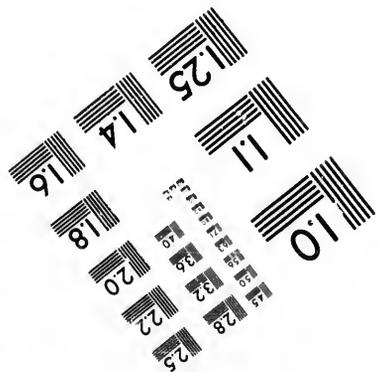
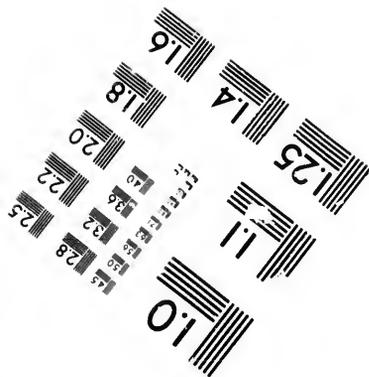
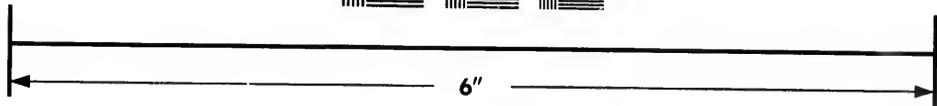
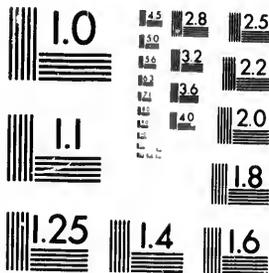


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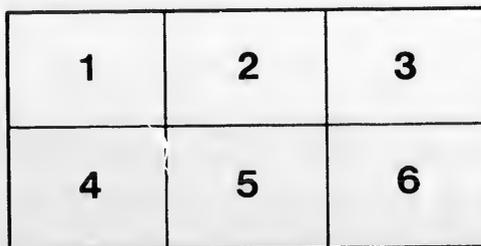
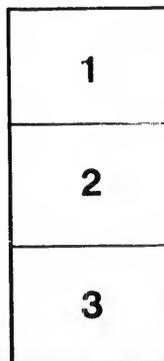
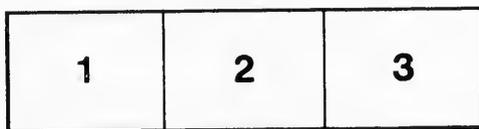
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MONTREAL TRACTS ON HOMŒOPATHY.—No. 2.

SMALLPOX

AND ITS

PREVENTION.

BY

THOMAS NICHOL, M.D., LL.D., B.C.L.

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My original intention was to issue a Tract on some form of Disease alternately with one on some point of the Homoeopathic Law of Cure, and accordingly No. 2 was to have been a collection of cases cured by the material dose. But the advent of smallpox forces me to change this plan, and I now send forth "SMALLPOX AND ITS PREVENTION" in the hope that my readers will obtain a clear conception of the disease and also just views on the great subject of its prevention.

THOMAS NICHOL, M.D.

140 Mansfield Street, Oct. 26, 1885.

SMALLPOX AND ITS PREVENTION.

—:O:—

SMALLPOX is at once the most loathsome and the most easily prevented of all the eruptive fevers. Before the great discovery of Jenner it was undoubtedly the most fatal scourge that decimated the human race, and, though at the present time it occupies a less conspicuous place, the fact remains that to the dwellers in Montreal it is more frequent and more fatal than even the much-dreaded diphtheria.

During the month of September, 1885, we lost out of a population of a hundred and sixty thousand no less than 830, being at the rate of 10,000 per annum, equal to the population of a town like Belleville, Ontario.

Smallpox, then, is an acute febrile and eruptive disease, eminently contagious, caused by a specific poison which reproduces itself during the course of the attack. After a period of latency, fever of a remittent type makes its appearance, followed by the specific eruption, which passes through the various stages of pimple, vesicle, pustule and scab. The disease runs a definite course, and, as a rule, it blunts the susceptibility to a second attack in the same individual.

Smallpox is the product of a specific poison, and this poison must, in the very nature of the case, be derived from some one afflicted with the disease. You might as well expect wheat to spring up where no wheat has been sown as expect smallpox to arise spontaneously. In the olden time, when medical men were even poorer reasoners than they are to-day, it was believed that smallpox could originate in mental emotion, or from some deficiency in sleep, exercise or food, or from some disorder of the

secretions, and even at the present time many people, including not a few physicians, believe that it may be bred in the blood, precisely like rheumatism or gout. But the specific nature of the disease is now placed beyond all doubt.

Smallpox, then, originates in a specific poison which reproduces itself. It is, therefore, an organic body which can exert its baleful power in the form in which it is thrown off by the sick person, and this is the self-evident mark of a contagious morbid poison. No one, so far, has been able to separate the contagious germ from the lymph in which it lies, and, like the poison of typhoid fever and some other diseases, we only know it by its effects. In the first place, the contagious germ may be transmitted through the medium of the air without any contact whatever with any infected person, and in this manner it may strike its victims at a very considerable distance. Thus Dr. Haygarth, on the authority of an American physician, affirms that the contagion, on one occasion, crossed a river fifteen hundred feet wide, and affected ten out of twelve carpenters at work on the other side. This contagious principle is given off by every part of a sick man's body, by the lungs as well as by the skin, and it clings to the clothing of the patient, to the coverings of his bed, to the newspapers he reads, and to the walls of the room. In the writings of the older physicians, such as Baron Dimsdale and Dr. Lettsom, we constantly find the ominous phrase "infected clothes," and these writers seem to have been more awake to the possibility of infection in this manner than the practitioners of to-day. Our filthy dollar bills, too, are suspicious, to say the very least. The dry scabs retain the contagion for a long time, and death does not destroy its energy, and it is quite certain that a smallpox patient throws off contagious emanations from the first day of the fever till the falling of the very last scab. Dr. W. V. Drury, a well-known English homœopathic physician, writes:—"I recollect being in the old smallpox hospital the last day it was occupied by patients. This building stood where the Great Northern Railway terminus now is. After the house was given over to those who buy old houses, it was pulled down, the materials would, in the

ordinary course of trade, be sold, and dispersed about London, to be again used in building. The year following the pulling down of the hospital we had an outbreak of smallpox in London."

There is but one contagious principle of smallpox, but the contagion appears in various forms, according to the constitution and susceptibility of the individual. When the pustules stand separate from each other, it is quaintly called *discrete smallpox* or *distinct smallpox*; when they run into each other it is styled *confluent*; when hemorrhage takes place from the mucous surfaces with effusion of blood under the skin it is called *malignant* or *black smallpox*. Lastly, when smallpox is modified by vaccination, it is termed *varioloid*. More minute divisions are made by some writers, but for all practical purposes these are quite sufficient.

The origin and early history of smallpox are involved in almost impenetrable darkness. It appears certain that it was unknown to the ancient Greeks and Romans, and many circumstances point to Hindostan as being the birth-place of smallpox as well as of cholera. Thus a goddess presided over the disease and its treatment, and from time immemorial the Brahmins have been in the habit of inoculation. From Hindostan it passed to Arabia and the countries bordering on the Red Sea, about the time of the birth of Mohammed; and in the seventh century we read of Caliphs being pitted with smallpox. Procopius, who wrote in the year 544, describes a disease which some think was smallpox; from the narrative it seems rather to have been the plague. But the history of smallpox prior to the time of Rhazes (A. D. 910) is mere conjecture, and we are indebted to the famous physician of Bagdad for the first clear and perspicuous account of the disease. A copy of his "*Treatise on Smallpox and Measles*" now lies before me, and from it I gather that he ascribes to Claudius Galen a knowledge of the disease, and he quotes passages relating to it from the "Pandects" of Ahron of Alexandria, who wrote in the fifth century. Rhazes speaks of smallpox as being generally known all over the East, and the same opinion is expressed by Ali Abbas, Avicenna, and other Arab physicians of the tenth and eleventh centuries.

