She now consented to operation, and was iridectomised with a satisfactory issue.

I will merely add that, in other cases, I have noticed that pilocarpine has been borne with comfort, where pain, after the use of eserine, has been complained of.

c. Eserine in Ocular Neuralgia.—The cases to which I refer, as those of ocular neuralgia, are characterised by severe pain in the eyeball and periocular region, and extending, it may be, over the brow in the course of the fifth nerve. There is always some hyperæmia of the ocular surface, and there may or may not be photophobia. In neither of the cases I relate presently did I satisfy myself of any increased ocular tension. The pain, in its darting, shooting, and periodical character, resembles neuralgia.

I am not yet able to satisfy myself as to the *modus operandi* of eserine in these cases; but its value in the two instances to be here recorded was unmistakable.

1. Some time since, a schoolmaster, aged about 35, consulted me under the following circumstances. He was suffering severe ocular and periocular pain, of a shooting and stabbing character—worse at some times than at others—and which for some days had rendered sleep well nigh impossible. There was some increased vascularity of the ocular surface. Vision was not affected, but effort with the eye was barely possible, and it brought on exacerbations of pain. He greatly feared that this was, as it were, the commencement of an attack similar to one he had suffered from some years previously; and which, notwithstanding a variety of treatment, had lasted for several weeks. Quinine, and then strychnine, were now prescribed without benefit. The sleepless nights and darting pains continued. He was next directed to place a gelatine disc of eserine, inside the lid, two or three times daily. The next day, he came to tell me of the almost immediate relief he had experienced. A disc had been inserted in the afternoon, and another in the evening, and he had enjoyed a comfortable night. He was desired to continue the use of the eserine; and, though in a day or two he was perfectly well, he determined to have the discs near at hand should a return of the malady ensue.

2. The next case, coming under my care shortly after the one just related, was that of a servant girl, aged about 21, sent to me by her mistress. In addition to the pain of the character and situation described in the foregoing case, there was more ocular congestion; the lids were tightly closed, and the photophobia had caused her to protect the eye with a bandage. Here the use of the eserine discs was directly prescribed, the result being equally successful—though the effect was not so immediate as in the previously recorded case.

VARIOLOUS AFFECTIONS OF THE EYE: THEIR PATHOLOGY AND TREATMENT.

By MONTAGUE D. MAKUNA, L.R.C.P.LOND.,
Late Medical Superintendent, Fulham Small-pox Hospital.

It is very singular that our writers on ophthalmic medicine and surgery—men of great ability, experience, and observation—should give so scant and imperfect a description in their works, otherwise comprehensive and elaborate, of the affections of the eye in small-pox. This, doubtless, arises from the fact that chances of observation in this particular disease seldom occur to them; while it is still more singular that extensive experience gained in our metropolitan and provincial small-pox hospitals, as well as by those experienced in epidemiology in different quarters of the globe, should contribute little or nothing to its literature, to elucidate its pathology and treatment.

It was in the year 1837 that Mr. J. F. Marson, of Highgate Small-pox Hospital, related his experience of these affections, in his 1,500 cases of small-pox, before the Westminster Medical Society. Although it is a valuable contribution, as far as the clinical observations are concerned, it falls far short of the requirements of the present generation of medical men, as, during the lapse of the last forty years that have expired, the anatomy and physiology of the eye have made such rapid strides as to bring our knowledge of them to a point of exactness. The only other descriptions of these affections in the English literature, so far as I can know, are those given in the works of Dr. W. Mackenzie (1854) and Mr. J. Soelberg Wells (1873). Although they are excellent in many respects, they are wanting in preciseness of their clinique and pathology, I presume from their want of observations; while Mr. C. Macnamara, in his work on the *Diseases of the Eye* (1872), makes no mention whatsoever of variolous corneitis—an affection that is the principal cause of loss of sight in this exanthematous disorder, especially among the unvaccinated and uncivilised communities of the globe. He

alludes to the subject of the ulceration of the cornea, I believe wrongly, meaning the former sequela of the disease. I have contributed this paper, fully anticipating that it may draw the attention of those who are far able to treat the subject, and who have had much more extensive experience, to throw better light on it.

