

Small-pox and cow-pox : comprehending a concise history of those diseases, and a comparison between inoculation for small-pox and vaccination, founded upon a statistical account of their effects in Cambridge, with a plan for the universal extension of vaccination.

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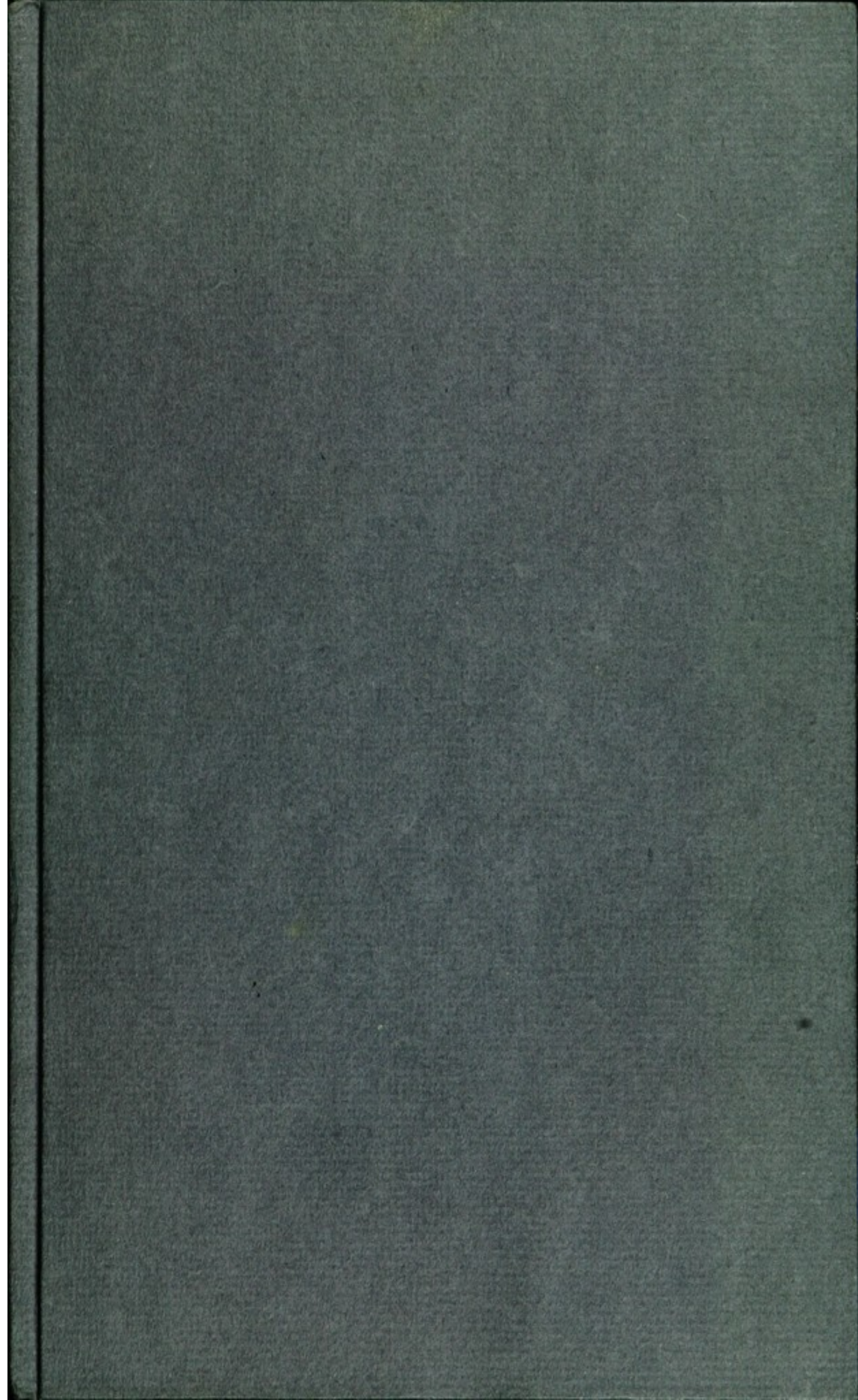
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SMALL-POX AND COW-POX:

COMPREHENDING A

CONCISE HISTORY

of those

Diseases,

and

A COMPARISON

between

INOCULATION FOR SMALL-POX

and

Vaccination,

FOUNDED UPON A STATISTICAL ACCOUNT

of

THEIR EFFECTS IN CAMBRIDGE.

WITH A PLAN

for the

UNIVERSAL EXTENSION OF VACCINATION.

ADDRESSED TO THE PUBLIC.

"Quæ amas optima, nec protinus se offerentibus gaudeamus; adhibeatur iudicium inventis, dispositio probatis."—*Quintilian.*

"That virtue which confines its beneficence within the walls of a man's own house, we have been accustomed to consider as little better than a more refined selfishness."
Paley.

By JOHN JENNINGS CRIBB,

MEMBER OF THE ROYAL COLLEGE OF SURGEONS.

CAMBRIDGE:

Printed by W. and W. Hatfield, Sidney-street;

AND SOLD BY DEIGHTON AND SONS, CAMBRIDGE; LONGMAN AND CO.,
AND UNDERWOOD AND CO., LONDON.

1825.

SMALL-POX AND COW-POX
A CONCISE HISTORY
OF THE
DISEASE,
AND
A COMPARISON
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ADDRESSED TO THE PUBLIC.

"For many nations, and perhaps in this country, vaccination is almost entirely
unknown; and the disease is still a source of great mortality." — *Edinburgh Review*
"That virus which confers its benefits is not the virus of a mild and gentle
fever, but a virus which is more or less virulent, and which is more or less
contagious." — *Edinburgh Review*

By JOHN JENNINGS CRIBB,
MEMBER OF THE ROYAL COLLEGE OF SURGEONS.

CAMBRIDGE:
Printed by J. N. P. at the University Press.
AND SOLD BY DEBENHAM AND SON, CAMBRIDGE; TOWNLEY AND CO.,
AND LINDSAY, 100, LONDON.

INTRODUCTION.

The attention of the Author was first particularly directed to the subject of Small-pox, by witnessing its ravages in Cambridge, during its epidemic visitation in 1823-4. The question naturally and forcibly presented itself, why are not the means of protection which we possess against a malady so terrible and destructive, afforded to every individual of the community? This led to inquiry into the particular causes of the neglect of those means, and the measures best adapted to their universal extension; and hence originated the investigation respecting Small-pox and Vaccination in the Town of Cambridge, which will be described in the following pages.

The author is well aware that statistical accounts are liable to various sources of error, and these he has endeavoured to avoid. He freely admits, that from education he had imbibed prejudices in favour of Vaccination, and that at the time he entered upon this inquiry, he continued to entertain a strong desire that its protecting power might stand the test of the strictest scrutiny, and that the confident expectations concerning it, which, till within a few years past, experience appeared to warrant, might be

fully verified. At the same time it is but just to declare that of this bias in his own mind he was fully conscious, and against the danger of a partial representation of facts which would naturally arise from it, he resolved to guard, and to adhere rigidly and scrupulously to the truth alone. Under the impression of this sentiment, he undertook the investigation; and he most unreservedly believes, that the statement is quite free from any incorrectness to which it might be liable from prejudice or partiality in the inquirer.

The manner also, in which it was conducted, viz. by going from house to house, accompanied in each parish by an Overseer, or a person long resident and well acquainted with the inhabitants, appeared the best adapted to procure a correct account; and to the individuals who thus kindly assisted him, the Author cordially acknowledges his obligation.

This investigation was completed in September, 1824; but various impediments and interruptions prevented the writer from digesting and reducing the facts collected, to a synthetic and regular form, until the commencement of the present year.

In the month of March last, a memoir comprehending a general statement of the facts, together with the observations and conclusions arising from them, was read before the Medico-Chirurgical Society of London, and which, it has been intimated, will probably be published in the next

volume of the Transactions of the Society, unless its appearance in that work may be considered as superseded by the present publication.

Under these circumstances, a separate publication on the subject would not, perhaps, have been expedient, prior at least to that of the forthcoming volume of the Medico-Chirurgical Transactions, had not the Small-pox again made its appearance in the town; as this, however, is unhappily the case, it has become a duty to endeavour, without delay, to arouse the attention of the inhabitants to the impending danger, and, if possible, to arrest the progress of the infection.

To the report of the number of cases in Cambridge, has been prefixed a concise general history of these diseases, derived from authentic sources, which it is believed will be found both instructive and interesting.

A plan for the universal extension of Vaccination is also submitted. It is not pretended that this plan is perfect or unobjectionable; but it appeared better to construct a frame-work which might be altered and filled up in any manner that should hereafter be deemed most expedient, than to leave the materials composing it in a state in which they would be comparatively useless, and very probably altogether neglected.

Although the plan here proposed is particularly adapted to the town and vicinity of Cambridge, it is obvious

that, *mutatis mutandis*, it would be applicable to any other place.

The motives in which the undertaking originated, and its obvious tendency to improve the condition of mankind, by relieving them from a source of great calamity, will, it is hoped, be deemed a sufficient apology for any deficiencies which may be imputable to its execution.

SMALL-POX AND COW-POX.

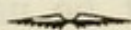
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SMALL-POX AND COW-POX.



ON THE NATURAL SMALL-POX.

THE Small-pox is a disease unhappily so well-known as scarcely to require description. It is one of those contagious eruptive disorders which seldom affect the same person more than once during life, like measles and scarlet fever, and is defined by Dr. Cullen as follows : “ Contagious, inflammatory fever, with vomiting, and upon pressure of the epigastrium, pain.—The eruption of small red pimples begins on the third day, and ends on the fifth, which pimples, in the course of eight days, suppurate, and at last fall off in crusts often leaving depressed scars, or little pits in the skin.”*

The virulence and mortality of Small-pox have been so much diminished of late years by the practice

* Cullen's Nosology.

of inoculation, and more recently of vaccination, that few persons in the present day are aware of the degree of misery and death which mankind suffered from this disease previously to the introduction of these two antidotes: a short retrospect therefore of the vast evils it has inflicted may not be useless, as a motive to vigorous exertion in the employment of any means which are adapted to its mitigation or extermination.

No mention is made of Small-pox by any Greek, Roman, or other European, nor even Alexandrian writer; from which it would appear that this terrible disease could not have existed among them, as they have described with minuteness almost every other. Rhazes and Avicenna, two Arabian physicians, who wrote about A. D. 900, are the earliest authors now extant on the subject; and the former of these (as translated by Dr. Mead,) alludes to Ahron, an Egyptian physician, who published a treatise on Small-pox during the reign of Omar, Mahomet's second successor, about A. D. 640: these appear to be the most remote traces of any record of Small-pox.

Dr. Bateman and some others are of opinion that Small-pox did exist among the ancients, and was included by the Greek and Roman medical authors under the head of "Eruptions occurring in fevers," without being particularly specified; whether this were the case

or not, it is certain that no accurate description of its symptoms (remarkable as they are) have come down to us of an earlier date than the writings of the Arabian physicians above mentioned.

It has also been stated that Small-pox existed from very remote antiquity in Hindostan and China, but the evidence on which this assertion rests, derived chiefly from some religious rites of the Hindoos, is so obscure and deficient as to leave considerable doubt of the fact; and as the time and place of the origin of the disease is uncertain, and in the present day a matter of mere curiosity, it will not be deemed expedient to pursue the inquiry any further on the present occasion.

