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Vaccino-syphilis.

When the antivaccinists attribute the spread of syphilis to vaccination they weaken their cause, for cases of vaccination syphilis are so rare, as almost deserve the designation of pathological curiosities. So pronounced are the manifestations of syphilis when due to vaccination that, had it been of common occurrence, there would not have been so few cases recorded in medical literature. As a matter of fact, many public vaccinators of large experience have never seen a case; and some even doubt its existence. Nevertheless, the possibility of transmitting syphilis by vaccination has long been suspected, and now sufficient evidence has accumulated as to amount to positive proof, and indeed there are few medical men who would vaccinate themselves with lymph from
an obviously syphilitic person. Yet there are others, and of equal eminence and experience, who doubt its possibility, their apparent reason being that by self inoculation they have failed to produce syphilis, and the extreme rarity as contrasted with the hereditary and otherwise acquired forms, of undoubted cases seen or reported. It is true that the bulk of alleged vaccino-syphilitic cases are either cases in which vaccination has been the cause of bringing out hereditary syphilitic phenomena, or those of ill-cared for, injudiciously fed, and puny children in whom are occasionally seen, concomitants with vaccination, skin disease, oral and anal thuchi, nasal catarrh, all of which are symptoms of syphilis but which may not be due to that disease.

Our faith in the words of a man of our Hutchinson's eminence, and reputation is so firm
that an attempt to shake it by reason would certainly be futile; and there are few, I think, who would act as if the following words of C. W. Hutchinson (Brit. Med. J., 1904, p. 1234) had no weight whatever:

"In reference to the possibility of conveying syphilis from a vaccinifer who does not reveal the taint by any visible symptoms, I feel bound in honesty to say that I feel sure of it. No surgeon in his senses would ever vaccinate from a child which showed obvious symptoms. The fact is that a certain number of syphilitic infants look perfectly healthy whilst yet very efficiently emasculated. There is no use and much danger in denying this important clinical fact."

When a child with hereditary syphilis is vaccinated, syphilitic manifestations not uncommonly first make their appearance, and in some instances simulate
Very closely those of true vaccino-
syphilis. The hereditary signs
may be merely concomitant with
vaccination, in their appearance
may be manifested by the con-
stitutional disturbance caused
by the vaccination, for it is well
known in Lock hospitals that any
irregularity such as drinking is
a great factor in bringing out
a syphilitic rash.

For a syphilitic parent to say that
his child's symptoms are due to
vaccino-syphilis is an excuse so
admirable that few practitioners
would openly contradict such a
statement. Again, if through
the vaccination of the infant a
practitioner discovers that a parent
had unwittingly suffered from
syphilis, such a train of events
would inevitably follow on her
knowing this, that he is not
justified in undeceiving her, but
rather in allowing vaccination
to bear the blame.
These are among the reasons why vaccine-syphilis is apparently better known to the laity than to the profession.

The extreme rarity of vaccination-syphilis may be ascribed to the fact that vaccinators are careful to avoid taking lymph from a syphilitic child or from one about whom they have doubts, and that provided lymph was taken by misadventure from a syphilitic child and inoculated into a healthy one, it does not follow that syphilis would result. When syphilis has been inoculated along with vaccine virus, says Prof. Journier (Journal de Médecine, April, 1889) three alternatives may present themselves.

Either the syphilis is not transmitted, and fortunately this is the most frequent result, or the vaccination does not take but syphilis is produced and the symptoms and course are identical with those when the syphilitic virus alone
is introduced into the body, or finally both forms of virus give a positive result, some forms of insertion being followed by pure vaccine lesions, while the chancre appears only at the points where the vaccine has failed. How long after the primary lesion a person may act as syphilis producing vaccinifer is not definitely known, but the time would appear to vary, as in the transmitting of syphilis by other ways, according to the strength of the poison, health of its host, and above all the treatment received. It is however maintained by Prof. Turner (ibid) that the syphilis may be latent, or even in the course of inoculation, as proved by cases seen in epidemics. A healthy child says the syphilisophilist is inoculated and on the 1st, 2nd or 3rd day serves as vaccinifer and the virus he furnishes may inoculate syphilis, and this before the chancre has appeared in his own person.
Before a case of syphilis can be said to be caused by vaccination, the following conditions are essential. The person must have been free from syphilis previously to being vaccinated; the vaccinator must have had syphilis in one of its stages; and the syphilitic symptoms must first manifest themselves, after a lapse of time needed for the incubation, at the seat of puncture which would be the locality of the primary lesion, the other stages following in order.

It is now generally admitted that the blood of a syphilitic person, in the early stages, is capable of conveying syphilis. Dr. Hutchinson (Lancet 73, p. 140) saw an old woman in the Munich Hospital who had been inoculated on the back between the shoulders with blood taken from a patient just recovering from secondary symptoms. A chancre developed in the back of the woman. Since the blood of a syphilitic person can produce a chancre,
It can easily be understood that syphilis may be conveyed from one patient to another by means of the lancet used in vaccination. The same risk is run when lymph is taken from a bleeding vesicle. Such lymph should invariably be rejected. The opinion that it was necessary to allow serum to ooze out of the vesicle after the first drops of lymph—the true product of vaccination—had been exhausted, is now modified; and it is at present believed that clear lymph is sufficient to produce syphilis.

In referring to this question C. W. Hutchinson (Brit. Med. Jour. 867, p. 59) says: “A question which was a few years ago in dispute, but which has, I may say, unfortunately, been finally settled at last, is the possibility of conveying syphilis by translucent vaccine lymph. The belief that it was necessary to draw blood, or at any rate to
allow the vesicle to drain after emptying it and thus permit the escape of fresh leucocytes, can no longer be entertained?"

The symptoms of vaccino-syphilis do not differ much from those of other forms of syphilis and to enumerate them would be a needless repetition; suffice it to bring to notice a few cases illustrative of syphilitic symptoms being revealed by vaccination, and a few cases of true vaccino-syphilis.

The two following cases recorded by Dr. Edmund Robinson (Lancet 1873, p. 321) will make clear some peculiarities presented by a patient whose syphilitic symptoms are brought out by vaccination. The first case was that of a lady who had been vaccinated during an epidemic of small-pox. The lymph was being preserved on a grill and taken from an infant from whom two other children had already been vaccinated. The
Lady and two of her daughters (aged 14 and 10 respectively) were vaccinated from the pox at the same time. Two months after the mother suffered from two hard edged ulcers where the vaccine vesicles had formed, and her body was covered with a scaly coppery coloured rash. The vaccinifer was then looked up and was found perfectly well, as also were the two other children who were vaccinated with lymph from the same source. All symptoms of erythroid were denied but it was found out that soon after marriage something similar appeared but not so bad, and there was loss of hair on the head. Mercury and iodide of potash and afterwards biq. Arseniealis were prescribed and she got rapidly well.