In variola, the complications of the eye are principally confined to the eyelids, conjunctiva, and cornea. Other structures are apt to suffer by the extension of the inflammation, but it is of unfrequent occurrence in the hands of a practised physician. That suppuration and disorganisation of the eyeball does now and then occur from incipient and rapid inflammation, I do not doubt; but when one sees more of this practice, the more he is convinced that the loss of sight, due to permanent opacities of the cornea, partial and total staphyloma, or otherwise, arises from want of care and proper treatment on the part of physicians in hospital practice, owing to the severe pressure of work in an epidemic, and negligence on the part of the patients both at hospitals and at home.

Eyelids.—Pustules on the cutaneous aspect of the eyelids are not so frequent as on the other parts of the face, especially the cheeks, nose, and its surrounding parts. They are very frequently seen at the edges of the eyelids, between the eyelashes, causing a good deal of irritation and pain, destroying the hair-bulbs, and thus producing the permanent loss of eyelashes, called madarosis. If they are within the margin of the palpebral conjunctiva, they may obliterate the openings of the Meibomian glands, and cause a stoppage and alteration in their secretions. They may cause entropion. The formation of pustules on the cutaneous surface of the eyelids is accompanied with much swelling, which is soft and cedematous. But it is seen usually with that of the face in severe cases of small-pox, frequently confluent, and without any pustules on them, at the commencement of the eruptive stage. It generally lasts till the eruption has advanced to the pustular stage, and then subsides with that of the face. It causes the closure of the eyelids during this period. Again, the vitiated secretions in the Meibomian glands and discharges from the pustules on the edges of the eyelids glue them together, so that the eyes cannot be opened for days, especially when accompanied with swelling. But at last, when the disease subsides, the eyes are opened again, uninjured. It is in this way that we hear talk of persons being blind in small-pox for so many days, and recovering their sight. In severe cases, the edges of the eyelids are rendered irregular, and liable to inflammation and excoriation from slight causes, which produce ophthalmia tarsi (Mackenzie).

Treatment.—The eyes should be bathed with warm water two or three times a day. When there is a good deal of swelling, warm fomentations do well. It must be our constant endeavour to prevent the eyelids from sticking together, in order to ascertain the injury to the inner parts. This can be effected without any difficulty, by dropping a drop or two of pure castor-oil in each eye after bathing. Unguentum cetacei or cold cream might also be used with advantage. As soon as the vesicles are maturing, they should be opened up from side to side with a fine flat needle to prevent further suppuration and destruction of the surrounding structures. I have seen nitrate of silver stick applied on the outer surface of the eyelids to cause subsidence of the swelling, with no benefit. Besides, the operation is attended with irritation, pain, and disfigurement. In the entropion, the eyelashes ought to be removed to prevent irritation of the eyeball.

Conjunctivitis Variolosa.—Inflammation of the conjunctiva in small-pox stands next in point of frequency to that of the mucous membrane of the mouth, pharynx, and respiratory tract. It occurs in about 8 per cent. of the total cases, both mild and severe, vaccinated and unvaccinated, and at all ages. Variola is not unfrequently an exciting cause of conjunctivitis in children of scrofulous diathesis, and in them it is most obstinate and difficult to cure, sometimes lasting from four to ten and twelve weeks. In them it runs on to granular lids; and the detection of the first traces of the inflammation of the cornea require a careful watch. It not uncommonly occurs during the first five or six days of the eruption. It is stated by some that vitiated secretion of the Meibomian glands, pent up during the closure of the eyelids, when they are swollen, is its exciting cause. But I am not prepared to verify this statement, as I have seen conjunctivitis in cases without swollen eyelids. In many cases it is local, and situated between the lesser canthus and the cornea, in the shape of phlyctenular conjunctivitis; and I have often thought that these phlyctenulæ near the circumcorneal zone, might be the variolous eruptions. By analogy of observation, we know that the eruptions on the mucous membranes of the mouth and pharynx are first to mature and heal; as these formations last but two or three days, leaving the conjunctival inflammation behind, I am led to believe that there might be some modification of the characteristic eruption. I have seen about five or six cases of the variole on the ocular conjunctiva, and one on the sclero-corneal junc-

