

A letter to Sir Henry Halford, bart. ... proposing a method of inoculating the small-pox : which deprives it of all its danger, but preserves all its power of preventing a second attack / by R. Ferguson.

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*To the Editor of the Edinburgh
Medical & Surgical Journal*

LETTER

TO

SIR HENRY HALLFORD, BART.

PRESIDENT OF THE ROYAL COLLEGE OF PHYSICIANS,

PROPOSING

A METHOD

OF

INOCULATING THE SMALL-POX,

WHICH

DEPRIVES IT OF ALL ITS DANGER, BUT PRESERVES ALL ITS POWER
OF PREVENTING A SECOND ATTACK.

BY

R. FERGUSON, M. D.

MEMBER OF THE COLLEGE OF PHYSICIANS OF LONDON AND EDINBURGH.

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1825.

SIR HENRY HATFIELD, BART.

THE HON. THE LORDS OF THE PRIVY COUNCIL

MEMORANDUM

INOCULATING THE SMALL-POX

TO THE HON. THE LORDS OF THE PRIVY COUNCIL

RECEIVED BY THE HON. THE LORDS OF THE PRIVY COUNCIL

ON THE 10TH DAY OF JANUARY 1780

IN THE PRESENCE OF THE HON. THE LORDS OF THE PRIVY COUNCIL

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LONDON:

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Poppin's Court, Fleet Street.

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A

LETTER

TO

SIR HENRY HALFORD.

SIR;

By your situation as President of the College of Physicians, you are the official head—by your unequalled eminence you are the natural head—of the medical profession. I take the liberty, therefore, of addressing you, because I am anxious to call your attention to, and ensure your sanction for, what I think is the solution of a medical difficulty.

About two years ago I was attending the child of a poor person for the confluent small-pox, which he had taken naturally. The brother of this boy, who slept in the same bed with him, had the same disease in a milder form. There was a third child, an infant, which had not yet been weaned. The mother, considering the tender age of her babe, and reflecting, that as it was not protected either by inoculation or by vaccination, it must probably

fall a sacrifice to small-pox, if it took it from its brothers, became very anxious to have it vaccinated.

As yet the infant had not shown any signs of ill health; nor indeed were any of those symptoms present, which are the ordinary precursors of the small-pox eruption. The child was vaccinated; but, instead of one vaccine vesicle, the operation was followed by a general eruption. I immediately recognised this as the modified small-pox.

As I watched the progress of the case with great interest, I found, that although this disease did not appear in the infant till some time after the two boys had sickened with small-pox, yet that it was well several days before the elder brother was out of danger, or the younger one convalescent.

Here, then, were three cases. In the first, the natural small-pox appeared in its malignant form, confluent, and attended with a typhoid fever. In the second it was distinct, attended with a fever, which was neither urgent nor dangerous. In the third there was little or no constitutional affection, and the disease ran through its course much more rapidly and mildly than in the other two.

Reflecting upon these three cases, it was evident to me, that that form of small-pox, known by the name of the "modified small-pox," or the "varioloid disease," was the mildest. I thought, then, that if I could generate it artificially, I should produce a disease, which would unite all the certainty of small-pox, in defending the constitution from

any subsequent attacks of this horrible malady, with the mildness of the chicken-pox. I saw, too, that the experiment had already been made in the case of the infant, for it had been exposed to the contagion of the small-pox, and also to that of the cow-pox, and that the result was a mild form of disease.

My aim now was to obtain from the history of small-pox all the hints I possibly could, tending to further the object I had in view. I turned to the various records of small-pox and cow-pox, to determine the following points:—

1. What is the anti-variolous power of the cow-pox?
2. What is the proportion of fatal cases in small-pox, occurring after vaccination?
3. Can the modified small-pox be induced artificially; and what is the degree of danger attending this disease so induced?
4. What protection does the varioloid disease afford to the constitution, from subsequent attacks of small-pox?

In examining the history of small-pox, with a view to determine my first question, I find, that the Board of the National Vaccine Establishment have admitted, “that the pretensions of vaccination, to the merit of perfect exclusive security in all cases of small-pox, were admitted at first too unreservedly.”

In reviewing the numerous examples of small-pox, supervening upon vaccination, I find, that the

conclusions drawn by Brown*, of Musselburgh, are, on the whole, correct.

1†. There are grounds for concluding, that the anti-variolous influence, directly after vaccination, is to be considered as nearly perfect.

2. That in proportion to the distance from the period of vaccination, the anti-variolous power is proportionably diminished.

3. That about three years after vaccination the constitutional influence is so much diminished, as readily to allow the operation of the variolous contagion, but still exerting a considerable influence in mitigating the disease.

4. That at the distance of five or six years from vaccination, the facility is so much increased, as hardly to impart any security; and so much diminished in its powers of mitigating the disease, that at this period the cases very nearly approach to the common form of the distinct disease.

5. That the eruptive fever, and all the other peculiarities of small-pox, increase in severity, and assume the characteristic phenomena, according to the foregoing rule, so as to *approach* to the natural disease.

The deductions are, on the whole, correct, although Nos. 3 and 4 are generalized too hastily. The attempt at assigning the *same* distinct limit to

* An Inquiry into the Anti-variolous Power of Vaccination. Edinb. 1809.

† Ibid. p. 244.

the anti-variola power of cow-pox in all constitutions is incorrect.

We have not data sufficient to prove, that the vaccine virus influences all persons for seven, or any other given number of years. In some constitutions it appears to impart a lasting security, in others only a temporary one.

They who wish to verify the conclusions of Brown will find ample documents in "Thomson's Historical Sketch of the Small Pox."

Seeing then that the Vaccine Board have admitted, that vaccination is not an absolute preventive of small-pox; and finding that the influence of this disease is much impaired by time, it becomes a question of no small moment, to ascertain the ratio of fatal cases in small-pox after vaccination.

There is not the slightest doubt of this fact, that wherever the small-pox occurs after vaccination it is modified, provided the vaccine matter influences the constitution at all. The National Vaccine Establishment reported in 1811, "That out of many hundred thousand persons vaccinated, not one died of small-pox."

