 48
Park-space and death-rates from zymotic diseases (1870-79) - 62

Llanelly.
Small-pox in 1871-72 - - - - - - - - 95, 96

Local Government Board.
Powers under Vaccination Acts - - - - - - 34
On pre-Jennerian small-pox - - - - - - 186
On the re-vaccination of the army - - - - - 224
Assertion respecting immunity of re-vaccinated soldiers - 224
On the safety of vaccination - - - - - 270
Encourage practice of vaccinating newly-born infants - 281, 282
Assertion respecting vaccino-syphilis - - - - - 293
And the Leeds case - - - - - - - 312, 314

Local Government Board.
PAGE
Cases similar to Leeds case - - - - - 316
Inquiry into 132 fatal cases (erysipelas, etc.) after vaccination 351
Promote glycerinated lymph - - - - - 379

London.
Population previous to present century - - - - 32
Small-pox epidemics (see Small-pox).
Small-pox and fever death-rates (1629-1835) - - 57
Typhus in 1685-86, 1741, 1837-38, 1847, and since 1871 - 37-39, 48
Insanitary condition in early times - - - 67-73, 400
Park-space and death-rates from zymotic diseases (1870-79) - 62
Squares, dates of construction of - - - 65

London Gazette.
Pock-marked faces (17th and 18th centuries) - - 55

London Medical Repository.
Case of small-pox after vaccination - - - 135
On alarming number of vaccination failures (1817) - 142

London Small-pox Hospital.
Vaccination failures (1825, 1826-65, 1867, 1871) - 35, 149, 150, 175

Lucas, Mr. Clement.
Case similar to Leeds case - - - - 316

Lürman, Dr.
Jaundice epidemic at Bremen from glycerinated lymph - 381, 382

Lupus.
Following vaccination - - - - - 358, 359

Lyman, Dr Henry M.
Animal lymph - - - - - - - - 367

Lymph (Vaccine).
No guarantee of purity (Mr. Farn) - - - 268, 269

Lyttelton, Lord.
Introduced Compulsory Vaccination Bill (1853) - - - 163
Promised certainty of vaccination as a preventive of small-pox - 163

Macaulay, Lord.
Window-tax - - - - - - - - 66

MacCombie, Dr. John.
Small-pox fatality in vaccinated children - - - - - 173
On malignant small-pox - - - - - 190
"Good" and "bad" marks - - - 203, 204
Cases of small-pox after re-vaccination - - 218-220
Opinion respecting protective value of re-vaccination - 220

Macdonald, Dr.
On the spreading of leprosy by vaccination - 344, 345

M'Ghie.
PAGE
Woodville's variolous tests - - - - - - - 18

Maclean, Dr. Charles.
Vaccinal injuries - - - - - - - - - 278

Macleod, Dr.
Cases of small-pox after vaccination - - - - 144-146

Macnamara, Mr. C. N.
Communicability of leprosy - - - - - - 326
Inoculation of leprosy - - - - - - 327, 328
In-vaccination of leprosy - - - - - - - 334

M'Vail, Dr. John C.
Age-incidence of small-pox - - - - - - - 49
Criticises Jurin's statistics - - - - - - - 181

Maddock, Mr. B.
Injurious results of vaccination - - - - - 275, 276

Maitland, Mr. Charles (early inoculator) - - - - - 10, 11

Makuna, Dr.
On classification of small-pox cases by vaccination marks 202, 203
Cases of vaccino-syphilis reported in his "Inquiry" - - 303-305

Malthus, T. R.
Vicarious mortality - - - - - - - - - 83, 84

Manchester.
Small-pox in 1769-74 - - - - - - - - 43
Typhus in 1839 - - - - - - - - - 48
Park-space and death-rates from zymotic diseases (1870-79) - 62

Marsh, Dr. E. J.
Animal lymph - - - - - - - - - 371

Marson, Mr. J. F.
Mild small-pox in the unvaccinated - - - - 189
Fatality of corymbose small-pox - - - - - - 191
His method of classifying small-pox cases - - 193, 194
His scar statistics - - - - - - - 204, 205

Martin, Dr. Henry A.
Case of *vaccine généralisée* - - - - - - - 285

Martin, Sir Ranald.
Leprosy and vaccination - - - - - - 334, 335

Massey, Isaac.
Mild small-pox in the eighteenth century - - - - 188

Measles.
In Glasgow, takes the place of small-pox (1783-1812) - - 84, 85

Medical and Chirurgical Review. PAGE
Cases of post-vaccinal small-pox, with remarks by editors 118-122
Case of small-pox attributed to chicken-pox 157, 158
On Mr. John Ring's prevarications 158
Injurious results of vaccination 276