tion, on the outer aspect of the eye, in my nearly 1,500 cases. I have seen but one case of variola on the central part of the cornea, in my student days in Bombay. This conjunctivitis, unlike the ordinary phlyctenular form, is found more frequently in one than in both eyes. In some severe cases of confluent variety, the inflammation is diffused, and assumes the type of catarrhal conjunctivitis. Chemosis occurs in about 1 per cent. of the cases. It is more liable to occur in variola hæmorrhagica, associated with hæmorrhagic blotches and petechiæ on other parts of the body, and then it is due to the exudation of the colouring matter of the blood in the tissues of the conjunctiva and the subconjunctival layer, and not to inflammation. Sometimes it takes months and months for the colouring matter to be absorbed and the disfigurement to disappear. The granular lids are formed usually in scrofulous children, and in two of these cases, where the ulcers were detected on the palpebral layer, I thought they might be due to the remnants of the variolæ. When the eyelids are swollen, acute variolous conjunctivitis is known by the patient complaining of the pain in the eyeball, increased on attempting to move the eye or to open it; a feeling of grittiness and running of hot tears. I have seen but one case of a purulent ophthalmia in my practice. I have here sufficiently drawn the peculiarities of the affections of the conjunctiva, and I need not describe their subjective and objective symptoms, as they are fully treated in the descriptions of the ordinary cases in works on ophthalmic medicine and surgery.

Treatment.—In mild cases, dropping a few drops of sulphate of zinc lotion (three grains to an ounce), three or four times a day, is all that is needed. In other cases nitrate of silver lotion (one grain to an ounce) answers well. In some cases, where the phlyctenular vascularity is small, circumscribed, deeper, and formed of larger vessels, I dust in the eye a few grains of powdered calomel. When it is associated with inflammatory redness and thickening of the lids, I smear unguentum hydrargyri subflavum between the eyelids; it is readily absorbed by the conjunctiva, and prevents them from sticking together. In severe cases with a good deal of muco-purulent discharge, I drop solution of nitrate of silver (10 to 20 grains to an ounce), after everting the eyelids, followed, soon after, by the solution of chloride of sodium, to neutralise the excess of the silver salt, once a day, and followed during the rest of the day with cold water lint on the eye, and drops of the weak solution of sulphate of zinc. When the inflammation is chronic, solution of sulphate of copper (3 to 5 grains to an ounce); or vinum opii might be used with advantage in some cases, especially in those where there is turgidity of the circumcorneal zone, threatening cyclitis and inflammation of the deeper structures of the eye. In a few obstinate cases I have used blisters behind the ears with good results. In cases of granular lids, lapis divinus and dilute nitrate of silver points have been used. Iodide of potassium solution (3 grains to an ounce) might be used to promote absorption of the colouring matter of the blood exuded in the subconjunctival tissue in hæmorrhagic cases. Fomentation of poppy and belladonna is useful when there is pain over the eyebrows and supra-orbital headache; in these cases, smearing with belladonna and glycerine might be used with advantage. Internally I do not drug my patients much. Weak, anæmic, and scrofulous children require ferruginous tonics, as syrup of phosphate of iodide of iron, with or without cod-liver oil, chemical food, etc. In grown-up persons, tincture of perchloride of iron with glycerine and quassia, or citrate of iron and ammonia, with a vegetable tonic, are indicated. Cleanliness, fresh air, nutritious diet, form the very backbone of treatment in these affections, as in all the maladies human flesh is heir to.

Variolous Corneitis.—It has been appropriately remarked that cornea serves as an indicator of disease and malnutrition. Whatever cause induces the poverty of the blood, disease, starvation, or age, also tends to the malnutrition of the cornea, resulting in inflammation, opacity, or degeneration. It is one of the most sensitive organs of the body and is most readily affected by the slight derangements of circulation. The glow of life and intelligence of a healthy person is read in its brightness, whilst the painful anxiety and vacant stare of another depict his misery on its lifeless surface. Consequently, that acute exanthematous diseases like variola should tell on its nutrition and induce inflammation in its structure, is only natural as cause and effect, in cases where there are anæmia and exhaustion. The nutrition of the cornea is performed by dialytic action, and is dependent on the vessels of the conjunctiva and circumcorneal zone, and it is for this reason that in cases of chronic conjunctivitis opacity of the cornea is the result. The cornea is also affected in scrofulous subjects, in whom chronic conjunctivitis is of frequent occurrence. To these constitutional causes, may be added the vitiated secretions of the Meibomian glands and conjunctival tissue and granular lids as the local causes. It is an inflammatory affection, and I think it can be appropriately designated "variolous corneitis". In severe and neglected cases it is associated

