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OBSERVATIONS
ON THE
CAUSES OF THE PREVALENCE
OF
SMALLPOX,

AND ON THE MEANS OF PREVENTING THE
DISSEMINATION OF THAT DISEASE.

By ALEXANDER MONRO, M. D. F. R. S. E

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From the Edinburgh Journal of Medical Science.

THERE can be no doubt entertained as to the comparative safety of smallpox and cowpox, the former, when caught by contagion, or even when received by inoculation, being frequently, even under the best management, a malignant and fatal disorder; whereas the latter is much more mild, seldom or never fatal, and is not a cause, like the smallpox, of any immediate or consequent disease, or even of blemish.

In these circumstances, it is matter of regret that prejudice or inattention should render any parent so blind to the welfare of his child, as to lead him to substitute the smallpox inoculation for that of the cowpox. Considering the unfavourable bias which public opinion has received against the cowpox as a preventive of smallpox, it seems necessary to inquire into the origin and validity of such prejudices, and to examine into all their bearings, in order to determine whether they be well or ill founded.

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On a former occasion *, I endeavoured to prove the beneficial effects of vaccination, and I again advocate the same cause, from the deepest conviction of the great and general interest of the subject,—from a desire to oppose, by fair and candid inferences, the distrust which some entertain as to the security afforded by cowpox against smallpox,—and also from a persuasion, that vaccination is one of the greatest blessings that has been conferred on mankind, but that, like many very powerful and valuable remedies, when unskilfully administered, and to one whose constitution is under the influence of some other disease, it will fail in producing the desired effect.

For some years after Dr Jenner had brought the cowpox into general notice, in consequence of the concurring testimonies of the Royal Colleges of Physicians and Surgeons in London, Edinburgh, and Dublin, the vaccination flourished, and was much in vogue, and almost universally held in the highest estimation. It was peculiarly unfortunate that public expectation, as to its effects preventive of smallpox, had been raised to too high a pitch: it had been represented as a never-failing preventive of smallpox. This was found to be an error, an overstatement as to its powers; for these have their limits, there being persons of such constitution as are not to be protected by previous vaccination. [Such a peculiarity of constitution is, however, comparatively rare, and even though universal, there is not any well grounded reason for rejecting vaccination, as the smallpox, consequent to cowpox, is a modified and mitigated form of that disease, which has very seldom proved fatal.

Other misconceptions and unfounded objections to cowpox, not altogether unconnected with malice and envy, have been proposed and circulated with great industry, tending to mislead the ignorant, and those who do not take the trouble of weighing the force either of argument or of evidence. It is impossible to employ language too strong in contrasting the virulence of smallpox, whether casual or inoculated, with the greater safety and greater mildness of vaccination. That the cowpox matter has lost its original virtues, is an assumption not consonant with fact.

The testimonies of Dr Barron and of Dr De Carro, and of many others, are in the face of such an assertion. The former gentleman has for many years been resident in Gloucestershire, and has ascertained that the preventive virtue of cowpox *has not been* impaired by time; for during sixty years the cowpox has been found to be a safeguard against smallpox with the greater number of individuals, and Dr De Carro's letter, which is subjoined,

* Treatise on the different kinds of Smallpox. Edinburgh, 1818.

is equally conclusive in favour of the duration of the virtues of cowpox. To what, then, is the greater prevalence and mortality of smallpox within these few years to be imputed? I apprehend it is chiefly owing to the vaccination having been improperly performed. Children, therefore, who have been supposed by their parents to have been sheltered from smallpox by the protecting influence of cowpox, have caught the smallpox after having breathed an atmosphere highly charged with the contagion of that disease.

This great evil might be averted by due attention to vaccination, and by adopting means to prevent the propagation of the contagion of smallpox.

Whilst in other parts of the world the full benefit of vaccination is reaped, by the employment of rigorous and judicious regulations, the subjects of the British empire, where the discovery originated, enjoy it only partially; and many, through the neglect of similar regulations, annually fall victims to smallpox.

Such being the case, it seems necessary to adopt a plan calculated to arrest the progress of smallpox, such as the following.

The inoculation of the smallpox is undoubtedly a means by which the disease is rendered much safer to the individual, but not so to the community at large. Thus the contagion is propagated. In proof of which, in those countries in which inoculation has been practised to the greatest extent, as in the Russian empire, the smallpox has been found to be most prevalent and fatal.

The inoculation of the smallpox should therefore be given up, and vaccination, the most powerful weapon for preventing the dissemination of the smallpox, substituted, and cherished with the same fostering care as in other parts of Europe, so that the full benefit of it might be reaped. There is on record a striking example in proof of the benefit to be derived from preventing the inoculation of the smallpox,—I mean that of a neighbouring kingdom, viz. France, in which the smallpox became epidemic in the year 1763. This created very great alarm. The parliament investigated the cause of the unusual mortality, and was persuaded it was owing to the inoculation: accordingly, a decree was issued, *prohibiting inoculation in Paris*.