Professor Thomson, in the work alluded to, says, he saw eight hundred and sixty-three cases of small-pox during the varioloid epidemic which prevailed in Edinburgh. Two hundred and eighty-three had neither been vaccinated nor inoculated, and of these one in four died. Seventy-one had small-pox after small-pox, and two died. Four

There is not a single fact in this book to prove that the influence of vac

hundred and eighty-four took the disease after vaccination, and only one died*.

Supposing this to be a fair ratio of the deaths, it would appear, that small-pox after vaccination is milder than small-pox after small-pox.

But this proportion of mortality is certainly not to be assumed in small-pox after vaccination. It is probable, that, in this fatal case, the vaccine virus had been much impaired by time. From all that is known of the varioloid disease, and from the report of the Vaccine Board already quoted, it is probable that the cases of death are exceedingly rare, the ratio therefore infinitely less.

Before proceeding to my third question, I will anticipate some objections, which must suggest themselves from the statements already made.

It may be asked, if small-pox after vaccination be so mild a disease, why not let the patient have the full benefit of vaccination, and give him the chance of escaping the varioloid disease altogether? For if he should take the small-pox, you allow it will be mild.

In answer to this I say, that though it is generally mild, it may be severe. If not severe enough to kill, yet sufficiently so to disfigure. It may be not at all modified, if the vaccine matter has ceased to influence the constitution: *a case of pure small-pox therefore caught naturally!* Now the advantages of inoculating so as to produce this disease will readily appear if it be considered—

* Historical Sketch of the Small Pox, p. 279.

That it is an acknowledged fact, that inoculation renders the small-pox mild. That it is also an acknowledged fact, that the cow-pox renders the small-pox mild.

If, then, I produce a mild form of small-pox, by inoculation, and mitigate that mild form, by subsequent vaccination, I ensure a disease, which is as secure as the small-pox, and as mild as the chicken-pox.

I proceed, therefore, to consider my third question :—

The first case which I have related, proved, that if a child be exposed to the atmosphere of small-pox, and afterwards vaccinated, the varioloid disease will be produced.

In looking over the various publications, relatively to my views, I was pleased to find, that the very mode which I propose for inducing the varioloid disease artificially, was adopted inadvertently, and altogether for another purpose, by Dr. Woodville, in 1799. Dr. Jenner published his great discovery in 1798. His views met with much opposition at the time.

Dr. Woodville, who was physician to the Small-Pox Hospital, wished to ascertain the truth of Jenner's discovery, and accordingly undertook a series of experiments.

He obtained cow-pox matter, and vaccinated five hundred and ten patients *in the Small-Pox Hospital**, but to his astonishment he found, that

* Vide Appendix, p. 25.

in the greater number of these, instead of the vaccine disease appearing, a general eruption of "variola-like pustules," as he terms them, broke out. He stated this to Dr. Jenner as a proof of the small-pox and cow-pox not being specifically different diseases.

Jenner, in reply, stated, that the vaccine matter must have been variolated. Dr. Woodville then sent some matter taken from *the arm* of a patient, who had three hundred and ten pustules, and with this matter Dr. Jenner invariably produced the genuine cow-pox.

Dr. Woodville, however, remarked, that in his private practice no eruptions ever appeared. "Hence," says he, "I began to suspect that there existed some peculiar cause, which rendered the patients under the vaccine inoculation *in the Hospital* more liable to pustules than others."

He inferred, therefore, that this cause was the variolous atmosphere, "which those patients were necessarily obliged to respire during the progress of the cow-pox infection."

This confession of the Doctor's will not be a matter of surprise at the present day, and it will be evident to all, that this eruptive disease was no other than the modified small-pox. These five hundred and ten cases of Dr. Woodville are conclusive as to the point in question.

I shall not apologize for making use of his experiments. Nay, I think, they are better than an equal number of my own, since they are impartial, as to my views at least.

It would be difficult to devise a set of experiments which would bear more on my subject. They were made by one whose opportunities were ample, and whose veracity was unimpeached, and whatever other theory they were meant to substantiate, they certainly could not have been made expressly for mine.

Upon referring to the Appendix*, it will appear, That when a patient is inoculated with cow-pox, and then with small-pox matter, an eruptive disease is invariably produced. That if a person be exposed to the contagion of small-pox, and then vaccinated, an eruptive disease will appear. Out of five hundred and ten patients who were so circumstanced, three hundred and ninety-eight took the modified small-pox.

That it is not of much consequence which of the two diseases has the priority of inoculation.

This requires further investigation.

It appears from Dr. Woodville's own testimony, that if equal parts of cow-pox and small-pox matter be mixed, and a portion of this compound fluid inserted into a patient, in twenty-eight cases he found in one half, that the local affection was cow-pox, in others the small-pox, "but in none was there many pustules, or much indisposition."

It also appears, p. 13, "That if the cow-pox matter, and the small-pox matter, be both inserted in the arm of a patient, even within an inch of each other, so that at the 9th day the same efflorescence

* Vide Appendix, p. 25.

becomes common to both the local affections, nevertheless, inoculating from the cow-pox tumour, the genuine vaccine disease will be produced."

This explains the fact of Dr. Woodville having sent matter to Dr. Jenner from the arm of a patient who had three hundred and ten pustules, and which matter, according to Dr. Jenner's statement, produced the genuine cow-pox.

Dr. Stokes, of Chesterfield*, says, that matter taken from the cow-pox tumour will produce cow-pox; and that taken from the pustules of the same patient, the eruptive disease.

Dr. Woodville inoculated sixty-two cases with the pustular matter; fifty-seven had the eruption, and those who received the disease from any of those fifty-seven patients appear also to have had pustules in the same proportion.

There are four modes, therefore, of communicating the varioloid disease:—

1. By inoculating with both poisons†. This is certain, and by far the best mode.

2. By exposure to a small-pox atmosphere, and then vaccinating. This is not to be recommended.

3. By propagating the disease from the varioloid pustule. This is dangerous.

* Vide Thomson. Willan's Reports on the Disease in London, p. 315.