with iritis, choro-iritidis, abscesses, suppuration of the eyeball, and its disorganisation. It is still described by some as "corneal ulcer", from want of correct understanding of its pathology. I cannot do here better than quote Mr. Macnamara's remarks on the general pathology of corneitis:—"The cornea we know to be a non-vascular structure; and formerly, when hyperæmia was regarded as the first and most essential step in inflammation, it was difficult to see how the cornea could be the seat of it. But now that we have learnt to look rather to the elements of a tissue, as the point of departure for inflammatory changes, and to regard vascularity and hyperæmia, however important, as accessory phenomena, the cornea becomes one of the most appropriate tissues for the study and illustration of the modern doctrine of vascular pathology."

The frequency of this affection in my cases, as well as in those of Mr. Marson, is nearly the same—viz., 1.7 per cent. It more frequently occurs in one eye than in both. It is of much more frequent occurrence during the stage of scabbing, from the twelfth to the fourteenth day of eruption, when the patient is getting over the secondary fever, and is associated with the formation of furunculæ and abscesses in other parts of the body, in severe and confluent cases. It is for this reason that Dr. W. Mackenzie describes it as "corneitis postvariola", or "secondary variolous ophthalmia". But we do come across cases, especially those of scrofulous children and others, in whom the disease has been mild and of discrete variety, where it makes itself manifest during the course of the first week, and in whom the secondary fever and subsequent exhaustion is *nil*; and the only complication is the eye affection. It generally begins at the margin of the cornea, and then extends to the centre. In rare cases, it is developed in more than one point at the same time, or is central; these cases must be looked upon with grave apprehension. It comes on very insidiously, and often without any pain or knowledge of the patient; and it requires a careful watch on the eyes of the patients to discover it early, and nip the malady in its budding stage. Occasionally, it runs on a very rapid course, involving the cornea and deeper structures within forty-eight hours. As Marson remarks, an experienced eye can sometimes prognosticate its approach, from the dull and lifeless surface of the cornea after exhaustion from secondary fever. But it is impossible to do so in mild and discrete cases of scrofulous subjects.

When the variolous corneitis commences, the surface of the cornea looks dull, dry, and, at the seat of lesion, uneven. Sometimes, the superficial or epithelial layer is raised so much, by the rapid cell-proliferation, that I was once inclined to believe that these elevations were due to the formation of vesicles; but such is not the fact. Within a few hours, this spot is rendered hazy and a white point appears, which becomes more and more extensive and nebulous. In some cases, it is attended with severe pain, and much photophobia; but these symptoms are not so frequent in this variety of corneitis as in the others. By proper care and treatment, the mischief ends here; the inflammatory exudation is absorbed, and no traces of the disease are left. But when it extends a stage further, the inflammation attacks the laminae of the cornea proper, the corneal corpuscles swell, are rendered more opaque by granular deposits in them, and are increased in number. The inflammatory exudation takes place between the laminae of the cornea proper, I believe, through the system of canals in which the processes of these corpuscles lodge. A stage further, and an abscess in the cornea is formed. This abscess is more frequently opened on the surface than in the anterior chamber, giving rise to partial staphyloma and prolapse of the iris. It is only in rare neglected and insidious cases, running on to rapid disorganisation, that total staphyloma, acute glaucoma, and suppuration of the eyeball, take place. In two of the microscopical slides prepared for me by Dr. Klein, I have seen micrococci in the anterior epithelial layer, at the seat of the inflammation. Although I am inclined to the parasitic theory of the infectious diseases, I am not prepared to class these micro-organisms in their etiology. They have been sufficiently demonstrated in all of them, but as yet as their concomitants and in their advanced stages, and not as their causation. The loss of sight in this affection is frequently due to leucoma, sometimes to partial staphyloma, and rarely to total staphyloma. When the lesion is situated in the centre, and associated with granular lids, it is in the form of a "pannus". In severe cases, it is more or less associated with iritis, and rarely with cataract. In the latter complication, I have frequently seen the lens escape; and, in one case, I have performed iridectomy, and removed the lens, through the opening of the abscess, with good result.