From Asia it travelled slowly westwards, striking England at the close of the ninth century, and its ravages were so frightful that the people lived in continual dread. In the Harleian manuscript, certainly written before the year 900, we find the following prayer:—"In the Name of the Father, of the Son, and of the Holy Ghost, Amen. May our Saviour keep us. Lord of Heaven, hear the prayers of thy men-servants, and of thy maid-servants, O Lord Jesus Christ. I beseech thousands of angels, that they may save and defend me from the fire and power of the small-pox." The returning Crusaders appear to have brought the disease with them; certain it is that not till then was it known on the Continent of Europe. It did not reach Germany till the year 1493, when it was introduced from the Netherlands by a soldier of the Emperor Maximilian I. From Europe it passed to Mexico in the year 1520, claiming its victims by millions.

In all these countries smallpox was the one great scourge, sweeping over vast tracts of country, and causing more deaths than all other diseases put together. As Dr. J. N. Hyde aptly remarks:—"If a modern traveller could find himself transported to the streets of the City of London as they appeared in the early part of the present century, it is probable that no peculiarities of architecture, dress or behavior would be to him so strikingly conspicuous as the enormous number of poek-marked visages he would encounter among the people at every turn."

In the year 1721, Lady Mary Wortley Montague introduced inoculation, which checked the disease to a very appreciable extent, and in the year 1775 Dr. Edward Jenner made the beneficent discovery which has saved myriads of human lives, and now it may be truthfully affirmed that whenever smallpox rages as an epidemic it is simply *the result of neglect of vaccination*.

Smallpox assails all ages, even the unborn babe. Infants, however, of one or two months are less liable than older children. Indeed, Dr. Underwood, one of the best of the older writers on the diseases of children, was of opinion that even contact in the cradle with a child ill of smallpox would not communicate the disease to the newly-born.

Sex causes no difference as to susceptibility to the disease--men and women are liable in the same degree. But both *pregnancy* and *childbirth* predispose to the disease, and, at the same time, give to it an additional malignancy. The fatality of the disease is greatly increased by intemperance, by violent exercise, by confinement in a warm room, and, according to all the older writers, by heaping a quantity of blankets on the bed. On the other hand, the severity of the disease is greatly mitigated by sponging with cold water, by light bed-clothes, by good ventilation, and by total abstinence from animal food and alcoholic drink.

The older writers, who saw only the unmodified disease, all assert that in the country and at a distance from large towns the disease is much milder than in a crowded city.

Chronic diseases do not diminish the predisposition to smallpox. Patients with heart or lung affections are attacked in the same ratio as the healthy; the only difference is that it is more likely to prove fatal.

Smallpox may co-exist with measles, when, according to Munro, of Edinburgh, the course of the smallpox is interrupted until the eruption of measles has disappeared. Children ill with scarlet fever *may* take smallpox, but they are not at all likely to do so, and the same may be said of typhoid fever patients. A man of eighty, who has neglected vaccination, is more likely to take smallpox than a man of fifty, simply because he is further from his infantile vaccination.

The young are the chosen victims of smallpox, chiefly because the disease is commonly contracted on the first exposure to the contagion. Thus, during the years 1840 and 1841, there died in London of smallpox 2,286 persons, of whom 2,060 were under the age of fifteen, and only 226 above it. During the months of June, July and August, 1885, *three hundred and twenty-four persons* died of smallpox in Montreal, of whom *two hundred and eighty-three were children* under five years of age; the adults numbering but *forty-one*, about eight per cent. of the whole. The adult deaths for September were *one hundred and five* against *seven hundred and twenty-five children*.

As a rule, smallpox is highly contagious. Sir Thomas Watson affirms that "there is no contagion so strong and sure as that of smallpox, none that operates at so great a distance." Mr. Marsden says that "a single breathing of the air where it is, is enough to give the disease;" and Dr. Haygarth tells us that, during his long attention to this subject, not a single instance had occurred to prove that persons liable to the smallpox could associate in the same chamber with a patient in the distemper without receiving the infection.

Notwithstanding these strong statements, which, as a rule, are correct, there are many people who are but little susceptible to smallpox, and even before Jenner's discovery many thousands passed through life without being attacked. Dr. Gregory tells a story of a lady in Salisbury, who had brought up a large family, many of whom she had attended in smallpox, but had never taken it herself. Finally, in the year 1804, she, being at the time eighty-three years of age, took a fancy to be inoculated, which was successfully accomplished.

A distinguished railway officer lately told me that, while manager of a railway centering in Chicago, he one day entered a car in that city for the purpose of inspecting it. Almost immediately a delirious smallpox patient, with his face and body covered with the confluent eruption, rushed into the car, closely followed by the conductor. The passengers scattered, as a matter of course, but the conductor grappled with the man, and, after a good deal of exertion, succeeded in mastering him. The conductor, whose hands and face were smeared with the variolous matter, wished to proceed with his run, but the manager told him to go home and get vaccinated, as the operation had never been performed. He went home, but did *not* vaccinate, and did *not* take smallpox.

Occasionally persons are met with who state that they have had smallpox twice, or even thrice. This happens, and not so very seldom either, but I am inclined to think that in the great majority of these cases, one of the attacks was chicken-pox.

Colored people are peculiarly susceptible to the contagion of smallpox, and the mortality is much greater than among whites.

Cullen's famous definition of the *discrete variety* is still the best: "Distinct smallpox, with few pustules, and those distinct, with circular margins, turgid; the fever ceasing upon the eruption breaking out." After a period of incubation, averaging twelve days, the individual is attacked by rigors, soon followed by burning heat. This stage lasts, as a rule, three days, though I have seen it shortened to two or prolonged to four days. The fever remits slightly in the morning and rises towards evening. The pulse is full and tense, the skin hot and dry, respiration short and labored. The patient rapidly becomes languid and weak, and after exertion the face becomes pale and sunken with a dull and heavy expression, while the pulse is quick and thready. The tongue is dry and parched, the thirst is constant and severe, appetite entirely gone. Nausea and vomiting are often present, with pain in the stomach increased by pressure; constipation is very common. But the most characteristic of all the early symptoms is the pain in the back. This is a dull, heavy pain in the small of the back, which is not increased by motion. When it is severe it usually ushers in a severe attack of the disease; when it is absent then the attack is mild. This back-ache is usually accompanied by drawing, tearing pains in the limbs, often mistaken for rheumatism, and Heberden remarks that it is a good sign when the pain is high up, between the shoulders. Headache is another constant symptom, which comes on very early and continues till the eruption appears. It seems to be of a congestive nature, for the face is hot and flushed, the eyes red and glistening, while the great vessels of the neck pulsate violently. The head throbs and beats with severe lancinating pains, often with a feeling as if a cord tightly encircled the head.

At times the disease sets in with restlessness and delirium, which soon passes into stupor, and in children it is often ushered in by convulsions, which take the place of rigors in adults. Sore throat is often present, with sneezing and running at the nose; a bronchial cough is less common.