Medical and Physical Journal.
Review on Mr. Goldson's objections 114

Medical Observer.
Fatal case of small-pox after natural cow-pox 111
113 cases with 16 deaths of small-pox after vaccination 125-127
Small-pox mortality after vaccination at Witford (1810) 128, 129

Medical Record (New York).
Case of tetanus following vaccination 361

Medical Times and Gazette.
Squalid surroundings of small-pox sufferers (1871) 246
On the transmission of tubercle by animal lymph 357, 358

Melichar, Dr.
Epidemic of *impetigo contagiosa* following vaccination 292

Merthyr.
Small-pox in 1871-72 64, 95, 96

Metropolitan Asylums Board.
Small-pox statistics in the Hospitals (see Small-pox).
Small-pox immunity in one of the Managers (unvaccinated) 232, 233
Cases of small-pox after re-vaccination 216-221, 223

Michaels, Mr.
Causes of Montreal small-pox epidemic (1885) 103

Milnes, Mr. Alfred.
Age-incidence of typhus and typhoid fevers 49
Age-incidence of influenza 49, 50
Age-incidence and sanitation 76, 396

Mold.
Small-pox in 1871-72 53, 93, 94, 104, 392

Montague, Lady Mary Wortley.
Introduces small-pox inoculation into England (1721) 10

Montreal.
Small-pox epidemic (1885) 102, 103

Moore, Mr. James.
Woodville's lymph 21, 22
Effects of small-pox inoculation 59

Moore, Sir William.
Communicability of leprosy 326

Morland, Mr. W.
Cases of erysipelas after vaccination 347, 348

Morrow, Dr. P. A.
PAGE
Vaccine généralisée - - - - - - - - 285
Skin diseases attending vaccination - - - - 289
Reluctance of profession to recognise vaccinal injury - - 363
Animal lymph - - - - - - - - 373

Morton, Dr. Richard.
Small-pox in the seventeenth century - - - - - 42

Moseley, Dr. Benjamin.
Publication on vaccination failures - - - - - - 122

Mudge, Mr. John.
Messrs. Langworthy and Arscott's experiments - - 23, 24
Mild small-pox in the eighteenth century - - 188, 189

Mudie, Dr. P.
Acknowledges his prejudice in favour of vaccination - - 161

Murchison, Dr. Charles.
Typhus fever epidemics (1685-86, 1741) - - - - - 37

Murray, Dr.
Communicability of leprosy - - - - - - - 326

Napier, Dr. Alexander.
Eruptions from calf lymph - - - - - - 373-377

Nash, Brigade-Surgeon.
Vaccination and re-vaccination in the army - - 224, 225
Small-pox cases and deaths in the army (1860-88) - - - 225

National Vaccine Establishment.
Founded (1807) - - - - - - - - 123
Principal function - - - - - - - - 123
Report on the Grosvenor case - - - - - 130
Cases of small-pox after vaccination - - - 143-145, 147
Pock-marked faces (1821, 1825) - - - - - 55, 56

Navy.
Small-pox after re-vaccination - - - - - - 223, 224

Nettleton, Mr. Thomas (early inoculator) - - - - - 11

Neuss.
Small-pox after vaccination at (1865-73) - - - - - 175

Newcastle-on-Tyne.
Park-space and death-rates from zymotic diseases (1870-79) - 62
Small-pox in 1871-72 . - - - - - - 64, 95, 96

Niemeyer, Dr. Felix von.
Dangers of vaccination - - - - - - 279, 280
On vaccination and tubercle - - - - - - 355
Opinion on compulsory vaccination - - - - - 356

Nightingale, Miss Florence.
On the first canon of nursing - - - - - - 265, 266

PAGE

Northampton.
Small-pox in 1871-72 - - 94, 95

Norway.
The Government of, on the vaccination of young children 283, 284

Norwich.
Small-pox in 1819 confined to lower classes 245
Small-pox in 1871-72 - - 95
Park-space and death-rates from zymotic diseases (1870-79) 62
Vaccinal erysipelas (1882) 348, 363

Nottingham.
Fatal case of small-pox after vaccination (1809) - 129
Park-space and death-rates from zymotic diseases (1870-79) 62

