omnibuses, the lifts of the Tube Railway, and similar places, where the risk of their having conveyed infection broadcast is very considerable. Such risks cannot by any amount of administrative zeal be avoided or removed. It is, however, no doubt very desirable, especially in densely crowded localities and houses, to remove each case of small-pox when recognized, and to surround it, at small-pox hospitals, with a cordon of people well protected by efficient vaccination. The duty of doing this has been assigned to the Metropolitan Asylums Board, a body which was created by the Metropolitan Poor Act of 1867. Its managers number 73. Of these, 18 are nominated by the Local Government Board, and the rest are chosen by the Boards of Guardians from among themselves. The Asylums Board is under the immediate control of the Local Government Board, and it is in no way responsible to the borough councils or vestries. It is defined as a "sanitary authority for the prevention of epidemic disease;" it would be more accurate to speak of "the limitation" rather than "the prevention" of such disease. It deals with infectious fevers, small-pox, and diphtheria, and also with defective children and imbeciles. It takes charge of the ambulance service of London. It has under its care twelve large fever hospitals, small-pox hospital ships on river and land, convalescent hospitals, land ambulance stations and wharves, hospitals for imbeciles, etc. Admission into any one of the hospitals under the Asylums Board is not equivalent to receiving parochial relief or alms, although the expenses incurred for the maintenance of such person are paid by the guardians of the Poor-law union from which he is received, and though the guardians are repaid out of the Metropolitan Common Poor Fund.²

The arrangements for removing small-pox and other infectious cases promptly, once they are recognized, are excellent. The failure in the case of small-pox to arrest an epidemic is not due to bad administration, but to the inherent impossibility of doing what is aimed at by means of isolation.

REFERENCES.

¹ See Report of the Medical Officer of Health for Liverpool, 1902. ² Public Health (London) Act, 1891, Sect. LXXX (2), (3).

BIBLIOGRAPHY.

The Public Health (London) Act, 1891; Macmorran. The Law relating to Poor-law Medical Officers and Vaccination, 1901; Dr. Greenwood. The Law of Public Health; Glen and Jenkin, 1899, 2 vols. Encyclopaedia of the Laws of England, vol. x (Public Health). *Hazell's Annual*, 1900, 1902. *Whitaker's Almanack*, 1902. The New Order of the Local Government Board on Vaccination, October 21st, 1898. Judgment of Court of Appeal (Moore v. Keefe), *Times*, March 6th, 1902.

VACCINATION PROBLEMS FOR PARLIAMENT.

By J. C. McVAIL, M.D.,

Medical Officer of Health for the Counties of Stirling and Dumbarton.

THE Royal Commission on Vaccination recommended in 1896 that one of the principal changes which they suggested in the vaccination law—the passing of the "Conscience Clause"—should be made only experimentally for a period of about five years. That recommendation was accepted by Parliament as regards the whole of the Vaccination Act of 1898, which remains in force only until the end of next year—December 31st, 1903.

It is not conceivable that when the time comes the Act will simply be allowed to lapse without anything taking its place. It may be re-enacted without alteration, or fresh legislation may be introduced. The latter course is the proper one, and if there is to be fresh legislation it will have to be carried out by Parliament next year, so that between now and then Government—for it may be assumed that any new Act will emanate from Government—will have to consider and mature its proposals to be embodied in a new Bill.

It therefore now behoves the medical profession and the British Medical Association to consider without delay what action should be taken in the way of advising and influencing Government in this matter so important to the public welfare. The purpose of the present article is to direct attention to the principal questions requiring attention.

These overlap and are closely interlaced with each other, but may, perhaps, be most conveniently dealt with in the following order:

1. The local authority for the administration of the Vaccination Acts.
2. Efficiency of vaccination.
3. Public and private vaccination.
4. Calf lymph supply.
5. Revaccination.
6. The Conscience Clause.
7. Small-pox hospital accommodation.

