

domestic maltreatment; and as regards the remaining 4, "there were 2 cases of transient eruption and 2 cases were reported to be erysipelas commencing respectively on the fifteenth day and the eleventh day after vaccination." Similarly, in the official annual summary of the reports from the institutes in Germany we find here and there an isolated instance of erysipelas noticed as occurring after vaccination, but the total number of such cases mentioned is surprisingly few.

A consideration of the many other skin diseases which have been noted as occurring after vaccination would form a large subject; it can only be remarked here that if we eliminate personal idiosyncrasy and predisposition and the ordinary possibilities of various extraneous organisms finding their way into a wound, there seems to be remarkably little left for which vaccination, as such, can be justly held accountable.

#### *Antiseptic Precautions.*

Upon the question as to what antiseptic precautions the vaccinator ought to take in performing his operation, and in the subsequent treatment of the wound, there is every variety of opinion. At the one extreme we have those who hold that the treatment ought to be conducted with all the rigidity of asepsis which characterizes an important surgical operation; at the other end of the scale are those who believe that, provided we have good lymph and a clean instrument, we need not trouble about any danger of extraneous contamination; and then there is a large intermediary class who find contentment in the elasticity of the phrase, "with all precautions possible."

Ideally speaking, the routine would be—make the inoculation site absolutely sterile; remove all traces of disinfectant with sterilized water or absolute alcohol; apply aseptic dressings after the operation so as to exclude the entrance of extraneous organisms; and in the stage of discharge keep the dressings clean by constant renewal.

It is not part of the purpose of the present article to consider how many vaccinators actually adhere to such rules as these, or how far others may deviate from them. They are better entitled to speak for themselves on that matter. But there are certain possible difficulties which may be pointed out as apparently standing in the way of strict asepsis. There is, in the first place, the question of time. The waiting room may be crowded with patients waiting to be vaccinated, and the operator may know that he ought to work at the rate of about thirty an hour in order to get through his daily task. In such a case, unless he has several attendants to do the cleansing for him, it must be very difficult to adhere to the principles of strict aseptic surgery. Again, his subsequent inspection of the patient will probably be limited to a single visit a week later, which seems hardly enough to satisfy the requirements of the aseptic theory of treatment. Supposing the arm to be really sterile at the time of inoculation, a clean dressing carefully applied ought to be a satisfactory protection for some days. But if there are numerous bacteria left at the site of inoculation, the additional warmth of the protective covering applied will probably only tend to foster their growth. Again, in the stage of discharge, if the dressing as soon as it becomes soaked is replaced by a clean one, well and good; but if it is left on until it becomes purulent and filthy, it will simply degenerate into a bacterial hotbed, and, as by this time it has probably worked loose, bacteria from outside will make their way in, and will find in this unpleasant mess greater facility for luxuriant growth than if the wound were unprotected. It must thus be a very difficult task for the vaccinator who insists on the importance of thorough asepsis always to carry out his treatment to his own satisfaction.

With regard to the view that cleansing of the arm and protective dressings are unnecessary, the practical consequences of disregarding such precautions will probably vary with the class of patient dealt with. With a patient of thoroughly cleanly habits the chances of any harm resulting are, no doubt, very slight indeed; but with a careless subject, and still more with a person engaged in a dirty or dusty occupation, the risk is certainly appreciable.

The intermediate principle of taking "all precautions possible" may perhaps be interpreted as meaning that the methods adopted must be adjusted to the condition of the

patient. Thus we may imagine that the amount of cleansing performed will vary according to circumstances, from the application of warm water merely to soap and water, alcohol, carbolic acid, and finally to thorough surgical sterilization, and that, though protective dressings will be applied or ordered when thought desirable, they will not, as a matter of routine, be sealed down with strapping, with strict injunctions that, filthy or not filthy, the patient must on no account disturb them for a week.

From a survey of the possible contingencies we have mentioned, it appears to follow that in the general question of vaccination asepsis there is great scope for individuality of judgement.

### THE VACCINATION HISTORY OF SMALL-POX CASES.

THE importance of obtaining all the facts available as to the condition of a small-pox patient in respect of antecedent vaccination will be generally admitted. The differences which exist between the well vaccinated, the indifferently vaccinated, and the unvaccinated in liability to small-pox attack, and in severity of the disease if contracted, have long been established on a larger and firmer statistical basis than almost any other facts in medicine. Nevertheless, continued observation and record are clearly still essential, not only to control conclusions drawn from earlier and larger data, but also as a means of adding to knowledge on a number of important points of detail. Investigation of such questions as the duration of protection afforded by vaccination at one or another age; the extent to which security depends upon the area of vesiculation produced by vaccination; or the significance, *quâ* protection, to be attached to the presence or absence of revaccination scars, is essentially an affair of figures, and it is needless to point out that the larger the total number of observations available the better the opportunity of drawing correct inferences.

