VACCINATION RASHES AND COMPLICATIONS.¹

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AT a time when we are passing through an epidemic of small-pox, and when large numbers of individuals are being vaccinated and revaccinated, I have thought it would be opportune and interesting to review shortly the subject of vaccination rashes and complications. In dealing with this matter I have no fear of supplying weapons to those who oppose the practice of vaccination. It is the function of a science of observation like medicine to record carefully and impartially all phenomena, normal or otherwise, that we may thereby increase the sum of our knowledge and the usefulness of our art. It is not my purpose in this paper to discuss the value of vaccination—that is a point, I take it, upon which we are all agreed. I would merely remark that the advancement of all knowledge is a process of slow and laborious evolution. I mention this because it is the stereotyped fashion in some quarters to make much of the fact that Jenner expressed the opinion that vaccination absolutely protected against small-pox. We are wiser now and know that vaccination in infancy does not confer complete immunity. It must not be forgotten, however, that small-pox itself does not absolutely protect an individual against a second attack, any more than one attack of herpes zoster excludes the possibility of a second, although in both diseases it is extremely rare for two attacks to occur. Louis XV. of France is said to have had variola at the age of 14 years, but that did not prevent him dying from a second attack at the age of 74.² Again, there can be no doubt that cases of syphilitic re-infection have occurred. As far as Jenner is concerned I may be permitted to say that his original contributions are models of lucidity and honesty of purpose and breathe the spirit of Harvey's noble "De Motu Cordis."

It will add, I think, to the clearness of my remarks if I adopt the following division of the subject, suggested originally by Dr. T. Colcott Fox,³ which is at once simple and natural, according with the manifestations as they present themselves clinically: (1) local abnormalities or irregularities in the development of the vaccine vesicles; (2) incidental exanthematic eruptions; (3) diseases inoculated with vaccinia at the time of the operation; (4) diseases of a septic nature which find a nidus in the wounds subsequently to the operation; and (5) diseases excited in subjects specially predisposed to the same. To which I will add—(6) accidental vaccination; (7) horse-pox or grease and sheep-pox in man; (8) effects of intercurrent diseases on vaccination and *vice versa*; and (9) vaccination as a mode of treatment.

1. Among the local abnormalities extra vesicles sometimes occur, due probably to the movements of the child and more points being inoculated than was intended. At other times bullæ may form instead of vesicles (vaccinia pemphigoides). In the case of calf lymph this arises as far as I can ascertain from impotent lymph. The bullæ leave no scars. In such an event vaccination should be done over again with good lymph. Jenner referred to this as "spurious" cow-pox and pointed out that it was not protective. He insisted on the necessity of re-inoculation with the proper virus.⁴ Again, vesicles may be retarded in their development or may not form at all. In connexion with the late appearance of vesicles curious instances of delay have been recorded: two months (Brierly⁵), one year (George

Harley⁶). But the most remarkable was a delay of 14 years, recorded by no less an authority than Sir Thomas Watson. The patient was a girl 14 years of age who had been vaccinated in infancy. In the course of an attack of influenza vesicles developed on the old vaccination areas and, what is more, an elder sister was revaccinated with the lymph of the aforesaid vesicles with positive results.⁷ There are also curious instances of revivification of old vaccination areas as a result of revaccination or a subsequent attempt at vaccination where the first had failed. In some cases, instead of drying up in the normal way, the vaccination areas may go on to ulceration with induration of the base and exudation, forming crusts accompanied by axillary adenitis. Such a condition might give rise to the erroneous diagnosis of syphilis. These ulcers have been called chancriform by the French. In one instance, Leloir and Hervieux investigated an epidemic of this kind, 37 out of 38 children being affected. The lymph was of human origin, but no specific symptoms developed.⁸ Gangrene has also been observed as a local complication. Diday has recorded the growth of hair as a result of vaccination forming a coronet round the areas.⁹

There has been some discussion in the journals with regard to relapse of vaccination.¹⁰ If by that is meant a formation of typical vesicles going through a normal course and following on a successful vaccination, I have never seen such a thing. But I have seen swelling up of one area (out of three) commencing a few days after the shedding of the scabs after successful vaccination. The purplish red lesion was of the diameter of a sixpence, flatly raised at first, but becoming convex. It felt soft in the centre, but on making a puncture no fluid escaped, the contents being jelly-like. Under treatment (euphen and blue wool and collodion) it gradually flattened down leaving (three months later) a slightly raised scar.¹¹ There was no axillary adenitis. I could only put this complication down to the staphylococcus. The patient had probably inoculated the area with her nails, and this was the more likely as she had a few acne pustules about the chin. In a case under the care of Mr. F. Gower Gardner of Warwick, small red spots appeared after successful revaccination and gradually enlarged to the size of the vaccinated areas.¹² Hypertrophic scars may develop on vaccinated areas.¹³ Such a condition is sometimes recorded as keloid, but it is important to bear in mind the differences between true keloid and hypertrophic scar.