1. *The Local Authority for Administration of the Vaccination Acts.*

There is a general consensus of opinion that Boards of Guardians are not the proper bodies for carrying out the Vaccination Acts. Their other functions have relation only to the Poor Law. Vaccination is essentially a public health measure, and its administration should be in the hands of that local authority which has charge of all other public health measures. This has always been obvious in theory and is becoming more and more obvious in practice. When small-pox breaks out in a locality the sanitary authority has the duty of removing cases to hospital and disinfecting premises and keeping contacts under observation, but to prevent small-pox it is most important that contacts should be immediately vaccinated and that all susceptible individuals in a threatened community should have every public facility for their vaccination or revaccination. At present in order to have this policy given effect to the sanitary authority requires to apply to the Poor-law authority. Clearly there must be some loss of time here, and clearly also the public body not charged with protection of the public health but responsible for the expense of public vaccination may take quite a different view of the urgency and necessity of the case from that taken by the other public body. Various examples have recently been published of the apparent inability of some local Poor-law Boards to grasp the elementary principles of sanitary administration. Being in the habit of dealing only with paupers, they seem to think that acceptance of the services of the public vaccinator is an act which takes undue advantage of the guardians and pauperizes the individual. Hence it is that complaints have been made at meetings of guardians that people able to pay privately have gone to the public vaccinator, and it has even been proposed to advertise the names of those so acting. But, as has been pointed out in the *BRITISH MEDICAL JOURNAL*, a man is no more pauperized by having his family vaccinated out of the public funds than he is by having them educated at a Board School.

One consideration bearing on the transfer of vaccination administration to sanitary authorities remains to be noted. The composition of Boards of Guardians has not infrequently been injuriously affected by elections fought specifically on the question whether the Vaccination Acts should be carried out bona fide, or should, as far as possible, be evaded. A man who is elected simply because he is an antivaccinationist is not likely to be, with regard to the general work of the Board, the best man for the post. It would be deplorable if the general character of local sanitary authorities, whose functions are of so much public importance, came to be lowered through the transference to them of the administration of the Vaccination Acts.

That danger, however, is probably less now than it was before. The present interpretation of the law lays on vaccination officers the duty of taking legal proceedings independently of the views of the guardians on the enforcement of vaccination. Antivaccinationists have attempted to incite Boards of Guardians throughout the country to object to an official paid by them acting independently of them in this matter; but their efforts, which no doubt have had opposition to vaccination as part of their ultimate purpose, have not perhaps met with any great measure of success. At the same time Government certainly ought to endeavour to remove as far as possible everything open to criticism in their dealing with vaccination, and there seems no good reason why such work should not be put into the hands of public prosecutors who would not be either wholly or partly the paid servants of local authorities. Some such reform should be kept in view if the administration of the Vaccination Acts is to be handed over to the sanitary authorities. It need hardly be pointed out here that the whole scope and purpose of prosecutions is closely related to the Conscience Clause, which is considered later on in this article.

2. *Efficiency of Vaccination.*

In these days much is heard of the question of efficiency in all matters relating to the government of this country. Efficiency of vaccination, as depending on the thoroughness with which the operation is performed, has long been acknowledged to be of great importance, but the law has not yet done anything whatever towards its attainment. The Vaccination Acts contain no statement of either the area or the number of vesicles to be regarded as constituting efficient vaccination. For the purposes of the law one vesicle is as good as four, and a pinhead size as half a square inch or more. Any new Vaccination Act ought to provide that every certificate of successful vaccination shall state the number of vesicles attempted, the number produced, and their total area. Also, whatever be done regarding any extension of the field of public vaccination, as discussed in the next part of this article, no payment should be made from public funds in respect of any vaccination falling short of whatever standard might be specified in a new Act. It would, however, be of no use to insist that children primarily vaccinated in only one small place should be revaccinated at once. Experience shows that even one small genuine vaccine vesicle makes it practically impossible to successfully revaccinate immediately afterwards. But the facts about all persons thus insufficiently vaccinated should at least be put on record so that the fair fame of vaccination may no longer suffer from inefficiency in performance of the operation. At the same time it might be arranged, perhaps through an Order of the Local Government Board if the matter were regarded as too minute for direct legislation, that parents lodging certificates of such inefficient vaccination should have handed to them a printed memorandum pointing out the incompleteness of the protection received and the importance of its renewal so soon as susceptibility to vaccination had returned. This question of efficient vaccination is further dealt with under the next heading.

3. *Public and Private Vaccination.*

It has been frequently urged that every medical man who chooses to undertake the work should be regarded as a public vaccinator. There is much to be said for this view, though it is not to be denied that reasons can be advanced against it. Taking first what can be said in support of it, public vaccinators at present are all, or very nearly all, in private practice, and it is obvious that difficulty may easily arise between them and the regular medical attendants of families whom they are required to visit officially in order to offer vaccination. There are already more than sufficient opportunities for misunderstanding and friction between medical men, and there is no reason why these should be added to as the Vaccination Act of 1898 has done.