Nurses.
Immunity to small-pox and plague - 231-233

Nursing.
Influence on small-pox fatality - - - 256, 266

OGLE, DR. WILLIAM.
On age-incidence of zymotic diseases 46

Oldham.
Park-space and death-rates from zymotic diseases (1870-79) 62

Oliver, Mr. Richard.
On the spreading of leprosy by vaccination 345

Open Spaces in Towns.
Salutary effect of - - 62, 63, 251

PAGET, SIR JAMES.
On the effects of vaccination 272

Parliament, Acts of.
Relating to vaccination 33-35
Public Health Act (1875) 54

Paul, Mr. Alexander.
Small-pox age-incidence in recent local epidemics 393-395

Pearse, Dr. S. H.
Animal lymph 372

Pearson, Dr. George.
Symptoms of cow-pox 271
Cases of small-pox after vaccination - - 120, 132, 133
Repudiates identity of cow-pox with small-pox - 30
His "insinuations that vaccination is good for nothing" 132

Peel, Sir Robert.
Opinion on compulsory vaccination (reported by Mr. Duncombe) 162

PAGE

Percival, Dr. Thomas.
On the inoculation of infants - - - - - - - - 283

Percival, Dr. W. F.
"Spurious" vaccination at Graniteville - - - - - 323

Perron, Dr.
Epidemic of *impetigo contagiosa* following vaccination - 292

Phipps, James.
Jenner's first vaccination - - - - - - - - 14

Picton, Mr. J. A. (see Royal Vaccination Commissioners).

Piffard, Dr.
Case of leprosy following vaccination - - - - 337, 338

Pitt, William.
Condition of the poor in 1796 - - - - - - - 78

Plague.
Compared with small-pox - - - - - - - 31, 32
Immunity of attendants - - - - - - - - 233

Playfair, Lord.
Statistics of small-pox in the Franco-Prussian War - - 237

Plomesgate.
Vaccinal injuries (1878) - - - - - - - - 351

Plymouth.
Park-space and death-rates from zymotic diseases (1870-79) - 62

Pock-marked faces.
Prevalence in seventeenth and eighteenth centuries - - 55
Disappearance avowed by Vaccine Board (1821, 1825) - 55, 56
Frequency deplored by *Lancet* (1872) - - - - 56
Cause of diminished prevalence since 1872 - - - 391

Pontypridd.
Small-pox in 1871-72 - - - - - - - 64, 94, 95

Portsmouth.
Park-space and death-rates from zymotic diseases (1870-79) - 62

Pourquier, Dr.
Epidemic of *impetigo contagiosa* following vaccination - - 292

Practitioner, The.
Heifer vaccination - - - - - - - - - 368

Preston.
Severe and fatal small-pox after vaccination - - 123, 124

Preston, Staff-Surgeon T. J.
Small-pox after re-vaccination on H.M.S. "Audacious" - 223

Prince, Dr. M.
Results of animal lymph - - - - - - - 375

Prisons.
Insanitary condition, eighteenth century - - - - 73-75

Protze, Dr.
Epidemic of *impetigo contagiosa* following vaccination - - 292

PAGE

Provincial Medical and Surgical Association.
Vaccination failures (1840) - - - 154, 155
Prurigo following vaccination - - - - 292
Public Health Act (1875), referred to - - - 54

RADCLIFFE, MR. NETTEN.
Erysipelas after vaccination at Gainsborough (1876) 348, 363
Railway Travelling.
Risk compared with that of vaccination - - - 365
Rake, Dr. Beavan.
Results of vaccination of lepers - - - - 328
Ransome, Dr. Arthur.
Action of glycerine on the growth of the tubercle bacillus 358
Raymond, Dr. J. H.
Fatal case of small-pox after re-vaccination 216
Redhead, Mr. M.
Cases of small-pox after vaccination - - - 136-141
Reece, Dr. Richard.
Injurious results of vaccination - - - 277, 278
Registrar-General.
Classifies small-pox deaths—
(Vaccinated) - - - - - - 199
(Unvaccinated) - - - - - - 199
(No statement) - - - - - 199
Investigates "no statement" deaths from small-pox (1871-72) 199, 200
Small-pox at Mold (1871-72) - - - - 93
Most of the chicken-pox deaths are "very probably" small-pox 45
Influence of sanitary measures on small-pox - - - 253
Effect of sanitary reform on child mortality - - 75
Causes of decline of fever - - - - - 41, 42
Deaths from vaccination, England and Wales (1859-95) 346, 362
Registrars (Metropolitan).
Influence of sanitary measures on small-pox (1843) 247-254
Re-vaccination.
Personal experiences of failure - - - - 214, 215
Experience of the Metropolitan Aslyums Board 216-221, 223
In the navy - - - - 223, 224
In the army - - - - 224-231
Fatal small-pox after, at Berlin (1870-72) - - 231
In the German army - - - 234-236
Rhazes.
On varieties of small-pox - - - 186
Rice, Dr.
Results of animal lymph - - - - 373
Richardson, Sir B. W.
On sanitation - - - - - - 259, 260