2. As to the incidental rashes some occur early. They are usually urticarial or erythematous and are in most cases evanescent, but they may also be vesicular and even bullous. As to the last named in infants and young children, the possibility of impetigo contagiosa bullosa must not be lost sight of, especially when there are only a few bullæ irregularly scattered about one limb or the face. A fairly common condition is the so-called vaccine lichen, consisting of a number of pin-point, red, conical papules, which come out in crops and may affect many parts of the body. According to Dr. H. Radcliffe Crocker, the rash comes out from the fourth to the eighteenth day, usually about the eighth.¹⁴ The character of the eruption is in some cases papulo-vesicular, exceptionally it is pustular. This kind of rash had apparently been noted by Jenner. More rarely still the groups of small vesicles may run together, forming bullæ, but this is a rare occurrence. As a rule it soon subsides but in other cases it may be very persistent. The same may be said of urticaria following vaccination. The fact is that urticaria once started is sometimes difficult to quell. Erythema multiforme may also ensue, no doubt as a result of a toxæmia, the rash appearing as papules about the backs of the hands and face; or it may take the form of an erythema iris¹⁵ or erythema bullosum. These conditions may occur when the vaccination areas are nearly or quite healed. Impetigo contagiosa is not uncommon in neglected children and many parts of the body may be involved by

¹ A paper read before the Medical Society of University College, London, on March 19th, 1902.

² Trousseau: Clinique Médicale de l'Hôtel-Dieu, Paris, 1865, second edition, vol. i., p. 34.

³ Medical Times, 1877, vol. ii., p. 621, cited by Poole, op. cit.

⁴ Jenner: On the Varieties and Modifications of the Vaccine Pustules occasioned by a Herpetic State of the Skin. (Originally published in the Medical and Physical Journal, August, 1804, No. 66. Also printed separately, Cheltenham, 1806. This paper is not included in Crookshank's History and Pathology of Vaccination, vol. ii., which contains many interesting reprints of original contributions by Jenner and others.) The above separately published paper is in the British Museum library.

⁵ Medical Times, 1862, p. 442. Cited by Poole in Vaccination Eruptions, 1893, p. 24.

⁶ Medical Times, 1881, vol. ii., p. 572. Cited by Poole, op. cit.

⁷ Vide note 3.

⁸ Cited by Delobel and Cozette in Vaccine et Vaccination, p. 67. See also Kapusi-Besnier, second French edition, vol. i., p. 325.

⁹ Radcliffe Crocker: Diseases of the Skin, second edition, p. 324.

¹⁰ Brit. Med. Jour., vol. i., 1902, p. 496; also vol. i., 1902, p. 568.

¹¹ Private Case Book, C, p. 208.

¹² Letter to Author, March 3rd, 1902.

¹³ Ehlers: Dansk Dermatologisk Selskabs Forhandling, 1899, p. 41. Also Pernet: British Journal of Dermatology, vol. xiv.

¹⁴ Op. cit., supra, p. 323.

¹⁵ Norman Walker: Brit. Med. Jour., vol. i., 1901, p. 1201.

the planting out of micro-organisms by the nails. It was evidently observed by Jenner.¹⁶ Where the lesions are numerous with much crusting it looks very formidable, and it is just such cases that have helped to make people prejudiced against vaccination, although vaccination has had nothing to do with the rash directly. Eczema is a common complaint in babies and is frequently seen in those who have not been vaccinated. But unfortunately with the public all skin eruptions that occur after vaccination are put down to the latter on the fallacious *post hoc propter hoc* principle.

A more important but uncommon eruption is generalised vaccinia, a subject about which there has been much discussion as to whether it arose from auto-inoculation or was conveyed through the blood. When an irritating rash is present on the body at the time of the vaccination auto-inoculation can account for the generalising of the vaccinia. On the other hand there are cases which appear to be in favour of the other view, which has many supporters in France. Jenner¹⁷ records instances where pre-existing pimples and vesicles were converted into vaccinia pocks which kept pace with those on the arms in their progressive changes and further, which is an interesting point, afforded a perfect vaccine virus.¹⁸ Woodville in his account of his experiments records a number of instances in which patients developed a generalised eruption which resembled small-pox. This was quite contrary to the experience of Jenner, who concluded that the rashes described by Woodville had not been produced by the pure, uncontaminated cow-pox virus, but that they might be explained by the fact that Woodville had inoculated a number of his patients with variolous matter on the third or fifth day after the vaccine had been applied and used lymph thus obtained for further cow-pox inoculation. Chauveau has shown that a general vaccine infection was possible by inducing an artificial general horse-pox as it were in the horse by injecting the vaccine virus into the trachea and veins.¹⁹ In connexion with the subject of generalised vaccinia the interesting experiments of Bryce and Hicks may be alluded to. They found, when a second vaccination was performed on a patient a few days after the first inoculation, that, assuming the latter to have been effectual, the second vesicle, in the words of Hicks, made immense strides to overtake the first.²⁰ Further, that admirable observer, Trousseau, has recorded a case of generalised vaccinia in which 27 vesicles exactly like vaccination vesicles²¹ developed about the face, trunk, and limbs on the eleventh day after vaccination in eight places. Trousseau concluded that the rash was the result of auto-inoculation, especially as the child had a fine sweat-rash at the time of the operation. This led Trousseau to go on revaccinating subjects from day to day, from the fourth day onwards after the primary vaccination. He found that after the ninth and sometimes the tenth day the inoculation was unsuccessful and that the earlier the re-inoculation the more typical were the vesicles.²² With regard to auto-inoculation the eyelids may become affected (vaccinal blepharitis) and lead to what Saemisch has called a vaccine-ophthalmia with keratitis.²³