Towards the close of this initial stage a red rash often comes out, especially on the lower part of the abdomen and the inner

surface of the thighs. It takes the form of small, irregular points or streaks, or it may cover a larger surface as a uniform blush of a pale red or brownish red tint. This rash fades and disappears as the true smallpox eruption approaches, and very much depends upon its early recognition.

The intense febrile symptoms now decline, the heat of the skin diminishes, the drowsiness and delirium pass away, and even the harassing back-ache subsides. The characteristic eruption first appears on the face; then, in succession, on the neck, trunk and limbs. Very rarely do the spots first appear on the extremities. Small reddish pimples first appear, which gradually enlarge until, after forty-eight hours, they feel *like small shot in the skin*, and this is highly characteristic. At this early stage the eruption looks a good deal like measles, and in the olden time the two diseases were not distinguished from each other. About the third day of the eruptive stage a very little clear fluid appears on the summit of each pustule, and this vesicle steadily enlarges till the sixth or seventh day, when it has the size and shape of a small pea. In mild cases these pocks may be as few as twenty in number; in bad ones, as many as five or six hundred. Soon after the appearance of the clear fluid a depression is seen at the apex of the pustule, which gradually deepens into the characteristic umbilication, and Dr. Hartshorne compares the pustule at this stage to a hat whose crown has been pushed down at the middle. The entire skin is now swollen and œdematous, and the head, face and eyelids are particularly puffy; in severe cases the patient is often blinded. About this time there is a distinct ring of inflammation around each pock. The fever now returns, a secondary fever, called the fever of suppuration, often opening with a rigor, followed by heat of the body and slight delirium. I have frequently met with bronchial cough about this time, often with blood-streaked expectoration. The matter in the pustules increases till the eleventh day, when they begin to break and discharge a yellowish matter, which dries into scabs or crusts and falls off. The subjacent skin is found to be full of depressed scars of a bluish-purple color which persist for a long

time. As the scabs form, the fever declines, the tongue cleans, the appetite returns, and the patient is himself again.

Very characteristic is the greasy sickly odor which exhales from the body during the maturation of the pustules. An experienced practitioner can often name the disease from the odor alone, for there is nothing on earth like it. Often the eruption appears in the mouth and throat, with soreness and difficulty in swallowing, and, in rare cases, the air passages are involved, causing hoarseness, cough and difficulty in breathing.

In the *confluent form* of the disease the stage of incubation is very short and the fever very severe. Cullen's definition is concise and accurate: "*Confluent smallpox*, with numerous pustules, confluent, with irregular margins, flaccid, and but little elevated, fever remaining after the eruption."

It is well to remember, however, that it is only an aggravated form of the disease, and that there is every possible grade between the mildest distinct form and the most severe confluent. But every confluent case is serious, and the danger is ten times as great as in the distinct variety. The preliminary rigors are longer and more severe, and diarrhoea is common, both in children and adults. The red rashes, already spoken of, often precede this form of smallpox, and delirium and stupor may appear almost as soon as the fever commences. In children convulsions frequently come on the evening before the poeks come out. At times the eruption is preceded by an erysipelatous blush, covering large portions of the body. About the close of the second day, a large number of deep red points appear, and on the following day they assume the pustular form, and almost at once they become confluent.

All the symptoms are greatly worse than in the distinct form. The pains in the back and limbs are more severe, the fever is much higher, the sickness more distressing. The eruption advances rapidly, but the pustules rise but little above the skin, especially on the face. They are flat and irregular in form, and soon run together, till at times scarcely a morsel of healthy skin can be seen. I have noted collections of pus as large as a hen's

egg, and an eruption of small boils is common. Soon the pustules burst, scabs form, and the face looks as if it had been thickly plastered over with honey-comb. The face, hands and feet swell enormously, and this tumefaction is greater about the sixth day. The swelling is greatest about the ears and the angles of the jaw, and the eyelids also participate in the tumefaction, though, on the whole, they are less swollen than in the milder form of the disease. Still, I have seen patients unable to open their eyes for four, five or even six days. Severe inflammation of the eyes is somewhat common, sometimes ending in perforation and total blindness.

The eruption in the mouth and throat is far more copious than in the distinct form of the disease, and it is accompanied by an abundant and distressing salivation, which is at its height about the ninth or tenth day. Not unfrequently the eruption and its attendant inflammation extend with the most astonishing rapidity to the air-passages, causing a hoarse and muffled cough, with futile attempts at expectoration, and sometimes complete extinction of the voice.

The fever declines but little on the appearance of the eruption but as soon as matter forms in the pustules it rises higher than before. It is often accompanied by violent delirium, followed by profound stupor. I have often seen obstinate diarrhœa towards the close of the attack, and, as a rule, convalescence is slow.

Unfavorable signs are, a sudden subsidence of the swelling, or a complete absence of the swelling; or a cessation of the salivation, or its absence. These statements are apparently contradictory, but I had abundant opportunity of verifying them during the epidemic that raged in this city from 1872 to 1880. Another unfavorable sign is the appearance of a blackish spot in the centre of each pock, for this is very often accompanied by increased fever, with brown tongue, frequent pulse and violent delirium. At other times the patient is overwhelmed by the increased virulence of the poison. The pulse does not increase in frequency, and the temperature is unchanged, but he suffers from constant restlessness and anxiety, with uncontrollable

retching and vomiting, and frequent desire to pass urine. Such cases are almost inevitably fatal.

Varioloid is smallpox modified by vaccination, or by a previous attack of smallpox. It is often ushered in by a good deal of fever, and yet it runs a milder course and has a shorter duration than the other forms. The danger, too, is very much less, as we shall see when we come to discuss the statistics of the disease, and yet it is not altogether devoid of danger, for fatal cases occasionally occur. The fever is one day shorter than in the distinct form of the disease, but the headache is very often of the most severe nature, with great prostration and distressing vomiting. The pain in the back, too, is so severe that patients often say that they feel it must break. The invasion-rashes, already described, are quite common. The fever disappears when the eruption comes out, and the eruption may consist of but a few scattered pocks. Sometimes there is no eruption whatever, and I have seen numbers of cases in which it first appeared on the body, not on the face. Again, it may be more copious, but it does not run its regular course, drying up on the sixth or seventh day, instead of the eighth or ninth. The smallpox smell is rarely present, and secondary fever is uncommon. In general terms it may be stated that this form of smallpox is severe in exact proportion to the length of time that has elapsed since vaccination. If fifteen years have elapsed, the attack is very light, an interval of forty years is followed by an attack of average severity; while a man of seventy-five or eighty, who has not been vaccinated since infancy, may have a severe or even fatal attack of confluent smallpox. As a rule, pitting is rare; when present it is usually slight. In spite of all these differences there can be no doubt but that modified smallpox is identical in its essential nature with the other forms of the disease.

Black smallpox, or *malignant smallpox*, as it is more correctly termed, is not nearly so frequent now as it was before Jenner's time. From the first onset all the symptoms are of the most formidable nature. The headache is very acute, the anxiety very great, the sickness and vomiting most distressing. In one

class of cases the nervous system is completely prostrated from the very first; continual restlessness and anxiety, with delirium, which soon passes into coma. In these cases the eruption is either imperfectly developed, or else it suddenly retrocedes after it is formed. In another and more numerous class, a low depraved condition of the blood is the most prominent characteristic. The thin and watery blood oozes from nearly all the mucous surfaces, from the nose, mouth, air-passages, kidneys, bowels and womb. The eruption is badly developed, bloody or purplish, with an unendurable smell and, at times, a disposition to gangrene. The skin is covered with dark red spots, varying in size from a pin head to a ten cent piece, and sometimes the entire eye is crimson with effused blood. About the tenth day the pustules burst and discharge a bloody ichor, which dries into brownish or blackish crusts of a most offensive appearance. The patient's countenance is at first expressive of anxiety, but as the disease marches on he sinks into stupor with oppressed breathing and great weakness of the circulation. Death usually takes place about the fifth or sixth day.