PAGE

Ricketts, Dr.
On the obscuring of vaccination scars by eruption - 195, 196
On vaccination scars wearing out - - - - - 195
Fallacy of classifying small-pox cases by marks - - - 195

Ricord, Prof.
On vaccino-syphilis - - - - - - - - 293

Rigden, Mr.
On small-pox being confined to the lower classes - - 245

Rijo, Dr. R. G.
Case of tetanus after vaccination - - - - 360

Rilliet, Dr.
Vaccination and tubercle - - - - - - 354, 355

Ring, Mr. John.
Cases of small-pox after vaccination - - - - 115-118
His prevarications - - - - - - - - 158
Case of "confluent" chicken-pox - - - - - 159

Robinson, Dr.
Severe and fatal small-pox after vaccination at Preston 123, 124

Ross, Mr.
Skin eruptions attending vaccination - - - - 287, 288

Ross, Dr. George.
Case of tetanus after vaccination - - - - - 359

Royal College of Physicians.
Sanction small-pox inoculation - - - - - 11
Condemn "spurious cow-pox" theory - - - - 29
Report favourably on vaccination (1807) - - - - - 123
On vaccination and leprosy (1867) - - - - - 339

Royal College of Surgeons.
On vaccinal injuries (1807) - - - - - 276, 277

Royal Commission on Vaccination. (Cases reported in Appendix ix.)
Cases of convulsions after vaccination - - - - - 274
Disgraceful case of vaccination of newly-born premature infant - 283
Cases of *vaccine généralisée* - - - - - 285
Cases of eczema following vaccination - - - - 291
Cases of *impetigo contagiosa* following vaccination - - 292
Cases similar to Leeds case - - - - - 316
Cases of vaccinal erysipelas - - - - - 351
Case of lupus following vaccination - - - - - 359
Case of tetanus after vaccination - - - - 360, 361
Injuries and fatalities from glycerinated lymph - - - 383

Royal Society.
Caution Jenner - - - - - - - - - 106

Royal Vaccination Commissioners (Majority of).
On Woodville's cases - - - - - - - 18
Criticise variolous test - - - - - - - 24

Royal Vaccination Commissioners (Majority of). PAGE
On age-incidence of small-pox 50-53, 392-396
Jurin's statistics 183
Small-pox and sanitation 241-244
Recent decline of small-pox in the Metropolis 244
On vaccine lymph containing organisms 270
Injurious results of vaccination 271, 272
Vaccination of infants 284
Skin affections following vaccination 286, 287
On blood being omnipresent in vaccine lymph 307
Leeds case 314
Relationship of cow-pox to syphilis 316
Vaccination and scrofula 354
Vaccino-syphilis cases more numerous than recorded 363
Compare risk of vaccination with that of railway travelling 365
Calf lymph 366, 378
Glycerinated lymph 380
Recommendations with regard to conscientious nonconformists 385

Royal Vaccination Commissioners (Dr. Collins and Mr. Picton).
Pedigree of Woodville's lymph 19
Reject Woodville's cases "as furnishing false evidence, and valueless as a scientific experiment" 22
Age-incidence of small-pox in the unvaccinated 46
Small-pox age-incidence, Scotland (1871) 76
Gloucester small-pox epidemic—causes of extension 97-99
Small-pox fatality, Metropolitan Asylums Board (1870-94) 183
On methods of classifying small-pox cases by vaccination marks 202
Immunity to small-pox in improved dwellings 247
Vaccinal erysipelas (cases and deaths) 350, 351
Statistics of risk of vaccination, and of railway travelling 365

Rühle, Dr.
Vaccination and scrofula 356

Rügen, Isle of.
Epidemic of vaccinal *impetigo* (1885) 291, 292, 380

Russell, Dr. James B.
On the obscuring of vaccination scars by eruption 192
Small-pox fatality at Glasgow (1871-72) 197

SALFORD.
Park-space and death-rates from zymotic diseases (1870-79) 62

Sanitation.
Influences small-pox (see Small-pox).
Neglect of, in 17th, 18th, and early in 19th centuries 67-75, 400
Influences age-incidence of disease 75, 76, 396, 398, 399

Savill, Dr.
On vaccination scars wearing out 193
Texture of vaccination scars 201, 202

PAGE

Savill, Dr.
On the obscuring of vaccination scars by eruption - - - 200
Warrington small-pox (1892-93) limited to smaller houses 246, 247