The second case was that of an infant, one of four, vaccinated by Dr Robinson from the same source, within the first nor the
fourth but the third. On the 8th day all had good vesicles. On the 24th day after vaccination the mud in question had coppery colored patches over the body, a sore bottom, and where the vesicles had been there were deep excavated zones. One of the eldest children of the same family parent was under going treatment for iritis at the same time. There were two other children apparently healthy.

The following cases by Dr. Hutchinson (Lancet, 73, p. 169) show characteristics that can leave little doubt as to diagnosis. A respectable tradesman aged 46, came to Moorfields Ophthalmic Hospital with iritis which was at once detected as syphilitic as it was accompanied with secondary rash &c. Examination disclosed coppery dusky rash and symmetrical ulcers of the tonsils. Ordinary questions as to syphilis were denied and the genitals showed nothing. On the arm, however,
two or three scabbed ulcers were found, as large as silverings, with dusky indurated borders; and there was an indolent tubo in the corresponding armpit. He said that the corresponding area of the arm had broken out at the seat of the vaccination puncture. He had been vaccinated three months previously. The puncture both looked and behaved as usual; but when just healed over, a month after the operation, they inflamed and broke out into sores. The vaccinator was a baby who when seen by Dr. Hutchinson (at 8 months old) looked healthy and showed no signs of syphilis except a sunken bridge of the nose. It was the third child, the first two having died in infancy. It was a remarkable fact of the twelve persons vaccinated from the same baby only the man above mentioned suffered any harm. The other case was that of a lady who applied to our
Hutchinson on account of a vascular growth of the urethra, but was declared to be suffering from a syphilitic rash. On inquiry it appeared that she was vaccinated in May 1871, by four punctures, that some of the punctures took but a month later one of them inflamed and became a hard edged ulcer lasting three months. Two or three weeks later (about a month after the vaccination) the rash appeared copiously and she fell into ill health. From the vaccination in May to the early part of September she had no specific treatment, which probably accounted for the severity of the rash. After this she took iodide of potash and mercury and then went to the seaside. At the end of this the left eye inflamed (iritis), and the rash, which had been nearly well, relapsed. She was vaccinated from a baby's arm, and,
at the same time, her two grown-up daughters. The baby was said by the vaccinator and its mother to have looked well at the time. As soon as dentition began it had some troublesome sores about the anus (? condylomata) for which it was undetected for three months at a dispensary. It was the third child, all living. Eldest boy showed no signs of inherited taint but the second child had large forehead and had had sores about the anus like the vaccinifer.

The following series of cases by Mr. Henry Lee (Lancet 73, p. 817) of a number of children vaccinated in Nov. 1856 at Lupara by Dr. Marone are more affirmative still. The vaccine lymph was sent in glass tubes and it was observed that it was mixed with a little blood. There were 23 children. They nearly all
displayed the same symptoms. The disease with which these children were affected showed itself subsequently among the nurses and mothers, and even among the servants and others who were brought in contact with them. They came of parents who never had at any time previously shown any symptoms of syphilis.

The children likewise had never shown any symptoms of syphilis, either congenital or acquired, previously to the vaccination in question. In some of the children the vaccine vesicles died slowly away but afterwards ulcers appeared on the spots, surrounded by hard edges and accompanied by multiple enlargement and induration of the axillary glands. In other cases the vaccine vesicles became covered with crusts which remained for an unusual length of time. These never became firmly cicatrizcd, and sooner or later reopened,
assumed an ulcerated appearance and were accompanied by the
usual cutaneous symptoms.
In all the children above named, sooner or later, but towards the mid-
dle of January, some form of constitutional syphilis developed
itself. The symptoms consisted chiefly in eruptions of roseola,
crops of papular, impetiginous, and in a few instances pemphigoid,
eruptions. At a later period mucous tubules appeared on
the angles of the mouth, on the
mucous membrane of the mouth,
around the anus, and on the vulva;
the post-cervical and inguinal
glands were affected; and the
children were emaciated generally
in proportion to the extent and
severity of the syphilitic symptoms.
The breasts of the women mothers
who suckled these children became
affected with ulcers, varying in
appearance but always indur-
ated. Some of these mothers
presented a mucopurulent discharge from the vagina. Subsequently many of the children died, in addition to the symptoms already mentioned, fresh eruptions of roseola, impetigo, psoriasis of the palms of the hands and soles of the feet, and ulcerations between the toes.

These women were also affected with chronic enlargement of the post-cervical and axillary glands which became the size of hazel nuts but never passed into suppuration. After the appearance of the above symptoms the husbands of some of these unfortunate women became affected with the same disease. Anti-syphilitic treatment greatly modified the disease but in the majority of cases the syphilitic symptoms recurred. Many of the women who had been affected by their children, when they subsequently became pregnant, miscarried; others were prematurely confined with children who subsequently became syphilitic.
No account of vaccination syphilis would be anything like complete if mention were not made of the well-known experiment of Dr. Corry, who, displaying that self-sacrificing enthusiasm in the cause of science, inoculated himself with lymph from syphilitic children. (Brit. Med. Jour. 84, p. 105-3). The children from whom Dr. Corry took lymph for his personal vaccination were in all cases but one, which was unsuccessful, not suffering from hereditary disease in a latent form but were infants in whom active symptoms were unmistakably present, as shown by cutaneous eruptions, smurflus, numerous tubercles, and ulcerations.

Out of the four children in question only one was proved to have been capable of imparting syphilis by the lymph taken from its vaccine vesicle.
The diagnosis of vaccino-syphilis, as in making any other diagnosis, requires judgment united with discernment. A disease cannot be diagnosed from the number of symptoms, for one symptom among many having more weight than the rest, may point in an altogether different direction to the others; and a single symptom appearing at a certain time and under certain conditions may be sufficient evidence of a disease. The diagnosis in question is rendered more difficult when symptoms of syphilis present themselves in an infant vaccinated in very early life. The infant might have contracted syphilis at birth. Let us imagine a case. A syphilitic man marries and his wife becomes pregnant. Escaping syphilis the gestation tends to pursue a normal course, when she contracts syphilis at a late stage of pregnancy through a partial herpetic eruption of the
husband; or a husband, try an extra-conjugal adventure, contract syphilis, which he gives to his wife in the latter part of pregnancy; and in this way the infant may be inoculated with syphilis at birth.

It need hardly be pointed out that it does not necessarily follow because a man has syphilis the children he begets are syphilitic. Thus it will be seen that the history of syphilis in other members of the family may possibly be misleading; for under the above-mentioned condition of cutaneous lesion, an elder child of a syphilitic man may have escaped the disease and a younger one may be syphilitic. However, the differential diagnosis between vaccinia-syphilis and other diseases with which it apt to be confused is ably given by Dr. P. Portalié (Brit. Med. Jour., 89:II, p. 1115) who reproduces a summary of Prof. Gournié's Clinical lectures on the subject.
Differential diagnosis between vaccinal ulcers and primary chancre.