† In order to ensure the varioloid disease, it is of the utmost consequence that the vaccine matter be taken from the arm of a patient, and inserted *immediately* into that of the person about to be vaccinated. The method of vaccinating with *points* is very uncertain.

4. Mixing the two poisons together, and then inoculating with the compound. This is very uncertain.

Allow me, Sir, to recal to your attention Dr. Willan's conclusions on the combined inoculation of the variolous and vaccine fluids.

“ 1. That when a person was inoculated with vaccine and variolous matter, about the same time, both inoculations proved effective; for the vaccine vesicle proceeded to its acmè in its usual number of days, and the maturation of the variolous pustule was attended by a variolous eruption on the skin.

“ 2. That these effects took place without much variation, in all cases where the interval between the two inoculations *did not exceed a week*: but,

“ 3. That when variolous matter was inserted on the ninth day after the vaccine inoculation, its action seemed to be wholly precluded.”—Willan on Vaccine Inoculation, p. 1.

As to the second clause of my third question, whether the “modified small-pox is dangerous, and in what degree,” I shall merely state, that the power of cow-pox, in mitigating small-pox, is so well known, that the common argument for inducing people to submit to vaccination is, that should small-pox occur subsequent to it, that formidable disease is disarmed of its terrors.

It is a common practice to vaccinate, when there are any suspicions of an unprotected person having been exposed to small-pox; and this with a view of either superseding or mitigating that disease.

I have already stated sufficient grounds for be-

lieving the ratio of mortality in small pox, occurring after vaccination, to be very small indeed.

The cases which have proved fatal were probably not much influenced by the cow-pox. Dr. Woodville mentions a fatal case of an infant, who died of convulsions, which preceded the eruption of one hundred pustules.

In this case I think it probable, that inoculation would have as certainly proved fatal, and that even the cow-pox might have done so, had it been attended with much fever.

But the best argument I can state is, that all these cases have been exposed to natural small-pox, and not to the inoculated one. The deaths in the former are about one in four, in the latter one in six hundred.

What protection does the varioloid disease afford the constitution from small-pox?

Dr. Woodville tested, I believe, the whole of the five hundred and ten cases; certainly two hundred of them, for these are detailed. The time at which this was done was, for the most part, immediately after the patient's recovery; and there is not *one single* instance of any disease being produced. This proves, that the varioloid disease is a perfect security, for a time at least*.

* The first two hundred cases in the Tables are those alluded to. Out of these, upwards of one hundred had the modified small-pox; the rest had no eruption upon them, and do not seem to have been influenced by the variolous atmosphere of the Hospital. Vide Appendix.

But from the history of the disease it will appear, that that period is the lifetime of the patient.

The cases of small-pox occurring after vaccination are very numerous.

Now I never have read or heard of a single example of the small-pox attacking any of these again, nor do I know anybody who has.

Yet these very cases are examples of the same disease being induced naturally, which I propose inducing artificially.

I do not mean, however, to say, that small-pox never does occur after the varioloid disease; but I do assert, that such cases are extremely rare. Indeed I see no reason to expect a recurrence, for the modified small-pox is still small-pox, and therefore probably not more liable to return than small-pox itself.

I beg leave to present another extract from Willan, whose high authority will, I have no doubt, go very far to settle the question.

“The conclusion to be made from the foregoing statement is, that variolous and vaccine virus, inoculated at the same time, restrain the operation of each other on the body, and somewhat alter the form of the pustules and vesicles, without effecting any change in the qualities of the fluid they contain. Several medical writers supposed that the disease thus produced was hybridous. In that case it would not have been either variolous or vaccine, but would have possessed distinct qualities, and have exhibited peculiar effects; it might even have

proved a new contagious eruptive disorder, not capable of preventing either the small-pox or the cow-pox. I can, however, inform those gentlemen who have shown some anxiety respecting the patients affected with eruptions, *that they are as safe as the inoculated small-pox can render them.* Some hundreds of them have been, at different times, exposed to infection in the wards of the Small-pox Hospital, and have even lain in the beds there, without experiencing the least inconvenience.”—Willan on Vaccine Inoculation, p. 7.

Thus, then, Sir, I have laid before you the whole case, and I leave it to every parent to make his choice, between the small-pox, with all its dangers; or the cow-pox, with all its uncertainty; or, lastly, the modified small-pox, with all the mildness of chicken-pox, and all the preventive security of the inoculated small-pox itself.

I have the honour to be,

Sir,

Your most obedient humble Servant,

R. FERGUSON.

5, Baker Street, Portman Square,

May 17, 1825.

APPENDIX.

FIRST CASE.

MATTHEW REDDING, sixteen years old. 3d day. The insertion of the matter did not appear to have produced any inflammation or hardness in the part: he was therefore inoculated with variolous matter, at the distance of two inches from the part in which the cow-pox matter was inserted. Next day, a little redness could be discovered at the first puncture, and from this time both inoculations proceeded very regularly, but slowly, so that on the seventh day they appeared to be inflamed in an equal degree, the extent of the inflammation not exceeding the tenth of an inch in diameter. 8th day*. He has pain in the axilla. 10th day. Both tumours are approaching to suppuration. They are of the same form, and attended with an equal degree of efflorescence. 11th day. He complains of headach: the red tinge now extends in a circular form, and includes both tumours. 13th day. There appears more tension and pain at the variolous tumour than at the other, but the latter tumour is more prominent. 15th day. Both tumours began to dry, and no inconvenience followed. This boy made no other complaint, during the process of infection, than of uneasiness in the

* Here, as well as in the subsequent cases, where the patient was twice inoculated on different days, I date the time from the first inoculation.

axilla, followed by a slight head-ach, of very short duration : however, on the 17th day, four small pustules appeared, *viz.* one upon his nose, one upon his thigh, and two on his head ; none of which suppurated. This case strikingly resembles that of Richard Payne, in which the pustules did not appear till the arm scabbed.