Vaccinia gangrenosa is another very unusual condition. Mr. J. Hutchinson²⁴ has described a case in which on the eighth day after vaccination a papulo-vesicular eruption appeared on the trunk which rapidly assumed a sloughing character. The vaccine vesicles were unaffected. Mr. Hutchinson looked upon it as a true vaccinia passing on to a gangrenous condition and analogous to varicella gangrenosa. Sir William Stokes has recorded a case in which 48 hours after vaccination, purple and black spots appeared on the body, followed by gangrene. The vaccine areas themselves were unaffected, and other children

vaccinated with lymph from the same source exhibited no rash of any kind.²⁵ This appears to have been a purpuric condition originally, but a "pemphigoid" rash is mentioned in connexion with the case, so that it may have been a hæmorrhagic bullous eruption. I may add that the bacillus pyocyaneus has been isolated in dermatitis gangrenosa infantum, and moreover bullous eruptions have been observed in infections by that micro-organism. Bullous eruptions and a somewhat rare condition, dermatitis herpetiformis, have followed vaccination.

I should like to say in passing that the inoculation of small-pox in the human subject is now a misdemeanour, although at one time in this country so great were the ravages of small-pox that it was considered an improvement to go through an artificially induced variola.

Morbilliform and scarlatiniform rashes also sometimes occur, but they give no trouble. Purpura is an extremely unusual eruption. It may appear as minute punctiform hæmorrhages or the condition may be much more serious with extensive hæmorrhages into the skin, accompanied by febrile symptoms, epistaxis, hæmaturia, together with hæmorrhages into the vaccination vesicles, indicating profound changes in the blood or perhaps, in some cases, depending on hæmophilia.²⁶

I have seen the itch ascribed to vaccination as the rash appeared soon after the latter, but the discovery of the acarus exposed the fallacious reasoning of the patient.

3. I now come to diseases inoculated with the vaccine virus at the time of the operation—a very important matter indeed and one which has led to no end of controversial writing on the part of opponents of vaccination. I propose to deal in this part of my paper with syphilis, tuberculosis, and leprosy. As to the first, there is no doubt as to syphilis having been communicated to healthy children and adults by means of vaccine lymph derived from congenitally syphilitic infants. Instances of this unfortunate accidental syphilisation were faithfully recorded by medical men immediately they recognised them. I need hardly point out that cases of the accidental mediate inoculation of syphilis occur from time to time quite apart from vaccination. When the possibility of such an accident in vaccination became known the medical profession was on its guard. Dr. Radcliffe Crocker states that at the East London Hospital for Children, where the patients were the poorest of the poor, over 20,000 cases passed through his hands and he never saw a case of vaccinal syphilis, nor did any of his colleagues there, or he would certainly have heard of it. Dr. Colcott Fox has had a similar negative experience at another children's hospital.²⁷ Now that calf lymph is in general use, inoculation of syphilis *via* the lymph is a thing of the past. It must not be forgotten, however, that in a certain stage of syphilis the blood of the patient is virulent and that an unclean lancet charged with such blood may be a source of danger in vaccination. Jullien has recorded a recent instructive instance of two surgeons contracting syphilis through wounds of the fingers whilst operating on a syphilitic woman just before the appearance of her secondary rash.²⁸

With regard to tuberculosis a number of investigators have looked in vain for the tubercle bacillus in the vaccine vesicles of phthisical patients and animal inoculation experiments with lymph from that source have been negative. Now that human lymph has been given up the possibility of tuberculosis being conveyed from calves must be examined. In the first place, tuberculosis in calves is very rare, but nevertheless the plan adopted in Belgium of making a necropsy of the animal immediately after the lymph has been collected is a sound one.²⁹ The selection of vaccifer calves should also be carefully made and animals having any sign of disease should be rejected. Chauveau and Jusserand failed to produce tuberculosis in guinea-pigs with lymph obtained from a tuberculous cow.³⁰ Another element in the discussion of this subject is the opinion expressed by Professor Koch at the British Congress on Tuberculosis in 1901 that bovine tuberculosis was not communicable to man. That inoculation of the skin by the

¹⁶ Vide Note 4.

¹⁷ Ibid.

¹⁸ Reprint of W. Woodville's Report on a Series of Inoculations, &c., in Crookshank, op. cit., supra (note 4).

¹⁹ Chauveau, cited in Vaccine et Vaccination, op. cit., supra (note 8), p. 56.

²⁰ Thomas Watson's Principles and Practice of Physic, 1848, vol. ii., p. 793. As to Hicks, see also Jenner's original papers in Crookshank, op. cit., supra.