The latter never develop before the 15th day after vaccination, the time required being mostly three weeks; twenty days after inoculation it is still in its earliest development. A "vaccination ulcer" is present if every 12 or 15 days after vaccination; after twenty days it is fully developed. The clinical differences are as follows.

In the case of vaccination ulcer:
(0) all the pustules are affected as a rule;
(1) much inflammation and ulceration;
(2) deeply excavated ulcer;
(3) much suppuration;
(4) irregular margin as in soft chancre;
(5) floor of ulcer uneven, suppuration;
(6) inflammatory induration;
(7) inflammatory ep pulpomatous areola;
(9) gland swelling none, or else inflammatory;
(10) complications often present, sloughing, erysipelas, &c.,

**Syphilitic ulcer**: 

1. is restricted to one or few punctures; often these do not develop;
2. inflammation is slight;
3. the loss of substance is superficial;
4. suppuration is absent, or scanty; crusts form;
5. border not notched, slightly elevated, gradually lost in floor;
6. surface of floor smooth;
7. the "parchment" induration is specific, not merely inflammatory;
8. hardly any inflammatory areola;
9. gland swelling constant, indolent;
10. complications rare.

**II Differential diagnosis between vaccinal rash and secondary syphilitic eruptions.**

Under the former are comprised:
- nonula vaccinialis, miliaria vaccinialis,
- vaccina bullosa and haemorrhagica,
- also accidental rashes, rubella,
- pellagrina, lichen, urticaria, &c.
A true vaccinal rash:
(1) appears between the 9th and 16th day after vaccination;
(2) absence of inoculation chancre;
(3) eruption has not syphilitic character;
(4) is attended with fever;
(5) is evanescent.

A secondary syphilitic eruption:
(1) appears, at the earliest 9 or 10 weeks after vaccination;
(2) requires the pre-existence, in every case, of a specific ulcer at the site of vaccination, this to constitute the rash due to vaccination;
(3) shows the character of true specific eruption;
(4) is not attended with fever;
(5) lasts a long time;
(6) is accompanied as a rule with specific appearances on the mucous membrane.

III Differential diagnosis between vaccino-syphilis and hereditary syphilis which may show itself
about the time of vaccination.

Vaccination syphilis:
(1) begins with a local affection, chancre and indolent bubo;
(2) has a typical development in four stages, incubation, chancre, secondary incubation, generalisation (secondary rashes &c.);
(3) (syphilides) never appear earlier than the 9th or 10th weeks after vaccination.

Hereditary syphilis:
(1) has no chancre, but begins with general phenomena;
(2) has no typical development after vaccination;
(3) is wholly independent of the latter as to time;
(4) is attended by habitual syphilits, or syphilitic bodily aspect;
(5) other manifestations of hereditary syphilitic lines may be present;
(6) the history may indicate syphilis. The only point in the above admirable summary requiring correction is the statement that
a secondary syphilitic rash is not attended with fever.

Unfortunately nothing new can be suggested in the way of prophylaxis; and although the risks of giving syphilis by vaccination are almost infinitesimal, it need be no excuse for a careless Choosing of the vaccinifer. No one would vaccinate from a child obviously syphilitic, nor from one about whom he had doubts.

When we recall to mind the opinion of our Hutchinson, that translucent lymph may convey syphilis, and that many syphilitic infants look perfectly well whilst yet very efficiently contagious, and the opinion of Prof. Gourmier, that syphilis may be transmitted from a vaccinifer in the latent stages of syphilis, or even during the period of incubation, we are bound to come to the conclusion that the only sure prophylactic method of avoiding vaccine-syphilis is the using of
calf lymph only. But, on the other hand, when our attention is turned away from the theoretical to the practical side of the question, when we consider how often vaccination syphilis does actually occur among the millions that are vaccinated with lymph from children, we are equally forced to conclude that the rejection of humanised lymph is riding the hobby too far; and that by a careful selection of the vaccinifer, avoiding in some instances first born children, by taking lymph, and the first few drops of clear lymph only from vesicles not later than the 7th or 8th days, by rejecting all purgineous or otherwise coloured lymph, the chances of transmitting syphilis by humanised lymph are thus practically reduced to nil, as time and experience have shown. (see Lymph).
Tuberculosis

It is difficult to imagine when and how the notion that tuberculosis may be transmitted by vaccination originated. On both practical and theoretical grounds the idea is opposed. No instance has been known of the conveyance of tubercle by vaccination, nor one of infection at autopsy of tubercular subjects. The tubercle bacillus of Koch is universally admitted to be the cause of tuberculosis, and again and again has it been proved that tubercle is inoculable. And Koch, Cheyne, and others have shown that pure cultures of a hundredth generation have invariably inoculated induced tuberculosis, when inoculated into the anterior chamber of the eye, a place where primary tubercle never makes its appearance, and in animals as dogs, which are almost
Except from the natural disease. The tubercle bacillus is then a sine qua non in the production of the disease. The bacillus is not found in the blood of tubercular animals, except in some cases of acute miliary tuberculosis; much less therefore can we expect to find it in vaccine lymph. Lauther Mayer (Medical Times 36, 7, p. 266) failed to find any tubercle bacilli in the lymph of 18 re-vaccinated phthisical patients, and Dr. Ackers (ibid.) at the suggestion of Dr. Wolfberg, undertook a series of carefully conducted experiments on the lymph and the examination of the blood of a large number of tubercular patients. Five patients advanced in tubercular phthisis whose sputum contained plenty of bacilli were vaccinated with antiseptic precautions. Bearing in mind Koch's observations
On the part played by the white blood cells as bearers of bacilli, it was not thought necessary to take lymph earlier than the 7th day, when these leukocytes first made their appearance. Samples were taken on most days from that to the thirteenth, when the vesicle dried up. In all, 48 preparations were made and stained with methy1 blue, gentian violet, and, latterly with fuchsine fuchsin. In no single instance could a bacillus be detected. Dr. Reker next made 214 preparations of blood taken from 57 patients in various stages of phthisis. He employed the slower methods of staining, keeping the preparation in the colouring fluid 12 to 24 hours, but the search for bacilli was fruitless, though in all these the
Physical signs were well marked, and bacilli had been demonstrated in the sputum in large quantities. Prior of Berlin, and Seidler of Munich, found the same negative results, but Weichselbaum of Vienna discovered bacilli in three cases of acute miliary tuberculosis examined by him.

Provided the bacillus did exist in vaccine lymph taken from patients or animals suffering from tuberculosis, experimental evidence would tend to show that the disease cannot be transmitted by the inoculation of such lymph into superficial scratches of the skin; for, as pointed out by Dr. Wartomont (Medical Times 83, 7, p. 5.54), if an animal is to be rendered tuberculous the bacillus must be carried...
deep into the tissues; and this is why infection is never produced at autopsies of tuberculosis subjects. Besides, the temperature of the epidermis is too low for the growth of the tubercle bacillus. The disease when inoculated in experiments spreads slowly and gradually from the point of insertion. Among the millions that have been vaccinated during more than eighty years, not a single one has presented at the point of vaccination any resemblance of tubercle.