Unlike scarlet fever and typhoid fever, this disease, running as it does a definite and rapid course, has but few complications and after-effects. You never see a lingering smallpox as you see, lingering scarlet or typhoid fever. I look upon laryngitis as being one of the most frequent and fatal of the complications. It results from an extension of the eruption and its accompanying inflammation to the larynx, but still more frequently it is the result of exposure to cold.

I remember attending (November, 1871) an unvaccinated child ill of confluent small-pox of a malignant type. It did well for ten days, and really looked like getting well, till one cold night the mother, exhausted by watching, threw herself across the foot of the bed and fell into the sleep of the weary. The child slipped from the bed and passed several hours on the cold, carpetless floor, and when the mother awoke the child was stricken with hopeless laryngitis. Pleurisy is a somewhat common and very fatal complication, and the same may be said of bronchitis. Ery-

sipelas is quite frequently seen, and abscesses and gangrene often retard recovery and endanger life. Inflammation of the eye and ear are nothing like so common now as they were before Jenner's time, and I have seen virulent nasal catarrh quite frequently.

Diemerbroeck, a Dutch physician who flourished in the beginning of the seventeenth century, tells a preposterous story of having seen individuals take smallpox three times within three months, and one English practitioner claims to have attended between eighty and ninety cases of recurring smallpox. But there can be no doubt that, after excluding such tales for the marines, true smallpox may recur in the same individual, and a third attack is occasionally, but very rarely, seen. Thus Mr. J. F. Marson, medical attendant at the Smallpox Hospital, London, tells us that the son of a medical officer in the army, who had been vaccinated in infancy by his father, and had a large cicatrix remaining from the vaccination, and who was attended by his father for smallpox in early life, and bore decided pits of the disease, in 1844, at twenty-three years of age, was admitted into the Smallpox Hospital with severe confluent smallpox, of which he died. The celebrated Trousseau had in his wards a medical student who, though he bore the marks of two attacks of smallpox, took it a third time, and that, too, in rather severe form. But one who has had very severe smallpox is not likely to have it a second time, at least not so likely as one who had the disease in a very mild form.

The temperature of the patient is often as high as 101° on the first day, and it continues to advance, with very slight morning remissions, till on the evening of the third day it may be 103° , or even higher. The chief point about the thermometry of the confluent form of the disease is that if the high temperature continues after the eruption is well out then there is certain to be a formation of matter in the pocks, or else some inflammatory complication is at hand. When suppuration does take place a temperature of more than 105° indicates danger, and I have noted 110° in fatal cases.

The anatomical character of the eruption is now well under-

stood. Deep down on the true skin, and partly within it, little patches of congestion appear, which steadily enlarge, rising at the same time towards the surface. At this early stage each of these bodies has the feeling of a small shot, and this is a characteristic of the early stage. As a result of the inflammatory action, effusion takes place into the surrounding tissues, and thus firm, flattened papules are formed. These stages occupy about forty-eight hours. Then follows an effusion of pearly fluid, which converts the papules into vesicles full of this colorless lymph, each having a central depression and an inflamed circle around it. This stage lasts about four days, when the vesicles ripen into pustules. The matter increases in quantity, and is deposited in little cavities formed by the adhesion of the changed epidermis to the true skin at some points and its separation at others. The pustular stage lasts three days, and, towards the close of the third day, when they have attained their full size, they rupture, the fluid or semi-fluid contents exude and form scabs. The stage of scabbing lasts about three days more, making the entire duration of the normal eruption about twelve days.

One would say that it should be a very easy matter to distinguish smallpox from other diseases, but, as my old teacher of clinical medicine remarks, when writing on this subject, "the most experienced physicians are sometimes deceived." And yet much, very much, depends upon the prompt recognition of the disease, *for it is contagious from the very first*. If the two first cases which came to Montreal last April had both been promptly recognized, and both had been carefully isolated, then we would have been spared that calamitous loss of life compared to which our pecuniary losses, heavy though they be, are but the merest trifle.

The initial fever of smallpox does not differ from any other fever. But severe pains in the back would be suspicious, and, if accompanied by excessive irritability of the stomach, occurring during an epidemic of smallpox, the probability would be quite strong. If a pustular eruption appeared, and if, at the same time, the fever subsided, then the proof would be *almost*

conclusive. Lastly, should the eruption become vesicular, with the characteristic umbilication, the evidence would be complete.

It is at times quite difficult to distinguish between smallpox and chicken-pox. True, well-marked cases of these diseases are easily diagnosed, but they insensibly shade into each other, and there are cases of chicken-pox hardly to be distinguished from smallpox. Thus, Dr. Munro (Tertius), of Edinburgh, who wrote in the year 1818, speaks of "the more severe form of chicken-pox, in which the fever is considerable, the vesicles pass on to suppuration, and pits are left by them, which, in a few instances, have disfigured the face fully as much as those of the confluent smallpox, and which pits bear a resemblance to those of smallpox." The fever of chicken-pox is slight: that of smallpox usually severe. The eruption of chicken-pox appears twenty-four hours after the patient sickens, while the characteristic pimples of smallpox appear seventy-two hours from the attack of the primary fever. The eruption of chicken-pox is almost always vesicular, and seldom proceeds to suppuration, and very rarely leaves pits. Lastly, the entire course of chicken-pox is five or six days, while that of smallpox is fourteen or fifteen. Previous to the year 1767 chicken-pox was looked upon as being a variety of smallpox, and even at the present day they are considered identical by not a few. But vaccination does not prevent chicken-pox, indeed it usually occurs after that operation; and, though one or two great authorities on the Continent of Europe are said to hold the old doctrine of identity, nothing is more certain than that chicken-pox always gives rise to chicken-pox, and smallpox to smallpox.

Measles has often been mistaken for smallpox, sometimes with ludicrous results, sometimes with results which are far from ludicrous. Thus during the height of the epidemic of 1872-80, a young lady, a member of a somewhat prominent family, was attacked with what a leading practitioner averred was smallpox. She was strictly isolated, every one in the house was vaccinated, and the place reeked with the fumes of carbolic acid. Two trained nurses were procured from the General Hospital, and

public prayers were offered up in the patient's behalf. The family got thoroughly alarmed, and the consulting physician, the Nestor of the Montreal physicians, cool and sagacious, was called in. As soon as he entered the room, he smelt the patient, and exclaimed in the sweet Deric of his native land, "*Mizzles! Dr——, Mizzles!!*" And measles it was, sure enough! The serious aspect of this weighty matter, the diagnosis of measles from smallpox, is well illustrated by a case which happened in this city just about the same time. A poor man, fortunately unmarried, was taken with what his medical attendant called smallpox. He was at once removed to the Smallpox Hospital, which in those days was a good brick building immediately in rear of the General Hospital, *and connected with it*—I presume, with the benevolent intention of giving the patients of the General Hospital an opportunity of catching smallpox in addition to their other ailments. The patient was barely within the walls of the smallpox department when the attendant physician detected that the disease was measles. The patient was promptly sent to his home, but during his brief sojourn in the smallpox department he had taken smallpox. He died in a few days.