But that is only a minor reason for the change here considered. The public interest is very directly involved. In the first place, it is mere common sense to suppose that if every medical man could act as public vaccinator, the practice of vaccination and revaccination would be promoted throughout the country, and fewer persons would remain unprotected against small-pox. In the second place, it seems likely that on the whole the average efficiency of vaccination, as regards number and area of vesicles, would also be promoted.

The Vaccination Order of October 18th, 1898, includes the following instruction: "In all ordinary cases of primary vaccination the public vaccinator must aim at producing four separate good sized vesicles or groups of vesicles, not less than $\frac{1}{2}$ in. from one another. The total area of vesiculation resulting from the vaccination should not be less than half a square inch." Notwithstanding this instruction, the force of circumstances some time ago caused the Local Government Board to accept, in exceptional circumstances, a lower standard of efficiency of public vaccination, two marks not being absolutely excluded as a substitute for the four marks above specified. The reason is that in some communities medical men are to be found who are willing so far to yield to the pressure of ill-informed parents as to vaccinate in one place only. Indeed the columns of the BRITISH MEDICAL JOURNAL showed a while ago that at least one man possessing a medical diploma, and not professing to be an antivaccinationist, held that one mark is as protective as three or four. Where this is so, there

is risk of some part of the less educated public resorting to such medical men instead of to public vaccinators who persist in making four marks. The Board, therefore, rather than have one-mark vaccination prevailing in a locality, did not see their way to entirely prohibit a public vaccinator who communicated with them on the subject from making only two marks instead of three or four. If every medical man in the country were to have a right to obtain payment as a public vaccinator for every vaccination done by him according to the required standard, men who make a practice of one-mark vaccination would have fewer people resorting to them, and the average of vaccinal protection throughout the country would probably be appreciably raised. Under the Conscience Clause there should be no need for any medical man yielding to the solicitations of nervous or foolish parents to make only one small mark on the baby's arm. Vaccination ought to be thoroughly done or not done at all, and any parent objecting to a sufficiency of area or number of marks should be sent away either to ask for a certificate of exemption or to return in a better frame of mind.

Two important objections have been made to any proposal that all medical men should, if they so desire, become public vaccinators. The first is that public vaccinators under present circumstances have special experience and skillfulness in their work, and may be expected to attain to a higher standard of insertion success than practitioners who vaccinate only their own private patients. It seems reasonable to believe that this must be the case. In the second place, public vaccination is at present under systematic inspection by the medical staff of the Local Government Board, and such inspection would be practically impossible if the number of public vaccinators were indefinitely multiplied. There is no doubt that this is so, and the fact has to be faced. All that could be substituted for the present excellent system would probably be a practice of surprise visits on the part of the Board's inspectors, or by medical officers of health not engaged in private practice. It would be the duty of a medical man, when sending in for payment his list of vaccinations, to certify quite definitely that at least once subsequently to the operation, but not earlier than eight days after it, he had inspected the arm, and that the Government standard of success had been attained in every case. Any false statement regarding any case on the list should subject the medical man to a severe penalty. It might even be for consideration whether a discovered repetition of false certificates should not be regarded as "infamous conduct in a professional respect," and fall to be dealt with accordingly by the General Medical Council. In this matter there would need to be no hesitation in acting with the utmost stringency. Such a system of surprise visits and severe penalties for false certification would not, I believe, be nearly so good as the present inspection by the Local Government Board's medical staff. The question therefore is, on which side does the balance of advantage lie? My own conclusion is that, as compared with the present system, the balance is in favour of conferring the status of public vaccinator on every medical man who desires the work.

It may be asked whether there is no other alternative to the existing system. There is another alternative, and it would consist in the appointment of a body of public vaccinators who should be entirely debarred from private practice. In this way the number of public vaccinators, instead of being indefinitely increased, would be strictly limited, and the supervision of them by the Local Government Board would be easily maintained. Being debarred from private practice, they could create no jealousies among the rest of the profession. If the local sanitary authorities were appointed to administer the Vaccination Acts, the offices of public vaccinator and medical officer of health might in some cases be combined, and if both vaccination and revaccination were made legally obligatory this department of work would be pretty regular in the amount of time required to attend to it.

I do not attempt to compare these two suggested schemes. Intimate departmental knowledge would be required to measure up in detail their relative value.