Dr. Schmidt (Medical Times, 1885, 7, p. 255), at the request of Dr. Bollinger, performed some experiments with the purpose of ascertaining, whether even...
Under the most favourable circumstances it was possible to effect tubercular inoculation epidemically. The extreme susceptibility of tuberculous guinea pigs is well known. Into the skin of a number of the animals and of rabbits, tubercular matter of various kinds was carefully worked in as in vaccination, but in all with a negative result; while the control animals into whose peritoneal cavities or subcutaneous tissues the same matter was introduced, were found, post mortem, to have been deeply infected. Guinea pigs are animals peculiarly suitable on which to conduct experiments with tubercle and vaccinia, as they
are susceptible to both diseases, and to tuberculosis in a special degree. The special susceptibility of the animals to tuberculosis might be thought a disadvantage for the animals might be tubercular at the time of inoculation or develop tubercle subsequently and from other causes. But if the animal be rendered tubercular by means of cutaneous inoculation, there is first a local, and afterwards, a general manifestation of tuberculosis.

We performed two series of experiments; one by simply working tuberculous matter into the scarified skin, the other by vaccinating the animals with lymph mixed with tubercle. Our first experiment was to
Vaccinate a guinea-pig in three places with lymph mixed with fresh purulent exudate from a case of tubercular phthisis that died. The exudate, kindly given me by Dr. Stuart, Resident at the Edinburgh Royal Infirmary, showed the bacilli in large numbers. The vaccination of this guinea-pig behaved so irregular and caused such constitutional disturbance, owing no doubt to the pathogenic organisms in the pus, that we decided in subsequent experiments, to vaccinate by one puncture only, and to employ the tubercle bacillus as free as possible from such organisms. Consequently our drairie of the Slaughter House, Edinburgh, was good enough to supply
me with some tuberculous glands from a cow which had suffered from well-marked tuberculosis. Dr. Zimo Woodhead kindly favoured me with a tube of tubercle culture.

Exper. IV. Jan. 13. Guinea-pig vaccinated by three punctures on side. Material - humanized lymph plus purulent exudation from case of tubercular phthisis. 2nd and 3rd days. All incisions took red but the redness confined to areas of skin scarified. 4th day. Where the skin has been scarified it presents circular, morbid, indurated patches. 7th day. Three scales are seen surrounded by a little vesicular
Structure. There is no areola. Animal is ill. 8\textsuperscript{th} day. One of the scales dropped off, leaving rose. Guinea pig ill.

10\textsuperscript{th} day. Part of another scale dropped off. Animal seems better. 14\textsuperscript{th} day. Animal looking very ill. Scales formed again where others had dropped off. No inflammation. 18\textsuperscript{th} day. All scales fallen, leaving three full-sized typical lesions. Guinea pig in good health.

\textbf{Exper. V} Mar. 2. Guinea-pig.
Fresh potent tuberculous matter from cow worked into scarified skin as in vaccination. One incision. 2\textsuperscript{nd} day. Scarifications well marked. 3\textsuperscript{rd} day. crust of dry tuberculous matter adhering to skin. 8\textsuperscript{th} day. Nothing.
to an except loss of hair at site of inoculation.

**Exp. V**

Mar. 2. *Sv. caviae* pig inoculated as in Exp. IV and with same material. 2nd day. Scratches only seen. 5th day. Crust of tuberculous matter on inoculation spot. 8th day. Nothing to an except loss of hair.

**Exp. VII**

Mar. 4. *Sv. caviae* pig. Potent tubercle culture worked in as in vaccination. The insertion. 3rd day. Scarifications red. 6th day. Crust. 7th day. Small scabbed ulcer. 14th day. Scar.

**Exp. VIII**

Mar. 2. *Sv. caviae* pig vaccinated by one puncture. Material — humanized lymph plus fresh potent tuberculous matter from cow.
Experiment IX. Mar. 2. Old guinea-pig vaccinated by one puncture. Material — humanized lymph plus fresh potent tuberculous matter from cow. 2nd day. Scarcification, lids marked. 5th day. Scab. 7th day. Dumbbell-shaped ulcer. 8th day. Scabbed ulcer. Animal looks ill. 10th day. Animal died.

Experiment X. Mar. 4. Guinea-pig vaccinated by one puncture. Material — humanized lymph plus potent tuberculous culture. 3rd day. Operation appears to have failed. 5th day. Doubtful if going.
to take. 7th day. Large flat scar. 10th day. Large irregular shaped ulcer about the size of a dessert.

11th day. Ulcer healing. 13th day. Large triangular glossy looking reabbed ulcer. 17th 13th day. Scar.

Exper. XI. Mar. 4. Guinea pig vaccinated by one punctum.

Material - humanised lymph plus potent tubercle culture. 5th to 7th days. Scar. 10th day. Scar very large. 13th day. Scar dropped off leaving scar.

That the death of one of these animals (Exper. IX) was not due to tuberculosis from inoculation is evidenced from the fact that it died ten days after
to vaccination; and curiously enough the most minute examination failed to disclose any tubercle bacilli in the internal organs, thus proving that the animal did not die from natural tuberculosis. The only pathological sign of any note that could be detected post mortem was a very distended gall bladder (two to four times its natural size) filled with mucoid pus-like matter. The animal was old and its death was probably much coincident with the vaccination, the ulcer caused by which might have led, however, some influence in turning the scale against it. At all events this was a particle of evidence to show that
The animal died of tuberculosis; neither was there any thing to show that the ulcers had induced pyemia.

When active tuberculous matter is injected into the peritoneal cavity of a guinea-pig, or introduced deep into the cutaneous tissues, neither method sufficing as a control experiment to ensure guaranty of the potency of the material. The animal begins to exhibit symptoms of malaise at the end of three weeks and usually dies of tuberculosis about 5 or 6 weeks after inoculation. It is customary to kill the control animals after the lapse of four weeks. It was not thought necessary therefore to delay examining these.
Animals for tubercle later than seven weeks. Out of the remaining seven animals inoculated as above described, only one (Spec. IV) was found tubercular at mortem. It was inoculated with tuberculous exudate on Jan. 13, some weeks before the others, and fourteen weeks after inoculation the abdominal and thoracic visera were found to be in an advanced state of tuberculosis; but there was no evidence of tubercle in the skin in the neighbourhood of the inoculation spots, thus showing, together with the fact that the animal was alive 14 weeks after inoculation, that it in all probability it did not
Acquire tuberculosis through the vaccination in question. The other pig animals were perfectly healthy and showed post mortem, at the end of seven weeks, no trace of tuberculosis.

