

treatment, in whom the glass tube was broken in consequence of the clumsy manner in which it was applied, the glass fragments were forced into the pustules, and a malignant erysipelas of the whole arm was the result. The little tube, according to the laws of capillary attraction, soon becomes filled with lymph, and may be withdrawn and cut off with the scissors, leaving about one-eighth or one-fourth of an inch unfilled at both ends, which are then closed with sealing-wax. In this manner vaccine lymph may be preserved in a fluid form for years.

When the lymph thus preserved is about to be used for vaccination, the two closed ends should be cut off with the scissors, the capillary tube is thrust into another somewhat larger glass tube, both are held between the thumb and index-finger, and the vaccine matter is blown directly upon the lancet. The vaccination is thereafter carried on as in the ordinary way, from arm to arm.

The vaccine pustule develops in the following manner: the small punctures may be seen for a few hours as minute dots. If no bleeding at all has taken place, all traces of the puncture will disappear, but, if that was the case, a few dark-brown spots will be visible for some time. On the third day after the vaccination, the vaccinated spot becomes markedly red, and a small, round, hard tubercle arises, upon the apex of which a pearl-like vesicle becomes developed by the fifth day. This vesicle daily grows in breadth, becomes distinctly umbilicated, like a variola pustule, and by the eighth day has reached the acme of florescence, when it will be seen as a bluish-red translucent pustule, surrounded by a red areola.

The pustules are constructed in compartments; their contents begin to turn turbid on the ninth day, the red areola enlarges more and more, the induration increases, the glands in the axilla become sensitive, and general symptoms supervene. The children become very restless, do not sleep at night, have a hot skin, great thirst, and are very much disposed to acute diseases, especially pneumonia and intestinal catarrhs. These general phenomena disappear in two or three days. From the eleventh day on, the red areola fades, and the opaque pustule acuminates and loses its central depression. When properly protected, it will not burst, but dry up into a brown crust, which falls off in two or three weeks, and leaves behind a white, depressed, somewhat irregular cicatrix, which, if scratched, will suppurate for a few hours, and then likewise dry up into a large crust with irregular contours.

The course of vaccination is not always so regular and simple as it has been sketched above. The secondary fever sometimes becomes so intense that life seems to be in danger. The children are attacked by severe convulsions, become collapsed, look very pale, or vomit, continuously, at first white, then bilious gastric mucus. No instance, how-

ever, has been heard of where the secondary fever brought about a fatal termination; and, when children with vaccine pustules die, some other remote cause of death will be found on careful *post-mortem* examination.

In children with a fine, irritable skin, other parts of the integument become affected; a nettle-rash or a varicella-like eruption of vesicles occurs on the whole or some part of the body. Scrofulous children are attacked by an extensive pustular eruption, in which the vaccinated arm especially participates, and then the vaccine pustules will not heal at all, but degenerate into scrofulous ulcers.

Erysipelatous inflammation of the arm is one of the worst complications which, through rough treatment of the pustules, particularly in cachectic persons, may develop between the ninth and twelfth day. The erysipelas spreads over the entire arm, even over a part of the trunk, the fever is intense, recovery progresses but very slowly, and the pustules ulcerate.

A too rapid and a too slow formation of pustules may be mentioned under the head of anomalies of the local course. If the vaccine lymph was poor, obtained from an imperfectly-developed pustule, small vesicles will form as early as the second or third day, will be but little umbilicated, barely attain to the size of a lentil, and dry up in six or eight days. On the other hand, as a rare anomaly, instances are related in which the eruption has been materially retarded, and the period of incubation was eight to ten days. I cannot remember to have observed a single instance of this kind in the many hundreds of cases that I have had the opportunity of vaccinating.

As a real sequela of a vaccination which has been performed with all due caution, the sudden breaking out of scrofulous affections only need be mentioned. This occurs in children the progeny of tuberculous parents, and they are often attacked with remarkable rapidity and vehemence.

The question, How long a time does vaccination serve as a protection against variola? has been considerably ventilated, and the investigations that have been instituted for the purpose of solving this question have finally led to the general establishment of a revaccination at the time of puberty. Whether it is assumed that vaccination protects for life, or only for ten or twenty years, it is, at least, certain that children who have had proper vaccine pustules are totally protected against genuine variola. Hence vaccination is to be looked upon as a great blessing to humanity, in which light also the Parliament of England regarded it, and, in gratitude to its discoverer, voted him a national gift of thirty thousand pounds sterling.

If the genuine or modified small-pox breaks out in a family in which one child is not yet vaccinated, this child should be vaccinated

as quickly as possible, so as to mitigate the course of the exanthema, which usually breaks out notwithstanding. The vaccine and small-pox pustules then run an undisturbed course together. Still, it has been observed that, when vaccinia anticipates the general exanthema, the latter assumes a less dangerous character.