There is little doubt however, from these and other sources of evidence, that this distemper existed in Arabia, long before the period above stated, and from that country it was exported by the followers of Mahomet, through Palestine, Syria, Egypt, Persia, and eventually into Spain; and wherever they carried their victorious arms in the eighth century. From the same source it seems to have spread over the remaining territories of Africa and Asia. Long after this period the Small-pox was more widely diffused over Europe by the Crusaders, who on their return from their eastern expeditions, carried with them the infection.

In America, the first epidemic on record took place in 1520, since which period it has spread over every part of the new world, as well as of the old; and there is now scarcely a known spot upon the habitable globe, free from the invasion of this terrible plague.*

The malignant and fatal character of Small-pox has attracted to its history and symptoms more attention than has ever been bestowed upon any other disease; and at one time, perhaps, more than on all others put together. The writers upon it, indeed, in every age since its introduction into Europe, have been innumerable. The symptoms of the distemper are also so peculiar, as almost to preclude the possibility of its ever being mistaken; so that from the very great variety and multiplicity of the statements which have been made respecting it at various periods and places, we are in possession of more accurate and perfect knowledge of this disease, than of any other to which the human body is subject.

How long the Small-pox had existed in the countries of the East previously to its irruption into other parts, or when and in what manner it originated in those countries, it has already been stated, is unknown;

* *Vide* Black's enquiry Medical and Political on the Small-pox.—Dr. Friend's History of Physic.—Holwell's Account of Inoculation in the East Indies.—Rees's Cyclopædia.—Bateman on Cutaneous Diseases.

and will now probably for ever remain among the secrets of the past, over which oblivion has cast its impenetrable veil. There is no record of its ever having spontaneously arisen in the human body, but it is always propagated by contagion from one person to another; thus it had no existence in Europe, until brought hither by the Saracens; nor in any of the various regions of America, till its importation thither by Europeans in the early part of the sixteenth century.*

Of the havoc which this destroyer has made among mankind, and the still greater misery it has inflicted, some idea may be formed from the following statements. By a computation of the mortality of Small-pox in London, made on a very extensive scale by Dr. Jurin, Dr. Martin Wall, Dr. Lettsom, and others, natural Small-pox is found to prove fatal to one in six who become affected by it.† The average number of deaths from Small-pox in London, according to the bills of mortality, for one hundred years, previous to 1780, was two thousand annually. As it proved fatal to one in six, of course six times 2,000, or 12,000,

* *Vide* Black p. 11. Rees's Cyclopædia.

† *Vide* Dr. Jurin's Tables, Philosophical Translations, 1723 to 1727.—Dr. Lettsom's Examination before the Committee of the House of Commons on Jenner's Petition.—Report of College of Physicians, 1807.—Report of National Vaccination Institution, 1813, of Small-pox in Norwich.—Thompson's Historical Sketch of Small-pox, p. 279.

must have suffered the disease annually; and in the course of the century, 1,200,000 must have been afflicted, and 200,000 fallen victims to it. The average of the whole population of London during this period was 600,000; the numbers annually born are found to be in proportion of 1-30th to the population,* which gives 20,000 births annually; of these, 3-5ths, (12,000) suffered Small-pox; and 1-10th of the whole number born, (*i. e.* 2000) were destroyed by it. And when it is considered that during the same period, half of those born in London, died under three years of age,† we may easily conceive how very few could have arrived at the adult state, without undergoing the disease, and how nearly verified was the observation of Condamine, “That none are exempt from it, but those who do not live long enough to catch it.”‡

In the whole of Great Britain and Ireland, the number of deaths from Small-pox, are computed to have been from 30 to 40,000 annually; and in Europe at 400,000.§ To whatever quarter of the globe we look, we are appalled by its destructive ravages. At Rome, according to Condamine, in 1754, 12,000 had the

* Malthus on Population, b. II. ch. 7. † Idem.

‡ “Qu’ il n’ y a d’exempts que ceux qui ne vivent pas assez long temps pour l’atteindre.”—Memoir read before l’Academie des Sciences, Paris, 1754.

§ Black. p. 109.

Small-pox, of whom 4,000, or 1-3rd died; the whole number of deaths annually in that city, averaging only from 5 to 7000. At Milan, in 1817, we are informed by M. Fontaneille, that of 290 individuals attacked by Small-pox, fifty-five died; that almost all who recovered were deeply marked, and that several lost their sight. At Edinburgh, so late as 1819-20, out of 281 cases, 70 died, *i. e.* one in four. In the island of Ceylon, at the same period, Dr. Ferrel states, that the Small-pox broke out and destroyed one-third of those whom it attacked near the coast, and in the interior half. In the new world its ravages have in many instances exceeded in malignity and extent, those it has committed in the old. When first introduced in 1520, such was its excessive carnage among the unprotected natives, that it nearly depopulated the countries over which it spread. In Mexico, half of those affected, died of the distemper. In Peru, where it first appeared in 1588, and in Paragua, whither it was carried still later, it is said to have proved even more fatal, scarcely any recovering from the disease. Among the adult Indians of Brazil, who used to go naked and to paint their skins, it was generally certain death.*

Nor is this terrible pestilence either distant or remote from ourselves; within little more than twelve

* *Vide* Black's p. 26. Malthus b. I. ch. 4

months from the present time, it has destroyed eighty-four individuals within the precincts of our own town; and within twenty-five years, as will be hereafter shewn, upwards of three hundred.

OF SMALL-POX FROM INOCULATION.

—

In the beginning of the last century, an antidote to the destructive malignity of the Small-pox was introduced into England, in inoculation with its own virus; this practice had prevailed for 200 years previously in Greece, Circacia, and Georgia, whence it was communicated to Turkey. It had also been long known in the northern countries of Africa; and in Hindostan, where it was periodically practised by the Bramins. It was introduced however into Europe immediately from Turkey, by Lady Mary Wortley Montague, the lady of the English Ambassador at Constantinople, celebrated for her epistolary writings, who had her own son inoculated in that capital in 1717; and on her return to England, her daughter was inoculated five years after; and this was the first instance of the practice in our own country. Shortly after this, some experiments were made by inoculating prisoners in Newgate; a few months subsequently, some of the members of the royal family also underwent the process, and all these with success.*—So strong, however, were the prejudices

* *Vide* Black's, p. 27. Rees's Cyclopædia, &c. &c. &c.

of the people against this novel practice, and so generally was its adoption resisted, notwithstanding the high sanction, and even example by which it was recommended to them, that Dr. Jurin, a very eminent physician and zealous promoter of inoculation, could find no more than 764 cases of it in the whole kingdom six years after its first introduction, *i. e.* from 1721 to 1727.* In France also, four years after its introduction, Condamine could discover only 400 cases of inoculation.† The practice, however, was gradually extended, till towards the close of the century it had become very general among all classes, not only in England, but throughout the whole of Europe and America. About this period (in 1798) Dr. Jenner published to the world his experiments on vaccination, the practice of which has since almost superseded that of inoculation.

In consequence of a number of persons who had undergone vaccination having become subsequently affected by Small-pox, many have had their confidence in this antidote so much shaken, as to induce them to express a preference for the old and exploded one of Small-pox inoculation; and, in fact, inoculation was actually resolved upon and adopted in the course of last year, in a parish within eleven miles of Cambridge, and several hundred

* *Vide* Philos. Trans. 1727. Black. p. 30 and seq.

† *Vide* Memoire sur l'Inoculation, &c.

persons had the Small-pox communicated to them in this manner : and not longer ago than the past month (April 1825), a number of persons have undergone inoculation by a practitioner of a neighbouring village.* The question at issue then is, can the evils of Natural Small-pox be more effectually prevented by inoculation with its own virus, or by vaccination? This is altogether a matter of fact and experience; there is no reason, *a priori*, why the Small-pox when communicated by inoculation, should be more mild than when received by contagion; nor is there any assignable cause why it should be altogether prevented, or in any way influenced by vaccination. The only mode then of deciding the above question, is by remarking and recording the events which have actually occurred; and our experience thus acquired, will enable us to judge correctly of the real merits of each of these antidotes.

For this purpose a brief review of the effects produced

* Although there is no legal enactment for the prevention of inoculation for Small-pox, yet persons exposing themselves or their children, with the disease upon them, so as to endanger other persons taking the infection, are indictable at common law, and liable to punishment for the offence. For this information the author is indebted to the kindness of Mr. Pryme. Upon these grounds a woman named Sophia Vantendillo, was prosecuted, in 1814, for exposing her child with Small-pox in the streets of London, and sentenced to three months' imprisonment. Mr. Burnet, the apothecary who inoculated the child, was also indicted for causing the said child to be brought through the streets to his house; he suffered judgment to go by default, and was sentenced to six months' imprisonment.

by inoculation for Small-pox will be taken ; first, as it respects the individuals themselves, who were the subjects of the practice ; and secondly, as to the manner in which it has influenced the prevalence of Natural Small-pox among the community at large. With regard to the effect of inoculation upon the individuals who have been the subjects of it, it is quite certain that the disease thus communicated is beyond all comparison more mild and gentle than when taken by infection. We have seen, that upon a very large average, the Natural Small-pox proves fatal to full one in six ; the degree of mortality of Small-pox from inoculation appears to have been very various at different times and places. Thus of the seven hundred and sixty-four cases mentioned by Dr. Jurin, one in fifty died. During an epidemic at Blandford, in 1766, out of three hundred and eighty-four inoculated, thirteen died, *i. e.* more than one in thirty. This last is, perhaps, the largest proportion of deaths on record. An inoculator in Somersetshire out of one thousand seven hundred, lost only two. In Hampshire and Sussex, in 1738, out of two thousand inoculated, only two died. In North America, of one thousand inoculated, eight died. Middleton, in England, inoculated eight hundred, and lost only one. Of three hundred Negroes inoculated in the island of St. Kitts, not one died. Ranby states, that he inoculated one thousand in England, without one death. In the Small-pox Hospital, St. Pancras, in the course of several years,

of one thousand eight hundred who were inoculated, eight proved fatal ; at another period, four hundred and ninety-six were inoculated, with but one fatal case ; at the same Institution, in 1759, five hundred and ninety-three were inoculated, and but one lost. The Suttons, very celebrated inoculators in the last century, by their own accounts, inoculated forty thousand, of whom not more than one hundred died, or one in four hundred. Sir Walter Farquhar and Dr. Bradley, in their evidence before the Committee of the House of Commons, on Dr. Jenner's petition, computed the proportion of deaths from inoculated Small-pox, at one in three hundred in England, and one in one hundred and fifty throughout the rest of Europe. Mr. Ring, believes one in a hundred to be the proportion in London.* In Cambridge, according to the annexed accounts, in twenty-five years, one thousand one hundred and twenty-nine are stated to have been inoculated, of whom ten have died, *i. e.* one in one hundred and thirteen ; and during the epidemic of 1823-4, out of one hundred and two inoculated cases, two were fatal, *i. e.* one in fifty-one ; at the same time, the proportion of fatal cases from natural Small-pox, was one in seven.

* Philos. Trans. 1727.—Dr. Baker's Inquiry into the merits of Inoculation.—Dr. Glass's Letter to Dr. Baker, 1767.—Dr. Black.—Dr. Thompson's Historical Sketch of Small-pox.—Report on Jenner's Petition.—Ree's Cyclopædia.