In measles, then, a catarrh of the eyes and air-passages is the essential part of the disease, but nothing of the kind is present in smallpox. Pain in the back is absent in measles, but almost uniformly present in smallpox. The eruption of measles is destitute of the shot-like feeling so characteristic of the early stage of smallpox, and it is, from the first, much darker in color. Moreover, the eruption of measles does not suppurate, and it never umbilicates.

The *prognosis* of smallpox depends very much upon vaccination. If the patient has been vaccinated he is likely to recover; if he has *not* been vaccinated he is likely to die. Before Jenner's time *one-half of all the children under ten died of smallpox*; now, when vaccination is systematically practised, the mortality is *nil*, and the German statisticians—the most accurate in the world—affirm that in the eighteenth century smallpox caused from seven to twelve per cent. of all the deaths. From this frightful slaughter Jenner delivered us.

Smallpox is more fatal in women than in men, and pregnancy greatly increases the danger. It is rare for an adult to die of modified smallpox, and, with good treatment, the danger in the distinct variety is very small. It is widely different in the confluent variety, and the black smallpox is as bad as the plague. People who have had smallpox once are not very likely to take it a second time, but if they do take it, they are very likely to die. A given individual who had a mild attack in his youth runs a greater risk from his second attack than another man whose first attack was severe.

Hebra's experience is that, while among those who are unvaccinated the mortality amounts to 30.1 per cent., it is not more than 5.2 per cent. in persons protected by vaccination—that is, the mortality is six times as great. Marson, the best English authority, says that, taking patients at all ages, as they came to the Smallpox Hospital, 50 per cent. die from the confluent form, and 4 per cent. from the distinct form of the disease. Curschmann, the best German writer on this subject, admits that, even including children up to ten years of age, the mortality in the epidemics observed by him was as high as fifty-eight per cent. Intemperance greatly reduces the chances of recovery, and a man of sixty, other things being equal, is more likely to die than a man of twenty-five. Hard work and insufficient food darken the prognosis.

The homœopathic statistics are eminently encouraging, Dr. Eubulus Williams, of Bristol, England, treated a large number of cases in a public institution in that city with the following results: he lost no patients at all of the period of life when the infantile vaccination remained effective, that is, up to the age of eleven. After that age, when the course of the disease proved that the patients were no longer protected, the mortality was 19 out of 257, or about $7\frac{1}{2}$ per cent.

Timid people and unvaccinated people should never nurse smallpox patients, indeed the unvaccinated should never come within many, many yards of them. The nurse should be thoroughly trustworthy, and should keep separate from all others

all through the illness ; even though she had smallpox herself, she should be vaccinated before commencing her duties, and she must be carefully disinfected before mingling with her fellows again.

The patient's bedroom should be kept fresh and cool, certainly not to exceed 67° ; and I prefer a degree or two lower. Half a century ago all doors and windows were kept jealously closed and not a breath of fresh air was admitted, now all are agreed that the room must be freely ventilated at stated intervals. In cold weather a fire in an open grate helps much in the matter of ventilation, and in mild weather the windows should be kept open, day and night.

The sick room should have no *carpets*, and as little furniture as may be. All heavy curtains should be removed, and paper blinds used instead. Quiet must be secured at all costs, and the nature of the disease effectually excludes the inevitable visitor.

In the good old times the patient was loaded down with blankets and coverlets, but now-a-days he has light bed-covering, frequently changed, very much to his own comfort. In the same good old times the patient was not allowed to change his linen, and Diemberbroeck, the Dutch physician already quoted, writes as follows :—"Never shift the patient's linen till after the fourteenth day, for fear of striking in the pock, to the irrecoverable ruin of the patient. Far better is it to let the patient bear with the stench than to let him change his linen, and thus be the cause of his own death. Nevertheless, if a change be absolutely necessary be sure that he puts on the foul linen that he put off before he fell sick, and, above all things, take care that this supply of semi-clean linen be well warmed." Except under exceptional circumstances, the linen should be changed at least each second day.

During the earlier stages the patient rarely can take food ; further on he should take milk, boiled and diluted with filtered water ; weak chicken broth, roasted apples, ripe fruit of almost any kind. Ruddock advises raw eggs beaten up with cold milk.

Cold water is by far the best drink, and a small piece of ice

allowed to dissolve slowly in the mouth is very grateful to most patients. The water may be flavored with the juice of oranges and raspberries, but as lemonade antidotes most homœopathic remedies it should never be allowed. The sick man may be allowed to drink freely, but not much at a time.

Stimulants should very rarely be used in smallpox, but I have followed Sir Thomas Watson's advice and given strong broths, or even wine, if the maturation of the pustules should proceed tardily, if they should not fill up properly, nor their contents become purulent.

Carbolic acid, chloride of lime, thymo-cresol (the very latest fad) and similar things are of very doubtful value as disinfectants, and it must not be forgotten that homœopathic medicines are liable to injury by such powerful odors. On this point, the value of these so-called disinfectants, I am glad to be able to quote the high authority of Dr. Abraham Jacobi, of New York, who thus writes:—"The popular idea, sometimes even shared by physicians, that the faint odor of chloride of lime or of carbolic acid in a sick room or in a foul privy is evidence that the place is disinfected, is entirely erroneous. Particularly in regard to the latter agent, it may be stated at once that its employment for disinfecting purposes on a large scale is impracticable, both on account of the expensiveness of the pure acid and the enormous quantities required to produce the desired effect. For in regard to its efficiency it does not rank very high in comparison with a great many other articles, as may be seen from a table of the disinfectant properties of different chemicals published by Miquel in the *Semaine Médicale*." Fresh air and cleanliness are by far the best disinfectants, and without them all others are but of doubtful utility. I never use disinfectants, other than fresh air and cleanliness, during the illness, when I can possibly avoid it. Specially to be condemned is the sheet saturated with a strong solution of chloride of lime, for that tends to make the patient's breathing difficult and to bring on the much-dreaded laryngeal complication.

Very high authorities, Hebra among them, recommended cold

douche baths, but sponging with tepid water is much safer and more grateful to the patient. An inunction with olive oil should follow each sponging. Dr. Hyde states that "in Vienna warm baths, administered either by the process of continuous immersion so generally practised there or by immersion for from two to three hours of each day, has been found to furnish the greatest amount of comfort to the patient," but, in this city at least, this can rarely be done in private practice.

A frequent change of position in bed is very grateful to the patient, and, at the same time, it tends to prevent bed-sores.

Many things have been recommended to prevent pitting, mercurial ointment, nitrate of silver, tincture of iodine, but with very doubtful success. Dr. E. H. Ruddleok, the well-known writer on homœopathic practice, points out that the action of light on the pustules *photographs* them on the skin, and to prevent that action he advised a mixture of cream and flour in such proportion as will make a thick paste. I have found simple olive oil exceedingly effective, and it has the additional advantage of relieving the intolerable itching. Ruddleok, whose missionary life ended all too soon, gives the following excellent advice:—"The hands of children should be muffled and lightly secured, to prevent scratching, which might lead to ulceration. Adults may wear loose gloves. This precaution is especially necessary while the patient is asleep, and acts unconsciously."

All infected bedding and linen should be boiled repeatedly, after fumigating them with sulphur, and if they are not of good quality it is better to burn them at once. The bedroom should be most thoroughly disinfected, and the first step should be a thorough fumigation with sulphur, according to the rules laid down on page 22 of the first of these tracts. Then should follow a most thorough domestic cleaning with hot water, scrubbing brushes and soap, permitting the fresh air to enter freely by open doors and windows.