We may, therefore, conclude that the transmissibility of the tuberculosis by means of official vaccination is beyond the limits of possibility; and for the following reasons: The tuberculosis bacillus is essential in the production of the disease; the bacillus has never been found in vaccine lymph; animals have not been rendered tuberculous by simply rubbing tuberculous material into superficial scratches of the skin.
The temperature of the epidermis is too low for the growth of the bacillus; no instance has been known of the conveyance of tubercle by vaccination, nor one of infection produced at autopsy of tubercular subjects.
Leprosy

We shall allude only briefly to this subject, not because it may appear unworthy of a more elaborate notice (on the contrary we think it deserving of due consideration), but because the paucity of material upon which to work forbids a lengthy discussion.

There is abundant evidence to show that leprosy is contagious, and there are no doubt other factors at work in its production, such as heredity, insanitation, climatic influences, unwholesome and putrid food, malaria, and inoculation.

That leprosy is inoculable is now generally admitted, but whether it is so in the same way as tuberculosis does not appear to have been definitely made out; that is, to say whether the leprous bacillus requires to be carried deep into the tissues in order that it may produce the disease, or whether it is sufficient to implant the
virus into a more superficial scratch such as that in vaccination.
There can be no doubt that the tubercle bacillus is less virulent than
the lepromus, but there are some striking analogies between the two;
for example Koch's tuberculin acts
on both tuberculosis and leprosy in
a very similar manner. If
leprosy be transmissible by vacci-
nation, then here is a difference
between it and tuberculosis.
The long incubation of leprosy as
contrasted with that of tuberculosis
renders its study in connection
with vaccination by no means
easy; whereas if some potent
tuberculous matter be introduced
into a small incision (not a super-
ficial scratch) the tubercle bacillus
can be demonstrated, about a
month after the operation, in great
abundance in various internal
organs.
Unfortunately no valuable deduction
can be made from the writings
on this subject by the antivaccinists, as it would appear that their argument to associate the spread of leprosy with vaccination was merely an ingenious route whereby to arrive at a more momentous goal. The truth of their statements is too meagre to act as an antiseptic on the falsehoods, and the consequence is that the whole goes bad.

Probably the clearest evidence to show that leprosy may be propagated by vaccination is that referred to by Dr. Malcolm Morris (But. Med. Jour. 90, p. 1230), as related by Dr. Daubler.

A woman, aged 36, was vaccinated with lymph taken from a leprous person, who subsequently died of the disease. She was vaccinated in three places on each arm, and fourteen days after the vaccination the skin around each spot was raised and discoloured. After five weeks these yellowish brown
spots, which in the meantime had become slowly larger, began to flatten, and, ten weeks after the operation, the skin of the upper arm and the upper third of the forearm was of a brownish colour and wrinkled. The brownish spots continued to increase until they began to diminish after feverish attacks, but the skin never regained its normal colour.

In the fourteenth week after vaccination she had two severe rigors, after which characteristic tubercular lipoxy developed on the cheeks and brow.

The second case, a girl of 15, was a half-caste from the same place as the first patient. She was said to have been perfectly well until revaccinated. During the first two months after the operation her symptoms resembled those of the other case. At the end of that time dark, prominent patches appeared upon the forehead and
cheeks, and three months later leprosy was fully developed on the forehead.

Prof. W. J. Sairdner (Brit. Med. Jour. 87, ii, p. 799) mentions a case where Dr. X. vaccinated his own child from a leprous family, though probably not from an actual or apparent leper; and then vaccinated a sea captain's child from his own son. It is all but certain that Dr. X. and his wife were unmixed European blood, and it is certain that the sea captain and his wife were. Prof. Sairdner does not say, however, where the children were born.

Dr. Beaven Blake, Medical Superintendent of the Trinidad Leprosy Asylum, expresses his opinion (Brit. Med. Jour. 87, ii, p. 433) that he has not yet seen sufficient
proof to convince him of leprosy being caused by vaccination. It is well known that Europeans born in Europe do sometimes die from leprosy after living some time in the tropics. He thinks that the single chain of facts adduced sometimes to explain the connection between leprosy and vaccination can be explained by the Theory of Coincidence, i.e., in a tropical island where leprosy is endemic. He says: "If vaccine lymph be taken from a healthy child in a locality where leprosy is endemic and such lymph be sent to a country free from leprosy, and a healthy child in such a country and who has never quitted the country be vaccinated with the lymph, and if this child after vaccination and without leaving the country develop leprosy,
then it may be taken as proved that leprosy is communicable by vaccination. The experiment has, I suppose, never been tried, for residents in Great Britain would not be likely to send to the tropics for lymph." Dr. Rake had failed to find the bacillus lepra in 27 examinations of pure and impure lymph from lepers; and animals vaccinated with lymph from lepers have not, so far, developed leprosy. But Dr. Arning (Report on Leprosy in Hawaii 1886 p. 45) says that in one case he found bacilli in the lymph and crust from a vaccine vesicle on a tuberculated leper.

Such then is the evidence that leprosy is communicable by vaccination, but it can hardly be deemed direct and irrefragable.
proof; and although no one will deny that the increase of leprosy in some countries demands the serious attention of the profession, yet when we consider that in Norway leprosy is on the decline and vaccination on the increase, we conclude ipso facto that investigators are liable to err in concentrating their attention too much on vaccination in ascertaining the causation of the spread of the disease.
Erythema. Erysipelas

Through the term erythema we can trace a generic development from the flush of emotion to the rosiness which borders a healthy wound to the tense and suppurative hardness which we name and treat as erysipelas. This variation of type depends on a variety in causation and the force and kinds of resulting change reflect the character of its stimulant. It will be admitted by all medical authorities that two chief groups of causes exist — that in which the mechanical irritation is a pre-vailing feature, and that in which septic forces are at work. In aid of these there is often a peculiar habit of the body in the person attacked. The undraped or improperly fed, the overworked, the relaxed and flabby type, in short,
Any in whom health means less than vigour possess this constitutional proneness; the child may be unhealthy, the house may be unwholesome, the parents may be uncleannly. There is abundant evidence that any degree of erysipelas may proceed from any surface injury. The pin scratch has no immunity which the amputated stump has not. In either case dirt, friction, bad ventilation, overcrowding, and other such conditions may introduce an unwelcome complication. But in order that true erysipelas may be produced the poison, called gum, or seed of the disease, must be implanted in the scarifying catarrh or wound thus induced. The rupture of a vesicle in viscid fluid is insufficient to cause erysipelas, otherwise
the intentional opening of vesicles would be followed by a similar result. The poison may be conveyed from one vesicle to another in the process of opening them.