Here then is abundant proof that the virulence of Small-pox when communicated by inoculation is so mitigated, and its mortality so diminished, as to render it, when compared with the destructive ravages of the Natural Small-pox, a very mild and even safe disease ; and as so few of those who live to be adults, escape taking the infection if unprotected, we cannot resist the conviction that it is much safer for any individual to undergo Small-pox by inoculation, than to run the risk of taking it by contagion ; or in the words of Heberden, “ That it is much better to have inoculation performed by any body, and in any manner, than to suffer Small-pox to come in the natural way, though assisted by all the helps which art can afford.”

There is, however, another most important point to be noticed when considering the subject of Small-pox inoculation, viz. its effects in diffusing the infection among the people at large ; for as it is highly contagious, even in the inoculated form, every person to whom it is thus communicated, becomes a fresh source of the dissemination of the infection among those who have not had the disease. It is therefore a question of much moment, whether the more extensive diffusion of the infection, which must naturally result from inoculation, be not an evil to the community at large, sufficient, in great measure, to counteract the individual safety which it may confer. This point cannot be

more satisfactorily exemplified than has been done by Sir Gilbert Blane, in a paper published in the 10th Vol. of the Medico-Chyrurgical Transactions. Sir G. gives a statement of the proportion of deaths from Small-pox to the total mortality, at four different periods of fifteen years each, taken from the London bills of mortality. The first period is fifteen years immediately preceding the introduction of inoculation, *i. e.* from 1706 to 1720 inclusive; the second is taken at the middle of the last century, when inoculation had made considerable progress; *i. e.* from 1745 to 1759 inclusive. The third series comprises the fifteen years previous to the introduction of vaccination, when inoculation had made still greater progress, *i. e.* from 1785 to 1798, both inclusive. The fourth comprises the time when vaccination had been so far diffused as to produce a notable effect on the mortality of Small-pox, *i. e.* from 1804 to 1818 inclusive. The result of these computations stand as follows:—

*Proportion of Deaths for Small-pox to the total
Mortality.*

From 1706 to 1720,	1 in 12-7,	<i>i. e.</i> 78 in 1000
— 1745 to 1759,	1 in 11-2,	<i>i. e.</i> 89 in 1000
— 1785 to 1798,	1 in 10-6,	<i>i. e.</i> 94 in 1000
— 1804 to 1818,	1 in 18-9,	<i>i. e.</i> 53 in 1000

From this statement it appears, that in the course

of the last century, the proportion of deaths from Small-pox to the whole number considerably increased, so that inoculation seems to have added to the mortality; and it is as clearly and undeniably demonstrated, that since the introduction of vaccination it has in a much greater degree diminished.

Dr. Lettsom also in his examination before the Committee of the House of Commons on Dr. Jenner's petition, bore testimony to the increased mortality of Small-pox during the time that inoculation was most practised.—“It appears” says the report, “by these tables, that out of 1,005,279 burials within the last forty-two years, one thousand seven hundred and forty-two persons more have died by the Small-pox, than the proportionate number as collected by the experience of the first forty-two years, or seventeen more deaths in every thousand have been occasioned by the Small-pox since inoculation has been adopted.”

There are also other and very serious objections to the practice of inoculation. We have seen that it at least sometimes proves fatal; still oftener the symptoms are so severe as to inflict much suffering upon the patient during the progress of the disease, and to produce permanent marks, and other bad consequences, which are known to arise from the natural Small-pox. The late eminent Dr. Baillie, says,

in answer to the questions of the committee of the House of Commons, on this subject:—"Have you ever seen an instance in which the vaccine inoculation has introduced or excited any disease?—*A.* I have seen no instance myself, nor have I ever heard of any.—*Q.* Have you ever known any instance in which the inoculated Small-pox has introduced or excited any disease?—*A.* I have known instances of the absorbent glands becoming enlarged and *scrofulous soon after a patient had undergone the Small-pox*: these instances happen sufficiently often to make a general impression upon the minds of medical men, that the constitution is sometimes excited to form scrofula, in consequence of the irritation previously undergone during the Small-pox."—On the grounds of diffusing the infection, Baron Dimsdale, although himself a very celebrated inoculator, objected to the adoption of inoculation: "Though the loss," says he, "under inoculation is very inconsiderable, *almost the whole* of those that are inoculated recovering, yet by spreading the disease, a greater proportion take it in the natural way: *more lives* are now lost in London than *before inoculation commenced*, and the community at large sustains a greater loss; the practice, therefore, is more *detrimental* than *beneficial* to society."

Notwithstanding these very weighty objections to inoculation, it is obvious from the previous statements,

that it possesses advantages sufficiently great to warrant the practice of it, had there been no alternative but exposure to taking the distemper in the natural way ; for although heretofore it has rather increased than diminished the mortality of Small-pox, by diffusing more widely the infection, yet this is rather to be attributed to the neglect than to the adoption of the practice ; since it is not pretended that the increase of deaths took place among persons who were inoculated, but among those who were not ; and who consequently were more exposed to the infection than if inoculation had not been practised at all. It is probable, however, that had no other antidote been discovered, the advantages of inoculation would have been gradually and generally perceived, and its practice adopted ; and thereby the malignity and mortality of Small-pox would have been very much diminished, although the extermination of the disease would, by the same means, have been rendered hopeless.

HISTORY AND NATURE OF COW-POX.

The fact that a disease to which the udders of cows are liable, when communicated to the human body by contact, rendered the person so affected insusceptible of Small-pox, had been known to the inhabitants of some rural districts for ages; but the circumstance, however remarkable, had been neglected, or regarded merely as one of curiosity, until the late Dr. Jenner, in 1798, published the result of his researches to the world. And what were the tidings he proclaimed? That the most painful, the most loathsome, the most deadly of all human diseases, which had destroyed, deformed, or in a greater or less measure afflicted a large majority of the people of the earth for centuries before, and was an object of terror to all, might be prevented and even exterminated, by means so simple as scarcely to deserve the name of an evil. Well might such an event be announced as “the greatest discovery ever made in medicine.”*

The main object of this inquiry is to ascertain, how far this annunciation has been corroborated by facts,

* *Vide* Dr. Baillie's Examination.

and stood the test of time and experience. As to proofs of the power of vaccination to prevent Small-pox, it is in the present day almost supererogatory to adduce any; the difficulty is not where to find them, but what to select from the overwhelming mass on record. Reports on this subject from all parts of the world coincide in their attestation to this fact. We need not, however, look abroad for evidence of the protecting power of Cow-pox; it is in our own families, and with numbers in their own persons.* So uniform

* Should any authorities for the protecting efficacy of Cow-pox be deemed necessary, the following, among a mass of others, may be mentioned:—Report of Jenner's Petition before the Committee of the House of Commons.—Ring on Cow-pox.—Reports of the College of Physicians.—Thomson's Historical Sketch of Small-pox.—Sir G. Blane's Med. Ch. Trans. v. 10.

The following letter, with which the author has been favoured from the Rev. Mr. Marks, the late very excellent and intelligent Clergyman of Waterbeach, is not only appropriate for insertion in this place, but will be found highly interesting and instructive:—

“ *Great Missendon, May 6, 1824.*

“ DEAR SIR,—In reply to yours of the 3d inst. I have to observe, that I commenced my vaccinating labours in Cambridgeshire, at the request and under the instruction of Dr. Thackery; first, in my own parish of Waterbeach, and then at Cottenham, Landbeach, Histon, Rampton, and Milton, until I had vaccinated more than eleven hundred. In the course of the same summer, as the Small-pox was at Cambridge and Ely, it found its way (partly by accident, and partly by being introduced by individuals hostile to vaccination,) into my own and *all the other parishes* where I had vaccinated.—My patients were exposed in very many cases in every village; but *no one took the slightest degree of Small-pox*. Nor did I ever observe any eruption, or witness any complaint follow in one single instance. The Cottenham and Waterbeach young people and children came most under my eye, and I can say at this day, that I never saw a set of more clear-skinned and healthy

and entire was the protection afforded by the practice of vaccination for many years after its first discovery,

looking people either before or since that time in any part of the kingdom. My ears were stunned for a while in the commencement of my labours, with a hundred foolish and false stories not worth mentioning. Time, however, confuted them all, and more than ever convinced me of the excellence of vaccination. I am quite certain that some constitutions are susceptible of a portion of Small-pox contamination after vaccination, because I have seen in this parish three instances; but it was no more than what might be termed a Small-pox effort or struggle; which produced some fever for 18 hours, then an eruption similar to measles; the fever then subsided, and on the 4th or 5th day all vanished. In Cambridgeshire my mode of practice was this:—I punctured each arm once; as I had always a great number of fine subjects to choose from, I had one at each elbow with the vesicle punctured. Not only did I dip the point of the lancet into the virus before I pricked the cuticle of the person in hand, but I made an ivory pricker, something in size, at the end, of a black lead pencil, when cut rather thick-pointed; this I applied to the vesicle, and on its point carried off a larger quantity of virus than the lancet would have done, and inserted it into the cuticle. The advantage of this was, that I did not alarm or prick them again with the lancet; and secondly, I ensured the introduction of a greater portion of virus than any other method would have done. The good effect of this plan was evident; I rarely found one in forty or fifty who required to be cut a second time.—I invariably took the virus from the arm, and instantly inserted it; and this always on the seventh day after the person had been vaccinated. It was not possible to find it in a state of decomposition at so early a stage—hence I felt sure of the purity of the virus I used—of course I selected the finest subjects to take from. The summer I came here, the Small-pox was introduced, and as the weather was very hot, and the confluent sort was what appeared, the people began to die almost as fast as they took the plague. Great prejudice prevailed against vaccination, in consequence of the parish having some years ago been vaccinated by a gentleman who knew nothing of the matter, and contaminated the people with decomposed virus, when it was good for nothing but to make ulcers, and produced very wretched arms, and left them all liable to Small-pox, which they were all inoculated for the same year. No wonder then at their prejudice. I publicly stated what I had done and seen in Cambridgeshire, and offered my services to the

that it was deemed, by the early operators, an infallible and universal security. The report of the National Vaccine Institution of 1814, states, that at that time no case of failure was known to have occurred among any of the persons vaccinated at that institution; and so late as 1819, only five failures were known to have taken place out of 60,000 who had been vaccinated within the last few years. However, it is certain,

parish as a gratuitous assistant to the parish surgeon. He vaccinated 300, and I vaccinated 500; and here I had the happiness of seeing the plague and destruction of a most horrid Small-pox completely stopped. It was speedily surrounded with vaccination. It could only spend itself on those who had not been vaccinated. It soon expired, and vaccination triumphed completely. One man who said he himself had had the Small-pox, and was determined his child should have it too, procured a shoemaker to inoculate it—the child died—the father took the Small-pox a second time from his child, and he died—as did the woman from whom the Small-pox virus was taken. Three years have now elapsed and no instance of eruptions, or any other illness has, to my knowledge, followed vaccination at Missendon. The three cases I mentioned as having come under my notice here, wherein the parties received a slight degree of Small-pox illness for five days, were people who had some years ago been vaccinated in distant parts of the country. I ought to observe, that in this county I have punctured each arm *twice*.—What yet remains to be discovered of the excellencies and defects of vaccination, time and impartiality will show. But as far as I have seen and understand the thing, I feel confident that it would be very easy to expel the Small-pox from the kingdom, and to keep it away by a general vaccination every three or four years, as more and more children were born. If this hasty account of what I have done will be of any service, you are at liberty to make what use of it you please. Meanwhile,

I remain, Dear Sir,

Yours very truly,

RD. MARKS,

Vicar of Great Missendon, Honorary Member of the Royal Jennerian Society, of the National Vaccine Establishment, &c. &c.

that many persons who had been previously vaccinated have become affected by Small-pox, in various parts of the kingdom, although in such instances, the symptoms have been very generally slight, and beyond the temporary illness produced, harmless.