Treatment.—Constitutional treatment plays a prominent part in this affection. Nutritious and generous diet, that can be readily assimilated by convalescents; wines to stimulate circulation and increase the appetite; and tonics—are necessary. Locally, in all these cases, it has been my plan to use lotion of belladonna with sulphate of copper, with

tepid water, placed over the eye with a piece of lint soaked in it. I have invariably found it to answer its purpose. When it is associated with iritis, drops of liquor atropiæ sulphatis are used as usual. When an abscess forms in the cornea, it is best to open it. In one case of acute glaucoma and disorganisation of the eyeball, I performed the operation of enucleation. In cases of partial staphyloma and leucoma, it is better to wait, and leave the patients in the hands of the ophthalmic surgeons for proper treatment. In children, and in some patients, I have found it exceedingly difficult to keep their eyes at rest—an important factor in the success of their treatment—and prevent them from scratching. In these cases, I have used the Cellini eye-protectors, of which Dr. L. Herbert of Paris speaks highly. They are made of zinc, and are of two varieties, perforated and non-perforated. I prefer the latter, as they keep the eyes cool. They are of the size and shape of the eyelids, over which they are fixed by an elastic band, that goes round the head. They keep the eyelids at perfect rest, and prevent them from scratching. When worn once or twice, they are of no more trouble to the patients than spectacles are. I am not prepared to vouchsafe the physical and chemical properties claimed for them.

THIRTY-THREE CASES OF CONCURRENT VARIOLA AND VACCINIA, WITH ANALYSIS AND REMARKS.

By R. D. R. SWEETING, M.R.C.S. Eng., etc.,
Medical Superintendent of the Fulham Small-pox Hospital.

THE presence on the same subject, at the same time, of the eruptions of two febrile disorders, which are variously regarded as either essentially the same, or as allied members of the same group, is in itself of sufficient interest to be noted, were it not for the wider and deeper significance of the condition variola-vaccinia, as affording us some appreciable criterion of the modifying influence of vaccination performed during the incubation-period of small-pox. The numerous letters bearing on this subject that have appeared in the medical journals from time to time sufficiently show the widespread interest taken in the subject; and hence I have been induced to tabulate the following consecutive cases, noticed by me at the Fulham Hospital during the epidemic of the past year, and to attempt to formulate some conclusions from the data afforded.

TABLE A.—Primary Vaccination.

No.	Sex.	Age.	Day of Incubation-period* on which Vaccination was Performed.	Character of Resulting Vaccination.	Variety of Small-pox.	Result as to Recovery and Complication.
1	F.	10 years	Tenth	4 recent vesicles	Confluent	Prolonged recovery; pitting and disfigurement.
2	M.	3 "	Probably third	4 recent vesicles	Discrete	Rapid recovery.
3	F.	4 "	Third	4 recent pustules	Discrete	Recovery.
4	F.	6 "	Probably ninth	4 recent vesicopustules	Coherent	Recovery.
5	M.	7 "	Ninth	3 recent vesicles	Coherent	Recovery.
6	F.	11 mths.	At end of period; day not fixed	3 recent vesicles	Confluent	Rapid death; bronchitis and laryngitis.
7	F.	9 years	Sixth	5 recent pustules	Coherent	Recovery.
8	F.	14 "	Fourth	3 recent pustules	Confluent	Recovery; conjunctivitis and œdema of feet.
9	F.	9 "	Probably third	3 recent pustules	Confluent	Recovery.
10	F.	30 "	Eighth	3 recent pustules†	Confluent	Prolonged convalescence; numerous abscesses.
11	M.	2½ "	Probably eighth	3 recent pustules	Confluent	Recovery.
12	M.	2 "	Probably tenth	4 recent pustules	Confluent	Recovery.
13	M.	2 mths.	Probably eighth	3 recent pustules	Coherent	Recovery.
14	F.	9 years	Probably sixth	4 recent pustules	Confluent	Recovery; abscesses.
15	F.	23 "	Third	1 recent pustule	Confluent	Slow recovery.
16	F.	14 "	Seventh	3 recent vesicopustules‡	Confluent	Protracted recovery.
17	F.	15 "	Eighth	4 recent vesicles	Confluent	Protracted recovery.
18	M.	3 "	Not fixed§	5 advanced pustules	Discrete	Rapid recovery.
19	F.	2 "	Not fixed	4 recent vesicles	Confluent	Recovery.
20	F.	5 "	Not fixed	4 recent vesicles	Coherent	Recovery.

* This reckoned as twelve days.

† Surrounded by a crop of small vesicles and a purplish-red blush.

‡ Surrounded by a crop of small vesicles.

§ From character of pustules, probably early.