Next fumigate a second time with burning sulphur, using at least *two pounds* for a room of ordinary size, and three, or even four, pounds for a larger one,—only less ridiculous than thymo-cresol,

chloride of lime and carbolic acid is the burning of a teaspoonful or two of sulphur in a room whose atmosphere is literally laden with smallpox or diphtheria germs. Then conclude with a second domestic cleaning, even more thorough, if possible, than the first, allowing all windows to remain open for a week. The entire house, not merely the patient's bedroom, should be disinfected in this thorough manner, for the deadly germs may cluster thick in the neighboring rooms.

On reaching convalescence the patient should take a tepid bath each day, followed by a copious inunction with olive oil. Each alternate day the bath should be preceded by a fumigation with burning sulphur, standing in the fumes for five or six minutes, covering the mouth and nostrils with a handkerchief. If this is done, thoroughly and conscientiously, he may mingle in society say in ten or twelve days, but if it is not done then he is a bearer of contagion for fifty or sixty days.

There are two methods of prevention in smallpox, inoculation and vaccination. Inoculation consists in the insertion of smallpox matter under the surface of the skin, so that the inoculated individual actually has an attack of smallpox, usually much milder than when acquired in the "natural way," that is by actual contact with a smallpox patient or by breathing an atmosphere contaminated with the specific germ of the disease. A similar practice has been known in China since the dynasty of Song, A.D. 59. The smallpox crusts, powdered and perfumed, were snuffed up the nostrils, and this was called sowing smallpox.

According to Munro Park, himself a medical man, inoculation has been known to the dwellers on the Tiger from a very early period, and the regimen followed consisted in abstinence from animal food and drinking copiously of water acidulated with lime-juice. Inoculation has been known to the Brahmins of Hindostan from time immemorial, and Drs. De la Condamine and Boscovitch state that it was the custom, from a very early period, among nurses at Naples and Pavia, to communicate smallpox to children by rubbing the palms of their hands with recent matter of smallpox.

About the year 1700 inoculation seems to have been first practised in Constantinople, and, in the year 1713, Dr. Emanuel Tinnoni, an Oxford graduate practising in that city, sent an account of the process to the authorities of the Royal Society. Two years later, Mr. Kennedy, an English surgeon who had travelled in the East, described inoculation in his work "On External Remedies," and in the volume of "Philosophical Transactions" for 1716 is an account of the same process by M. Pylarini, at the time Venetian Consul at Smyrna. The curious part of the matter is that the medical profession in Great Britain paid no attention whatever to these distinct and well-attested statements.

At last, in the year 1717, Lady Mary Wortley Montague, wife of the British Ambassador, had her son inoculated at Constantinople, and four years later her daughter was operated on in England. Next, a certain Dr. Keith ventured to inoculate his daughter, and then Dr. Munro (Tertius) tells us that, "six criminals, who had forfeited their lives to the laws of their country, were, by the royal prerogative, to receive full pardon on condition of submitting to be inoculated. The inoculation was accordingly performed, all of them had the disease in a mild form, excepting one, on whom it entirely failed, he having previously had the disease." Lastly, in April, 1722, after consultation with Sir Hans Sloane, Mr. Amyand, sergeant-surgeon, inoculated the Princesses Amelia and Caroline of Wales.

This seems to have established the practice in England, but it passed into the hands of ignorant non-professionals, and the mortality was so great that it fell into disrepute. But some medical men, notably the brothers Sutton, by applying Sydenham's cool regimen to inoculated persons, secured wonderful results, and in the year 1746 the smallpox hospital was founded, to extend its benefits. In the year 1754, a generation after its introduction into England, it received the sanction of the Royal College of Physicians. In France, Trousseau tells us, it was absolutely prohibited when first proposed, in 1723; and it was not until 1756, thirty-three years later, that anyone ventured to try it.

Inoculation was not without its dangers, for, notwithstanding the statements of Baron Dimsdale, a noted inoculator, that not one in fifteen hundred died, there can be no doubt but that the mortality was vastly higher. The National Vaccine Board, a much higher authority, places it at one in three hundred, that is when performed with all proper precautions, but in spite of the once-popular operation, half a million of people died annually in Europe of smallpox. Notwithstanding this frightful slaughter, and notwithstanding Jenner's glorious induction, it required the authority of an Act of Parliament to displace inoculation in Great Britain. The Act was passed in the year 1840, but the practice still lingers in obscure nooks of the British Islands, and in September, 1885, I vaccinated a young woman who had been inoculated in infancy.

Inoculation was an excellent thing in its day, but it had one obvious drawback in that each inoculated person became a centre of infection to all around. Then, as time passed on, people became careless, and so it came that the century preceding Jenner's discovery no less than four millions and a half of people died of smallpox in the British Islands. But Jenner was not the first who inoculated with cowpox for the purpose of protecting against smallpox, for in 1765 two English surgeons, named Sutton and Fewster, described cowpox and directed attention to its protective power. Next, a certain Gloucestershire farmer, named Benjamin Jesty, inoculated his wife and two sons, for the purpose of protecting them against smallpox. The experiment succeeded, but the operator was hooted at and pelted with stones whenever he attended market. Lastly, a French Protestant pastor, Rabaut-Pommier, of Montpellier, pointed out the same remarkable property in the year 1781.

But to Jenner belongs the credit of having systemized the hitherto scattered facts, and of having made almost innumerable experiments, so that, in the noble language of August Hirsch, of Berlin: "That the achievement of Jenner was at once a turning-point in the history of smallpox, and a new era in the physical welfare of mankind; that the power of the pestilence became

more and more restricted, both in range and in severity, in proportion as the practice taught by him obtained acceptance and careful attention at the hands of various nationalities; that the disease at the present day, as is abundantly shown in the account of its geographical distribution, still bears, in those regions where ignorance and prejudice have opposed the adoption of vaccination, or where the carelessness of the authorities have neutralized its good effects, the same character for destructiveness that meets us in the medical and chronological accounts and in the mortality statistics of European countries of the pre-vaccination period; that even to-day we find in the devastation of popular districts, and in the uprooting of whole tribes, the indications of what this raging pestilence would do. All this is so thoroughly brought out in the writings I have named, that it can only be folly or stupidity that would seek now-a-days to minimise or to question the immortal merits of Jenner. The foolish attempts made to discredit vaccination may be met with the simple but conclusive remark of Porter's: "it will require an immense accumulation of facts, more than the world ever saw, to shake our faith in the protective influence of vaccination."

Cowpox, then, is an eruptive disease, very similar to smallpox, passing through almost identical stages, but differing from smallpox in that it rarely has constitutional symptoms, that it can only be communicated by inoculation, and that, as a general rule, the pocks only appear at the point of inoculation or very close to it. I have, however, recently seen some cases of cowpox, the result of vaccination, which bore such a close resemblance to smallpox as to deceive very good observers. The entire body was covered with a reddish eruption studded with pustules very like those of smallpox, and this eruption was accompanied by high fever, prostration and slight delirium.

As the fever, eruption and scars of cowpox are so similar to those of smallpox, it follows that vaccination is an illustration of the homoeopathic law of cure—*similia similibus curantur*—likes are cured by likes. This similarity is admitted by some of the best writers of all schools of medicine. Thus Dr. Frank P.