The treatment of small-pox is to be conducted in as expectant a manner as scarlet fever and measles, being directed to the symptoms as they occur. The ventilation of the room should be carefully looked after, the temperature should be 58° F., and all weakening measures, such as abstraction of blood, calomel, and cathartics, must be absolutely avoided. When intestinal catarrh is present, as is usually the case in children under one year of age, it need not be interfered with so long as it is moderate, as the cerebral symptoms are thereby visibly mitigated; but, so soon as it threatens to become profuse, an attempt is to be made to control it by small doses of opium, one drop of the tincture every three or four hours.

With the *breaking out* of the pocks, the indication is to prevent the development of the pustules in the face, and with it the formation of cicatrices, which so frightfully disfigure the patient. All the remedies recommended for that purpose are sadly deficient in many respects, and perceptible cicatrices result, notwithstanding all manner of treatment. An early cauterization of the pustules, which, according to *Bretonneau*, is performed by dipping a pointed gold needle in a concentrated solution of nitrate of silver, and then puncturing with it every young pustule, is the surest remedy.

If the pustules are thus cauterized on the second day of the eruption, they will be arrested in their development; and the integument in a few days becomes elevated by a thin crust, and, after it has fallen off, no deforming cicatrices will be perceptible.

But this cauterization is painful, and, in confluent small-pox, requires much time, owing to which this treatment has been limited to the eyes, eyelids, and nose, while the other parts of the face, the forehead, cheeks, and chin, are covered with mercurial plaster. It must be changed every other day, and should be discarded altogether if the pustules have become developed notwithstanding. One portion of the pustules, no doubt, is arrested and destroyed by this treatment; another does not attain to a proper, extensive development, and very few only leave permanent, disfiguring cicatrices.

Lotions of corrosive sublimate, chlorine-water, and painting the face with iodine, have also been recommended.* The general man-

* Prof. J. Hughes Bennett recommends the following mixture: carbonate of zinc, three parts; oxide of zinc, one part, rubbed in a mortar with olive-oil to a proper consistence.—A solution of gutta-percha in chloroform is equally as efficacious as the

agement after the eruption is limited to an antiphlogistic diet, to keeping the bowels open, and, when the restlessness is very great, to the administration of small doses of opium.

The utmost attention will be required during the periods of suppuration and desiccation, to prevent the patients from scratching themselves and prematurely tearing off the crusts. Linen mittens, secured at the wrists, will be found to be of great benefit. Starch, powder, or a liniment of lime-water and olive-oil, is very efficacious in assuaging the itching of the skin. The patients should not leave the room till the crusts have fallen off, and the new cicatrized skin begins to turn white.

If the fever has assumed a torpid, septic character, nervines and tonics should be plentifully administered, such as have already been described in detail in the therapeutics of scarlet fever.

(5.) MODIFIED SMALL-POX, VARIOLOID AND VARICELLA, CHICKEN-POX.—Both physicians and the public had been familiar with a mild form of children's disease, known by the names of varicella and chicken-pox, long before vaccination was discovered. But there is a long list of gradations between this lowest step of development of small-pox and the most perfect form of confluent variola, all of which have been comprised under the name of varioloid, or modified small-pox. To regard them as exanthemata capable of existing by themselves, without any direct connection with genuine small-pox, is not very proper, for the simple reason that it has often happened that unvaccinated patients, with mild varicella, were attacked by the severest forms of small-pox; and, conversely, that vaccinated persons, through contact with patients having genuine small-pox, acquired only varicella.

Nevertheless, it is advisable, in order more easily to comprehend these affections, to retain the old denominations. Both of these certainly not very distinctly-defined forms of disease, *varioloid* and *varicella*, will therefore here be separately considered.

Symptoms of Varioloid.—The same stages may be observed in varioloid as in variola, but they are all of shorter duration, and less sharply defined. The entire duration of variola, from the invasion of the prodromata until the desiccation of the pustules, embraces a period of from sixteen to eighteen days, that of varioloid from seven to eleven days.

The prodromata are the same as in variola, but usually do not last three full days, twenty-four to thirty-six hours at the most, and are less intense in general. The specific smell of small-pox is totally absent in varioloid; on the other hand, a dark-red, large-spotted erythema of the integument, which has been described by the name of

preceding remedy. And, of late, carbolic acid has also been recommended for the same purpose.—Tr.

"rash," supervenes, a sign not usually seen in variola. This erythema is not to be regarded as the commencement of the pustular eruption, for the pustules that subsequently develop may appear upon the parts of the body which the rash has not invaded.