Scarlet fever.
Decline since 1861-65 - - - - - - - - 40, 41

Schaefer, Prof.
On vaccinal injury being greater than recorded - - - 364

Scotland.
Small-pox age-incidence (1871) - - - - - - 76

Scott, Dr. Anna.
On the spreading of leprosy by vaccination - - - - 345

Scrofula.
And vaccination - - - - - - 280, 305, 354-358

Seaton, Dr. E. C.
Vaccination at Mold prior to 1871-72 small-pox epidemic - 93
Vaccination at Swansea prior to 1871-72 small-pox epidemic - 94
Similarity of vaccination sore to syphilis - - - - 310, 311

Shaftesbury, Lord.
On small-pox being chiefly confined to the lowest class - - 245
Improved lodging-houses might exterminate small-pox - - 245

Sheffield.
Park-space and death-rates from zymotic diseases (1870-79) 62
Small-pox in 1887-88 (see Small-pox).
Small-pox after recent vaccination (1887-88) - - - 171-173
Small-pox after re-vaccination (1887-88) - - - - 221, 222
"Census" - - - - - - - - - 176, 177

Shipman, Dr. N. S.
Animal lymph - - - - - - - - 372

Shorter, Mr. John.
Effect of inoculation after vaccination - - - - 14, 15

Short Heath.
Small-pox in 1894 - - - - - - - - 92

Simon, Sir John.
On complete immunity of the vaccinated to small-pox 164, 214
Assertions respecting safety of vaccination - - - 268
If lymph be not guaranteed pure, vaccination should be optional 268

Sims, Dr. John.
Case of small-pox after natural cow-pox - - - 108, 109
Remarks on the "loathsomeness" of cow-pox - - 109

Skin diseases.
And vaccination - - - - - - 285-292
And calf lymph - - - - - - 366-370, 372-378

Small-pox (Variola).
PAGE
A disease of the poor - 245-247, 249, 250, 257
Blindness from 266
Disfigurement from - 55, 56, 391
Displacement of (by measles, etc.) - 84, 85, 396
Identity with cow-pox repudiated 30, 309
Inoculation (see Inoculation).
In the Franco-Prussian War 80-83, 237-240
In the German army 234-236
Treatment of - 186, 187, 260-266, 391

Age-incidence.
In seventeenth century - 42, 54
In eighteenth century - 43, 54
Since 1837-38 44
In local epidemics - 51-53, 392-396
And vaccination 45, 46, 50-54, 125-129, 151, 152, 154, 155, 392-396
Compared with that of other diseases 46-50, 396
Influence of sanitary measures on 76, 396, 398

Causes of extension.
Inoculation (small-pox) 58-61, 86, 390
Insanitation 65-77, 241-260, 399-401
Density of population on area and in dwellings 61-65, 248-250, 252
Commercial depression and high prices of wheat 77-79
War 79-83

Decline.
Prior to introduction of vaccination 57, 58, 60, 390
From thence to the 1871-72 epidemic 35, 40, 41, 53
During recent years - 35, 36, 40, 41, 54, 244, 391

Epidemics.
Aynho (1723-24) 43, 44, 181, 409
Bavaria (1871) 175, 176
Berlin (1870-72) 175, 198, 231
Birkenhead (1877) - 246
Birmingham (1891-94) 92, 175, 178, 185
Bromley (1881) 175
Cairo (1885) 226-231
Cairo (1888-89) 225, 226
Chester (1774) 43, 97, 182, 183
Cologne (1871-73) - 175
Dewsbury (1891-92) 52, 213, 247, 393
England and Wales (1817-19) 79, 161, 179
England and Wales (1837-38) 38, 44, 61, 79, 151, 152
England and Wales (1870-72)
31, 32, 34, 35, 41, 52, 54, 63, 83, 94-96, 199, 213, 246, 391-393
England and Wales (1892-95) 199, 201
Glasgow (1871-72) 197

Small-pox (Variola).
Epidemics. PAGE
Gloucester (1895-96) - 51-53, 96-102, 185, 263, 389, 391-395
Keighley (1893) - 53, 91, 97, 225, 390, 392, 393
Leicester (1892-94) 51-53, 88, 90, 91, 94, 97-99, 171, 225, 226, 231, 244, 390-395, 402, 411
London (1634, 1685, 1710, 1714, 1719, 1757, 1796) - 32, 77, 78
London (1817-19) - - - - - - - 79, 142-145
London (1837-38) - - - - - - 38, 247-253
London (1870-72) - - 32, 35, 36, 174, 185, 199, 255, 256
London (1892-93) - - - - 36, 52, 196, 197, 394
Mold (1871-72) - - - - 53, 93, 94, 104, 392
Montreal (1885) - - - - - - 102, 103
Norwich (1819) - - - - - 245, 264, 265
Scotland (1871) - - - - - - 76
Sheffield (1887-88) - 52, 92, 171-173, 175-177, 185, 206, 207, 211, 221, 222, 393, 394
Short Heath (1894) - - - - - - 92
Sunderland (1884) - - - - - - - 175
Swansea (1871-72) - - - - - - - 64, 94
Warrington (1773) - - - - - - 43
Warrington (1892-93) - - - - 52, 92, 175, 394, 395
Willenhall (1894) - - - 53, 92, 93, 175, 211, 389, 393
Witford, Hertfordshire (1810) - - - - - - 128, 129