SECOND CASE.

Jane Collingridge, a healthy active girl, seventeen years of age. 3d day. The inoculated part began to be elevated and inflamed. 5th day. It was vesicated, and attended with itching. She was now inoculated with variolous matter in the right arm, the former inoculation having been in the left. 8th day. The whole tumour is much increased in all dimensions ; its form is perfectly circular, and it appears of a lemon-coloured tint. She now complains of a stiffness across her arms, and of a pain in the left axilla : the puncture in the right arm begins to be elevated and inflamed. 11th day. She complains of head-ach, and pain about the loins : the tumour produced by the cow-pox matter is now more inflamed at the margin, which is beset with minute confluent pustules : the variolous tumour is also advanced to a state of vesication ; and she reports, that last night both axillæ were painful. 12th day. She continues indisposed : the tumour is surrounded by an extensive efflorescence : the variolous tumour is of a deeper red colour. 13th day. The cow-pox tumour is subsiding, and forming a scab : that of the small-pox is efflorescent : her head-ach continues : pain in the right axilla : several pustules appear. 15th day. There are small pustules round the edges of the variolous tumour : more pustules appear scattered over the face, body, and limbs. 17th day. The scab over the cow-pox tumour is completely formed ; at its edges, however, a fluid is still visible : the variolous tumour is in a state of

suppuration: she complains of a sore throat: the number of pustules is now from one to two hundred, in no respect differing from variolous pustules of the mild sort. From this time both the tumours gradually healed, and the pustules dried at the usual time.

THIRD CASE.

Ann Pink, a tall girl, of a brown sallow complexion, aged fifteen years. This girl was inoculated with variolous matter, on the fifth day, in the same manner as Collingridge, and both tumours proceeded to maturation, though more slowly than in that case. Neither of the tumours began to scab till the seventeenth day, when they resembled each other so perfectly, that the one could not easily be distinguished from the other. She had no pain in either axilla, nor made any complaint during the whole progress of the infection, neither did one pustule appear upon her.

The only other persons whom I first inoculated with the matter of cow-pox, and on the fifth day afterwards with variolous matter, were William Harris, William Bunker, and James Crouch.

FOURTH CASE.

William Harris, twenty-one years of age, of a tall and slender make, and of a delicate constitution, was inoculated, January 24, with the matter of cow-pox, taken from the arm of Sarah Rice, who received the disease by milking the cows. 3d day. The inoculated part was evidently elevated and inflamed. 5th day. It advanced to vesication, and a sensation of itching was perceived in the part: he was this day inoculated with variolous matter. 9th day. The tumour of the first inoculation presents prominent callous edges, with but very little redness; its centre is

depressed, and contains a lymphatic fluid: he perceives a tenderness in the axilla: the variolous tumour is considerably inflamed and vesicated, and itches more than the other. Next day a pain was perceived in the axilla of the arm in which the variolous matter was inserted, as well as in the other. 12th day. Redness of the cow-pox tumour is going off; but that of the variolous still spreads with an irregular margin. 14th day. Several pustules appear. The cow-pox tumour is now dry at the centre, but its surrounding edges appear of a blueish tinge, and still abound with ichorous matter. The variolous tumour is much inflamed, and beset with confluent pustules at its edges: its centre is depressed, and of a dark hue. 19th day. The cow-pox tumour has formed into a dry scab, with a finely polished surface, and of a mahogany-brown colour: the variolous tumour is in a purulent state, with an extensive inflammation at the margin: the pustules are about 300 in number, very large, and all in a state of maturation. From this time all the effects of inoculation went off gradually: he never complained of head-ach, nor of any febrile symptom during the whole progress of the disease.

FIFTH CASE.

W. Bunker, a strong healthy boy, fifteen years of age, was inoculated, in his left arm, on the same day, and with matter from the same person as Harris. 3d day. The inoculated part was elevated and reddened. 5th day. The inflammation was much increased: he was now inoculated in his right arm with variolous matter. 8th day. The tumour upon his left arm is much elevated, and the vesication considerable since the sixth day: he now complains of pain in the axilla, and of head-ach. The pustule on the right arm advances very slowly. 10th day. The pain in the axilla and the head-ach continue. The tumour of the

left arm begins to scab in the centre, and is surrounded with a red tinge of considerable extent. The tumour on the right arm now also presents a red tinge of a similar appearance, but not of half the extent: its centre is in a state of vesication, and its edges studded with small pustules: his head-ach is not entirely gone off. 12th day. The red tinge surrounding the tumour on the left arm has disappeared, except a narrow ring at its outer ambit: the tumour on the right arm is depressed at the centre, where it is also of a livid colour; its edges are hard and inflamed: he now discovers two or three pustules upon his body. 17th day. The matter of both tumours is almost wholly formed into a dry incrustation: no more pustules have appeared: one upon his hip has matured. 20th day. Both tumours are perfectly scabbed; that upon his left arm appears browner and smoother than the other.

SIXTH CASE.

James Crouch, seven years old, inoculated on the same day as the last patient, with matter taken from the same girl, and with variolous matter five days afterward. 5th day. The inoculated part was considerably elevated and inflamed. 9th day. The cow-pox tumour is much advanced: the pellicle filled with ichor: the marginal inflammation not considerable: the variolous puncture now displays a small red speck, which begins to spread. 11th day. The cow-pox tumour exhibits an extensive efflorescence, or red stain, upon the surrounding skin, and its centre begins to dry: the variolous tumour is spreading a little, and in a state of vesication. 14th day. Pain in the axilla is now produced by the cow-pox tumour, which is drying at the centre: the variolous tumour is now efflorescent, but not to half the extent of the other. From this time the tumours quickly healed, no eruption took place, and no farther inconvenience was experienced.

SEVENTH AND EIGHTH CASES.