²¹ It should be noted that the earlier writers on the subject used the word "pustule" in the sense of vesicle. Jenner himself admitted in op. cit., supra (note 4) (foot-note p. 6) that vesicle or pock would be a better term to employ than pustule.

²² Loc. cit., supra (note 2), p. 64.

²³ Rille: Encyclopädie der Haut- und Geschlechts-Krankheiten, 1900, p. 250.

²⁴ THE LANCET, Dec. 13th, 1879, p. 873, cited by Poole, op. cit., p. 113.

²⁵ Medical Times, 1880, vol. i., p. 586, cited by Poole, op. cit., p. 114.

²⁶ Vaccine et Vaccination, op. cit., supra (note 8), p. 59.

²⁷ Op. cit., supra (note 9), foot-note, p. 325.

²⁸ Neumann's Festschrift, 1900. See also Brit. Med. Jour., vol. ii., 1901, p. 827.

²⁹ Degive of Brussels cited in Vaccine et Vaccination, vide supra (note 8), p. 155.

³⁰ Op. cit. (note 8), p. 154.

bacillus tuberculosis from phthisical sputum, &c., may occur is an ascertained fact, but it is not an easy thing to produce experimentally. As far as vaccination is concerned it is very difficult, as Dr. Colcott Fox rightly points out,³¹ to exclude the possibility of pre-existing bacilli having found a suitable soil in the wounded tissue or of a secondary infection from the outside.

Vaccination has also been accused of leading to an increase of leprosy. Now, although leprosy is undoubtedly a contagious disorder, all attempts to inoculate the disease in sound individuals have failed. Danielssen and others have tried it on themselves and on various persons who have voluntarily submitted to the test. The case of the Hawaiian criminal Keanu, inoculated as an alternative to death, is not decisive, as leprosy occurred in some of his relatives, and the disease being, moreover, very prevalent in the Sandwich Islands, he may have contracted it in another way. The long latency of the complaint is a factor which makes it difficult to arrive at a positive conclusion in countries where the disease is endemic and in the case of individuals who have lived in those countries. The source of error afore mentioned is a valid objection to the very few published cases of so-called vaccinal leprosy. The careful inquiries of the Leprosy Commission in India on this point led the commissioners to report that the practical danger of leprosy being diffused in this manner was minimal, even supposing the disease to be highly contagious.³² Arning and Auché and Carrière have found the bacillus in the vaccine vesicles of lepers, so that the possibility of transmission in arm-to-arm vaccination in this way cannot be denied. But Armauer Hansen, who originally discovered the bacillus lepræ and whose authority on any subject connected with leprosy is acknowledged, cannot believe that such transmission could have been frequent as some writers have contended. Further, Hansen distinctly states that in Norway leprosy has steadily diminished during all those years in which vaccination has been compulsory. In 1891 he put the question to all medical men in Norway who had anything to do with leprosy, and not a single one had ever observed such an occurrence.³³ As the leprosy bacillus has not yet been either cultivated outside the human body or successfully transmitted to animals calf lymph cannot be accused of being a cause of leprosy.

4. I have next to consider diseases of a septic nature which find a nidus in the wounds subsequently to the operation. This portion of my subject and the one just dealt with overlap to some extent. Given strict cleanliness and carefully prepared lymph nothing but the vaccine virus should be inoculated at the time of the operation. Erysipelas is a rare complication. It varies in degree and may remain more or less localised to the neighbourhood of the vaccinated areas. On the other hand, it may spread extensively and sometimes prove fatal. Jordan³⁴ has called attention to the fact that erysipelas may result not only as a result of streptococcal, but also of staphylococcal, infection. Erysipelas may develop in a vaccinated child as a result of erysipelas in the mother or in a neighbour coming in contact with either the child or its parents. Furunculosis, cellulitis, and even septicæmia and pyæmia have been observed. Impetigo contagiosa and gangrene have already been alluded to. A very rare complication is tetanus. Dr. W. Findlay and Dr. J. W. Findlay³⁵ have recorded a case of this kind following vaccination on the leg occurring in a woman, aged 21 years. They have further been able to collect ten other cases. Of these, Toms's case followed calf-lymph vaccination on the arm, and another is recorded in the report of the Royal Commission on Vaccination in which human lymph was used. This is an interesting point. Tetanus is caused by a bacillus found in the earth and *a priori* might be expected to be common in calf lymph owing to accidental contamination. But tetanus as a complication of wounds is an

extremely rare condition, in this country at least, and Dr. G. Vivian Poore,³⁶ who has made inquiries, found that in the market gardens of the Thames Valley it was the rarest of diseases. This agrees with the rare occurrence of tetanus among agricultural labourers.