It is now generally understood that the mere statement that a case of small-pox is "vaccinated" or "unvaccinated" has no value for statistical purposes. Classification of small-pox deaths in this way has now very properly been abandoned at the Registrar-General's office. "Vaccinated," for example, may or may not mean that evidence of vaccination rests on the presence of a vaccination cicatrix, while the term has not infrequently been applied, without qualification, to cases vaccinated for the first time when incubating small-pox. Such cases for statistical purposes ought clearly to be kept in a class by themselves.

At the small-pox hospitals of the Metropolitan Asylums Board at Long Reach it has been the practice of the medical staff for many years to devote much care to the systematic collection vaccination data. The following are the particulars sought on admission in each case, and recorded along with notes of the patient's age, dates of admission and discharge (or death), and type of disease:

#### *Statement Made as to Primary Vaccination: for example:*

Stated to have been vaccinated.  
Not stated to have been vaccinated.  
Stated to be unvaccinated.  
Primary vaccination performed only after infection by small-pox.

#### *Statement as to Revaccination, or as to Previous Attack of Small-pox; for example:*

Stated to have been successfully revaccinated; if so, how long ago?  
Stated to have previously suffered from small-pox; if so, how long ago?  
Revaccinated only after infection by small-pox; if so, when?

#### *Vaccination Cicatrices.*

Total number.  
Their collective area in terms of a square inch.  
Fractions of cicatricial area which can be described as foveated.  
Other observations regarding cicatrices.  
Nature of evidence of revaccination afforded by cicatrices or otherwise.

*Marks of Successful (Primary or Re-) Vaccination Performed after the Case had been Infected by Small-pox.*

Their total number.

The greater portion of the data thus obtained are classified year by year in the elaborate series of vaccination tables which appear in the annual report of the Statistical Committee of the Metropolitan Asylums Board, and it is probable that in future additions will be made to these tables so as to allow certain other of the points above detailed to be exhibited in statistical form.

At provincial small-pox hospitals the practice of recording vaccination observations varies considerably. Not infrequently, owing to the stress of emergency arrangements necessary to provide hospital accommodation for small-pox cases, such records are imperfectly kept.

It is particularly desirable that the facts as to vaccination of small-pox cases should be able to be ascertained for the country as a whole, but for this to be done it is clearly essential that they should be noted in the same way at all provincial hospitals, whether large or small, temporary or permanent.

We understand that a timely proposal has been made that the Local Government Board should issue a form of vaccination register for use at all small-pox hospitals other than those of the Metropolitan Asylums Board. It is suggested that this register should be compiled from special "vaccination cards" filled up for each patient at the time of admission. From these cards, or from the register, the vaccination history of each patient can be seen at a glance. The following are the sub-divisions proposed:

Patient's name.	Age.	Address.	Date of Admission to Hospital.	Type of Disease.	Date of Discharge.	If fatal, Date of Death.	
<i>Class A.</i>							
If presenting a vaccination cicatrix or cicatrices	...	...	...	...	...	...	
							Their number. Their approximate total area in terms of a square inch. Age at vaccination.
<i>Class B.</i>							
If presenting no vaccination cicatrix or cicatrices*	...	...	...	...	...	...	
							(Stated to have been vaccinated.)
							(Not stated to have been vaccinated.) (Known to be unvaccinated.)
* Note to Class B.—Cases in which it is doubtful whether a scar or scars on the usual sites of vaccination can be referred to vaccination, and also cases in which scars affirmed to be present are obscured by copious eruption, should be placed in Class A, but an explanatory note should be added.							
<i>Class C.</i>							
If presenting no vaccination cicatrix or cicatrices, but showing marks of vaccination performed subsequent to the case having been infected by small-pox	...	...	...	...	...	...	
							Date of such vaccination. Date of appearance of eruption of small-pox.
<i>Class D.</i>							
If stated to have been successfully revaccinated	...	...	...	...	...	...	
							Are cicatrices present which may be attributed to revaccination?
							How long since last successful revaccination? Was the revaccination performed after the case had been infected by small-pox?
<i>Class E.</i>							
If stated to have previously suffered from small-pox	...	...	...	...	...	...	
							Are scars present which may be attributed to previous small-pox? How long since previous attack of small-pox?