4. *Calf Lymph Supply.*

Relating to this same subject of public and private vac-

cination is the question of the supply of glycerinated calf lymph. The present state of things is certainly unsatisfactory. Either the production of vaccine lymph should be entirely in the hands of Government, or else private makers should be under Government supervision. In this way there would be greater security than at present as to the activity and purity of lymph, and in saying so I gladly acknowledge the general high quality, especially as to activity, of the material produced by firms throughout the country. If every medical man had the right to become a public vaccinator, and if the Local Government Board felt unable to accept the responsibility for keeping up a lymph supply sufficient for the requirements of the whole country, then the present system by which public vaccinators can always obtain Government lymph would no doubt have to be modified so that they could get some of their lymph elsewhere, but it would still be lymph sent out from places under Government inspection. The other course would be for Government to undertake the whole work itself. That might involve hardship to various individuals whose records of work are unimpeachable and whose supplies of lymph have been of the greatest value in times of need. Such facts ought to have full consideration given to them, and it occurs to me that the hardship might be minimized if present makers of lymph had the opportunity of being placed on the Government staff, which would obviously require increase under the circumstances indicated. That is a suggestion which may be valueless or impracticable; but, however the change may be brought about, the essential point is that no lymph should be used in this country unless produced by Government or under Government supervision. If every medical man were made a public vaccinator, means might require to be taken to prevent waste of lymph through practitioners asking for more than they really required. A small charge for every tube sent out should meet this difficulty; but that also is a detail.

5. Revaccination.

It is well known that when the Vaccination Act of 1898 was before Parliament, it was passed by the House of Lords only on the promise that the question of legislation for revaccination would be considered without delay by Government, with the view to its being dealt with in the next session of Parliament. Whatever consideration the question may have received, no legislation has yet been introduced. The contention of the Council of the British Medical Association has been that primary vaccination and revaccination should be placed on exactly the same footing as regards legal obligation towards their performance.

It need hardly be pointed out here that revaccination is a national requirement if the country is to be kept free from small-pox epidemics. If Parliament, in its wisdom, were to conclude that primary vaccination need not be in any degree compulsory, it should adopt the same conclusion as regards revaccination. If, on the other hand, Parliament determines that obligation towards primary vaccination shall remain as at present, or shall be made stronger, it should put obligation towards revaccination exactly on the same footing. Both are necessary for the public protection, and they should stand or fall together as matters of legislative concern. If the Conscience Clause is to remain on the statute book it should apply to both. The machinery for carrying out a law of revaccination is to be found in connexion with the Education Acts. Before a child leaves school, or say, at the age of 12 years, his parent or guardian should be called on to procure his vaccination, and if the parent or guardian neglects to do so, and at the same time neglects to take advantage of any Conscience Clause that may be in force, he should be subject to the same penalties as for neglect of primary vaccination. The same public facilities should be given for the performance of both operations, and what has been said regarding extension of the system of public vaccination applies alike to both.

It is very possible that many children whose primary vaccination had been omitted on account of so-called conscientious objection might be vaccinated at twelve years of age after the subject had once more to be definitely faced by the parent. The suggestion has been made that if the Conscience Clause is to remain relative to primary vaccination, the law should again come into force with regard to exempted

children at the time of their entering school, so that all found unvaccinated at the age of about five years would be subjected once more to the provisions of the law, including once more the possibility of relief afforded by the Conscience Clause. Such a scheme might quite possibly turn out very useful, but on the whole, taken along with revaccination at twelve years of age, it seems somewhat complicated, and conceivably might have the effect of rather encouraging neglect of infantile vaccination, the parent keeping before himself the alternative of primary vaccination at the time of the child's beginning school life.

(6) The Conscience Clause.

Discussion of legislation for revaccination has necessarily introduced reference to the Conscience Clause, which has now to be further considered.