I may here refer to vaccination on the leg, demanded by some ladies. I have vaccinated very few in this situation, but in one case the patient, instead of keeping quiet, took off the protective dressing, put on coloured stockings in direct contact with the unhealed vaccine areas, and went to a ball. The result was a great deal of local inflammation, with the formation of a large irregular bleb full of sero-pus. The patient was quite sure that it was the vaccination.³⁷

5. An interesting part of the subject under review is the fact that diseases may be excited in individuals specially predisposed to the same. Here, again, the *post hoc* fallacy crops up. Nevertheless, vaccination appears to have started psoriasis where there was a predisposition, but that it was actually the cause is another story. Occasionally, one or more psoriasis lesions may precede the vaccination and sometimes, too, rashes have broken out when vaccination has been postponed which would inevitably have been ascribed to the latter had it been carried out. In a similar way an eczema may be started by vaccination. In two recent cases vaccination led to the recurrence of a cured eczema. In infants vaccinated very early in life, before congenital syphilis has developed, the specific symptoms would appear to the lay mind to be the result of the inoculation with lymph. It must be remembered, too, that the subjects of hereditary lues do not always present the "old man" appearance but may at first look healthy enough. I have lately seen pityriasis rosea occur in a recently vaccinated patient sent to me by Dr. Percy J. Edmunds, but there was no reason whatever to think that there was any connexion between the two conditions.³⁸ The sequence was, no doubt, quite accidental.

6. There are numerous instances of accidental vaccination scattered up and down in medical literature. I have seen it on the face and wrist. Medical men have inoculated themselves on the lip through the small wound caused by the broken end of a capillary tube whilst blowing out the lymph. When it occurs about the mouth or cheeks it gives rise to much discomfort, as may well be imagined, especially as regards opening the mouth. I have seen an interesting case in a woman nursing her vaccinated child, the accidental vaccination occurring on the cheek as the result of a scratched pimple. She had never been vaccinated, as her parents objected to the practice.³⁹ Dr. A. MacLennan⁴⁰ has recorded the case of a man in whom the chin was inoculated. He thought that he got it off a towel used by other members of the house, five of whom were vaccinated. The patient himself had declined to be vaccinated as he did not think it necessary. Accidental vaccination in the great majority of cases occurs as a single lesion, giving rise at a certain stage to much surrounding redness, together with swelling and tenderness of the corresponding lymphatic glands. But Dr. Arthur J. Hall⁴¹ of Sheffield has published a case in which there were 11 lesions about the dorsa of the hands. The patient was a domestic servant who had never been vaccinated and who suffered severely at the time from chapped hands. The vaccinia was contracted from a recently vaccinated baby she had nursed. When the lesions are single the possibility of an extra-genital primary syphilitic sore may arise in the observer's mind, especially in certain stages of such accidental vaccination. The scar left by an accidental inoculation in the lip, for instance, may also be taken for the remains of an old primary syphilitic sore, especially if the patient be the subject of syphilis.

7. Much of what I have just said applies to the accidental inoculation of horse-pox or grease. Men looking after horses with greasy heels may contract the disease about the hands or forearms and also on the face. This fact was well known to Jenner who held the opinion that such individuals, employed in milking, transmitted the disease to cows, giving

³¹ Little: Vaccinal Lupus, British Journal of Dermatology, vol. xiii., 1901, p. 93. This paper contains a review of the subject. For other interesting facts see also Vaccine et Vaccination, op. cit., supra (note 8).

³² Report of the Leprosy Commission in India, 1890-91, Calcutta, 1893, p. 269.

³³ Hansen and Loefft's Leprosy, translated by Norman Walker, 1895, p. 103.

³⁴ Jordan on the Etiology of Erysipelas and its Relation to Pyogenic Infections, in Münchener Medizinische Wochenschrift, No. 35, 1901, p. 1371. See also abstract in British Journal of Dermatology, January, 1902, p. 78.

³⁵ W. Findlay and J. W. Findlay: THE LANCET, Feb. 22nd, 1902, p. 506.

³⁶ G. V. Poore's Milroy Lectures, THE LANCET, Feb. 25th (p. 491 and March 4th (p. 563) and 11th (p. 678), 1899. Also in the Milroy Lectures and Other Essays, 1902, p. 6. Dr. F. S. Palmer tells me he never saw a case during the 25 years that he practised at East Sheen.

³⁷ Private case-book, A, p. 254.

³⁸ Private case-book, C, p. 271.

³⁹ I am indebted to Dr. Radcliffe Crocker for permission to make use of this case which was seen by me whilst in charge of his hospital practice.

⁴⁰ MacLennan: Brit. Med. Jour., June 8th, 1901.

⁴¹ A. J. Hall: British Journal of Dermatology, vol. xii., 1900, p. 55.

rise to cow-pox, this being further communicated to other milkers who were thereby rendered immune to small-pox. The lesions occasioned by grease in man have sufficient resemblance to the cow-pox to make one think of the possibility of such an infection, especially in grooms, farriers, horse-keepers, and so forth. Bosc and Bourquier⁴² have recorded the case of a woman who according to them accidentally contracted sheep-pox (*variola ovina*) and developed variola-like lesions about the hands and forearms.