It would be impossible within the limits of a tract of this kind, to comprehend even a cursory review of the accounts which have been published on this subject in other places ;* and this is the less necessary, as the statements which have been collected in our own town, afford a very satisfactory exemplification of the several variolous diseases ; and to these, therefore, will our attention hereafter be confined.

* *Vide* Thompson's Historical Sketch of Small-pox, and his Treatise on Variolous Diseases. Also Dr. Gregory's Reports of the Small-pox Hospital, for two or three years past.

AN INQUIRY
CONCERNING
THE SMALL-POX AND COW-POX,
AMONG
THE INHABITANTS OF CAMBRIDGE,
DURING TWENTY-FIVE YEARS PRECEDING THE SUMMER
OF 1824.

In the autumn of 1823, Small-pox made its appearance in Cambridge, and continued to spread through the town and neighbourhood until April, 1824. Many exaggerated reports being in circulation, tending to invalidate the protecting efficacy of Cow-pox, in an alarming degree, an investigation, the result of which is stated in the following pages, was undertaken by the author. The chief objects were to ascertain in what manner, and to what degree the practice of vaccination had influenced Small-pox contagion; and to what extent, under what circumstances, and with what degree of severity Small-pox had taken place in persons previously vaccinated.

It was at first intended to limit the inquiry to the cases which had occurred during the late visitation of the disease ; but it soon appeared that unless a longer period, and a more extensive view were comprehended, many interesting facts must be excluded, and the history of the diseases would be very incomplete and unsatisfactory. The period chosen therefore was from the first promulgation of the discovery of vaccination by Dr. Jenner, (about twenty-five years) to the present time ; as this would include all persons who had ever undergone vaccination, and shew the effect of this antidote from the earliest to the latest stages of our experience, and under the greatest possible variety of circumstances. For purposes of comparison and calculation, which will be hereafter developed, the same period was fixed upon for inquiry into the history of Small-pox in this town ; distinguishing, however, those cases which had occurred during the late epidemic, as admitting of more particular and accurate information, than those of an earlier date. Appropriate tables were accordingly constructed, and the author of this paper, accompanied by an overseer of each of the parishes, called at every house, and made the requisite inquiries of the inhabitants, the result of which is exhibited in the adjoining table :

TABLE I.

Shewing the number of Cases of Small-pox and Cow-pox in Cambridge, for twenty-five years preceding the summer of 1824.

PARISHES.	Population Census of 1821.	Natural Small pox.	Inoculated Small pox.	Died of Small pox.	Vaccinated.	Small pox after Vaccination	Neither Sm. pox nor Vaccinated.	EPIDEMIC of 1823-4.		
								Natural Sm. pox.	Inocula- Sm. pox.	Died of Sm. pox.
St. Giles's	1,635	364	143	34	371	15	83	110	32	20
St. Peter's	481	97	46	9	86	7	24	45	9	4
St. Clement's.....	772	154	51	9	185	10	41	34	1	4
St. Sepulchre's	642	93	67	8	180	11	27	19	3	3
All Saints'	938	118	97	11	301	15	15	23	0	5
St. Michael's	379	57	45	8	115	17	10	3	3	0
Trinity	1,793	253	139	24	511	46	80	72	13	11
St. Mary (Great)	880	70	73	3	299	7	26	9	0	1
St. Edward's.....	810	40	40	2	210	11	13	1	0	0
St. Bene't	967	111	88	9	251	12	18	34	2	4
St. Botolph.....	716	81	43	13	183	12	12	14	3	2
St. Mary the Less	648	78	55	5	196	2	13	7	0	2
St. Andrew's the Great	1,267	163	109	32	318	16	51	25	1	2
St. Andrew's the Less.	2,211	528	151	38	747	43	186	188	35	28
Total	14,142	2207	1129	205	3953	224	599	584	102	86

TABLE II.
Shewing the Total Number of Cases in the whole Town, according to Table I.

<i>Total in 25 years, including 1823-4.</i>				<i>Epidemic of 1823-4 alone.</i>			
	CASES	DIED.			CASES	DIED.	
Natural Small-pox	2207	192		Natural Small-pox	584	84	
Inoculated Small-pox	1129	10		Inoculated	102	2	
Vaccinated	3953						
Small-pox after Vaccination	224	3					
Have had neither Small-pox nor Cow-pox	599						
	8112	205			686	86	

TABLE III.

Shewing the Degree of Mortality of the Natural and Inoculated Small-pox, and Small-pox after Vaccination, i. e. the proportion of Deaths to the Number who had the Disease in any of these forms.

<i>Total Number in 25 Years.</i>				<i>24 years preceding and excluding 1823-4</i>		<i>Epidemic of 1823-4.</i>	
Died of Natural Small-pox	....	....		192, or 1 in 11	119, or 1 in 14	84, or 1 in 7	
— Inoculated Small-pox	....	....		10, or 1 in 113	8, or 1 in 124	2, or 1 in 51	
— Small-pox after Vaccination	....	....		3, or 1 in 1318			

In reviewing table No. 3, one most striking circumstance presents itself; viz. the very great superiority in the proportion of deaths, during the late epidemic, compared with that of the preceding twenty-four years; for in 1823-4, one in seven are found to have died of natural Small-pox; whereas one in fourteen, only half the number of 1823-4 are reported to have died of the disease previously; and of inoculated Small-pox, one in fifty-one died in 1823-4, and only one in one hundred and twenty-four in the preceding period. It is worthy of inquiry whether this great difference in the mortality of the disease did in fact occur, or whether the report itself may not be erroneous.

It must be considered that the returns here made are not those of a regular and current register, in which the events would be noted down at the time and in the order of their occurrence; but it was taken at the termination of a given period, and that a period of no less than twenty-five years. The accounts it contains must consequently depend on the testimony of the individuals of whom the inquiry was made, and upon their memory and veracity. Reports resting on such a foundation must almost necessarily be short of the truth; in some instances the memory may be fallacious; although the death of a member of a family from Small-pox is certainly an event of

a memorable nature. There is also reason to doubt the veracity of some persons on such an occasion ; for since the introduction of inoculation, and more especially of vaccination, the death of a child from Small-pox, is considered to a certain degree disreputable, inasmuch as it implies neglect or prejudice on the part of the parents ; and in many instances a reluctance to make the communication was obvious.

The circumstance, however, which would chiefly operate in rendering the report defective, is the *dispersion of families* which must have taken place in the course of so long a period. In every instance where a death from Small-pox had taken place in a family, out of several other members probably who survived the disease, and that family had become subsequently dispersed ; the case of death would not be recorded, although the cases of the survivors would ; they being still living to give an account of themselves. The report then, as respects the number of deaths, is much less likely to be correct, than as respects the living ; and, indeed, with regard to the latter, it may be depended upon with a considerable degree of confidence, as the number of inmates in each house was easily ascertained, and each individual was to be accounted for.

From these considerations, it appears extremely

probable that the report is deficient in the number of deaths which occurred in former years. There would be but little danger of the same incorrectness in the report of those deaths which took place recently ; for it is impossible that any could have been forgotten ; misrepresentation would have been easily detected ; and the dispersion of families in so short a space of time must have been very inconsiderable.

Now the proportion of deaths among those who had Small-pox during the late epidemic, was one in seven ; nor does the disease appear to have been unusually malignant or fatal ; for as has been before stated, the degree of mortality of natural Small-pox computed on a very extensive scale, is found to be one in six ; and this proportion is almost universally admitted by authors. * Supposing then the Small-pox to have been as fatal in Cambridge in former years as recently, and as it has almost universally been in other places at every period, the number of deaths from this disease within the last 25 years, instead of one hundred and ninety four as reported, or one in eleven ; would amount to three hundred and fifteen, or one in seven ; and for the reasons already mentioned, it is probable that this last number is much nearer the truth than that stated in the return.

* *Vide* note, p. 5.

The number who have died of inoculated Small-pox, according to the tables, is ten out of one thousand one hundred and twenty nine cases, or one in one hundred and thirteen, on the average. In 1823-4, two died out of one hundred and two, or one in fifty-one. It is obvious that the return of the number of deaths from inoculated, is liable to the same sources of inaccuracy as that from natural Small-pox. The mortality of Small-pox from inoculation we have seen, when treating on that subject, was very different at different times; some authors having placed the average at one in fifty, others as low as one in one thousand, and even lower. When the accounts of any phenomenon differ so very widely, as in this instance, it requires a much more extensive range of observation than the present occasion affords, to arrive at any valid conclusion. In our calculations, therefore, on this head, it will be best perhaps to take the numbers as they are reported, with the assurance that although they may fall short of, they cannot exceed the truth.

Three cases are recorded of death from Small-pox after vaccination, out of 3953 persons who had been vaccinated, or one death in 1318. It may, perhaps, be doubted, whether these cases fully answer this description; as however the inference respecting the utility of vaccination, must be essentially the same,

whether they do so or not ; they will be assumed to be such in the reasonings which follow, for the sake of avoiding a disputation, which the evidence is probably insufficient to decide.

The foregoing statement of facts, affords sufficient data whereon to found a computation of the effect of vaccination and inoculation conjointly, in checking the mortality of Small-pox, so far as they have heretofore been practised ; and what would have been the probable result, had vaccination been universally adopted.

It appears that 2207 persons in Cambridge have had the natural Small-pox within twenty-five years preceding 1824 : of these we have seen that most probably 315 or one in seven, have died of the disease. Now, supposing that all who have been inoculated with Small-pox, and who have been vaccinated, together amounting to five thousand and eighty two, had, instead of these diseases, caught the natural Small-pox, and the usual proportion had died ; this would have increased the number of deaths 726, making in all one thousand and forty one. The deaths, however, which are reported to have occurred among the inoculated and vaccinated, are only thirteen ; so that from this computation, seven hundred and thirteen deaths from natural Small-pox have been prevented, by the joint influence of vaccination, and Small-pox inoculation, within the above period.

The whole number who have undergone either of these diseases, (viz. natural Small-pox, inoculated Small-pox, and vaccination), amounts to seven thousand two hundred and eighty-nine. Suppose the whole of these had been inoculated for Small-pox, and one in every hundred and thirteen had died, (the proportion in the report.) The number of deaths in this case would have been sixty-four; to say nothing of the impossibility of preventing the disease from spreading more or less by infection, had inoculation been very extensively practised.

Had the whole of these persons undergone vaccination, and the same proportion died of the Small-pox subsequently as stated in the return, viz. three out of three thousand nine hundred and fifty-three, or one in one thousand three hundred and eighteen, the deaths from Small-pox would have been five and a half, leaving a proportion in favour of vaccination of fifty-eight or fifty-nine in the whole, or of one to eleven or twelve over inoculated Small-pox; in other words, where one died of Small-pox after vaccination, eleven or twelve have died of inoculated Small-pox; so that from the foregoing history, we are driven to the conclusion that from the joint influence of inoculation and vaccination, 713 lives have been saved; and had vaccination been universally practised, the whole of those who have actually died by Small-pox, in all probability,

amounting to considerably more than 300, would have been rescued, with the exception of five or six.

Although in the present day, the adduction of any proof of the preventive efficacy of Cow-pox, may be justly deemed a work of supererogation; yet the following exemplification of it may not be altogether uninteresting.

If vaccination be a preventive of Small-pox, we should of course expect to find, that in proportion to the extent of its diffusion, Small-pox would be diminished; and to ascertain whether this be really the case among the subjects of this enquiry, the several parishes have been divided in the adjoining table, No. 4, into two divisions; the first consisting of those parishes which contain the largest proportion of vaccinated persons; and the second, of those containing the smallest.