The system here proposed has the additional advantage of facilitating the observance of Section VIII of the Vaccination Act, 1898, which requires the keeping of a "list of names, addresses, ages, and condition as to vaccination of all small-pox patients" treated at a hospital maintained by any sanitary authority. By the same section these lists are made accessible, under certain restrictions, to the public, and for this reason also is important that they should not lack completeness.

The following are a few points which may be noted in connexion with vaccination records.

Patients' statements with regard to primary vaccination should be carefully ascertained wherever no vaccination marks are observed. In the case of children inquiry should be made of the parents. It must be remembered, however, that the reliance which can be placed on such statements is often small. The statement of an adult that he is vaccinated may be a mere assumption, or be based on an imperfect recollection of what he has been told by his parents. The

uncertainty is illustrated by the not infrequent cases in which an adult will confidently assert that he is unvaccinated, notwithstanding that unmistakable vaccination scars can be found on his arm. Parents again are sometimes led to assert—contrary to fact—that their child has been vaccinated, through apprehension that proceedings may be taken against them if they admit their neglect.

Patients' statements with regard to revaccination are of special importance, as the test afforded by the presence or absence of scars is here far less conclusive than in the case of primary vaccination. The age at revaccination, and the reason which the patient furnishes for concluding that the operation was successful should be inquired into.

Vaccination scars should preferably be looked for by daylight, but it is well to remember that faint scars are liable to escape observation if the arm is in too strong a light. With ordinary care, however, the presence of vaccination scars can very seldom be missed. The rare cases in which vaccination is performed in some unusual position—for example, on a naevus\*—are worth bearing in mind. Cases occasionally arise where assertion that vaccination scars are absent is impossible: for example, a patient with extensive scars on the arm from a burn. The eruption of small-pox, even in a severe case, is very seldom so extensive on the upper arms as to interfere with observation of scars. And, as Dr. Ricketts has pointed out, proper observations may be made even when the rash is thick in this situation, provided the eruption is not far advanced. It will be noted that in the vaccination classification above referred to, it is suggested that vaccination should not be given the benefit of the doubt in cases where scars affirmed to be present cannot be observed for reasons such as those just given.

To obtain the approximate total area of scars in terms of a square inch, it is necessary to reckon on the size of each separate scar. At the Metropolitan Asylums Board hospitals, the area in the case of scars of an ordinary character is ascertained by taking a longitudinal and transverse measurement of each scar by means of a scale, and obtaining the area of a corresponding ellipse from a specially prepared table. A more ready, if slightly less exact, method is to compare the scar with a series of circles of known area, which can be kept at the hospital for reference. The area of a threepenny-piece slightly exceeds  $\frac{1}{4}$  square inch; that of a sixpence is about  $\frac{1}{2}$  square inch. At the Metropolitan Asylums Board hospitals it is usual to make separate note of puckered scars, the area of which has clearly been determined by exceptional inflammatory action supervening on the vesiculation of vaccinia.

The significance of the foveation of scars as an index of satisfactory vaccination has been frequently insisted on, and it will be interesting to observe how far foveation continues to characterize the scars which result from vaccination with glycerinated calf lymph as at present practised. Observations of foveation, however, depend far more upon the judgement of the observer than the estimation of scar area; and trustworthy conclusions can be drawn only from large series of cases observed by a limited number of individuals following precisely the same system. Such opportunities would seldom arise in the smaller small-pox hospitals of the country.

At the present day the large majority of small-pox cases are removed to isolation hospitals, and it is there that such observations as are dealt with in this article should in most instances be made. But some districts do not possess isolation accommodation for small-pox; moreover, some severe and rapidly fatal cases of small-pox are too ill to be moved to hospital. The latter cases are necessarily of first importance from the statistical viewpoint, and we would strongly urge upon all medical practitioners called to cases of this kind themselves to obtain and note at the earliest opportunity as many of the details of vaccination history as are available. Such observations are not only of much service to the medical officer of health of the district, but they have the great advantage of enabling the Registrar-General to broaden the basis on which to classify fatal cases of small-pox in accordance with their vaccination history.

\* The late Dr. Cory, it will be remembered, when vaccinating on a naevus adopted the useful plan of making at the same time a single insertion of vaccine on the arm.