8. As to the influence of intercurrent diseases on vaccination and *vice versa* Jenner⁴³ mentions the case of a boy who the day preceding the insertion of the cow-pox had sickened with the measles. Both diseases went through their usual phases uninfluenced the one by the other except that the vaccine vesicles enlarged without any surrounding efflorescence, which appeared later, having suffered a temporary suspension on account of the measles. Jenner⁴⁴ had also noticed that papular eruptions which had long been troublesome were speedily swept away as a result of vaccination. A similar effect is noted by Dr. Radcliffe Crocker⁴⁵ as regards eczema, which may sometimes be cured by vaccination; he further observes that eczematous children, otherwise in good health, may often be vaccinated without any aggravation of the eczema. This is a point of some practical importance. Where there is danger from small-pox, vaccination should be done in such cases on sound skin, the inoculated areas being carefully protected to avoid a transference of inoculable material to other parts of the child's body.

Jenner saw scarlet fever develop on the eighth day after vaccination, but the only deviation in the respective evolution of the two conditions was just the same as in the case of measles which I have already mentioned—viz., the areola round the vaccine vesicle was delayed, but it appeared as soon as the patient got better of the scarlet fever. It was otherwise, however, with the patient's sister. Her scarlet fever rash and symptoms were interrupted in their development and were delayed until the vaccine vesicle began to subside and to dry up, when her throat became sore and the scarlet fever rash spread all over her.⁴⁶ On the other hand, Dr. Radcliffe Crocker⁴⁷ mentions a case in which the child was unwittingly vaccinated during the incubation of scarlet fever, which developed before the eighth day of vaccination. All four vaccination areas coalesced into a slough of the size of a crown piece; the child recovered. Trousseau⁴⁸ found that measles and scarlet fever arrested the vaccinia in its development, the latter resuming its course when the acute exanthem had subsided. The French observer further noted that variola and vaccinia developed simultaneously without influencing one another, whereas other observers contended that variola was favourably influenced by vaccination performed during the incubation period of the former. The fact is that it is the right thing to vaccinate as quickly as possible any unprotected individual who has been exposed to small-pox.

As to syphilis, I have not seen any complications of either the syphilis or the vaccination in the later stages of a secondary syphilide. Balzer⁴⁹ however, has recorded confluent sloughing of the vaccinated areas. Such a complication might depend on various factors. And it would be interesting to know if vaccination is influenced by chronic poisoning by alcohol, lead, and so forth, or by drugs. If any readers know of any such facts I shall be glad of information on the point. Trousseau⁵⁰ remarks that congenital syphilis either in the latent or florid state does not influence vaccination.

Dr. E. W. Goodall and Dr. C. Basan⁵¹ record hæmorrhage into and around the vaccine vesicles in a girl, 11 years of age, who had been vaccinated a few days before an attack of diphtheria. She exhibited at the same time purpuric lesions about the extremities and on the trunk with bleeding from the nose and mouth. About 11 days before the purpura she had been injected with 6000 units of antitoxin; this was

followed by some urticaria which rapidly disappeared. Dr. Goodall and Dr. Basan exclude the antitoxin as the cause of the hæmorrhages and rightly, I think, attribute it to the diphtheria poison itself. Trousseau⁵² long ago pointed out that petechiæ, epistaxis, and ecchymoses occurred in diphtheria. I have not seen vaccination influence an existing widespread psoriasis one way or the other, but psoriasis papules may appear on recently or old vaccinated areas occasionally. Nor have I seen bad effects from vaccination in obstinate urticaria, although *a priori* one would expect an aggravation of the latter condition.

9. These considerations lead me to vaccination as a mode of treatment. It is well known that nævi can sometimes be cured by vaccinating upon them. Care must be taken to scarify such very lightly. Jasiewicz has gone extensively into the prophylactic and curative action of vaccinia as regards a variety of infectious diseases.⁵³ This aspect of the matter has been dealt with to some extent in my previous remarks. But here Jasiewicz recommends the vaccine virus as a therapeutic agent on the principle that one toxin may neutralise or counteract another. It may be pointed out, however, that by adding its own effects to those of the toxin already present in the body it may make matters worse. That one disease may influence another beneficially is illustrated by what has been observed with regard to erysipelas, a spontaneous attack of which on the face, for instance, may act favourably on a lupus vulgaris. This is the idea underlying the use of Coley's fluid.

It would appear that vaccination has benefited whooping-cough, a fact which Delobel and Cozette state was known to Jenner, but I have not come across the point in the papers of Jenner I have perused.⁵⁴ Indeed, the French writers whom I have just mentioned say that they have personally observed whooping-cough to be cured by vaccination.⁵⁵ Influenza and pneumonia have also been improved, it is said. It has been observed by Beaven Rake that leprosy was arrested in its development by vaccination.⁵⁶ Of course, in leprosy it is sometimes difficult to tell what is due to treatment, as spontaneous involution of lesions may occur, and amelioration may take place for a time without any active treatment at all. As to phthisis, Tyndal has seen the febrile and other symptoms improve after several subcutaneous injections of two drops of calf lymph in 15 drops of distilled water and one gramme of glycerine.⁵⁷ Winogradoff, having noticed that an intercurrent attack of variola improved pulmonary tuberculosis, is said to have also obtained good results from systematic subcutaneous injections of calf lymph in that disease.⁵⁸