It cannot be too clearly pointed out or too often repeated that the purpose of the Royal Commission in recommending a Conscience Clause was not to lessen but to promote the practice of vaccination, by robbing the antivaccination agitation of perhaps its most powerful weapon. An outsider like the writer of this article has a difficulty in reaching any very decided judgment as to what has really been the result of the policy propounded by the Royal Commission and adopted by Parliament. Indeed, looking to the fact that other agencies besides the Conscience Clause have come into play—as the alteration of the obligatory vaccination age from 3 months to 6, the introduction of domiciliary vaccination, and the use of calf lymph instead of humanized lymph—it may be difficult even for those most directly interested in the question in England to dissociate and appraise the influence of the Conscience Clause. So far, however, as can be gathered from Parliamentary returns and medical journals, and the doings of antivaccinationists as reported in the press and in their own organ, the Conscience Clause seems to have had a really beneficial effect in helping the vaccination machine to work more smoothly, and consequently in promoting the practice of vaccination. The one outstanding fact which appears to me to outweigh in favour of its continuance all considerations to the contrary, is that it makes more easy the achievement of a national system of revaccination by legislative means. It is not sound reasoning to argue that if Parliament believes that universal primary vaccination and revaccination will prevent small-pox epidemics, therefore primary vaccination and revaccination must be made absolutely compulsory. The statesman may admit all that is claimed for vaccination, and yet may argue that a system of rigid compulsion might in this country be attended by political evils more serious than small-pox epidemics, and it does not belong to the medical profession as such to pronounce a final verdict as to the duty of Government and Parliament in circumstances like these. Looking plain facts in the face, however, a Revaccination Act apart from a Conscience Clause can hardly be expected, and might not work well if it were obtained. Still less can it be expected that Parliament would accept a Conscience Clause regarding revaccination without also continuing to apply it to primary vaccination. In the interests of the public welfare, therefore, it seems to me that the medical profession should rather accept a Conscience Clause as a basis for a revaccination law, than endeavour to have it repealed with regard to primary vaccination. That is an opinion which I would be inclined to hold even if it could be shown that the Conscience Clause had not so far promoted the practice of primary vaccination. Obviously the greater the neglect of primary vaccination the more need there is in school life for the protection against small-pox of those whose vaccination had been omitted, and who had been fortunate enough to escape attack by small-pox up to the age usually looked on as suitable for revaccination.

If we assume that the Conscience Clause is to be continued in the statute book, the question remains whether its provisions can in any way be improved. The original intention was that it should differentiate in a practical though somewhat rough and ready fashion between parents who might be regarded as having a definite and genuine objection to vaccination and other parents whose omission to protect their children would be due merely to indifference. The Conscience Clause was to operate by compelling every objector to take at least as much trouble to procure the exemption of his

child as to procure its vaccination. The trouble was to consist in the father requiring to attend a law court, and there make a declaration on oath that he seriously objected to vaccination. This was to involve some loss of time in every case, and might no doubt also involve some loss of money. In practice, however, the clause has not been administered with anything like uniformity throughout the country. In some places every facility has been given to diminish the time and trouble involved in registering conscientious objection. Mothers instead of fathers have been allowed to attend. Courts have been specially held at hours fixed to accommodate or encourage objecting parents, and the whole proceedings have been made as easy as possible, or reduced even to a farce by magistrates professing strong sympathy with antivaccinationists. On the other hand, a good many magistrates have erred in the opposite direction, and have refused to grant certificates to parents who have taken all the trouble that Parliament intended, to try to satisfy the magistrates of the reality of their objection to vaccination. Parents have been cross-questioned or bullied, and in the end certificates have sometimes been refused on the ground that the magistrates have not been "satisfied." For the proper working of the law a perfectly definite procedure should be enforced by Parliament, so that both of these faults would be avoided in future. There should be a clear statement of the hours when courts might be held, and of the forms requiring to be gone through, and of any fees exigible for certificates.

7. *Small-Pox Hospital Accommodation.*

Growing knowledge of the evil effects of small-pox hospitals on surrounding populations is not without a bearing on the question of legislation for revaccination. If vaccination and revaccination were universal there would be no need for small-pox hospitals. In the entire absence of vaccination and revaccination small-pox hospitals would be of practically no use, as epidemics would freely spread in spite of them. The present position being midway between these, small-pox hospitals do give an opportunity for treating cases of the disease whilst vaccination and revaccination are being carried out. But every epidemic of small-pox shows more and more clearly the dangers attached to such hospitals. Where they are in use on any large scale near any considerable population they are very likely, if not quite certain, to have the effect of spreading small-pox in the surrounding neighbourhood. The facts give very strong evidence that the spread is both aerial and by contact, and indeed it seems to defy every preventive measure.