TABLE IV.
Shewing the number of Persons in 100, who had Natural Small-pox, Inoculated Small-pox, and Cow-pox in each Parish, under twenty-five years of age.

FIRST DIVISION. Comprising seven Parishes which contains the largest proportion of Vaccinated persons.					SECOND DIVISION. Comprising seven Parishes which contain the smallest proportion of Vaccinated persons.				
PARISHES.	No. Vaccinated in 100.	No. who had natural Small-pox in 100.	No. who had Small-pox in 1823-4, in 100.	No. of Inoculated Small-pox in 100.	PARISHES.	No. Vaccinated in 100.	No. who had natural Small-pox in 100.	No. who had Small-pox in 1823-4, in 100.	No. of Inoculated Small-pox in 100.
St. Edward's ..	69	13	0½	13	St. Michael's..	50	25	1½	20
St. Mary's Great	64	15	2	15½	St. Andrew's Gt.	49	25	4	17
All Saints'	58	23	4	15½	St. Sepulchre's	49	25	5	18
St. Mary's Less	57	23	2	16	St. Andrew's Less	46	32	11	9
St. Botolph's ..	57	25	4	13	St. Clement's..	43	35	8	16
St. Bene't.....	53	23	7	19	St. Giles's	38	37	11	15
Trinity	52	27	7	14	St. Peter's	34	38	17	18
7 Parishes..	7) 410	7) 149	7) 26½	7) 105	7 Parishes..	7) 309	7) 217	7) 57	7) 113
Average No.	58.4	21.2	(3½ + ⅓ =) 4	15	Average No.	44.1	31	8.1	16.1

In the first division, in which it will be seen, that the proportion of vaccinated persons, amounts to 58 in 100; that of the subjects of natural Small-pox, is only 21 in 100; and in 1823-4, four in 100. Whereas in the second division in which the mean number of vaccinated cases, is only 44 in 100; that of Small-pox amounts to 31 in 100; and in 1823-4, to 8 in 100; evincing, in a striking manner, the influence of vaccination in the prevention of Small-pox. That this difference is attributable to vaccination, and not to inoculation with Small-pox, is shewn by the last column, by which it appears, that the number of the inoculated in each division is nearly equal, the first having 15 in 100, and the second 16 in 100. The natural and obvious inference from this calculation is, that in proportion to the prevalence of vaccination, has been the prevention of Small-pox.

SMALL-POX SUCCEEDING VACCINATION.

One of the most interesting and important parts of the present investigation remains to be developed. There are recorded 224 cases of Small-pox succeeding vaccination. Respecting these, various points of inquiry suggest themselves, the chief of which are the following :

1. Was the Vaccine Disease perfectly received and undergone?
2. What were the symptoms of the subsequent Small-pox?
3. What interval of time transpired between Vaccination and the supervention of Small-pox?
4. In what year was Vaccination performed?
5. In what year did Small-pox supervene?

With regard to the first mentioned object of inquiry, viz. the nature of the vaccine disease in the individuals ; as no record of the cases has been kept by the operators, no satisfactory history of them can be obtained : nearly all were vaccinated by respectable surgeons, who, it may be presumed, were satisfied with the vesicle produced, and the process it underwent. In most of those whose arms were examined, a cic-

trix, more or less distinct, was found; in some few none could be perceived; the majority, however, were not examined, either from the individuals themselves not being present, or the inconvenience of removing the part of the dress necessary to inspection of the arm.

Secondly, the symptoms of Small-pox succeeding vaccination.

From the manner in which the returns have been collected, no sufficient opportunities were afforded for the accurate observation of the symptoms of the disease reported as Small-pox occurring after Cow-pox. Very many of the cases, indeed, were not seen by any medical practitioner: that most of them, however, were produced by the contagion of Small-pox, is rendered extremely probable, by the circumstance that a very large proportion of them are stated to have taken place in the years 1818 and 1823-4; two periods when Small-pox was very extensively prevalent in the town; but those reported to have occurred in other years, were most likely either chicken-pox, or some similar eruptive disease, as there is no evidence of the Small-pox having existed in the town at the time they are said to have been affected.

As the description of the symptoms was derived

from the individuals concerned, and not from medical authority, it cannot of necessity be particular nor complete. The cases have, however, been arranged according to the accounts given of them under the four general divisions which follow :—

CLASS 1. Slight—The patient not confined to bed, and in most cases, not so ill as to be induced to apply for medical assistance.	163
2. Severe—Patient confined more or less to bed, either the fever or the eruption, or both, severe, but no danger apprehended.	33
3. Dangerous—Producing blindness, leav- ing pits on the skin, and for a time recovery doubtful.	9
4. Died.	3
	<hr/>
	208

The symptoms of the other sixteen cases could not be satisfactorily ascertained.

The statement of three deaths having occurred from Small-pox after vaccination, will probably be regarded as the most remarkable and most important disclosure which this investigation unfolds; and the history of each has therefore been inquired into, and the following information obtained respecting them :

The subject of the first case, was the child of Mr. B. of Trumpington-street, Cambridge. It was vaccinated when an infant by the late Mr. Okes, in 1813. It was attacked by Small-pox in 1818 (at which time the disease was epidemic in Cambridge) of which it died. Mr. Lestourgeon testifies to its death from this cause.

The second case was the child of — Kisby, residing in Mr. Johnson's yard, Sidney-street. It was vaccinated by Mr. Scarnell, now of St. Osyth, Essex, in the early part of 1823; from inquiry of the mother of the child, and of Mr. S. himself (who has kindly written to the author on the subject), it appears, that the arm became infected by the vaccine virus, and Mr. S. intended to have vaccinated another child from it when the vesicle should be sufficiently advanced. On inspecting the arm, however, at the proper period, the vesicle was found to have been so much injured by friction or other violence, as to render vaccination from it impossible; this child caught the Small-pox about a year afterwards, and died of the disease.

The third case was that of a married woman, living in New Street, Barnwell; her husband, Henry Howard, shoemaker, gave me the following account: That his wife was 21 or 22 years of age; her name before marriage was Maria Smith; she was the daughter

of Samuel Smith, miller, of Laxfield, near Halesworth, Suffolk; both she and her friends had assured him, that she had been vaccinated, when a child, by Mr. Cottingham of Laxfield*. Since her death he has visited her native place, and took occasion to make particular inquiries as to her having been vaccinated; at which time he saw two women, who both assured him, that they remembered being themselves vaccinated from his wife; the name of one who is married, is Reed, formerly Ward; that of the other, who is a servant, Pearse.—In December, 1823, his wife caught the Small-pox, of which she died, and he himself took the infection at the same time, and suffered severely, having been previously vaccinated. The wife had for eighteen months preceding been in a very bad state of health, and was an out-patient of the hospital, for a dropsical complaint.

The history of the first of these cases is only deficient as respects the vaccination, and so it must remain, in consequence of the death of the very respectable surgeon by whom it was performed.

In the second, the disease appears to have been properly communicated, but was interrupted in its progress by the injury done to the vesicle, and there

* Mr. Cottingham, (now of Bury) was written to on the subject, by the author, but no answer was received.

is reason to believe that unless the vesicle passes through its natural course, the protecting influence on the constitution is more or less impaired. One of the worst cases of Small-pox succeeding vaccination, in this town, was of this description, where the woman who was the subject of it, having a young infant that was restless at night, both arms became so much injured by friction, as to produce painful sores.

The third case rests upon the testimony of the husband of the patient; and it certainly is so explicit and particular, as to render it very probable, not only that his wife had the Cow-pox, but that persons were vaccinated from her; but still it must be remembered, that he reports only what he has heard from others, of events which are said to have taken place a number of years ago; and those who are accustomed to investigations of this nature, which depend on the memory of persons of uncultivated minds, through a number of years, are well aware of their extreme liability to error; and how unsafe it is to rely upon such representations unsupported by other evidence. Nor should it be forgotten, that the woman had long been in very bad health, which probably contributed to the fatal result.

In none of the above cases then is the evidence of their having duly undergone the vaccine disease, sufficiently complete to place the matter beyond all doubt.

The following tables, Nos. 5, 6, and 7, will illustrate the remaining points of inquiry, viz. the interval of time that elapsed between Vaccination and the occurrence of Small-pox; and the periods at which they took place.

Interval of Time.	Cases.	No. in each Case.
Weeks -	1	4
	2	6
	3	8
	4	9
	5	10
Months -	7	4
	1	5
	2	6
Years -	8	1
	9	2
	10	3
	11	4
	12	5
	13	6
	14	7
	15	8
	16	9
	17	10
	18	11
	19	12
	20	13
	21	14
	22	15
	23	16
	24	17
	25	18
	26	19
	27	20
	28	21
	29	22
	30	23
	31	24
	32	25
	33	26
	34	27
	35	28
	36	29
	37	30
	38	31
	39	32
	40	33
	41	34
	42	35
	43	36
	44	37
	45	38
	46	39
	47	40
	48	41
	49	42
	50	43
	51	44
	52	45
	53	46
	54	47
	55	48
	56	49
	57	50
	58	51
	59	52
	60	53
	61	54
	62	55
	63	56
	64	57
	65	58
	66	59
	67	60
	68	61
	69	62
	70	63
	71	64
	72	65
	73	66
	74	67
	75	68
	76	69
	77	70
	78	71
	79	72
	80	73
	81	74
	82	75
	83	76
	84	77
	85	78
	86	79
	87	80
	88	81
	89	82
	90	83
	91	84
	92	85
	93	86
	94	87
	95	88
	96	89
	97	90
	98	91
	99	92
	100	93
	101	94
	102	95
	103	96
	104	97
	105	98
	106	99
	107	100

TABLE V.
SMALL-POX AFTER VACCINATION.

The first column shews the interval of time which elapsed between Vaccination and Small-pox; the Second, the No. of cases in each interval.

Interval of Time.		No of Cases	No. in each term of six years.
Weeks -	4	1	
	6	3	
	8	2	
	9	1	
	10	1	
Months -	4	7	
	5	1	
	6	5	
Years	1	8	
	2	9	
	3	6	
	4	17	
	5	11	
	6	25	..Interval of 6 years.—97.
	7	9	
	8	7	
	9	3	
	10	13	
	11	6	
	12	5	..6 to 12 years 43=140.
	13	2	
	14	1	
	15	6	
	16	7	
	17	2	
	18	2	..12 to 18 years, 20=160
	19	1	
	20	3	
	21	1	
	22	0	
	23	0	
	24	2	..18 to 24 years, 7 = 167.
		167	

TABLE VI.
SMALL-POX AFTER VACCINATION.
Shewing the year of Vaccination, and the number Vaccinated in each year.