This concludes my survey of a subject of great interest. I have only taken a bird's-eye view of it, for exhaustively dealt with it might be almost indefinitely expanded, the literature connected with it being enormous. It now remains for me to summarise. The upshot of my remarks is the necessity for scrupulous cleanliness. The operation is a trivial one but any interference with the continuity of the skin, however small, opens the door to infection. We can always learn something from opponents and rivals—that is, if we are not above being taught. The criticism of those who are against vaccination has directed attention to the necessity of all-round cleanliness in vaccination. The next point of importance is the calf lymph. It should be carefully prepared on the lines which experimental investigation has proved to be the right ones, absolute cleanliness being an essential feature. After the operation the vaccinated areas should be properly protected from the patient's nails and so forth. In this way preventable rashes and complications will be prevented. On the other hand, there are certain factors which are not under our control, such as idiosyncrasy, renal inadequacy, cardiac insufficiency, and so forth; but the eruptions which arise in these cases are usually of an evanescent and trivial nature. When several patients are vaccinated at the same time with the same lymph, these individual factors are brought out: one patient will have a rash, the others exhibiting nothing of the kind.

The employment of the "*lancettes plumes*" on a metallic

⁴² Bosc and Bourquier: *La Presse Médicale*, No. 73 1897, p. 138. Also abstract in *British Journal of Dermatology*, vol. ix., 1897, p. 459.

⁴³ Jenner: *Further Observations on the Variolæ Vaccinæ*, 1799. See Crookshank, loc. cit., supra (note 4), p. 138.

⁴⁴ Jenner: *On the Varieties, &c.* 1804 (*vide* note 4).

⁴⁵ Radcliffe Crocker: *Op. cit.* (note 9), p. 324.

⁴⁶ Jenner: *A Continuation of Facts and Observations, &c.*, 1801; *vide* Crookshank, *op. cit.*, supra (note 4), p. 261.

⁴⁷ Radcliffe Crocker: *Op. cit.* (note 9), p. 325.

⁴⁸ Trousseau: *Op. cit.*, pp. 65 and 66.

⁴⁹ Balzer: Cited by Radcliffe Crocker *op. cit.*, supra (note 9), p. 325.

⁵⁰ Trousseau: *Op. cit.*, supra (note 2), p. 65.

⁵¹ Goodall and Basan: *THE LANCET*, Nov. 30th, 1901, p. 1492.

⁵² Trousseau: *Op. cit.* (note 2), pp. 363 et seq.

⁵³ Jasiewicz: *Bulletins et Mémoires de la Société de Médecine Pratique*, 1890, p. 453. Cited by Delobel and Cozette in *Vaccine et Vaccination*, *op. cit.*, supra (note 8), p. 116.

⁵⁴ Jenner: cited by Delobel and Cozette, *vide op. cit.*, supra (note 53), p. 118.

⁵⁵ *Op. cit.*, supra (note 53), p. 118.

⁵⁶ Rake: Cited in *op. cit.* (note 53), p. 119.

⁵⁷ *Op. cit.* (note 53), p. 119.

⁵⁸ *Op. cit.* (note 53), p. 120.

holder, a plan originally recommended by Mareschal, a French army surgeon (*vaccinostyle individuel*), will be found useful. After vaccinating a patient the pen is thrown away and a fresh one used for the next case.

Upper Gloucester-place, N.W.