Thomas Fox, aged twenty-five, and John Dennis, twenty-three years of age, both strong men, and accustomed to hard labour, were inoculated on the 22d of January, with variolous matter, and on the following day with cow-pox matter, taken from the arm of Sarah Rice. In both these cases, the first inoculation was performed by two punctures at the distance of two inches from each other, and the latter by one puncture at the same distance from the two former. The local effects and appearances of the inoculation were very similar in both these men: the cow-pox tumours seemed to advance equally with those of the variolous, and bore a strong resemblance to them; the former, however, were more elevated and circumscribed: for about the ninth day the variolous tumours became angulated or ragged at the margin, which was not so conspicuous in the others, though both had small confluent pustules at their margins. Those of the cow-pox also sooner healed, and formed a smoother scab. The eruptive fever came on about the eighth day with Dennis, but not till the tenth with Fox: the former had more than 300 pustules, and the latter about 100; all of which were in every respect similar to variolous pustules.

NINTH AND TENTH CASES.

John Talley, fourteen, and Thomas Brown, fifteen years old, were, January 25th, inoculated with variolous matter in the left arm, and the following day they were both inoculated in the right arm with the matter of cow-pox, taken from the arms of Mary and Elizabeth Payne (see cases first and second). The progress of both the infections on the arms of these boys was perfectly regular and equal throughout. On the 7th day all the tumours were considerably

inflamed, and in a state of vesication, attended with itching. Brown also at this time complained of a pain in each axilla ; but with Talley the pain was confined to the left till the next day, when both arm-pits were affected. 10th day. They both complained of head-ach, and of pains about the loins: these, however, were very slight, and no further indisposition ensued. On the evening of the 12th day some pustules appeared upon Brown, but upon Talley they did not appear till the 14th day: the former had in all about thirty, and the latter only six, all of which were apparently variolous. The cow-pox tumours were more elevated at the edges, and less depressed at the centre, after the 9th day, than those of the variolous ; and they eventually formed a smoother and browner scab, as in the case of Fox and Dennis.

After I had received the proof sheets, some passages from "Willan on Vaccine Inoculation," which I have since inserted in my letter, were placed in my hands by my friend Dr. Gooch. From the same work I shall quote another here.

"Other gentlemen wish to introduce the inoculation with vaccine and variolous matter at the same time, hoping thereby to prevent any extensive or suppurative eruption. This practice might, probably, be attended with very great success ; but, as it must disseminate contagion, it would forego the chief advantage of vaccine inoculation."

From this it will appear, that the plan which I now propose has been contemplated by others. I have searched for these authorities, but, as yet, I have not succeeded in finding them.

I must confess, I shall be astonished, if so obvious a circumstance shall not have been *glanced* at by others before me ; but I am not aware that the subject has ever been

steadily examined till now: it is unknown to the profession; nor is there any account of it in works on small-pox as late as 1822.

As to Willan's objection to the plan, "that it must disseminate contagion;" this is of no avail, for as long as no law exists to enforce vaccination, the carelessness of some, and the prejudices in favour of inoculation of others, will always ensure the existence of small-pox. He has referred to his own work (*Reports on the Diseases of London*), in order to prove the difficulty, if not the impracticability, of this plan. I have consulted the passage, and find, that it does not bear upon the question at all. He objects to rubbing the two fluids, and producing a hybridous disease, by inoculating with the compound; and so do I. The results from such a source of inoculation are uncertain and dangerous; besides, the modified small-pox is not a hybridous disease.

I wish it to be distinctly understood, that I do not believe any other but the first of the four modes of inducing the varioloid disease is safe. The rest are either uncertain or dangerous.

Another objection may be raised against the practicability of my plan, *viz.* that it requires the existence of natural small-pox, and of the cow-pox. Small-pox matter, it may be said, will be procured with difficulty, or not at all. Should the time ever arrive when small-pox matter is not to be procured, then, I suppose, the disease itself will have ceased to exist, and with it the necessity of guarding against it, by vaccination or by any other plan*.

* If the cow-pox and small-pox tumours preserve their respective characters on the arm, and each is capable of propagating a specific disease, then the above objection at once falls to the ground.

T A B L E.

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From the Cow to				
M. Payne.....	2	6	3	0
E. Payne	0	4	5	0
Buckland	0	4	4	24
R. Payne	10	0	0	5
Redding	16	0	1	4
Collingridge.....	17	0	4	170
Pink.....	15	0	0	0
From M. and E. Payne to				
Talley	14	0	0	6
Brown	15	0	0	30
From Collingridge to				
Mundy	25	0	2	15
George.....	25	0	6	530
Butcher	13	0	2	0
Dorset	19	0	1	0
From Buckland's pustules to				
S. Price	13	0	2	6
From Redding to				
Wise.....	14	0	0	4
From Mundy to				
Slade	21	0	5	4
From George to				
Tarrent	19	0	1	0
From Butcher to				
Jewel	20	0	2	0
Bumpus	20	0	6	310
West	21	0	5	20
W. Hull	11	0	4	200
H. Hull	13	0	1	8
S. Hull.....	8	0	2	120

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Jewel to				
Fisk	0	4	4	40
Reed	15	0	5	70
From S. Price to				
Pedder	0	11	5	40
Hoole	0	5	5	102
Hickland	0	6	3	300
Morton	0	9	7	200
From Fisk to				
Davy	0	3	1	3
Murrell	0	7	4	20
From Bumpus to				
Dixon	19	0	4	174
W. Walker	0	11	0	2
Cummins	0	3	0	0
Ellistone	1	3	2	0
Dunn	1	8	3	0
From West to				
So. Dobinson	5	0	0	0
Sarah Dobinson	3	0	0	0
H. Dobinson	1	0	1	0
Giles	20	0	3	30
Bigg	18	0	5	12
Briaris	16	0	4	2
From Reed to				
Cowling	23	0	4	50
Webb	12	0	0	12
Mason	2	6	0	4
Goodluck	0	3	2	0
From Murrell to				
Hatt	20	0	4	40
Platford	17	0	8	1000
From H. Dobinson to				
Gunter	1	0	2	3
Sears	0	9	5	200
E. Giles	0	9	3	90
From Dixon's Pustules to				
C. Harriskind	4	0	4	100
W. Harriskind	2	0	3	12
D. Harding	0	3	1	15
E. Harding	3	0	1	2
Waters	12	0	6	120
J. Harding	17	0	1	0
From Webb to				
H. Timms	19	0	7	165
S. Timms	17	0	5	0