<i>Year of Vaccination.</i>	<i>No. which took Sm.-pox after Vaccination.</i>	<i>No. in each term of six years.</i>
1800	4	
1	0	
2	2	
3	2	
4	3	.. From 1800 to 1806-18
5	4	
6	3	
7	8	
8	12	
9	5	
1810	4	
11	1	
12	7	.. 186 to 1812, 37=55.
13	4	
14	5	
15	4	
16	2	
17	10	.. 1812 to 1818, 44=99.
18	19	
19	3	
1820	4	
1	4	
2	2	
3	13	.. 1818 to 1824, 92=826.
4	1	
126		

TABLE VII.
SMALL-POX AFTER VACCINATION,
*Shewing the year in which Small-pox took place, and the numbers,
in each year.*

<i>Year of Small-Pox.</i>	<i>No. in each Year.</i>	<i>No. in each term of 6 years.</i>
1804	1	..First 6 years.—1.
1807	1	
8	2	
1810	1	..1806 to 1812.—8=9.
11	1	
12	3	
13	5	
16	2	..1812 to 1818---43=52.
17	4	
18	33	
19	2	
1820	4	..1818 to 1824---92=144.
21	2	
23}	84	
24}		
	144	

Table No. 5, illustrates the third point of inquiry, viz. the interval of time that elapsed between vaccination and the occurrence of Small-pox. From this table, it appears that the notion which some have entertained, that the protecting influence of Cow-pox endures for a limited period only, is a mere prejudice; for, of 164 cases, 97, or considerably more than half, took place within six years from the time of vaccination, and 34 more or 141 within 12 years.

It has been conjectured that the efficacy of the vaccine virus may have been impaired by the length of time that has transpired, and the great number of persons through whom it has passed, since it was first taken from its original source. This question may be in some measure answered, by ascertaining the year in which vaccination was performed, in those who subsequently took Small-pox ; for if the hypothesis be true, the number of failures would have diminished in proportion as we recede from the present time, and approximate to that of its first introduction. For this purpose, Table No. 6, shewing the year in which vaccination was performed in those who were afterwards affected by Small-pox, was constructed ; and from it we learn that out of 126 cases, 18 were vaccinated previously to 1806 ; 37 more (or 55) previous to 1812 ; 44 more (or 99) before 1818 ; and 27 within the last six or seven years. When it is considered, that the number of vaccinated persons has gone on rapidly increasing with the progress of time, and that with the increase of numbers, the chances of failure must have been proportionably multiplied, provided they continue to be exposed to Small-pox infection, which in this town has been the case ; there is strong reason for believing that those to whom the vaccine disease was communicated in the early years of the practice, have taken Small-pox in proportions quite as large as those who have been more recently done ;

and consequently that its protecting influence is as powerful at the present time as it ever has been.

Table No. 7, exhibits the year in which Small-pox succeeding vaccination took place, and the numbers in each year; from this it appears that the supervention of Small-pox after Cow-pox, has been beyond all comparison more frequent of late than in former years. Dividing the years since 1800, into four equal portions of six years each—the number in the 1st, or till 1806 is 1; for the 2d, till 1812, 8; for the 3d, to 1818, 43; of which 33 were in the year 1818; and for the 4th, 92, of which 84 were in 1823-4; so that of these 144 cases of Small-pox succeeding vaccination, 125 or six-sevenths have occurred within the last six or seven years. From these facts then, the confident assertions and sanguine expectations of the early vaccinators of the perfect and infallible efficacy of their antidote, are not only accounted for, but warranted.

From the last Tables, Nos. 5, 6, and 7, it is evident that Small-pox has affected much greater numbers of vaccinated persons of late than in former years, but without regard to the period when vaccination was performed, or the interval of time which had elapsed since the operation.

The following summary will comprehend the general facts and inferences which naturally result from the preceding details :—

1. It is very probable that more than 300 individuals have died with Natural Small-pox in Cambridge in the course of 25 years preceding the summer of 1824.

2. Ten have died in the same period of Small-pox from inoculation.

3. Three have died of Small-pox subsequent to supposed Vaccination.

4. From the joint influence of Vaccination and Small-pox inoculation, it is very probable that 713 deaths from Natural Small-pox have been prevented.

5. If all who have been affected within the given period with either of these diseases, (viz. Natural Small-pox, Inoculated Small-pox, or Cow-pox,) had been inoculated with the Small-pox, 64 only would have died.

6. Had all undergone vaccination five or six only would have died of Small-pox.

7. Where one person has died of Small-pox after

vaccination, 11 or 12 have died of Inoculated Small-pox.

8. In the several parishes of Cambridge, in proportion to the diffusion of Vaccination has been the prevention of Small-pox.

9. Two hundred and twenty-four cases of Small-pox have occurred after supposed vaccination.

10. In these cases (see 9) the disease was slight in 163 ; more severe, but not dangerous, in 33 ; dangerous in 9 ; and fatal in 3.

11. In two of the three fatal cases, the history of the vaccine disease is imperfect ; in the third, the Vaccine vesicle was injured, and its natural progress interrupted.

12. The supervention of Small-pox in persons previously vaccinated, has been incomparably more frequent of late than in former years.

13. Lapse of time does not impair the protecting influence of Cow-pox, in the persons of those who have once undergone the disease.

14. The vaccine virus has lost none of its efficacy

from the time which has transpired, and the number of individuals through whom it has passed, since it was first taken from its original source.

The following cases were incidentally stated in the course of the investigation, without their having been made objects of particular inquiry :

Resisted repeated attempts at inoculation, both for Small-pox and Cow-pox, and afterwards caught the Small-pox	1
Resisted repeated attempts at inoculation with both, and never had Small-pox	2
Resisted vaccination, inoculation not tried, and caught Small-pox	1
Resisted Vaccination, and had not had Small-pox ; inoculation not tried	5
Lost one eye from Small-pox	5
Had Small-pox twice	3

Two of these last had Small-pox from inoculation the first time, and the second time from contagion ;

the other was uncertain whether from inoculation or contagion; two were pitted, the other not.*

A curious and interesting question here presents itself, viz. why has Small-pox taken place after vaccination so much more frequently in the last seven years than in the preceding eighteen? To this question an answer fully satisfactory cannot, perhaps, be given; the following considerations, however, will in some degree serve to explain it.

The number of vaccinated persons having gone on progressively increasing, has of late years greatly accumulated, and of course with the increase of numbers there would be a proportionate increase of failures; provided a sufficient number should still continue unprotected, and in fact, should undergo the Small-pox, to disseminate the infection extensively, which has unhappily been the case in Cambridge. The longer also the period which elapses, the

* The proportion of cases of Small-pox a second time, which were discovered in the course of the inquiry through the town of Cambridge, is remarkably small, when compared with the statements which have been made respecting its recurrence elsewhere. Dr. Thomson has quoted a number of authorities, by whom events of this nature are stated to have occurred at almost every period and place; and he himself testifies, that of 836 cases of Small-pox in Edinburgh, 71 had *previously* passed through Small-pox, and of these, two died.—It is true that the occurrence of secondary Small-pox was not made a particular point of inquiry in the Cambridge investigation, but it is probable that such an event would have been voluntarily mentioned where it had taken place.

more numerous will be the chances of exposure to the infection of Small-pox, and hence the greater the probability of its producing contamination. Besides these considerations, within the last six or seven years, Small-pox has twice extensively prevailed in the town, so that it must have been almost impossible for any to escape exposure to the contagion.

The foregoing statements it may be presumed fully establish the superior advantages of vaccination. We have taken a hasty glance at the dreadful ravages committed by the natural Small-pox; and although these may be in great measure prevented by inoculation, yet we have seen that this practice, besides the greater severity of the disease and its consequences, compared with vaccination, has a tendency to perpetuate and to extend the evil, which it is intended to remedy; and that during the seventy-five years, in which inoculation was practised, although it afforded protection to the individuals who were the subjects of it, yet the mortality of Small-pox was actually greater than before. To vaccination on the contrary no such objection belongs; on the other hand it is an indisputable fact, that since its discovery the Small-pox has very considerably diminished; still, however, the nature and properties of Cow-pox are but imperfectly understood: it is certain that under longer and more extensive experience, its protecting powers have been

found to be less uniform and complete than was anticipated at an earlier period of the practice; it is also a curious circumstance, that in England, the place of its nativity, vaccination should have been less generally adopted, and indeed less successfully practised than in many other countries who received it from us.* “In France, varioloid eruptions are not admitted by the central committee ever to have occurred in the vaccinated, and Chicken-pox are not even mentioned among the eruptions which are reported to have occurred in those who had gone through the salutary process of vaccination.”† Dr. De Carro of Vienna, says, “Some physicians have spread a report that the Cow-pox virus had degenerated, and that it would be necessary to renew it from England.” “With regard to this pretended degeneration,” says Dr. De. Carro, “I must declare that I have not observed the slightest difference in the patients whom I vaccinated in 1799, and those I vaccinated in 1820, and that I am absolutely ignorant upon what grounds such an assertion rests.” “I do not see,” he continues, “the necessity of renewing the vaccine lymph, by obtaining it from England; but if, as it is pretended in that country, and as is confirmed by our learned compatriot, Dr. Marcett, who has practised

* Vide Sir G. Blane's Paper, Med. Th. Trans. v. 10.

† Thompson's Sketch, p. 310.

medicine for the last twenty years in London, the Small-pox have attacked many more vaccinated individuals there than any where else, I think that we ought to be very careful in guarding against English vaccine lymph, at least we ought to be well assured that it has been taken immediately from the teat of the cow ; an opportunity of doing which is, as we know, very seldom to be found even in dairy counties. About a year ago, a traveller of very high rank, who had probably heard of this pretended necessity of renewing the vaccine matter in Austria, brought some from England. His physician offered it to me ; but I refused it, telling him that we had too much reason to be satisfied with our own, to run the risk of substituting in its place matter brought from a country which appeared to furnish the greatest number of examples of its inefficacy as a preservative. I advised him even to destroy this English vaccine lymph, that it might not be mixed with our own, which, although from the same source, had continued for twenty-one years the same as when I received it.” “ But, whatever be the cause,” Dr. De Carro adds, “ of the great number of cases of Small-pox after vaccination which have occurred in England, and other countries, I must repeat that these occurrences are extremely rare in Vienna, and throughout the Austrian Monarchy, that I have never seen a single example of Small-pox in any of the patients

whom I have vaccinated; and that the result of my researches (without denying the possibility of a greater number) has been confined to the three cases which I have mentioned.* It is then highly desirable that some plan should be devised, adapted not only to the more general diffusion of vaccination throughout the country, but also to afford more ample means and opportunities than have hitherto existed for observing its phenomena, especially with reference to the cases which are succeeded by Small-pox.

* Thompson, p. p. 235—237.

MEANS OF EXTENDING VACCINATION.

That the means heretofore employed for the promotion of vaccination in this town, have been very inadequate to the accomplishment of the object, is clearly proved, by a reference to the foregoing tables ; from which it appears, that within twenty-five years, only 3953 persons, being but little more than one-half of the number who are now living under that age, have been vaccinated. Consequently, when the Small-pox made its appearance last year, nearly 600 persons took the infection ; besides 102, to whom it was communicated by inoculation ; and after the epidemic had subsided, there were still found 600 unvaccinated persons who had escaped the contagion, but who of course still remained liable to it.

An immense majority of the vaccinated was found among the upper and middling classes, who do not depend on gratuitous vaccination ; and consequently, the subjects of Small-pox, and those who remained unprotected, were chiefly among the poorer classes ; and of these a comparatively small proportion had been vaccinated.

In considering the best means of extending vaccination, the chief obstacles to the practice naturally present themselves; these will be found principally to consist in—

1. The ignorance and prejudices of the poor.
2. Their indifference and apathy.
3. The want of a convenient and permanent provision for gratuitous vaccination.
4. The apathy of persons of respectability and influence.

These are obstacles of too great magnitude to be overcome in a day, or by the exertions of a few private individuals; for what are the objects to be accomplished?—To inform and convince the ignorant and prejudiced; to persuade them to act against their deep-rooted and long-cherished opinions and prepossessions; to arouse them from that careless and listless apathy, which is scarcely to be conceived but by those who have witnessed it; to provide means not only for the effectual and gratuitous performance of the operation, but to make the provision constant and permanent, and as far as possible to secure its universal adoption; and to this end to keep up the attention and the energies of the friends of vaccination in its behalf.