In regard to syphilis which may be the starting point of ergotism as the condition may be caused by the use of a dirty lancet for vaccination or for opening a vesicle, the application to the vaccine vesicles of nutrimus which are a suitable medium for the culture of septic organisms, for example "hen's fat" goose grease, poultice, etc., the use of carelessly selected crusts for vaccination, and shields. The application of cream on milk which are apt to turn sour, and especially when procured from a locality where infectious diseases are prevailing may be
mentioned as causes of erythema. Dr. Little (Brit. Med. J., Jan. 82, p. 398) in his report on vaccinations says that crusts, if not carefully selected, are apt to cause inflammation and ulcerations, and that the arm operated on swells in some cases to twice the natural size; and the spot where the lymph is inserted becomes the centre of a slough of the size of a rupee or larger. Crusts have, however, almost universally fallen into disuse. Dr. Buchanan of the Local Government Board (Lancet 85, II., p. 1060) cautioned against the use of vaccination shields, and their doubtful utility is now generally admitted. The portion of flannel woven which rests on the arm, as also the bands, are covered with and consist of porous material, such as lint &c., and whenever any dis-
Charge takes place this material runs almost certain risk of being soiled. Any subsequent use of the shield practically amounts to a dirty surgical dressing, and it is well known how serious a danger this is even to the most trivial surgical wound. Shields moreover are liable to interfere with the circulation of the arm. Our experiments in this part of the research do not prove anything beyond the already well known fact of the risk of vaccinating with septic lymph. In the experiments with tubercle we find that any addition of foreign matter to the lymph is very prone to give rise to a very irregular vaccination, and often to vaccinia ulcers.
Exper. XI
Jan. 26. Guinea-pig vaccinated in 2 places on side. Vaccine material — humanised lymph mixed with scales from case of scarlet fever which had not been treated with any lubricant. Scales taken from arm and allowed to stand in drop of water for 24 hours. 2nd and 3rd day. Two inflamed looking papules. 5th day. One of the scales had fallen leaving an abraded surface rather than a scar. At site of the other puncture was a small elevated scal. No areola. Guinea-pig well. 7th day. Scales dropped off, leaving two small scars.

Exper. XII
Feb. 5th. An old and a young guinea-pig vaccinated by 2 punctures each, one on side and other on ear. Material — humanised lymph mixed with serum from bleb.
of erysipelas of face. 4th day. There is a button-like induration of the skin on the side of each animal extending beyond the area scarified. No ardeola. In the old guinea-pig ear shows nothing. 6th day. On side of old guinea-pig well marked scar about which is seen a little vesicular structure. In the younger animal part of the scar on side dropped off, and ear feels soft. By thickened where it was inoculated. In neither animal was there any ardeola or constitutional symptoms. On the 9th day scabs had dropped off leaving scars.

Exper. XV Feb. 23rd. Young guinea-pig vaccinated by two punctures, one puncture on side and other on ear. Material - humanised lymph mixed with pus from erysipelas wound. 2nd and 3rd
Days. Papule at site of puncture on side looks inflamed. Eros cuta.
No obvious constitutional disturbance.
Punctum on ear shows nothing. 8th day. A deep, punched out, irregular ulcer about the size of a three-penny piece at site of puncture on side. 12th day. Scar covers the ulcer, the margins of the latter projecting further than the scar. 14th day. Scar. (See diagram III)

Epistaxis is a frequent symptom of vaccination ulcers. The skin in the vicinity of the vaccine vesicle is red, hot, and tense, and covers a larger area than the normal inflammation to which the name vaccine cuta is given; and in aggravated cases the vaccinated arm itself becomes swollen, and there is corresponding constitutional disturbance. In addition, erysipelas from vaccination is very
rare. It shows itself about 24 hours after the operation, which itself may be unsuccessful. The disease after vaccination is not so rare and is due to the encephalitic poison being introduced through the vaccination wound. In either variety the onset of the disease is sudden and there is swelling, tension of the skin, a characteristic margin limiting the inflammation, high fever, constitutional symptoms, and a tendency for the disease to spread rapidly.

The treatment of these affections should be commenced early and the causes as far as possible removed, such as the use of a dirty vaccine shield or dirty or ill-fitting clothing. The parts, if uncleanly, should be washed with some antiseptic, say warm boracic acid solution, dried, and
then dusted with some powder as oxide of zinc or starch. If there are ulcers they must be treated like ulcers from other causes and anti-septics are indicated. Weak tracce ointment is useful and the arm ought to be protected by some material as corrosive sublimate wool frequently changed. When true syphileas supervenes more active measures are required. Dichloride of iron both internally and externally is useful. Some simply apply dusting powders and wrap the parts in wool. The experiments of Dr Julius Hesseler (Lancet 91: p. 101) have shown that ichthyol has a potent deterrent influence on the multiplication of the organisms (streptococci) that cause syphilas. The following is usually the method of employing ichthyol:
℞. Ichthyol 3vi
Cretaе Prep.
Adips. aa 3½

do be smeared on the part. In cold weather olive or almond oil may be added. Koch's formula for lupipelas is one part of Creolin, four of sodoform, and ten of lanoline, spread well over the affected area and covered with gauze pericha tissue (Medical Annual 1891)

In regard to prophylaxis special precautions are needed if lupipelas is prevailing in the neighbourhood of the recently vaccinated, or if the dwelling or its vicinity be very unsanitary. No judicious vaccinator would take lymph from an arm in which there was any excessive redness or swelling, nor would he use a vaccine point a second time.

The following account by Dr. Cases
Flamack Marshall (Lancet 86, ii. p. 95) illustrated the rare disease - erysipelas from vaccination. On Jan 21. I vaccinated two infants, 3 and 4 months old respectively, from a healthy child of 4 months with four typical vesicles with little or no areola. Two days afterwards the mother of one brought the child to show me its arm which was in a state of erysipelas inflammation from shoulder to elbow; and the same evening the father of the other infant came to me to say that it was still from inflammation of the arm, that it could not be brought, and he knew that there was something wrong.

I called next morning and found the child suffering from acute erysipelas from shoulder to wrist. Immediately I called and saw the vaccinator and found the infant in perfect health. Both recovered in a week.
or ten days. There was not the least attempt at the formation of any vesicles and at the end of a week just a few marks of scarification could be seen. Homes mile apart and nothing to be detected with the sanitary arrangements. Scurvy clean and was used to vaccinate other children. In a record of over 6000 there are only two in which I have seen erysipelas immediately follow vaccination. Lieman vol ii p. 436 mentions a case of transmission of erysipelas but the disease appeared in the vaccinator the day after lymph was taken.

A rather curious case came under my notice, of an infant whose vaccinated arm commenced to show erysipelas about twenty-five days after its vaccination. The inflammation started at the site of the vaccine sore caused by the scar.
being knocked off, rapidly spread to as to cover the entire surface of the body and terminated, as the mother expressed it, by "peeling like scarlet fever." The patient's sister had had scarlet fever some weeks prior to the vaccination in question, but Dr. John Taylor, under whose care the patient was placed attributed the disease to a very foul, open, undrained ash-pit which was connected with the house. The child recovered of the dyspepsia after nine or ten days.
Vaccinia Gangrenosa

By the term vaccinia gangrenosa we understand a local or generalised gangrenous affection of the skin caused by vaccination. Its causes seem to be of a two-fold nature; the introduction generally through the vaccination of septic organisms into a body whose tissues have been rendered vulnerable from any cause, such as cachexia.