Fatality.
Pre-Jennerian - - - 180-183, 186-189, 391, 408, 409
Post-Jennerian - - - - - 183, 184
Statistics of, in the unvaccinated - 185, 197, 198, 204, 205
In the vaccinated - 128, 129, 173, 174, 179, 180, 196-198, 203-205
In the re-vaccinated - - - - - 231
Influence of sanitation and treatment on - - 97-102, 241-266, 391

Immunity.
Not in proportion to proximity of vaccination 141, 151, 152, 154, 155
In the unvaccinated - - - 166-171, 232, 233
Of hospital attendants - - - - 231-233
In improved dwellings - - - - - 247

Prevention.
By separation of the sick from the healthy - - - - 402
Sanitary improvements - - 245, 247, 251, 254, 256-260, 401, 402
Provision of open spaces in towns - - - 61-65, 251, 402
Sir Edwin Chadwick on - - - - - 257, 258
Dr. Southwood Smith on - - - - - 254
At Berlin since 1872 - - - - - 259
Leicester's system - - - - - 88-91

Varieties.
Discrete - - - - - - 186-190, 260-262
Confluent - - - - - - 191-197, 260-262
Malignant - - - - - - - 190, 191
Corymbose - - - - - - - 191

PAGE
Small-pox after natural cow-pox - - - 27, 106-111
Small-pox after re-vaccination - - - 214-231
Small-pox after vaccination (see Vaccination).
Small-pox by inoculation after vaccination - 112, 121, 141
Smith, Dr. Southwood.
Immunity to small-pox in improved dwellings - - 247
Prevention of epidemics - - - - - 254
Southampton.
Small-pox in 1871-72 - - - - 95, 96
South Shields.
Small-pox in 1871-72 - - - 64, 94, 95
Sparling, Dr.
Injurious results of vaccination - - - - 281
Spurious cow-pox - - - - 26-29, 108-111, 114
Stevenson, Mr. John.
Cases of small-pox by inoculation after vaccination - - 112
Stockton.
Small-pox in 1871-72 - - - 64
Stoke Newington.
Vaccinal injuries (1871) - - - - - 350
Sudbury.
Fatal vaccinal erysipelas (1883) - - - - 351
Sunderland.
Small-pox in 1871-72 - - - 64, 94, 95
Small-pox in 1884 - - - - - 175
Park-space and death-rates from zymotic diseases (1870-79) 62
Sutton, Daniel (inoculator) - - - - - 11
Swansea.
Small-pox in 1871-72 - - - - 64, 94
Sweeting, Dr.
His method of classifying small-pox cases by vaccination marks 202
Sydenham, Dr. Thomas.
Fever epidemic (1685-86) - - - - 37
Varieties and treatment of small-pox - - 186, 187, 260-262
Syphilis.
And vaccination - - - - - 293-324
Not awlays easy to detect in vaccinifer - 307, 308
Analogy with cow-pox - - - - 309-319

TAYLOR, DR. FREDERICK.
Case similar to Leeds case - - - 318, 319
Tebb, Mr. William.
"The Recrudescence of Leprosy," referred to - - 325

PAGE

Tetanus.
And vaccination - - - - - - - - - 359-361
Infantile mortality at Calcutta (1881-90) - - - - - 361

Thin, Dr. George.
Eczema after vaccination - - - - - - - 290

Thomson, Dr. John.
Vaccination failures (1817-19) - - - - - - 147
Disparaging remarks on Jenner's discovery - - - - 147

Thorne, Sir Richard.
On calf lymph and tuberculosis - - - - - - 358

Thornton, Mr.
Variolous test failures - - - - - - - 15, 16

Thursfield, Dr. W. N.
Immunity to small-pox in the unvaccinated - - - 169, 170

Tillmanns, Dr.
Incubation period of erysipelas - - - - - - 353

Timoni, Dr.
Letter on inoculation - - - - - - - - 10

Toms, Dr. S. W. S.
Case of tetanus following vaccination - - - - - 361

Toussaint.
His experiments, referred to - - - - - - - 357

Tradition of the dairymaids - - - - - - - 9, 403

Triple vaccination.
Failure to protect from small-pox - - - - 215, 216, 223

Trobridge, Mr. Arthur.
Small-pox in the German army - - - - - 234, 236

Tubercle.
And vaccination - - - - - - - - 354-359
Growth in culture media favoured by glycerine - - 358, 384