It would be expedient, in the first place, to ob-

viate the objections of the poor: let them be disarmed of what they consider arguments against the practice of vaccination; which as most of them in the present day are able to read, may be done by circulating a printed tract or bill, expressed in concise, plain, and forcible language, and containing a refutation of the arguments generally adduced by the poor. These arguments are chiefly founded on their scepticism of the protecting efficacy of vaccination, commonly produced or strengthened by some case or cases of Small-pox succeeding vaccination, which have come to their knowledge, and which they eagerly bring forward, at the same time overlooking the far more numerous instances in which full security is afforded, and the great mitigation of the symptoms of Small-pox when that disease does supervene. The truth should be candidly and fairly laid before them; and it is amply sufficient to convince the judgment of the expediency of the practice. Much harm has doubtless been done by claiming for vaccination a more uniform and perfect protecting efficacy than it appears really to possess. Until within these few years, its patrons have been accustomed to represent it as a universal and infallible security; this representation has been falsified by facts; and a mis-statement having been once detected as to the extent of its protecting powers, has produced among the uninformed an incredulity of those which it really does possess.

Another cavil, frequently urged by the ignorant, has its origin in religious scruples. On the subject of Small-pox, above almost any other, they appear to adopt the delusions of fatalism. This objection should be also set in its true light; and it may be suggested to the ministers of religion, whether it be not a fit subject for public elucidation, as well as private instruction.

It has also been objected, that the Cow-pox has a tendency to excite scrofula, humours, and other diseases in the constitution. It is an established principle in pathology, that where a very strong predisposition to any disease exists in a person, *any* disturbance of the general health, from whatever cause, tends to excite it to action; even the slight disorder sometimes produced by vaccination may have been sufficient, in some instances, to have produced this effect; but cases of this kind are certainly very rare. In the late investigation in Cambridge, a few such were reported, but none witnessed by the inquirers. On this point, indeed, it is in the power of any individual to procure satisfactory information, by comparing the health of any considerable number of persons who have undergone vaccination, with that of an equal number on whom the operation has not been performed; and according to general experience, the inference will be, that the Cow-pox,

seldom or never produces any pernicious effect upon the health. Even admitting, however, the possibility of its sometimes exciting to action the latent diseases of the system; this effect would be much more readily produced by inoculation with the Small-pox; inasmuch as the constitutional disturbance which it causes, is much more violent than that which accompanies vaccination. This fact is sufficiently obvious; but it may also be easily supported by authority. The College of Physicians, in their second report to Parliament, in 1807, says, "The testimonies before the College of Physicians, are very decided in declaring, that vaccination does less mischief to the constitution, and less frequently gives rise to other diseases, than Small-pox, natural, or inoculated."*

* *Vide* also extract from Dr. Ballie's examination, inserted in p. 17 of this work.

In France vaccination has been supposed even to remedy many other diseases besides Small-pox. "Vaccination, from its earliest introduction into France, was supposed to be a remedy for certain diseases, and in the reports of the Central Committee of Vaccination, from the year 1806 to the present time, numerous cases in proof of this supposed salutary influence are brought forward." * * * *

"The diseases which in France are said to be ameliorated, and even cured by the action of the Cow-pox virus, are very numerous, viz. recent Scrophulous affections, Dartres, Crusta lactea, serous Ophthalmies, Intermittent Fevers, Marasmus, Tinea, Itch, Chlorosis, Epilepsy, Paralysis, Rachitis, and Nervous affections." * * *

"The amelioration in all these cases is owing to the vaccine considered as a cause of prolonged irritation of an action which goes through well-marked periods, which excites fever, accelerates the circulation, induces a longer or shorter suppuration, which, in a word, changes the habitual state of the body, and not to the vaccine considered simply as a preservative from Small-pox."*

* *Vide* Thompson's Sketch, p. 333-4.

But we know, that to convince the judgment merely of the ignorant and prejudiced, is not sufficient to induce them to act in opposition to their pre-conceived opinion and purpose—

“ A man convinced against his will
Is of the same opinion still.”

They must not only be convinced, but induced to act upon that conviction before its advantages can be obtained; they must be persuaded and enticed; and how difficult this frequently is to accomplish, all medical men, who are friends to vaccination, can testify. In the article of mere persuasion, however; in the endeavour to influence the disposition and the will of the uneducated, who it is well known are more ready to obey the impulse of their feelings than the dictates of their reason; success depends more upon the manner in which the solicitation is made, and the persons from whom it proceeds, than upon the advantages themselves which may be held out. The poor are accustomed to consider medical men as personally interested in the event, and regard with suspicion whatever they may say on the subject. To this may doubtless in great measure be attributed the want of success, which the members of the profession so continually experience. The persons most likely to prevail, are those in the upper and middle classes, who of course are free from all suspicion of

interested motives ; who have generally their own example to plead ; and who from their relative situation as the neighbours, employers, and frequently benefactors of the poor, naturally possess the greatest influence over their minds.

On reviewing the obstacles which oppose themselves to the diffusion of vaccination, and reflecting on the exertions necessary to overcome them, it will be readily perceived that the separate endeavours of private persons, however active and zealous, must be quite inadequate to the purpose. The communication of the Cow-pox to every individual in the community, requires that each person not already protected, should become an object of attention and care, as relates to this matter, and the difficulties which present themselves in every case combatted and overcome.

An undertaking so extensive and arduous, can only be accomplished by the friends of vaccination steadily exerting themselves in union and concert, and acting upon a plan systematically organized and arranged. The advantages of individuals uniting and forming themselves into societies, for the accomplishment of any great or difficult purpose, are too well understood, and too often exemplified in the present day, to require any proof here ; and that the advantages likely to result from a society for the promotion of

vaccination, beyond what could be effected by the separate exertions of individuals, would be great and numerous, it will not be difficult to demonstrate. These advantages would consist chiefly—

1. In the provision of means for the effectual performance and universal extension of vaccination.
2. In securing a constant supply of vaccine virus.
3. In exciting and perpetuating the attention of the public to the subject.
4. In affording better opportunities than have heretofore existed, for observing the phenomena of the Cow-pox, and the diseases connected with it.

With regard to the means immediately to be employed in the execution of the object; it is not sufficient that the gratuitous performance of vaccination should be offered to those who will seek after it; this has already been tried and found to be inadequate. The Brahmins of India have set us an example in their method of diffusing inoculation with Small-pox, worthy of our imitation in the present case. They were accustomed at stated intervals to go round from house to house, for the purpose of inoculating every inmate who had not previously undergone the disease. In the same manner, for the extension of vaccination, should the efforts of the society be directed successively to every parish, and

to every family and individual residing therein; thus would those who were protected and those who were not, be distinguished and known, and the proper objects of attention pointed out. One or more competent persons should be appointed as vaccinators, under the superintendence of a committee, composed in part of medical men of established reputation. It should be the duty of the vaccinators, to visit the poor in their own dwellings, for the purpose of proposing and performing vaccination; and their endeavours should be assisted by the influence of respectable persons, residing in the immediate vicinity as before recommended. By these means, there is every reason to believe, that the obstacles arising from the prejudices and indolence of the poor, might be speedily overcome.

The experiment proposed, viz. the universal diffusion of vaccination, cannot be fully and fairly tried, unless the provision for the practice, be made constant and permanent for some years to come. For, suppose all the present generation to have undergone the process, still those who are yet to be born, would remain unprotected and liable to the contagion, if at any time they should be exposed to it, unless the antidote were communicated to them, as well as to their predecessors. To render the provision constant, a continual succession of cases every week

would be necessary, in order to maintain the supply of vaccine lymph, with which to perform the operation. It therefore becomes an important inquiry, whether the population of this town and neighbourhood, be sufficiently large to supply the number of subjects for gratuitous vaccination, which would be requisite to perpetuate the disease: the following statement will in some measure, elucidate this point.

According to the census of 1821, the population of the town of Cambridge was 14,142; from its extraordinary increase since that period, 15,000 is not probably too high an estimate at the present time. According to the most authentic statistical accounts, the proportion of births to the whole population, is found to be about as one to thirty annually*, which gives $(30 \div 15,000 =)$ 500 births annually for the town of Cambridge, or nearly 10 per week. From these must be deducted, all those who from their circumstances, would not be objects of gratuitous vaccination; those who die in very early infancy, (which form a considerable portion) those who remain unnoticed; and those who refuse vaccination. These deductions would probably reduce the remainder, who would become subjects of gratuitous vaccination, so much as to render it doubtful whether the numbers would be sufficient to perpetuate the disease.

* Malthus, b. ii. ch. 7.

For this reason, therefore, as well as for the sake of more extensive usefulness, it would perhaps be expedient that the institution should embrace those villages, which are situated within a convenient distance of Cambridge—suppose within eight miles on every side. The population included within this circle, according to the last census, was 23,230 ;*

* The following are the Parishes situated within eight miles of Cambridge, with the Population of each, according to the census of 1821 :—

PARISHES.	Popu- lation.	PARISHES.	Popu- lation.
Chesterton	1137	Willingham	1170
Childerly.....	50	Swavesey	1029
Cottenham	1488	Bottisham	1123
Dry Drayton	420	Quy and Stow... ..	378
Histon.....	678	Great Wilbraham	495
Oakington	393	Little Ditto	274
Ditto Hamlet	47	Foxton	368
Great Abington.....	337	Harston	529
Little ditto	257	Hauxton.....	236
Babraham	238	Newton	146
Pampisford	285	Great Shelford	718
Cherry-Hinton	474	Little Ditto	438
Fen Ditton.....	461	Stapleford	408
Fulbourn	1023	Triplow	371
Harningsea.....	285	Trumpington	540
Teversham	155	Barton	273
Eversden Great.....	268	Barrington	483
Little Ditto	232	Comberton.....	383
Hardwick	134	Coton... ..	228
Toft	259	Grantchester	344
Girton	326	Harlton	221
Impington	149	Haslingfield	514
Landbeach	371	Shepereth	320
Lolworth	111	Whittlesford	486
Longstanton	504	Population within 8 miles of Cambridge	} 23,230
Madingly	231	Fourteen parishes in Cam- bridge	
Milton	341		} 15,000
Rampton	297		
Waterbeach	448	Total	38,230

besides the 15,000 in the town of Cambridge; making altogether 38,230: among these by the rule above stated, there would be 1274 births annually, *i. e.* twenty-four and a half weekly. After making the deductions from these, which were mentioned, when calculating for Cambridge alone, we may, perhaps, take the proportion of those who would become objects of gratuitous vaccination, at one-third, which would be eight weekly; and when the large number of poor in the agricultural villages is considered, this estimate may, perhaps be rather too low, for the author was unable to obtain any certain data, whereby to form an accurate calculation. This number would probably be sufficient with due attention and management, to secure a constant and permanent supply of cases. For some time to come, indeed, an abundant resource would doubtless be afforded in the great number of individuals already in existence, who still remain unprotected; but should the vaccination of the whole of the present generation be effected, the supply must ultimately depend upon the numbers subsequently born; and hence the necessity of the foregoing calculation. It would be obviously inconvenient, if not impossible, to attend to the subjects for vaccination, who are dispersed over this wide district, in the order of the period of their birth. It would be found expedient, and practicable, to divide the district into a number of different departments; one of which

might be visited every week throughout the year, and due notice thereof given, and preparation made in each, for the execution of the object. As, however, vaccine lymph is always to be procured from the National Vaccine Establishment, it would, probably, be sufficient, and more convenient, to limit public vaccination to a part of the year only.