If these conclusions are sound they raise some very serious questions. Where are sufficiently isolated sites for small-pox hospitals to be found? What right has a city community to determine that the residents in any particular locality within its own bounds, or in the country near it, shall be exposed to the risk? No doubt the city may say to the people of the selected locality, If you only take the trouble to get fully protected by vaccination and revaccination you will have no need to fear the propinquity of our hospital, even if it be full of small-pox patients. But, obviously, the people so addressed may retort to the city, If you all get vaccinated and revaccinated you will not require a small-pox hospital, but if you must have one then set it up among yourselves.

The financial question also is of some consequence. If in any community the majority of the people are willing to attend to their own vaccination and revaccination, and so to prevent their requiring incarceration in a small-pox hospital, why, they may ask, should they have to bear a share of the cost of building a hospital, and of nursing and maintaining therein persons who have refused or neglected to protect themselves?

From a practical point of view some heed must be given to the obvious fact that such hospitals are least harmful where the surrounding population is smallest in amount, and to evidence that small-pox hospitals are not so likely to prove centres of infection if the patients in them are very few. If vaccination and revaccination were obligatory in this country, there would be so little small-pox that very little hospital accommodation would be required, and there would be very little opportunity for the hospitals doing any harm. But

so long as vaccination and revaccination are neglected the hospital difficulty will remain, and it constitutes an additional reason for bringing legislation for revaccination into line with that for primary vaccination.

THE COMPLICATIONS OF VACCINATION.

By T. COLCOTT FOX, M.B., F.R.C.P.,

Physician for Diseases of the Skin to the Westminster Hospital, and to the Skin Department of the Paddington Green Children's Hospital; formerly Physician to the Victoria Hospital for Children and Medical Superintendent of the Fulham Small-Pox Hospital.

In a healthy subject the inoculation of pure vaccine lymph is followed by local manifestations of a very definite character, with periods of incubation, evolution, and decline, and by general symptoms, which we do not need to describe here. These symptoms, local and general, vary within certain limits, and, when they pursue a certain definite and recognized sequence the vaccinia is to be considered normal. Some variation will probably always occur, in so far as it depends on the state of the tissues of the subject, and on modifications in the activity and amount of the vaccine lymph inoculated; but a greater uniformity will be reached as the preparation of the vaccine lymph becomes perfected, and as the best method of vaccination, including after-treatment of the pocks, becomes more generally adopted. The reaction may vary considerably in intensity, and a successful revaccination in the adult is generally accompanied by more intense inflammatory phenomena than a primary inoculation in a child (Brouardel). The reaction to calf lymph is also apt to be somewhat more severe, with more local swelling, oedema of the arm, adenitis, and radiating pains.

At present it is not rare to meet with variations from the normal which must be set down as abnormal, and they chiefly depend on the condition and susceptibilities of the subject, on the quantity and quality of the virus and its contamination with undesirable organisms, on the degree of disinfection of the skin, on the method of inoculation, and on the subsequent treatment of the pocks and contamination from without.

A *Lancet* Special Commission which investigated all the glycerinated calf lymphs on the market and the Local Government Board lymph, had the satisfaction of reporting¹ "that although the lymphs then on the market differed very greatly as regards their bacterial purity, they were, taking them as a whole, eminently satisfactory." And in a further report² the Commission confirmed this conclusion, but added that "there is still room for improvement, since there is yet much diversity in respect to the degree to which extraneous bacteria are present." "The results," it is added, "of the investigation carried on by the Commission appear to indicate still more clearly that the efficacy of the vaccine is not necessarily impaired in those cases in which the glycerinization has been carried to such a point that practically all the bacteria have been got rid of."

The vagaries, anomalies, and complications of vaccination have been fully dealt with by Dr. Theodore Acland in an elaborate and scholarly essay in Professor Clifford Allbutt's *System of Medicine*, with which every vaccinator should be cognisant. His observations refer no doubt chiefly to the old system of vaccination, but are also applicable to the modern calf-lymph inoculation. The latter, whilst exciting some increased reactionary effects, eliminates almost entirely the possibility of the inoculation of such diseases, amongst others, as syphilis, leprosy, and tuberculosis.

Many of the variations in the development of the vaccine pocks are of comparatively little importance, and need only a brief reference. For example, the incubation period varies. The pocks may develop unequally, or they may be somewhat accelerated or retarded for a fortnight or even, it is said, up to thirty days. In this connexion we may note the assumption of activity under the influence of a revaccination at points where the inoculation performed a week or more previously appeared to come to nothing. The recrudescence, or relapse, or revivifying of a pock after some weeks is said by some to be not infrequent. The cause is not clear, and the occurrence may be of little moment, but has been found