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Webb to				
Franklin	12	0	1	0
Lee	15	0	2	3
From Hatt to				
Spooner	21	0	4	150
M. Wall	14	0	3	10
J. Wall.....	10	0	0	0
J. Ockendon	10	0	3	0
W. Ockendon	12	0	3	1
W. Jennings	7	0	2	1
G. Jennings.....	6	0	2	0
Pluckrose	7	0	0	0
C. Webb	0	3	0	0
Dibden.....	0	3	1	0
E. Eaton	2	0	2	2
C. Eaton	0	10	2	2
Pigg.....	11	0	4	14
From Platford to				
Williams	0	7	0	0
Runtsman	0	3	1	0
Lear.....	1	5	1	0
Selby	0	5	2	40
S. Ariell	2	0	2	0
J. Ariell	5	0	2	0
Servy	2	6	2	0
S. Lovell.....	4	0	2	40
H. Lovell.....	2	0	3	170
Salmon.....	0	9	1	200
Corwell	0	8	3	36
Cundell	0	6	2	12
From S. Rice to				
Harris	21	0	0	300
Bunker	15	0	3	3
Crouch.....	7	0	0	0
Fox	25	0	0	100
Dennis	23	0	0	300
From Crouch to				
Keys	25	0	1	0
Turner.....	24	0	6	220
Morgan	1	0	5	0
Mr. Coleman's Cow.				
From the Cow to				
Streeton	22	0	6	300
Smith	16	0	4	105
Meacock	30	0	5	350

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Turner to				
Fairbrother	15	0	4	4
Calloway	19	0	3	20
Camplin	17	0	4	30
J. Turner.....	0	8	2	1000
Buckley	0	5	1	0
Welch	0	3	1	0
From Streeton to				
Grenvill	20	0	3	35
Honeywood.....	2	0	0	0
Rood	1	6	2	0
Mile.....	1	3	0	0
Jenkins	1	0	3	300
Barber	0	11	2	1
Dix	0	11	0	6
A. Walker	0	10	2	0
Brough	0	10	3	20
Towser	0	8	2	10
Knighton... ..	0	8	2	0
Price	0	8	1	0
Spilsbury	0	4	2	0
May	0	4	4	5
Sully	0	3	1	0
Terry	0	2	1	1
Scott	0	2	1	0
Johnston	0	2	0	0
Stewart	0	2	0	0
From Smith to				
Wrench	24	0	3	30
S. Peters	19	0	4	1
P. Peters.....	18	0	4	24
Brown	5	0	0	0
Shipley	3	0	0	1
Crosby.....	0	10	0	0
Evans	0	7	2	0
From Meacock to				
C. Cooke.....	4	0	0	0
A. Cooke.....	2	0	0	0
From Brown to				
R. Scott	2	6	1	14
Bennett	1	0	0	0
Black	1	0	3	7
M. Jenkins	0	9	1	0
Lawyer	0	8	0	0
King	0	6	0	0

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Brown to				
Jones	0	6	0	0
Phipps	0	6	3	0
Newman	0	6	4	0
Harper.....	0	5	2	0
From May to				
G. Paul	3	0	0	2
A. Paul	1	0	3	40
Chandler	0	5	0	0
M. Hatt	1	0	1	5
Boardore	0	7	0	0
Lampart	2	0	2	3
Page	1	6	0	0
Carter	0	1	2	3
Sermon	0	6	3	5
A. Marshall.....	2	0	0	0
H. Marshall.....	0	4	0	0
Henley.....	5	0	0	0
New.....	1	6	4	100
From Turner's Pustules to				
M. Crouch	3	0	0	0
From Stewart to				
Wood	3	0	1	0
Clifford	2	6	1	0
From A. Walker to				
Restieux	0	4	0	0
Bates	0	1 $\frac{1}{2}$	0	0
Thompson	2	0	2	1
W. London	3	0	1	0
J. London	0	6	0	0
Wallace	3	0	2	0
Rogers.....	42	0	3	0
T. Thoroughgood.....	14	0	3	33
A. Thoroughgood.....	17	0	6	10
From Streeton's pustules to				
S. Reeve	1	6	1	20
A. Reeve	0	1	1	12
Richardson	13	0	3	12
Adams	0	6	3	200
From Phipps to				
Shipton	4	0	0	0
Staits	2	0	2	3
Youngman	0	3	0	0
Dudley.....	2	0	1	50
Cade.....	0	10	0	0
Piper	0	4	1	0

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Lampart to				
M. Ockendon	16	0	4	6
S. Ockendon	7	0	3	4
S. Stacey	12	0	4	0
A. Stacey	7	0	4	0
Fuller	11	0	4	6
Barrett	11	0	4	20
Perry	3	0	0	0
Vinicum	0	5	0	0
Bensden	1	6	0	0
Ward	0	10	2	7
Terry	0	2	0	0
C. Poorey	3	0	0	0
A. Poorey	0	11	2	0
Langstaff	4	6	0	0
Lightfoot	1	1	2	5
Sinclair	0	7	2	0
Hills	0	4	0	0
Donaldson	1	7	0	0
From Wrench to				
Buckthorpe	22	0	4	100
Cater	14	0	3	40
Tomlin	19	0	3	24
M. Burgess	4	0	0	3
S. Burgess	3	0	0	0
From P. Peters to				
Clarke	5	0	0	3
From Platford's pustules to				
Prince	1	0	0	30
Chandler	1	9	0	40
Jervoise	0	6	1	0
Palmer	0	3	3	100
Henderson	0	10	4	300
Crawford	1	10	3	250
From Dudley to				
A. Vallentine	3	0	2	0
J. Vallentine	2	0	3	0
From S. Timms to				
S. Harris	21	0	7	6
S. Clarke	0	9	2	0
M. Harris	23	0	6	60
Ludgrove	0	11	2	0
Stringer	20	0	4	2
From Grenville to				
B. Crane	2	0	3	200
T. Crane	4	0	2	12