The symptoms commence at the early part of the maturation of the vaccine vesicles, or they may be delayed till three weeks after the vaccination has been performed.

In some cases the affection is preceded by a general skin eruption, a part or whole of which takes on a gangrenous action, but in others the skin disease is entirely local and limited to the vicinity of the vaccine pustules. The constitutional symptoms disturbance is great; there is much asthenia, and the
disease may pursue a long course.

M. Balger (La France Medicale Ap. 15th 90) describes a case of a strumous female, aged 23, who was the subject of early malignant syphilis, in whom a few days after vaccination there appeared at the site of the vaccinal pustule a slough which eventually attained the size of a five-franc piece.

It was fifteen weeks before the slough became finally detached and this under large doses of iodide of potash, leaving an ulcer that took two weeks to heal. M. Balger could not attribute the complication solely to syphilis, nor to the quality of the vaccine, since it was the only case amongst several vaccinated at the same time. But he thought it was due to the accidental intro-
duction of septic organisms at the vaccination, the soil being more favourable for their development.

A very interesting account ac-
count of a case where the gangrenous was limited to the locality of the
Vaccine vesicles is given by Mr. Clement Lucas (Braithwaite's Retrospect, 86, Vol. XVI p. 305). The case was a child aged 5 months. The mother was a delicate looking woman but the father was strong and well built. The parents had been married six years, the father's age being 27.

There had been three children as the result of the marriage, none of whom had been vaccinated by the mother. The first child was born thirteen weeks after the marriage. This child had a rash over its buttocks when six weeks old, and thrush in its mouth, but the mother was doubtful as to smuffles. The mother had never suffered from an eruption of any kind, either during pregnancy or after the birth of the child. This child was brought up on the bottle and had rickets when a year old, but is now strong and well. The second child was born about two years ago. It likewise had a rash over,
the buttocks when six weeks old, and
the mother thinks it had smuffles.
It recovered without medical treatment
and, though bottle fed, escaped scolds.
The mother had never a miscarriage.
The third child, who is the patient,
was born on the 10th Aug. 1862. It
had smuffles at birth and a rash
over its buttocks when three weeks old.
Had thrush in the mouth. It was treat-
ed by a medical man who gave
it grey powders 
and the rash
disappeared. Was thin and weak
when taken to be vaccinated. It
had been fed on condensed milk,
Bridges' food, Robb's biscuits. When
three months old it was vaccinated.
The first time it did not "take,"
accordingly a week later it was vac-
cinated in the same place again,
but again the vaccine failed to
produce vesicles. The child was
not vaccinated again until it was
five months old. It was then vac-
cinated for the third time in the
same site and the following week
five weeks had developed.
No child was vaccinated from this infant, nor was any lymph taken from its arm. Between
the second and third vaccinations the mother had noticed that the
child had grown thinner.
The last operation was performed
in Jan. 1863, and about three
weeks later the skin at the site
of the operation turned brown
and sloughed. She took the
child to a private medical man
who treated for a short time, and
then advised her to take it to
the Evelina Hospital. When I
first saw the child it presented
the following appearance:
It was extremely emaciated, with
sunken cheeks and eyes, and wasted
limbs. The abdomen was tympanitic
and there was no enlargement
of the liver or spleen. There
was no cranio-tubal, or enlargement
of any epiphysis, and the ribs
were not beaded. The buttocks
and pudenda were in a state of multiformous eczema, but there were no disseminated shiny spots and no eruptions on any other part of the body. The mucous membrane of the mouth and lips was sound. The left arm was slightly swollen and at its upper part presented a somewhat remarkable appearance. A sore commencing at the point of the shoulder extending down below the middle of the arm, and was occupied, in the centre, by a large thick black slough. The sore was 2½ inch in length by an inch and a half in breadth. It presented a sharply defined edge of ulceration which dipped through the skin into the cellular tissue beneath, and a red blush of infested vessels extended for about half an inch around. Between the slough and the ulcerated edge there was a yellow line coated with pus. The slough which was hard, black, and dry, was divided into two portions.
the upper of which was oblong in shape, an inch and a half in vertical measure, one inch across, and a quarter of an inch in thickness.

The smaller portion of the slngle was situated below and in front of that already described, and was about three quarters of an inch in diameter. There was no glandular enlargement in the axilla. The child was ordered cod oil and still wine and carbolic oil was applied to the wound. It died on Mar. 4th, without any convulsion or special symptom of note. The father of the child most emphatically denied ever having had any venereal disease of any kind, either before or after marriage.

Post mortem. Head not examined.

Heart healthy. Lungs collapsed at the lower part behind. Intestines empty and the stomach small. Liver and spleen healthy, but latter contracted. Kidneys healthy.
Four other children had been vaccinated from same source and no ill effect followed in these cases.

The child had an hereditarily eruption over the buttocks, but this made no appearance some months before the vaccination and could not therefore be attributed to any poison introduced at the time.

Mr. Lucas, taking all into consideration, was led to doubt the existence of syphilis either from vaccination or hereditary. He thought the vesicles were due to artificial dirt and neglect of cleanliness.

In other cases, described by Mr. Hutchinson, a more or less symmetrical eruption follows vaccination, and the vaccine-vesicles are unaffected. One such case is described by Mr. Hutchinson (Lancet 19, 11, p. 873), of a child who was vaccinated three months before its death. Three other children vaccinated from same source took no hurt. On the 8th day after vaccination a
popular and vesicular rash appeared over the trunk, which rapidly assumed a disagreeing character. The eruption was at first taken for smallpox and when death took place, a fortnight later, an inquest was held on the case, for it was thought to be syphilis. But Mr. Hutchinson pointed out that its evolution, as well as its character, were not those of a syphilitic affection, and he considered it to be a case of true vaccinia passing on to a gangrenous condition—a condition which he had sometimes observed to take place in varicella.

The following case by Mr. Wm. Stokes (Medical Times 80, p. 586) shows the difficulty in the diagnosis of vaccinia gangrenosa. Mr. Stokes's patient had been previously to her illness, a healthy, plump, well-nourished girl of nine months. She was admitted to the Richmond Surgical Hospital on Feb. 17th, 1860. According to the mother's account she had
been vaccinated ten days previously, and within 48 hours after the operation, a number of purple and black spots appeared, first on the buttocks, next on the face, and afterwards all over the body. On admission the child presented the following appearance: the body and face were sparingly sprinkled with spots, each of these covered with a yellow scale, and exactly resembling the crusts to be seen in a mild case of variola that is ancelling. There were large sloughing surfaces on both buttocks, on the back of the right thigh, on the calf of one leg, and on both arms. The largest of these was on the right buttock and back of the right thigh; it was 8 inches long and 2 ½ in. wide at its widest part. In the middle of it was a large black slough separating; it was dry and looked like leather. The slough implicated not only the skin but also the subcutaneous tissues. The other sloughs were smaller and there on the calf
of the leg, and on the arm had
not yet begun to separate. There
was no inflammation around these
latter. There were three distinct
well marked vaccination vesicles on
the left arm, one of which had been
ruptured. They presented the ap-
pearance usually seen on the 9th
or 10th day. They were healthy
looking, but there were large sloughs
in the immediate vicinity. Under
a suitable treatment and nourishing
dietary the child happily made
an excellent recovery.