The exanthema breaks out more rapidly and less uniformly. The eruption does not begin on the face alone, nor does it descend gradually upon the trunk and the lower extremities, but appears almost simultaneously upon the whole body. Whereas, in variola, all the pustules on one part of the body are at an equal stage of development, and no new accessions are noticeable; while, on the contrary, in varioloid tubercles, vesicles and large pustules are usually found alongside of each other, and the number of the pustules increases for several days. While it is true that solitary pustules, which, in regard to form and structure, differ in no way from those of genuine small-pox, occur in varioloid, the majority of them, however, do not become umbilicated pustules, but remain hyaline vesicles of the size of hempseed, and desiccate into correspondingly thin scabs.

The general symptoms, which were very slight from the commencement, either disappear entirely with the eruption of the exanthema, or are, at least, reduced to a minimum. No real secondary fever occurs in this disease, and the patients, in most instances, feel so well that they can hardly be kept in bed. Even the most developed pustules begin to dry up by the fifth or sixth day at the latest, and occasionally a few solitary followers are observed in the midst of the drying ones, but they only become vesicles, and usually, as such, soon perish. The suppuration of the pustules never becomes so intense as to produce an erysipelatous redness around them, and but few of them ever burst. They usually dry up quickly, the crusts fall off in a few days, and leave behind them slightly-red, barely-depressed cicatrices. The pustules on the mucous membrane of the mouth and pharynx heal in an equally short time.

Sequelæ are rare in varioloid, and attended by little danger in previously healthy children. Occasionally an obstinate furunculosis, or a profusely suppurating impetigo, follows. The latter is generally attended by swelling of the adjacent lymphatic glands. In most scrofulous children the various cachectic affections make very rapid progress.

The *prognosis* is more favorable than in variola, for, of children under one year, only eight to ten per cent., and of older ones from five to six per cent., perish.

The danger especially to be apprehended is from a participation of the larynx, through which croup-symptoms and sudden œdema of the glottis are occasioned. Convulsions which have a tendency to a rapid fatal termination, complication with pneumonia or meningitis, and

finally a septic character of the fever that exceptionally becomes developed, are among the recognized sequelæ.

Treatment.—Vaccination offers *no* protection against varioloid, as it only modifies the contagion of genuine small-pox to such an extent that, when communicated to a vaccinated child, it at most produces varioloid. But, since it has often been observed that varioloid runs a milder course in a vaccinated child than in one that is not vaccinated, vaccination must therefore, in this respect, also be looked upon as a beneficial prophylactic.

The treatment of the disease that has already broken out is purely expectant. Every thing that has been said with respect to variola is applicable to varioloid. No cauterization of the pustules on the face is necessary in this case, for the pustules penetrate less deeply into the cutis, and only leave superficial pittings. Disfiguring cicatrices of the face, as a rule, may be readily prevented by the aid of mercurial plaster.

In the early stage of the disease it is best to give some diluted mineral acid; if diarrhoea be present, mucilaginous remedies. In laryngeal croup, the greatest benefit is derived from intense cauterizations of the pharynx, larynx and epiglottis, with a concentrated solution of nitrate of silver (3 ss to water ℥ j). These cauterizations are easily performed; but, in order to be convinced that the contents of the cauterizing sponge find their way into the larynx, the index-finger of the left-hand should first be thrust quickly far into the mouth of the child, the epiglottis raised up, and the sponge then rapidly pressed into the glottis. The head of the child should be held firmly and steadily by an assistant. This procedure always requires a certain amount of dexterity and practice. In children who have teeth, it is advisable to protect the last joint of the index-finger with some lint, before it is introduced into the mouth, for they are very apt to bite it severely.

In small children, the immoderate amount of scratching during the desiccating stage may be prevented by the aid of linen mittens; older children, naturally, are much offended and annoyed by this procedure. In the latter, the nails, at least, should be cut off as short as possible.

Convalescence usually progresses rapidly, and a special tonic after-treatment will but very seldom be required.

Symptoms of Varicella.—Varicella, also called false, chicken, water, swine, or stone pox, is the least dangerous, the most insignificant of all exanthematous affections, and the majority of cases, especially during the prevalence of an epidemic, do not come at all under medical supervision.

Hardly any precursory signs are observed in large and otherwise healthy children. Occasionally slight gastric symptoms, vomit-

ing, loss of appetite, stomach-ache, mild febrile phenomena, and urinary difficulties, precede the eruption of the exanthema for one, at the most two days.

The exanthema, without any particular aggravation of these prodromatory symptoms, now breaks out simultaneously upon different parts of the body without any apparent order. In from six to twelve hours small red spots grow into vesicles of the size of lentils or peas, which, regarded by themselves, cannot be distinguished from small blisters produced by a burn. Most of them are circular, or slightly oval and unilocular, and when punctured the entire contents escape at once. They are not at all, or but slightly, umbilicated. The majority of these vesicles are found upon the back and breast, a few upon the extremities, and the least upon the face, one or two pustules only appearing on the forehead.