Turkey.
Small-pox inoculation - - - - - - - 10

Typhoid fever.
Age-incidence - - - - - - - - - 49

Typhus fever.
Decline of - - - - - - - - - 37-41, 53, 391
Causes of decline - - - - - - 40-42, 257, 258, 400
Epidemics (1685-86, 1741, 1837-38, 1847) - - - - 37-39
Epidemics and high prices of wheat - - - - 77-79
Age-incidence - - - - - - - - 47-49
Immunity in improved dwellings - - - - - 247

Underwood, Dr. Michael.
Immunity to small-pox in the unvaccinated - - - 167, 168

Unna, Dr. P. G.
PAGE
Cow-pox and erysipelas - 347

Unvaccinated.
Whether a danger to the community 164, 178
Immunity to small-pox 166-171, 232, 233
Alleged high fatality among 185
Drawn from the lower strata of society 197, 257

Urticaria.
Complicating vaccination 290, 375

VACCINAL ERYSIPELAS.
Cases of 346-351
And cow-pox 346, 347

Vaccination.
Jenner first interested in 9
Early experiences of 15, 16
Critical position at end of 1798 16
Rescued from oblivion by Woodville 17
Accepted by profession 18
Jenner's assertions respecting permanent value of 105, 164, 214, 267
Opinion of some of Jenner's contemporaries 106-109
Reports of failures begin to multiply (1804) 113
Mr. Goldson on (1804) 114
Investigation demanded by *Medical and Chirurgical Review* 118, 119
Failures become numerous (1806) 122
Report of Royal College of Physicians (1807) 123
Before Parliament 122, 123
Established and endowed (1807) 123
Almost abandoned at Preston on account of failures 123, 124
Failures at Cambridge reported by Sir Isaac Pennington (1808) 124
Opposed by men of education and influence (1808) 124, 125
Vaccination and Jenner "again to be put upon their trial" (1809) 125
Criticised by Mr. Thomas Brown (1809) 127, 128
Failures at Witford (1810) 128, 129
Insinuations by Dr. George Pearson (1812) 132
Criticised by Lord Ellenborough (1813) 132, 133
Failures reported by Mr. M. Redhead (1817) 135-141
Mr. Thomas Harrison's confidence somewhat shaken 141
Falls into disrepute at Frampton (1817) 142
Medical Repository on "alarming" number of failures (1817) 142
Clamour about failures (1818) 143
Hesitation of respectable persons (1818) 143
Reluctant admissions of National Vaccine Establishment 143-145, 147
Dr. Macleod loses faith (1820) 144, 145
"Mortifying fallibility of medical opinions" 145
Prejudices "not altogether unreasonable" 147
Pretensions "rather too unreservedly" admitted 147
Extensive failures (1817-19) 147

Vaccination. PAGE
Disparaging remarks by Dr. John Thomson (1822) - - - 147
Criticised by *Edinburgh Review* (1822) - - - - - 148
Failures on H.M.S. "Phaeton" (1825) - - - - 149
At London Small-pox Hospital (1825) - - - 149, 150
Mr. Edward Greenhow on (1833) - - - - - 151
Reviewer in *British Annals of Medicine* (1837) - - 152
Earlier anticipations not realised (Sir Henry Holland, 1839) 152
Dr. George Gregory on (1823-52) - - - - 152-154
Lancet on "numerous and discouraging" failures (1853) 155
Made compulsory (1853)- - - - - - - 162, 163
Lord Lyttelton on - - - - - - - 163, 164
Criticised by Dr. James Copland (1858) - - - 165, 166
"A very fleeting protection, indeed" (Dr. William Gayton) 164
Lord Herschell on - - - - - - - 396-399
Failures in various towns, etc., since 1852 - - - 175
Assertions respecting safety - - - - - 267, 268, 270
Of infants - - - - - - - - 281-284
Risk compared with that of railway travelling - - 365, 366
Injurious results from - - - - - 267-384
Injury greater than recorded - - - - - 362-366

Vaccination Acts - - - - - - - - - 33, 34

Vaccination Registers - - - - - - - - 201

Vaccination scars.
Wear out - - - - - - - - 192, 193, 195
Obscured by eruption in confluent small-pox - 192, 194-196, 200
Varieties - - - - - - - - 201
Texture - - - - - - - - 201, 202
"Good" and "bad" - - - - - - 202-205
As a measure of protection - - - - - 201-213

Vaccine lymph.
Always contains blood - - - - - - - 307

Vaccine Pock Institution.
Cases of small-pox after vaccination - - 113, 119, 120

Vaccino-syphilis - - - - - - - - 293-324
Tables of alleged cases - - - - 296-298, 306

Vachell, Dr. C. T.
Cases of vaccinal erysipelas (1883) - - - - - 349

Vacher, Mr. Francis.
Method of classifying cases of small-pox - - - 193
On small-pox being confined to the labouring and artizan classes 246

Variola (see Small-pox).