Analysis.—It will be observed that the majority of cases of this condition noted were in females; no inference, however, can be drawn

from this, it being probably only a coincidence. The ages range between two months and thirty years, the majority being under five years. Most were vaccinated on the third and on the eighth days of the incubation-period, the times ranging through almost all the twelve days of that period. The vaccination observed on admission consisted usually of pustules, which were mostly three in number. The variety of small-pox in most of the cases was confluent; only one death occurred, and recovery was noted as prolonged and attended with complications in seven, rapid in two.

Remarks.—In order to gauge the amount and degree of protection afforded by vaccination in these several cases, we must compare the variety of disease and result of attack, first with the day on which the operation was performed, and then with the number of pocks produced. We thus notice that the majority of the confluent and coherent cases were vaccinated from the eighth to the twelfth day of the incubation-period, and that, in the discrete, this took place within the first three days. The fatal case was vaccinated at the end of the period, the majority of the prolonged and complicated recoveries during its latter half; whilst both the rapid recoveries were early vaccinated: one on the third day definitely, and the other, from the character of the pustules, probably also about that time. On comparing the variety of disease with the number of resulting pocks, we find most of the confluent and coherent cases vaccinated in three places, whilst the discrete are not vaccinated in less than four. The fatal case showed only three vesicles; three only of the seven protracted recoveries were vaccinated in four places, whilst the rapid ones showed four and five pocks respectively.

TABLE B.—Revaccination.

No.	Sex.	Age.	Day of Incubation-period* on which Vaccination was Performed.	Character of Revaccination.	Character of Primary Vaccination.	Variety of Small-pox.	Result.
1	F.	16	Eighth	4 recent vesicles	1 fair mark	Coherent	Protracted recovery.
2	F.	17	Third	2 recent pustules	2 fair marks	Discrete	Recovery.
3	F.	14	Twelfth	3 recent vesicles	2 fair marks	Confluent	Recovery.
4	F.	24	Fifth	2 recent pustules	Traces of marks	Discrete	Recovery.
5	F.	20	Fourth	2 recent pustules	Fair marks	Discrete	Recovery.
6	F.	15	Sixth	5 recent pustules	Doubtful	Coherent	Recovery.
7	M.	3	Not fixed	3 recent pustules	3 poor marks	Confluent	Recovery.
8	F.	13	Probably tenth	4 recent pustules	5 fair marks	Coherent	Recovery.
9	F.	29	Fifth	3 recent pustules	3 poor marks	Discrete	Recovery.
10	F.	18	Seventh	2 recent pustules†	2 poor marks	Confluent	Death on sixteenth day.
11	M.	17	Fifth	3 recent pustules	1 poor mark	Discrete	Recovery.
12	F.	12	Sixth	3 recent pustules	1 poor mark	Coherent	Recovery.
13	F.	16	Twelfth	3 abortive vesicles	1 poor mark	Confluent	Death on twelfth day.

* This reckoned as twelve days.

† Surrounded by a crop of small vesicles.

Analysis.—Females here also predominate; the ages range from three to twenty-nine, the majority being between fifteen and twenty. More were revaccinated on the fifth and sixth days of the incubation-period than any other, the times ranging between the third and twelfth days; the revaccination consisted mostly of pustules, and generally to the number of three. The primary vaccination was imperfect in all, in most of them of a very meagre description, both in number and quality. The variety of the disease assumed in most of the cases was the discrete form; two deaths occurred, and recovery was noted as protracted in one case.

Remarks.—Though hardly bearing on the subject of this paper, yet I would draw attention to the fact that not one of these cases was well vaccinated primarily. All the discrete cases were revaccinated within the first five days of incubation, the majority on the fifth day; in the coherent and confluent, on the other hand, the operation took place from the sixth to the twelfth day. The fatal cases were revaccinated on the seventh and twelfth days respectively, and the protracted recovery on the eighth. In most of the confluent and coherent cases, three pocks were noted; in most of the discrete, only two. Of the deaths, one showed two pustules; the other three vesicles, which were of an abortive character.

General Conclusions.—1. Primary vaccination, after definite exposure to the infection of small-pox, should be performed within three days and in four places, in order to ensure a slight uncomplicated attack, and a rapid recovery. 2. Revaccination should not be delayed beyond the fifth day after such exposure, in order to ensure a discrete attack and recovery.