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Grenville to				
Garrett	14	4	4	62
M. Crane.....	8	4	4	30
From A. Stacey to				
M. Stacey	38	0	3	5
R. Stacey	0	7	0	12
J. Stacey.....	3	6	0	5
Harriott	0	8	1	6
M. Waite.....	0	10	2	50
J. Waite	3	0	2	20
From M. Ockendon to				
H. Pigley	22	0	4	100
Dach	0	4 $\frac{1}{2}$	2	0
G. Pigley.....	0	5	0	0
Morgan	0	2 $\frac{1}{2}$	0	0
Bradley	19	0	6	156
Harrison	0	2	1	0
Morton	0	5	0	0
Cooper.....	4	11	0	0
E. Cooper	0	4	1	0
Ellikins	3	3	0	0
M. Hide	4	11	0	0
D. Hide	1	5	0	0
Phillips	0	8	0	0
From Tomlin to				
C. Hopes.....	3	0	1	0
S. Hopes.....	1	0	0	0
Oliphant	3	0	1	0
Castin	0	6	3	0
Hamm	2	0	0	0
A. Smith	4	0	0	0
Reynolds.....	0	4	0	0
From J. Wall to				
Gallway	0	3	1	0
Barneby	1	6	0	0
Dick	2	8	0	3
Dalkins	0	5 $\frac{1}{2}$	1	0
Bromley	1	2	2	3
Ford	0	6	2	0
From J. Vallentine to				
Merrin.....	0	3	0	0
Loathis	4	0	3	5
Gedge	0	4 $\frac{1}{2}$	0	0
Beasley	0	3	0	4
Goodman.....	1	10	2	40

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Spooner to				
Stainer.....	16	0	3	34
M. Pepler	4	0	0	0
Swannell	10	0	3	6
F. Pepler.....	2	0	0	0
Brown	19	0	4	35
P. Roberts	6	0	4	12
M. Roberts	4	0	0	6
C. Roberts	1	8	3	6
Freeman	11	0	4	40
A. Palmer	0	9	2	40
Wade	16	0	4	3
From Cooper to				
Munden	0	7	1	50
From H. Timms's pustules to				
Stiles	0	6	3	500
Burrows	0	5	1	12
From M. Bartlett to				
J. Mundy	0	6	3	100
From Cowley to				
Nash	15	0	1	0
From Spooner's pustules to				
Serjeant	16	0	4	35
Cook	15	0	2	11
From Stringer's pustules to				
Argant.....	17	0	7	19
From H. Timms's pustules to				
E. Gilbert	17	0	3	4
Brewster	11	0	4	6
Truluck	0	6	2	250
Wiggins	0	5	0	7
Th. Turner.....	0	6	0	50
Gilbert.....	0	6	3	500
Downes	0	4	2	30
King	0	2	2	4
Talbot	0	4	3	500
From Corwell to				
Graham	0	4	0	0
Sellers	15	0	0	0
From Barrett to				
T. Barrett	32	0	3	200
M. Barrett	5	0	0	0
J. Barrett	2	3	1	0
H. Barrett	0	7	2	30
E. Wybrow	5	0	3	200

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Barrett to				
T. Wybrow	9	0	3	150
J. Wybrow	1	0	1	6
Harwood	2	3	1	6
M. Harwood	4	0	0	12
J. Harwood.....	5	0	2	6
P. Harwood.....	0	5	4	200
Higgins	0	3	0	0
M. Higgins	2	6	0	5
From Henderson to				
Upstone	19	0	5	12
I. Bumpus	16	0	5	20
From S. Harris to				
Tyler	13	0	0	0
W. Meacock	18	0	5	400
M. Meacock	29	0	5	20
R. Meacock.....	1	0	3	6
Porch	3	6	0	2
E. Porch	2	0	0	0
J. Porch	0	4	3	350
Fermoy	0	11	0	60
Gurney	0	11	0	0
Downs.....	1	6	3	200
From Wade to				
Mays	1	1	2	500
From J. Mundy to				
Matthews.....	0	4	2	0
From Brewster to				
M. Brewster	0	11	0	0
From Lee's pustules to				
Baker	29	0	3	140
Caterer	15	0	5	8
R. Featherstone	12	0	3	40
C. Featherstone	9	0	3	120
Porter	5	0	0	9
J. Porter	1	6	1	12
J. Jennings	5	0	1	30
C. Jennings.....	3	0	1	30
W. Jennings	1	1	0	9
Mansfield.....	1	6	2	12
S. Wybrow	6	0	2	300
S. Baker	1	1	3	25
J. Goss	2	8	1	0
W. Goss	0	8	2	30
Odell	0	9	3	90
Murphield	0	6	2	0

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Dalkins to				
Sharp	0	4	2	0
From Waite to				
T. Jennings.....	1	6	0	0
Kitchen	5	0	1	0
S. Pluckrose	4	0	2	0
T. Pluckrose	0	10	2	0
Rout.....	0	6	1	20
W. Houghton	2	6	1	0
From Swannell to				
Mickland.....	0	2	0	3
Ferguson	0	7	1	7
Goddard	1	0	2	0
Roberts	0	9	1	0
Gran	0	6	1	0
Benson	0	8	2	0
Floaks	0	2	1	2
From M. Gilbert to				
Welch	15	0	3	100
Rowley	0	3	2	25
A. Waite	17	0	4	10
Tarbotts	1	1	2	600
S. Tarbotts	3	3	4	300
Bell	0	3	3	250
From S. Hopes to				
Snell	17	0	2	200
I. Houghton	32	0	3	200
Stedman	0	5	3	60
M. Broadwood	0	6	2	150
W. Broadwood	0	6	2	200
Sorrell	4	11	4	500
S. Sorrell.....	6	0	1	1
Underwood	0	9	2	105
From Ellikin to				
G. Cooke.....	2	2	3	20
Costin	0	5	2	0
From Reynolds to				
Walford	0	6	2	600
From Wade to				
Wentworth	1	8	3	500
Gibson.....	0	8	0	0
Lister	0	5	0	0
Wooden	1	4	4	0
Smart	6	0	2	0
Taylor	1	0	1	200
Arnold.....	0	5	3	0