Foster, of New York, who writes on this subject in *Pepper's System of Practical Medicine*—the best work of the kind that has yet been written on this continent—affirms that cowpox is “characterised by a cutaneous lesion closely resembling that of *smallpox*.” Cowpox, then, prevents smallpox in virtue of its homœopathic relationship to that malady. It produces similar symptoms, and thus blunts the susceptibility of the organism to the assaults of its similar, but more terrible, congener, smallpox. It is true that Cohn, a German observer quoted by Lebert in *Von Ziemssen's Cyclopædia of the Practice of Medicine*, asserts that the fungus of cowpox is *identical* with that of smallpox, but clinical experience proves that the poisons carried by these fungi are not *identical* but *similar*, differing of course greatly in energy.

Edward Jenner, born in the year 1749, was the son of the Rev. Stephen Jenner, rector of Rocknampton, Gloucestershire, England. While still an “apprentice”—as medical students were styled in those primitive times—his attention was directed to the antagonism between smallpox and the eruptive vesicular disease of the udders of cows called cowpox. It was well known in his native country that a dairy-maid who caught cowpox from a cow *could not take smallpox*, and to test the matter Jenner inoculated with smallpox matter several girls who had had cowpox, but found, to his delight, that *they were proof against the disease*. These first experiments date from the year 1775, and as a result he conceived the idea of propagating cowpox from one human being to another, and thus quelling the disease which slew over forty thousand every year in Great Britain alone. The difficulties in his path were great. In the first place he found that the teats of cows were subject to several eruptions, but that only one of these was protective against smallpox. Then he had the idea, still held by some excellent observers, that cowpox in the cow was caused by “the grease” of horses, but an exhaustive series of experiments satisfied him that horsepox did not possess the full protective power of cowpox, and that, moreover, it was open to objections which could not be brought against the latter.

These experiments lasted for a long time when he found him-

self confronted by the fact that the virus of cowpox did not always protect. A fresh series of experiments proved that the virus must be taken from the teat at an early stage, when it is thin and watery, and that the thick pus-like matter was worthless. The next experiments were performed with the view of determining whether the vaccine disease could be transmitted from one human being to another—in other words, whether humanized lymph was as efficacious as bovine lymph. Accordingly, on May 14, 1796, “matter was taken from the hard of Sarah Nelmes, who had been infected by her master’s cows, and inserted by two superficial incisions into the arms of James Phipps, a healthy boy of about eight years old. He went through the disease apparently in a regular and satisfactory manner; but the most agitating part of the trial still remained to be performed. It was needful to ascertain whether he was secure from the contagion of smallpox. This point, so full of anxiety to Dr. Jenner, was fairly put to issue on the first of the following July. Variolous matter, immediately taken from a pustule, was carefully inserted by several incisions, but no disease followed.”

Vaccination was at once introduced into the United States, where it made rapid progress, next into Austria and Switzerland, and, somewhat later, into France, Spain and Italy. So enthusiastically was it received in Southern Italy, especially in Sicily, that religious processions were organized for the purpose of receiving the vaccine virus, and for a long time Jenner’s birthday (May 17) was a festival in Germany.

The first forces that Jenner encountered were ridicule and doubt, precisely the forces that strove to overwhelm the still greater discovery of the illustrious Hahnemann, and, at a later date, envy and detraction. But Jenner’s facts were too powerful, and his conclusions too unanswerable, and now, irrespective of creed or school, the entire medical world, save a few fools, accept that “matchless piece of induction.”

In 1802 Parliament voted Jenner ten thousand pounds, and in 1806 twenty thousand more, while the people of Hindostan both native and European, presented him with seven thousand more.

For many years humanized virus was universally in use, but during the past fifteen years there has been a strong disposition, especially on the part of American and Canadian physicians, to return to the use of the original virus, the virus from the cow. The practice of transmitting the vaccine disease from one human being to another is not an essential part of Jenner's great discovery, and it would have been well for humanity if it had never been conceived.

"What is the difference between these two forms of the vaccine virus?" some may ask. The differences are weighty. In the first place, the animal virus, taken directly from the cow, gives a more complete, more abiding protection than the humanized lymph. Again, the animal virus is more powerful, and therefore more likely to take, though at times it is slower in taking. In this city, especially, where the use of animal virus is all but universal, we are obtaining results, particularly in secondary vaccinations, such as we never had from humanized lymph.

But the crowning excellence of the animal vaccine lies in the fact that *disease is not communicated by it*. It is far otherwise with the humanized vaccine. Much of it, especially the English, has passed through hundreds, even thousands of human systems, and it is preposterous to assert that all those people were in good health. Again and again scrofula and syphilis have been communicated by lymph taken from the arm of a tainted child. Witness the frightful outbreak at Rivalta, Italy, in the year 1861, in which *eighty infants* were vaccinated with syphilitic lymph, of whom eight died, and in addition twenty-six mothers and nurses, five husbands, and three brothers and sisters were infected in consequence of these vaccinations. Or the horror at Lupara, in the same Kingdom, in the year 1856, where thirty-four infants were inoculated with syphilis in being vaccinated, and where a still larger number of persons were directly or indirectly contaminated by the unhappy victims.

Again, notwithstanding the assertion of Dr. Edward Seaton, who writes on vaccination in *Russell Reynolds' System of Medicine*, that these things only happen in Italy, an outbreak took place

at Coblenz, Germany, in the year 1849, where a veterinary surgeon vaccinated twenty-six persons from an apparently healthy child. In nineteen of these the vaccine pustules were converted into syphilitic ones in from three to four weeks. Once more, in Hollfeld, Bavaria, the public physician, Hübner, vaccinated thirteen healthy children from lymph from an infant of three months; syphilis was developed in eight of these children, and the mothers were infected from their babes.

“*But,*” say the friends of arm-to-arm vaccination—fortunately not numerous in this city, or in fact anywhere on this clear-eyed Continent—“*we only use vaccine matter from healthy children.*” Precisely so, but an infant may have the semblance of health without the reality. For example, Dr. Eulenberg, of Berlin, reports a series of cases in Rhineland that came officially under his notice in the year 1872. A child, three months old, *which appeared quite healthy*, was used by a physician for vaccination. The child appeared to be such a fit subject for this that the physician vaccinated several of his relatives from it. Of one hundred and forty individuals who were vaccinated with lymph from this child, *fifty became syphilitic*. Or, take Mr. Jonathan Hutchinson’s cases, reported in the *Lancet*, April 7, 1873, and most strangely overlooked by Dr. Edward Seaton in his haste to sneer at foreigners, in which twelve persons were vaccinated from a child *that to all appearance was healthy*. In two months, eight of these persons were saturated with syphilis.

One of the incontestable advantages, then, of animal vaccine is that *no syphilitic contamination can possibly result*, unless the operator is the most careless of mortals and vaccinates with the same instrument that he uses to open syphilitic buboes. *The cow cannot acquire syphilis*.

Yet in the face of all these facts, well-known to all physicians worthy of the name, there are still medical men who practice arm-to-arm vaccination as confidently as if they lived in the year 1815 instead of 1885, and I know of a very recent incident in this city, in which a physician vaccinated *ninety-two persons* from a young man of nineteen years. This was a highly criminal

act, and I trust that the time will come when enlightened legislation will place the use of humanized lymph in the same category as inoculation.

Curschmann tells us that vaccination should never be performed "upon very young, feeble or sickly children, nor during the period of dentition, nor at very unfavorable seasons of the year," but during such an epidemic as is at present raging in Montreal, it is criminal to refuse vaccination to these very classes. The trifling inconveniences which sometimes result from vaccination are as nothing compared to the frightful risk of smallpox. The story is told of a family of ten who were vaccinated by a physician who did not have the necessity of this very clearly on his mind. But one child, on account of delicate health, was not vaccinated, the doctor observing that for the present he would be a *petit Coderre*. Smallpox came into the household and took the *petit Coderre*, and passed over the vaccinated ones.