Mr. Stokes admitted that difficulties
existed as to the diagnosis of vaccinia
gangrenosa in the case reported
by him. In the first place three
other children had been vaccinated
with lymph from the same source,
without injury. Secondly, the great
rapidity with which the pemphigoid
rash manifested itself, raised a
doubt as to connexion between the
vaccination and the development
of the rash. A third difficulty
was the fact that the vaccine besides themselves did not either primarily or secondarily participate in the

vaccination action.

Vaccinia gangrenosa is to be distinguished from varicella

gangrenosa.

Treatment would be to support the strength by a proper diet, the use of local antiseptic measures, and in some instances the internal administration of iodide of potash, Parietis syrup and the like. It is a disease little known.
Contiguous Impetigo.

This disease needs mere mention. It may be inoculated at the time when the vaccination is performed, or subsequently develop in the vicinity of the vaccine vesicles. When this associated with vaccination heaped-up scabs appear on the skin near the vaccine marks and the disease may be conveyed by the child's nails to other parts of the body, particularly the face, head, and neck, but not necessarily to these regions only. It is apt to occur in children whose health is below the normal standard and there may be some constitutional disturbance. When recognised it is easily cured. The strength should be supported by suitable food and medication and the parts treated with antiseptics.
as toracic stach poultics or ammonio-chloride of mercury (gr. v to 3f). Pediculi and otorrhoea if present should also be attended to.
Miscellaneies

There are other odd diseases which have been known to complicate vaccination and which may be mentioned together. *Framboesia* (yaws) an inoculable epidemic disease peculiar to the African race both in their native country and in the West Indies, consists of an eruption of yellowish or reddish yellow tubercles which gradually develop a moist exuding fungus, with constitutional symptoms.

It attacks the face, limbs, feet, and organs of sensation, has a period of incubation ranging from three to ten weeks and except in rare instances the disease occurs only once in a lifetime. The treatment is cleanliness, antiseptics (Carbolic acid), generous diet and tonics.

M. Paul Diday (Medical)
Times 85, p. 491) relates a curious case — piliferous vaccine virus — of a healthy girl, aged 11½ months, who was vaccinated with animal vaccine virus which had been forwarded in flask by the agency of the Lyons Municipality. The inoculation by two punctures made in the anterior part of the thigh produced fine pustules which ran their usual course and no lymph was taken from them. Sixty days afterwards it was observed around the cicatrices, then recently formed, that a coronet of hairs had sprung up, which, at first, were thin and downy, soon after increased in length, substance and colour. On examining the placis between which the lymph had arrived there a four small hairs were discovered adhering to them.
Dr. Edmund Robinson (Brit. Med. Jour. 90: 71, p. 1233) says that he has seen several cases of diphtheritic membrane form on children's arms after the application of cream from small shops where scarlet fever had been treated during the sale of milk. Boracic acid would be useful in the treatment of such a complication.

Pyaemia has been noticed after vaccination. A case is mentioned in the Lancet (1847, p. 857). A child, aged 6 months, vaccinated with two other children from same source, showed on the 9th day ap.

Appearances of successful vaccination with no unusual symptoms; but on the 16th day, the pustules were ulcerated and freely discharging pus. There was also blematitis. Child died on the 25th day after vaccination.
At the post-mortem examination, the body was found to be well nourished. There was slight ulceration beyond the site of the vaccine pustule, three of which had become confluent. Associated lymphatic glands enlarged, veins not thrombosed. Both temporo-maxillary articulations, right sterno-clavicular joint, and left ankle were full of pus. Two small patches of purulent infiltration beneath the scalp. Bursa over right olecranon had burst, suppurated and recently burst. Lump presented numerous wedge shaped infarctions, some red, some firm, others decoloured in the process of disintegration. Small patches of collapse. There was in the house a man with an abscess of the foot and occasionally the woman had washed some linen in the water which had been used for cleansing his foot. Pneumonia is also said to occasionally follow vaccination, as also is septicemia.
General Conclusions

1. Compulsory vaccination, in the interest of the whole community, is not inconsistent with freedom. Vaccination may be followed by certain skin eruptions and other complications, some of which demand treatment.

2. The artificial cultivation of vaccine lymph in such quantities sufficient for general purposes is a desideratum. It is possible to imagine that the failure in the cultivation of lymph may be due to the micrococci giving rise to a product which interferes with their natural proliferation. Lymph should be cultivated on healthy children whose vaccination pursues a normal course. Many of the cases of so-called supernumerary vesicles are probably...
Cases of "vaccine generalisation". Lymph taken from re-vaccinated adults is too attenuated and not to be recommended for vaccination purposes. The vaccine vessels may be delayed in their appearance, or they may be re-virified by a subsequent vaccination. The antiseptic treatment of vaccine vessels is admitted. Vaccination ulcers may be the starting point of erysipelas, and our experiments would tend to show that the admixture of septic matter with the lymph was a great factor, though not the only one, in their production. The inflammation and swelling caused by accidental vaccination would be best explained by the lymph being contaminated with septic germs, in its transit from the
vaccination to the vacciniae. The poxes due to accidental vaccination when occurring in some localities are to be distinguished from primary sores.

3. The inoculation with pure vaccine may cause, in predisposed subjects, skin rashes, many of which are interesting only from a diagnostic point of view, as they are very evanescent.

4. The existence of "vaccine generalisation" (spontaneous), due to blood infection, can no longer be doubted, and there are in consequence two varieties of the disease, one due to blood infection, and the other due to cutaneous inoculation. The inoculation of infants suffering from eczema or other skin disease ought to be postponed.
ill the patient is well, except in times of smallpox epidemics when the danger of smallpox is far greater than the risks of a benign eruption due to auto-inoculation.

5. Many of the alleged cases of vaccino-epidemic are either cases in which syphilitic phenomena have been revealed by vaccination, or those of children whose tissues are especially vulnerable from injudicious feeding, and who exhibit symptoms easily mistaken for those of syphilis. It is possible to transmit syphilis by transplanted lymph, but the cases are so rare as not to justify the discontinuance of humanized lymph. The history of syphilis in some members of a family may be misleading, as it is possible that a syphilitic may have a first child healthy and a second one syphilitic.
6. The conveyance of tubercle bacilli by official vaccination is impossible.

7. The transmissibility of leprosy by means of vaccination is a moot point.

8. Erysipelas may occur from vaccination or after vaccination, the former variety of the disease being all but unknown.

The utility of vaccination itself is now generally admitted to be more than doubtful. Several cases of vaccinia parvum have been described; and impetigo contagiosa may complicate vaccination.