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Wade to				
Turvey	0	3	2	12
Guilder	2	3	2	0
Gallop	0	2	2	0
Stanny	2	2	4	2
Moore	0	4	0	0
M. Moore	2	6	1	0
From Oliphant to				
Absalom	0	7	1	0
From M. Ford to				
Clark	2	4	3	0
Cox	1	7	2	0
Sandaw	0	2	0	0
From J. Roberts to				
T. Roberts	3	0	3	0
From Kitchen to				
T. Foster.....	5	0	2	5
J. Foster.....	1	0	1	2
M. Foster.....	1	0	1	24
S. Gobby	27	0	2	20
W. Gobby	5	0	0	2
J. Gobby	0	6	3	0
Putney.....	0	7	2	0
Bush	1	7	1	0
E. Franklin	3	0	2	0
S. Franklin	0	8	0	0
Neat.....	2	0	2	9
Hicks	3	0	2	0
More	0	5	0	0
Barker.....	6	0	2	6
North	2	0	3	0
Cowland	1	3	3	12
Harrison	0	8	1	2
R. Lawyer	36	0	1	1
E. Lawyer	3	6	1	7
F. Lawyer	4	6	0	0
M. Lawyer	1	0	0	0
E. Dunn	5	0	0	0
F. Dunn	2	6	0	0
T. Dunn	0	3	2	6
N. Collop	9	0	1	0
J. Collop	7	0	1	0
A. Collop	3	0	1	0
E. Collop	0	5	0	0
T. Wiggins	7	0	0	0

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Kitchen to				
W. Wiggins	4	0	0	0
P. Wiggins	1	6	0	0
Ruffles	19	0	2	6
Bridges	0	1	0	0
From I. Barrett to				
I. Mitchell	6	0	2	100
P. Mitchell	4	0	2	50
T. Mitchell	2	0	2	26
From Cooke to				
E. Chapman	12	0	2	27
M. Chapman	9	0	3	67
Good	13	0	4	400
From Styles to				
Edwards	18	0	3	0
From Talbot to				
Brandrom	12	0	0	0
From Caterer to				
Stapler.....	22	0	4	300
Marsham	17	0	4	43
Waller	18	0	3	15
Wall	8	0	3	200
R. Johnston	0	3	2	0
Fletcher	0	6	3	500
From Bradley's pustules to				
Vaughan	0	5	2	12
Vethall.....	0	4	3	200
Hope	0	6	4	100
Masterson	0	5	2	20
Green	2	4	3	30
Lutman	1	0	2	20
Roberts	0	4	3	450
Starbuck	0	5	2	20
M. Phillips	2	2	3	500
S. Phillips	3	11	3	5
Wicks	0	4	2	36
Terry	0	3	2	8
Sheriff	7	0	3	34
Steers	13	0	3	40
From I. Houghton to				
S. Houghton	19	0	0	0
W. Houghton	58	0	0	0
Jolly	1	8	0	0
From T. Pluckrose to				
Lineau	12	0	3	3

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From T. Pluckrose to				
Woolard	2	0	0	0
From Kitchen to				
Kettridge.....	16	0	1	3
Raymond.....	1	0	1	3
From I. Harwood to				
A. Harris.....	26	0	4	100
M. Harris	0	1	4	500
S. Harris	4	6	5	50
W. Harris	5	6	2	25
G. Harris	2	6	1	5
S. Boyton	8	0	4	700
E. Boyton	6	0	3	600
J. Boyton	3	0	3	350
From Talbot to				
Lemare	0	6	3	60
Williams	0	9	4	650
English	1	3	2	100
Churchman	0	3	4	30
Hunt	1	2	4	700
Whitburn.....	0	9	4	430
Chartau	0	10	4	17
Callen	0	8	3	75
Russel	0	5	4	15
E. Russel	3	6	3	12
Knight.....	0	8	3	500
Richardson ...	0	6	2	200
Johnston	1	7	3	150
From J. Goss to				
Blinkinhorn	0	2	0	0
Millward	0	7	0	5
Haywood.....	1	8	4	46
A. Godden	1	0	2	300
W. Godden	3	0	3	650
Jones	0	6	0	0
Paradise	3	0	3	50
Kelly	2	0	0	100
Hales	0	6	4	500
I. Mountain.....	4	6	2	300
M. Mountain	2	0	2	150
A. Mountain	1	0	1	75
From Brewster to				
Barnett ...	1	1	0	0
Balling.....	0	9	2	6
Upton	1	9	3	0
Penn.....	1	1	2	0

	Years of Age.	Months.	Days of Illness.	No. of Pustules.
From Brewster to				
Hilliard	0	6	0	0
White	1	4	0	0
From W. Meacock to				
Westbrook	0	3	0	0
From E. Chapman to				
Hider	0	2	1	0
Hughes	1	8	3	12
C. Hughes	0	5	2	4
From M. Chapman to				
Sharp	18	0	3	30
Calburn	16	0	3	12
Ledger.....	0	4	2	50
Vautin	1	0	1	2
M ^c Kennish	4	3	2	150
Wright.....	0	7	3	10
Rance	0	2	0	0
From Ruffles to				
Thornton.....	17	0	1	0
Boreham	16	0	2	3
Hill	0	5	1	3
Towler.....	1	3	1	0
French.....	0	11	0	0
Brestley	0	8	0	0
Thomas	0	4	1	0
Richardson	0	9	0	0
Morgan	0	5	0	0
From A. Waite to				
Wood	22	0	4	6
Young	16	0	2	0
Norman	12	0	2	0
M. Bartlett	0	11	1	20
Askew	0	3	0	15
Clark	0	9	0	0

THE END.

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