Variolæ Vaccinæ.
Misleading appellation of cow-pox - - - - 30, 308, 309

Variolation (see Inoculation).

Variolous Test.
PAGE
Applied by Jenner - 13-15
Applied by Woodville 17-25
Criticised by Royal Commission - 24, 25
Victoria, Select Committee of Legislative Assembly
On vaccination 280, 281

WAGSTAFFE, DR. WILLIAM.
Effects of small-pox inoculation - 58
Varieties of small-pox 187, 188
Wainwright, Mr. Thomas.
Skin diseases attending vaccination 287
Walker, Dr. George B.
Animal lymph 372
Wallace, Dr. T. C.
Case of small-pox after triple vaccination 215
Walsall.
Small-pox in 1871-72 95
War.
Effect on small-pox mortality - 79-83
Ward, Mr. E.
Case of vaccino-syphilis 305
Warlomont, Dr.
Assertion respecting safety of vaccination 267
Warrington.
Small-pox in 1773 43
Small-pox in 1892-93 52, 92, 175, 394, 395
Small-pox epidemic (1892-93) limited to the smaller houses - 246
Vaccinal erysipelas (1871) 350
Watson, Dr. Heron.
On blood being omnipresent in vaccine lymph 307
Watson, Dr. R. S.
Experiences in the Franco-Prussian War 80-82
Watson, Sir Thomas.
Fever epidemic (1838) 39
On cases of small-pox being ascribed to chicken-pox - 155
Vaccino-syphilis 386, 387
Watt, Dr. Robert.
Decline of small-pox—its place taken by measles (1783-1812) - 84, 85
Watts, Dr. Giles (inoculator) - 12
Wells, Mr. J. W.
Fatal case of erysipelas after vaccination 348
Wells, Sir Spencer.
Infantile mortality from tetanus at Calcutta (1881-90) 361
Wheat.
High prices and small-pox mortality 77-79

Wheeler, Mr. Alexander. PAGE
Effects of war on small-pox mortality - - - - - 80
Fatality of malignant small-pox in vaccinated and unvaccinated 190
On statistics of small-pox in the Franco-Prussian War - 238

White, Dr. Andrew.
Small-pox and vaccination at Montreal (1885) - - - 102

Whitehaven.
Small-pox in 1871-72 - - - - - - - 95, 96

Whitehead, Dr. James.
Cases of vaccino-syphilis - - - - - - 299-301

Willan, Dr. Robert.
Insanitary condition of London (1800) - - - - 70-73
Effects of window-tax - - - - - 71
Injurious results of vaccination - - 276, 287, 369

Willenhall.
Small-pox in 1894 - - - 53, 92, 93, 175, 211, 389, 393

Willis, Dr. Thomas.
Small-pox in the seventeenth century - - - - 42

Wilson, Sir Erasmus.
Cases of leprosy following vaccination - - - 338, 339

Windley, Alderman.
On Leicester system of small-pox prevention - - - 89

Window-tax - - - - - - - - 65-67, 71, 74, 400

Winterbottom, Mr. T. M.
Confluent and fatal small-pox after vaccination (1805) - 116, 117

Wolverhampton.
Park-space and death-rates from zymotic diseases (1870-79) 62

Wood, Dr. C. B.
On the spreading of leprosy by vaccination - - - 345

Wood, Dr. Thomas F.
Animal lymph - - - - - - - - 369

Woodforde, Dr. James.
Case of small-pox after natural cow-pox - - - - 111

Woodville, Dr. William.
Receives news of cow-pox outbreak, Gray's Inn Lane (1799) 17
Experiments at London Small-pox Hospital - - 17
Three fifths of "vaccinated" cases had variolous pustules on body 18
Dr. Collins' and Mr. Picton's pedigree of his lymph - 19
His lymph contaminated with small-pox - - - 21, 389
His lymph away from the Small-pox Hospital - - - 21, 22
His variolous tests on the "vaccinated" convince profession - 18, 22
Dr. Collins and Mr. Picton on the value of his experiments 22
His lymph ultimately assumes the nature of vaccine - 61

World's vaccine, *i.e.*, Woodville's lymph - - - - 22

Accession no. 31710
Author Tebb, William
A century of vaccination ...
Call no.
1916 RM787
Cent T42
1898