As to the mode of vaccinating, it is so well known that it is needless to say anything about it, and it will be of more interest to describe a typical vaccine vesicle, and this can best be done in the words of Sir Thomas Watson:—"On the second or third day after the insertion of the vaccine matter into the arm, the puncture looks red and inflamed; and on the fourth or fifth day the vesicle becomes perceptible; a pearl-colored elevation of the cuticle enclosing a minute quantity of a thin transparent liquid. It gradually increases in magnitude till the eighth day, when it should measure from a quarter to half an inch across. Like the pustule of smallpox, it is more prominent at its circumference than at its centre, and it consists of small cells from ten to fourteen in number. By puncturing carefully one of these cells, a drop of the virus may be let out, the other cells remaining full. Up to the seventh or eighth, or even to the beginning of the ninth day, the inflammation around the vesicle should extend to only a very small distance from it. After this it spreads, and what is called the *areola* is formed—a circular red border, which continues to increase during the ninth and tenth days, and begins to fade on the eleventh, passing through shades of blue as it declines,

and leaving a degree of hardness behind for two or three days more. By this time a brown or mahogany-colored crust has formed over the vesicle, of a nearly circular shape; this becomes gradually harder and darker, and finally detaches itself about the twentieth day. The cicatrix which it leaves should be distinct, somewhat less than half an inch broad, circular, slightly depressed, marked—sometimes—by radiating lines, with a well-defined edge, and dotted with little pits, which seem to correspond to the cells of the vesicle." This is the course of vaccination in one who is unprotected, but if a former vaccination still protects it is evident that the results will be somewhat different. There will be less inflammatory action, the vesicle will be irregular in form, and the resulting crust less perfect.

In the ten years preceding the introduction of vaccination, the deaths from smallpox in London were 22,863 to each million of inhabitants. In the next ten years it fell to 8,045, and in the next to 4,798.

In Sweden, forty years *before* vaccination, out of every million of persons, 2,050 died annually; *after* vaccination, 158 out of each million.

In Berlin, before the introduction of vaccination, 3,422 died annually; *after* vaccination, 176 only.

In the British army, scattered all over the world, and consequently exposed to great risks, but most carefully protected by vaccination, one man in each thousand is attacked annually; and the mortality among those attacked is only ten per cent.

In Paris, too, *before* vaccination, the mortality among smallpox patients was 80 out of every 100 attacked; *after* vaccination, it was from 14 to 16 out of every 100.

At the present time we in Montreal are having an epidemic of smallpox, which is a veritable scourge, and which far outstrips in fatality the epidemic which raged from 1871 to 1880. The worst year of that epidemic, 1872, showed a mortality of 896, but in the single month of September, 1885, we lost no less than 830.

The disease is marching rapidly on, as the following figures shc 7:—

October was worst month
November was in wane

		DEATHS.	INCREASE.
Week ending August	1.....	56	...
" " "	8.....	36	...
" " "	15.....	42	6
" " "	22.....	56	14
" " "	29.....	96	40
" " Sept.	5.....	102	6
" " "	12.....	128	26
" " "	19.....	185	57
" " "	26.....	242	57
" " Oct.	3.....	322	80

Mill
 had a
 list of
 3164
 Small pox
 deaths in
 1885

How does vaccination compare with non-vaccination? Here is the reply.

During the week ending September 18, six Protestants died of smallpox, four of them being under five years of age—the Protestants are just about a quarter of our population.

During the same week nine Irish Catholics died, of whom six were under five years—the Irish Catholics are nearly as numerous as the Protestants—nearly a quarter of the people.

Now the French-Canadians form rather more than one-half of our people in this city, and accordingly their mortality for the same week should have been about eighteen, or twenty at most. But it was *one hundred and sixty-nine*, of whom *one hundred and fourteen* were under five years of age!

What is the cause of this enormous difference? It cannot lie in physical surroundings, for our French-Canadian fellow-citizens, in spite of the pitiful slanders of people who do not take the trouble to learn the truth, are the most cleanly of people. The floors of very humble homes remind one of the deck of a British man-of-war, the beds are clean and sweet in a superlative degree, while the master of the modest house, reading his paper and smoking the inevitable pipe at his door, is the ideal of a cleanly and comfortable citizen.

The difference cannot lie in physical strength, for the average French-Canadian, stout and compact, is a stronger man than the average English-speaking citizen.

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The difference lies in vaccination, and in that alone.

If our French Canadian people had been vaccinated their loss during that fatal week would have been *twenty* instead of *one hundred and sixty-nine*—vaccination would have saved *one hundred and fifty* French Canadian lives.

If the Irish Catholics had been unvaccinated to the same extent as their French-Canadian fellows they would have lost *eighty-four*; so that vaccination saved *seventy-five* Irish lives in a single week.

If the Protestants had been unvaccinated to the same extent as the French-Canadians, they too would have lost *eighty-four*; so that vaccination saved the lives of *seventy-eight* Protestants in one week.

This train of thought and this chain of reasoning might be continued almost indefinitely, for all our reports tell of a hideous slaughter of the unprotected French-Canadians and of the comparative immunity of the protected portions of our population.

Thus during the same fatal September week, St. Ann's Ward, with a population of 12,360, largely composed of Irish Catholics and English-speaking Protestants, lost *four* by smallpox, while St. Mary's Ward, with a population of 13,428, chiefly French-Canadians lost *seventy-five*.

Again, from August 29 to October 9, inclusive, there were no deaths from smallpox in St. Denis and St. Hubert streets, while in Wolfe street there were *eighty-six*, and in Montcalm street *sixty-two*. *Why the difference?* Simply because the first-named streets are largely occupied by the higher class of French-Canadians, almost all of whom are vaccinated; while the unfortunate dwellers in Wolfe and Montcalm streets are unprotected by vaccination.

The only help, the only hope, is in vaccination, and the antipathy shown to it by the mass of French-Canadians will fade away when they understand the difference between humanized and animal vaccine.

The vast majority of our fatal cases—ninety-two per cent.—are children under five years of age, and Dr. La Rocque, a most

competent authority, thinks he is justified in stating that, no matter how many thousands of dollars the city may spend, it will hardly reach the seat of the epidemic, namely, the infants, unless a compulsory vaccination law, or its equivalent, requesting the vaccination of all infants, be carried out.

Who should be vaccinated? The children should be, for they are the men and women of the future, and, unvaccinated, they fall an easy prey to the foul destroyer. No infant should pass the third month of its life without this most beneficent of operations, and in epidemic times even young children should be re-vaccinated, as in not a few it runs out in two or three years.

Vaccinate the women, for in market and shop and street they too are exposed, and the harmless-looking stranger, met by the way, may wear garments laden with smallpox and death.

Vaccinate the men, for they are constantly exposed to contagion in the performance of their duties. I heard the other day of the loss of a most valuable life from neglect of this simple precaution, and such cases occur with alarming frequency.

Vaccinate the aged, for they are further from their infantile vaccination than the middle-aged, and during the present epidemic I have vaccinated many aged people with results which proved that they had been wholly unprotected.

Vaccinate those who have had the smallpox, for though they are not very likely to contract the disease, they are likely to die if they do take smallpox.

Vaccinate everyone, when smallpox is the epidemic. Vaccinate again and again, and keep on vaccinating, for *in vaccination lies the only hope of safety.*

Lastly, "pour light on the eyes of mental blindness" and *vaccinate the anti-vaccinationist doctor.*

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