A SECOND CASE OF SUCCESSFUL OPERATION FOR PERFORATION IN TYPHOID FEVER.¹

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THE patient was a boy, aged 10 years, who was admitted into St. Bartholomew's Hospital under the care of Dr. Norman Moore on Sept. 1st, 1900. He was in the third day of an attack of typhoid fever and beyond the fact that the case was severe and prolonged it called for no special comment except that after the temperature had come down to normal on the thirteenth day he suffered from a severe relapse on the twenty-first day and had again a very high temperature, reaching 105.4° F. on one occasion. The date of the relapse was Sept. 19th. On Oct. 1st the temperature was still above normal (101°) and tympanites, which had been present throughout, was still well marked. There was also some crepitation at the bases of the lungs. On the 2nd, after a slight shivering fit, the patient became blanched and cold, the temperature sinking to 97.6°, but there was no subsequent evidence of hæmorrhage or pain. On the 3rd he seemed to be better but the temperature was still 101°. The abdomen was less distended and the bowels acted without enemata. On the 4th the temperature was normal but the abdomen was again distended. The pulse was 96. A little before 3 P.M. he complained of some difficulty in micturition and while passing urine he was seized with severe pain in the abdomen. The temperature half an hour earlier had been 102.6° but after the attack of pain the patient sweated profusely and it dropped to 98°. For the next half hour the boy was screaming with pain and was exceedingly restless. He then became quieter and collapsed, with sunken eyes, a cold sweat, and shivering. The pulse had gone up meantime to 140. I saw him at 4.30 P.M. with Dr. Norman Moore and found his general condition to be as above described. The abdominal wall was hard and fixed during respiration and I agreed with Dr. Norman Moore that perforation had almost certainly taken place and quite concurred in his proposal that an operation should be undertaken at once. At 5 P.M. therefore, two hours after the symptoms of perforation, the abdomen was opened in the middle line and at once free gas was found in the peritoneum. A considerable quantity of almost clear fluid welled up but there was no large collection of faecal matter. The intestines were so much distended that several coils had to be allowed to extrude and they were kept wrapped in hot towels. Many areas of inflamed peritoneum indicated the affected Peyer's glands. I then sought for the cæcum and after finding it I rapidly passed the small intestine through my hands till I found a perforation situated less than two feet from the ileo-cæcal valve. The bowel was not adherent or otherwise altered nor could any induration be felt in its walls, but the peritoneum corresponding to the shape of a Peyer's patch was very red and injected. The opening in the intestine was quite small, being not much larger than a pin's head. I wiped the bowel clean and then closed the opening by five Lembert's sutures of fine silk. The greater part of the incision was now closed and a glass drainage-tube was placed in its lower end. Owing to there being no complications the operation was completed in about 20 minutes and at the end of it the patient's general condition was none the worse for the handling and exposure of the bowel. The peritoneum was not douched but the intestines were carefully wiped clean and all fluid was completely mopped up from the pelvis and elsewhere with sponges. For several days the boy remained very ill and in the early morning after the operation the pulse was still 150, the temperature being 100.4°. There had been no sickness and flatus was passed. The patient

was fed by nutrient enemata and only a little water or ice was given by the mouth. The abdomen remained distended. After this time there was steady and rapid improvement except for some sickness on the 7th and a troublesome cough, so that by the 10th (six days after the operation) the boy seemed to be convalescent. On that day, however, he had a slight epileptiform attack and in the evening a more severe series of fits, necessitating the administration of chloroform. This threw him back and weakened him but he again rallied and in spite of a return of severe convulsions on the 20th he ultimately recovered. The tympanitic distension of the abdomen which had been so marked throughout continued till the end of his illness. I saw the boy some months later and found him to be in excellent health.

I have already recorded a similar case of operation for perforation of typhoid ulcer in vol. lxxx. of the Transactions of the Royal Medical and Chirurgical Society (in conjunction with Sir Lauder Brunton) and in that case also, which had a similar satisfactory ending, the patient was operated upon late in an attack of typhoid fever, for he was in the sixth week of the illness and was at the time suffering from a relapse. In that case there were much induration of the perforated Peyer's patch and some consequent difficulty in suturing the aperture, but in all other respects the cases had much in common except that at the time of the operation the boy whose case I now record was much more ill than was the first patient and that there was greater distension of the abdomen.

The two cases represent the only patients I have operated upon and there can be no doubt that they represent two lives saved. On the other hand, however, I do not regard them as at all typical cases of typhoid perforation but rather as typical of a special class in which perforation occurs after the fever is practically over and in which the general condition of the patient is otherwise relatively good. In such patients as these the symptoms of perforation are generally well marked and the diagnosis is readily arrived at. But in very many other cases the reverse is true, for it not infrequently happens that the perforation occurs when the fever is yet high in patients who are nearly or quite unconscious and in whom there is no perception or expression of pain and who may have distended and tympanitic abdomens before perforation occurs. Many such patients are already at death's door and in not a few of such cases in addition to the perforation there are numerous other areas where the intestine is so rotten that its giving way is only a question of time. It is not to be supposed that even if an ulcerated bowel is sutured many such patients can recover and in some of them at least the operation of suture may be practically impossible. I saw at least one such case in South Africa with Dr. H. H. Tooth in which the patient was quite unconscious and manifestly dying. Dr. Tooth suspected that there might be a perforation but as the symptoms were not clear no operation was undertaken and the same day the man died. A post-mortem examination showed that the intestine was so matted and adherent to the peritoneum and mesentery that even after death it could with difficulty be unravelled and though there was a perforation I do not think that it would have been discovered by operation, even if the patient's condition had permitted one to be performed.

As surgeons we are of course entirely dependent on physicians for the opportunity of operating on cases of perforation in typhoid fever and it is evident that it is for us to convince them that operations may save life. The case which I have recorded is one in which the saving of life was primarily due to Dr. Norman Moore and in recording it I do not wish to suggest that all cases are likely to be so successful. On the other hand, I do think that in the present position of intestinal surgery there is good reason to advocate that the chance given by operation should not be withheld in any case of perforation, and I would suggest that in all such cases where perforation is suspected a surgeon should be called in as promptly as possible.

Manchester-square, W.

WESTON-SUPER-MARE ISOLATION HOSPITAL.—On Dec. 17th an additional ward, which has been recently added to the Weston-super-Mare Isolation Hospital, was formally opened by the chairman of the sanitary committee. The new ward will provide accommodation for eight patients and has been erected at a cost of £300. The hospital now contains 28 beds.

¹ A paper read at a meeting of the Clinical Society of London on Dec. 12th, 1902.