Mr S. Bourne most justly observed, in the House of Commons, that “the Legislature would be as much justified in taking measures to prevent inoculating out-patients in the Smallpox Hospital in London by restraint, as a man would be in snatching a firebrand out of the hands of a maniac, just as he was going to set fire to a city.”

Those labouring under smallpox, should be most strictly

4 Dr Monro on the Causes of the Prevalence of Smallpox.

confined to their own houses, or within an hospital appropriated to the purpose, until all the crusts have fallen off, and as long as it is thought they may communicate the infection to others. Their clothes should be well washed and fumigated, before they mix again in society.

If such laws were passed, and rigidly enforced, the smallpox, for want of victims, would necessarily decline, and in a short time become extinct.

Similar regulations are also necessary in the case of smallpox after cowpox, for smallpox of a virulent kind may take its rise from such a source.

The bed-linen of the patient should, as soon as it is taken off, be put into cold water for some time, and afterwards well washed, and also the chamber and the furniture.

At our sea-ports still more vigilance is requisite, in order to guard against the importation of the contagion of smallpox; and, besides adopting those measures which are best calculated for destroying the contagion, it might be well to hold out a suitable reward to those who discover the source of the contagion, and are most active in restraining or destroying it.

It may be stated against the first of the proposed regulations, that, in a country with a government like ours, where the inhabitants are accustomed to liberty in every thing, it could not be enforced. But if quarantine laws are daily enforced with rigour, why should not similar enactments be provided against the propagation of smallpox, which has proved, and continues to *prove, much more fatal than the plague itself?* When the plague broke forth in Britain, it appeared only in London and some of the larger cities; whereas no city, no village, or even hamlet, is exempted from the smallpox; and a much greater number have died from the former than the latter.

It were much to be wished, that those salutary measures which have been proposed, and in one case only enforced, against a woman, convicted of carrying her child, covered with the eruption of smallpox, abroad, should be universally extended, and firmly executed, as general means of public preservation. In the case alluded to, eleven persons were infected with smallpox, eight of whom died, and one became blind. The court declared, in the above case, that the exposure of a person labouring under a contagious disease, which endangers the lives of others, is a criminal act punishable by law. At the present time, such a measure is imperiously called for, considering the greater prevalence of the smallpox.

The above remarks may probably gain weight, by a perusal of the subjoined letter of Dr De Carro of Vienna. It is, in my mind, an important document, as explaining some curious points in the history of vaccination,—also the means by which

it is propagated, and likewise the great effect which a general vaccination, and judicious regulations strictly enforced, have had in arresting the progress of smallpox.

“ MY DEAR PROFESSOR, Vienna, July 13. 1825.

“ You mention smallpox cases after vaccination as a very common occurrence, but mitigated in their symptoms. The more I read and hear about the frequency of your consecutive smallpox after vaccination, the less I understand how such cases are so infinitely rare among us. Exact registers are kept, where every individual seized with the smallpox is announced to the public, where a regular list is every year carried from one house to the other, to inquire and mark down every person who has not yet been vaccinated; where, in every case of smallpox, a board, upon which is written *Here is smallpox*, is hung before the door, to warn the neighbours; where no child is admitted to any school whatever, without a certificate of vaccination; where the names of children dying from the smallpox, are put in the *Vienna Gazette*, as victims of the carelessness of their parents; in short, where the civil and medical authorities act conjointly to superintend carefully the general measure of vaccination. Since the year 1799, *our vaccine keeps perfectly true and genuine*, and I do not see the least difference in its present and primitive nature. I doubt very much, if, in the course of these 26 years, 10 cases of smallpox after cowpox, would be ascertained as such; and as to me personally, *I never saw one in my own practice*, and the only case of it I ever witnessed, where vaccination had been perfectly regular, was very severe, and not in the least mitigated smallpox.

“ The source of our cowpox is partly British, and partly originating from the *grease* of a horse at Milan, without any intervention of a cow. The effect was so similar in every respect, that they were soon mixed, that is to say, that it was impossible to say, after several generations, and in the hands of innumerable practitioners, what was equine, and what was vaccine. The whole British settlements in India have been *equinated*; for the first liquid drop which I sent 25 years ago to India, was the second generation of Milanese equine or greasy matter, transplanted at Vienna. You know by frequent reports from the East, that the practice is upon the best footing.