It is, however, unnecessary here to enter any further into details of this nature; the particular regulations for conducting such an institution, would require a more minute knowledge of local circumstances, and a more competent judgment respecting them, than the writer professes to possess; the only object of these remarks, is to form a ground-work upon which any variety of superstructure may be raised, which may hereafter appear the best adapted to the end proposed.

Another very important effect of the proposed institution, would result in keeping alive the public attention to the subject. Hitherto, as we have seen, it has been much neglected, except when the Small-pox has been actually prevalent, and a great accumulation of unprotected cases, was the necessary consequence: this would be prevented by the regular and periodical meetings of the committee appointed to conduct the business of the institution, and by the occasional publication of their proceedings.

One most desirable and important end to be obtained by an establishment for vaccination in a provincial situation, remains to be considered, viz. the opportunities which would be thereby afforded of observing extensively and accurately, the phenomena of the vaccine disease; and of those complaints produced by the contagion of Small-pox, which sometimes succeed it.

Vaccination, it has been before shewn, for many years after its first introduction, appeared to be a perfect and uniform protection against the contagion of Small-pox; and such it proves at present, in a very large majority of cases; in some instances, however, the security afforded has been but imperfect, only partially resisting the infection of Small-pox, which has supervened in a mitigated and lenient form; and in a very few instances of persons reported to have undergone vaccination, it appears to have exercised little or no influence in arresting or modifying the virulence of the subsequent disease.

When the effect produced by the Cow-pox on the constitution, is so widely different in different persons, it is obvious, that there must be some essential difference either in the state of the constitution of the individuals, or in the events and conditions which appertain to the process of the vaccine disease: but,

in what this difference consists, we at present know not. The uncertainty in which this matter is involved, is apparent, from the diversity of opinion which exists among professional men, even with respect to the nature of this class of diseases in their relation to each other. Some contending, (and with much appearance of reason,) that Small-pox, Chicken-pox, and Cow-pox, are merely modifications of the same disease, contrary to the long-established doctrine of their entity being distinct and independent.*—Our ignorance and uncertainty on this important subject, in great measure, arises from the difficulty of obtaining a complete history of the cases in every stage. The nature and progress of the vaccine vesicle, is doubtless of great importance: that a spurious disease is occasionally produced by vaccination, which may sometimes afford an imperfect protection, and sometimes none whatever, has been the unanimous opinion of all writers on the subject, from Jenner to the present time.† But as vaccination is usually practised, no record is made of the appearance and progress of the vesicle, and should Small-pox subsequently occur this most essential point in the history of the case, cannot of course be ascertained, nor, consequently, the instruction which it might have afforded, derived.

* *Vide* Thompson on Varioloid Diseases, &c. &c.

† *Vide* Jenner, Willan, Bateman, Mason Good, Thompson, &c. &c.
loc cit.

At the London institutions, indeed, some note as to the supposed security or non-security of the case is made; but among the multitudinous and diversified mass which apply for vaccination at those establishments, the patients, it is probable, are seldom to be heard of afterwards.

A well managed provincial institution, would afford much greater facilities for observing the phenomena of the diseases throughout every stage, than is possible in the metropolis, or other very large towns; as the patients would be better known in the neighbourhood, and might be much more readily brought to notice, should they subsequently become infected by Small-pox. For this purpose a register should be kept, in which every case should be entered, and for facility of reference, a number affixed to each; and the following particulars noted down, viz. the name, age, bodily structure, temperament, and health of the patient; the person (by the number in the register) from whom the lymph used was procured; the age and state of the vesicle from which the lymph was taken; whether it was transferred immediately from the arm, or by means of points or glasses; in the latter case how long it had been taken previously to being used; and the number of punctures made. On the eighth day from the time of vaccination, the appearance of the arm should be remarked and stated, viz. the number of

punctures which had taken effect; their condition; the number from which lymph may have been taken; and the constitutional symptoms during the progress of the disease. Each of these particulars might be easily and quickly noticed and recorded by a competent and practised observer, by the aid of appropriate tables, and, perhaps, of abbreviated characters, with an explanatory index annexed.

In every instance of the Small-pox supervening, means should be adopted for bringing the case under the observation of the medical officers of the institution, that its complete history may be ascertained and recorded. For this purpose gratuitous medical aid should be provided for all such cases, and endeavours used to induce the patient to apply to the establishment. This object would be much facilitated were the institution made an appendage to the public hospital, although to a certain extent its management would require to be separate and distinct. The experience thus acquired should be published from time to time under the direction and authority of professional persons of established reputation; and by these means would a full and accurate knowledge of the nature and properties of Cow-pox, and the diseases related to it, be at length obtained; and by such knowledge only shall we ever be able to ascertain whether the circumstances and events on which the protecting influence of the vaccine disease depends, be subject to

human control, or whether they lie beyond the limits of our power.

After reflecting on the dreadful ravages of the natural Small-pox, and on the means which we possess for its mitigation or prevention, in the practice of inoculation or vaccination; it is impossible for any one not sunk in the very abyss of ignorance, folly, or superstition, to refuse or even to neglect to adopt one or the other of these antidotes; and the only question to be determined is, which of them should be preferred. The advantages and disadvantages of each have been, it is hoped, fairly and impartially developed and discussed in the foregoing pages. From the facts stated, we learn that Small-pox when communicated by inoculation, is incomparably less severe and dangerous than when received by infection; but at the same time that it is much more severe in itself than vaccination (which, indeed, scarcely deserves the name of a disease); and that more have died of Small-pox from inoculation in the town of Cambridge in the course of the last 25 years, in proportion of eleven to one, than of Small-pox among those on whom vaccination has been performed, even admitting that it was properly undergone in the three cases of death which have been stated, although this, indeed, is by no means certain. Besides this comparative disadvantage, inoculation necessarily extends the infection more widely,

and tends to perpetuate rather than to eradicate the disease, which great evil is avoided by the practice of vaccination.

The advantages then so far as our experience has gone, decidedly preponderate on the side of vaccination. But our knowledge of the properties of this antidote it has been shewn, is at present so deficient, that it may still be considered as on its trial. Let this trial then be granted it; and let it be conducted in the manner best adapted to develop the whole and the genuine truth respecting it. The more extensively and carefully the experiment be made, the more ample and perfect will be our means of judging; and after a full and impartial investigation, let vaccination be promoted or abandoned, according as its merits shall be found to exceed, or fall short of, those of inoculation.

Be it remembered, that if it be the natural duty of parents to be careful for the preservation and protection of the children whom they have been the means of bringing into existence; and who, consequently, are entirely dependent upon them during the helpless years of infancy and childhood; they are certainly bound to shield them as far as possible from the suffering, the deformity, and even from death itself, in one of its most dreadful and appalling shapes,

to which their liability to this horrible disease exposes them: And if this duty be neglected by the parent, he is in effect the cause and author of all the miseries, and probably even the destruction which his innocent and helpless offspring may suffer in consequence.

The question then is not one of private or individual interest, but it is of great import to the whole human race; it is not merely whether we ourselves, or the persons in whom we are immediately interested, shall be secured from the loathsome horrors of Small-pox; but whether the disease can be abolished and exterminated, and ages yet unborn and the world itself be thereby delivered from its ravages. It is a subject certainly worthy of the consideration, and perhaps adapted for the providence of the legislature; but since the aid which the government has hitherto afforded, is very limited and inefficient, the appeal must be made to the benevolent, the philanthropic, and the influential of the community; to those who are anxious for the happiness of mankind, and are ever ready to oppose and divert every source of danger and misery. To such is presented an ample field for the exertion of their benevolence. The object is to prevent and eradicate a cause of vast suffering, deformity, and premature death to the human race; and the probable means of preventing it are in our hands. Shall we

supinely neglect them, or selfishly appropriate them to our own advantage merely? Or shall we not rather endeavour to extend the inestimable blessing to mankind at large, and to future generations? It is true that much exertion and perseverance will be required; but the good to be attained is proportionately great and well worthy of the cost and toil.

It is earnestly to be hoped that the effort will be made not only vigorously but promptly—the necessity is urgent; for again the destroyer invades us; even now he is within our precincts, and has already commenced and is carrying on his work of desolation.

APPENDIX.

When the printing of this work was nearly completed, an instance of death from Small-pox in an individual previously vaccinated, occurred, under circumstances too interesting and well authenticated to be suffered to pass without notice.

The subject of this case, was Mr. Thomas Barrett, son of Mr. Barrett, the very respectable bookseller of Trinity-Street; Mr. B. has kindly furnished me with the following extract from his family register, viz. "that his son, Thomas, was born November 18, 1806; vaccinated January 26, 1807, by Mr. Farish, and a fine pustule on each arm."—Mr. B. further states, that he particularly observed the vaccine vesicles throughout their course, comparing them with the plate prefixed to "Aikin's Concise View of Cow-pox," which he procured for the purpose; and was quite satisfied of their genuineness and perfection, from their resemblance to the plate in every stage. That his son was taken with Small-pox, May 14th, 1825, and died of that disease in its confluent form, on the 28th of the same month. That his health both generally and immediately previous to the occurrence of the Small-pox

was good, although he was by no means of a robust frame, and had very recently undergone great fatigue and anxiety of mind.

On Friday and Saturday last, three other children of the same family, previously vaccinated, were taken ill; on Saturday and Sunday, an eruption, resembling incipient Small-pox, shewed itself. This morning (Monday) Mr. B. obligingly allowed me to see the children; there is a slight eruption on the skin, but no fever, and they appear and declare themselves to be nearly free from any other symptoms of illness. It is worthy of remark also, that several years ago, two other children of Mr. B.'s, took the Small-pox subsequently to being vaccinated, but the disease was not severe.

It has also been stated to me, that several deaths had recently occurred from Small-pox succeeding vaccination, in Barnwell, and this report I have been careful to investigate.—On inspecting the parish register, and inquiring of the clergyman, clerk, sexton, and a considerable number of the inhabitants of Barnwell, I found eight children to have died in the parish, of Small-pox, since the end of March last; two were stated to have been *cut* for the Cow-pox, but the arms did not rise; and in fact none of them had undergone vaccination.

One of these cases was inoculated for Small-pox by a woman, but Mr. Beales, who saw the child during its

illness, informs me, that he believes it had previously caught the infection.*

Since writing the above, another case of death from Small-pox after vaccination, has been reported to me to have occurred at Girton, a small village three miles from Cambridge, within these few days; on inquiring of the friends of the deceased, whose name was Taylor, I am informed that he was vaccinated twenty-two or twenty-three years ago, by the late Mr. Okes, along with several other children of the same family; the mother observed that his arm did not rise in the same manner as the others, which she attributed to his being at the time so very young an infant. No further particulars could be ascertained.

This publication has been delayed for the purpose of inquiring into the circumstances stated in this appendix; it was desirable that every report should be investigated, and their truth or falsehood developed; this, as far as it was practicable, has been done, and the facts simply stated; no comment appearing necessary, that has not already been made in the course of the work.

J. J. CRIBB.

JUNE 6, 1824.

* Of one person only who has died in Barnwell since March last, I could obtain no account, nor discover the relatives; the entry in the parish register is—"Edward, son of Henry and J. Marsham, April 4, 1825, aged sixteen months."



FINIS.

ERRATUM.

Page 22, line 8, for "within the last few years. However" read "Within
the last few years however."

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