“ The impossibility of a variolous epidemic with us, where vaccination, and never inoculation, is so universally practised, accounts probably for the rareness of consecutive smallpox. I know very well, that measures like those adopted in Austria, and almost in every other state of Germany, are of more difficult execution in Great Britain, where every individual

thinks himself free to do what he pleases, and not what he is commanded to do; but I particularly admire an absolute form of government, where it is applied to such salutary measures. Believe me, my Dear Professor, to be,

“ Most truly yours,

“ To Dr A. MONRO,
Professor of Anatomy, Edinburih.”

“ J. DE CARRO, M. D.”

I shall conclude, by a brief enumeration of the principal causes of imperfect vaccination, which has had a most pernicious influence in favouring the propagation of the contagion of smallpox.

1st, The smallpox is propagated by inoculation for cowpox being performed in an imperfect manner. The seeming simplicity by which the inoculation of cowpox is performed, together with the mildness of the disease, has led midwives, nurses, gardeners, and many others, not at all conversant with the appearances or progress of the genuine cowpox, to practise vaccination; and the same description of people, having gained confidence by their experience, still continue to inoculate a much greater number of the poor than medical practitioners. Besides, such inoculators do not take the trouble of visiting their patients during the progress of the disorder, or the parents neglect to bring back their children for the inspection of the inoculator.

2d, Another cause of imperfect vaccination is, that the inoculation for cowpox is practised when the patient labours under some cutaneous disorder, as measles, scarlet fever, itch, herpes, tinea capitis, or crusta lactea, all of which disorders render the cowpox inoculation abortive.

3d, It is extremely difficult to determine by the eye, whether perfect vaccination has taken place or not, of which the reader cannot fail to be fully convinced, upon perusing Dr Willan's observations on the various forms and appearances of the spurious, as well as of the genuine cowpox vesicle; and, besides, the local may be mistaken for the constitutional affection; hence the great value of Mr Bryce's test, which affords a *certain criterion* for distinguishing whether the constitution has been under the full influence of cowpox or not. Vaccination does not succeed, if the lancet on which the matter of the cowpox is preserved becomes rusty, for the rust of the steel decomposes the poison.

4th, The matter taken from the genuine cowpox vesicle may be injured by heat, exposure to the air, or moisture, and even the crusts employed for cowpox inoculation, when kept in a high temperature, soon acquire a particular smell, which Mr

Bryce has observed, marks their loss of power to reproduce the cowpox.

5th, If the vaccine vesicle has been repeatedly punctured or drained for two or three successive days, the inoculation generally fails; for the poison which, in the progress of the disease, is deposited into the cells of the vesicle, is thus exhausted, or may be so much diluted as to be incapable of producing the disease by inoculation.

6th, If the matter be taken after the 13th day from the cowpox vesicle, it does not, according to Willan, produce the genuine cellular vesicle, but is, in some cases, wholly inefficient; while in others, it suddenly excites a pustule or ulceration; in others, an irregular vesicle; and in others erysipelas, all equally ineffectual in giving the desired protection against smallpox.

Such are some of the more frequent causes which occasion imperfect vaccination.

From what has been above stated, the following inferences may be drawn.

1st, That the cowpox still merits the confidence of the public, as a preventive of smallpox.

2d, That smallpox rarely succeeds cowpox, when the inoculation has been practised by a skilful person, and when the patient does not labour under some other cutaneous disorder.

3d, That the smallpox, consequent to cowpox, is a modified and mitigated form of that disease, which seldom or never has proved fatal.

4th, That cowpox is one of the principal means by which the dissemination of the contagion of smallpox might be arrested.

5th, That the smallpox might be rendered extinct, or extremely rare, by the employment of the cowpox, and of rigorous regulations, to prevent its propagation.

Since the preceding observations were put to press, I have had an opportunity of reading a valuable paper on smallpox by my friend and late pupil Dr George Gregory, physician to the Smallpox Hospital in London, and whose authority on such subjects must carry great weight with it. I have had the gratification to find that Dr Gregory confirms many of the statements in the preceding paper, *1st*, As to the frequency of smallpox during the last year; *2dly*, As to vaccination having occasionally failed to give security against smallpox, and also as to the severity of smallpox on those who were unprotected by vaccination; *3dly*, As to the difficulty of ascertaining exactly whether vaccination had been perfect or imperfect; and, *lastly*, As to the great benefit to be derived from vaccination. His

words upon this last and most interesting branch of the subject are too important to be omitted:—"That vaccination has the strongest claims upon the confidence of medical men, and on national support; and that nothing further is to be desired in the way of protection against smallpox, than a stricter attention, on the part of practitioners in the country, to the diffusion of good and genuine vaccine lymph, and perhaps some increased facilities, on the part of government, to the procuring lymph from large towns, where alone it can be obtained in that state of purity and perfection which is essential to the safety of the individual in after life."