Usually it is not completed by one eruption, but a second crop of vesicles appears on the next day, and then we have fresh and totally-dried varicella vesicles alongside of each other. Although most of the vesicles are not larger than a lentil, several pustules are found in all varicella patients, upon the forehead or back, which are slightly umbilicated, and resemble the genuine variola pustule.

The course of most of the vesicles is very rapid. Their contents become turbid as early as the second or third day, and dry up on the fourth; flat, bloody crusts then form, which fall off in a few days, and leave no pitting, but a red spot. The narrow red areolæ which formed at the time the vesicles became opaque, disappear as soon as the crusts have desiccated.

The red spot, which for several weeks indicates the former site of the crust, is not to be seen after this time.

Unless accessions of vesicles particularly protract the course, the whole disease, with the exception of the red spots just mentioned, marking the site of the pustules, is entirely completed in from eight to ten days. These red spots will remain for some time thereafter. No sequelæ are observed in this affection, but, in scrofulous children, chronic suppurating eruptions sometimes develop directly from the vesicles and resist for a long time the desiccating treatment. Varicella regularly terminates in rapid recovery.

The variations of ordinary chicken-pox described in medical literature are: varicellæ lenticulares, where none of the vesicles are larger than lentils, and not umbilicated; and varicellæ coniformes, or acuminatæ, the so-called horn-pox, where hard tubercles form at first upon the skin, on which small acuminated vesicles originate the next day. The vesicle dries very quickly, and its indurated base shrinks by repeated desquamations.

If we are to recapitulate the essential differences between varioloid and varicella, we will find that varicella, in contradistinction to the former, has but a short or no precursory stage, that the exanthema appears in a perfectly orderless manner, and is followed by many accessions, the face being almost wholly spared; that it dries up in two or three days and leaves no pitting. No danger to life, nor any permanent injury, is to be apprehended from varicella. Vaccination and genuine small-pox do not serve as protection against varicella.

Treatment of Varicella.—If an expectant treatment has been pronounced sufficient for varioloid, it is of course still more so for varicella. When the children are free from fever, as is usually the case, it is a difficult task to put them in bed. Nor is it absolutely necessary to keep varicella patients in bed, for no bad effects are usually seen, even when they are allowed the utmost freedom, and expose themselves to great changes of the temperature.

Where febrile prodromatory symptoms are present, some mild laxative, such as tamarinds or neutral salts, may be prescribed. The pustules should be pencilled over with a little oil or cocoa-butter; the patients are, for a few days, put upon a bland vegetable diet, and kept in a room of uniform temperature. The disturbed activity of the skin is remedied by three or four lukewarm-water baths after the crusts have fallen off.

(6.) **ERYTHEMA NEONATORUM.**—Besides the physiological red discoloration of the skin, with which all normal children come into the world, and which, after a few days, becomes yellowish red, and finally bright red, an erythema papulosum also very frequently occurs in newborn children.

Symptoms.—The erythema is usually most strongly developed upon the breast and back, and consists of small, dark-red pimples resting upon an equally red base. The cutis is but slightly infiltrated; itching of the skin seems to be present, for all the patients are uneasy so long as the exanthema is visible. On pressure by the finger the redness quickly disappears, but returns again in an increased degree as soon as it is removed. The erythema fades in a few days, and the darkest spots desquamate in very thin scales.

There is nothing typical whatever to be observed in its whole course, and the entire process is sometimes completed in two, sometimes again in fourteen days. The child may also be attacked by it more than once. Hardly any general symptoms are occasioned by it, the children have no fever, the mucous membranes do not participate in this affection, and the appetite is not disturbed, which fact alone sufficiently distinguishes this erythema from scarlatina and rubeola. The exanthema itself, certainly, has the greatest resemblance to scarla-

tina, and, but for the accompanying symptoms, might be mistaken for this exanthema. It is a fact worth remembering, that new-born children are but little predisposed to take scarlatina.

Etiology.—The causes of this erythema, most probably, are external, from the circumstance that these children are attacked by it in the first few days of life, and from its repeated occurrence in one individual. Indeed, the delicate skin does not tolerate, from the very first, the irritation of the garments and baths, and is thereby excited into a high degree of hyperæmia, which constitutes erythema papulosum.

Treatment.—Since erythema expires spontaneously in a short time, its treatment may be simply expectant. The skin should not be rubbed nor irritated so long as the erythema exists, especially after the baths, which need not be omitted even for one day. The patients, however, should be simply wrapped up in dry cloths, and all rubbing avoided. Mild infrictions of *ol. coccos*, or some other pure oil, seem to be soothing to these children. During this period their underclothes and diapers should be as fine and soft as possible.

(7.) **ERYSIPELAS.**—In children of from five to fifteen years, erysipelas, which differs in no respect from that of the adult, occurs, and it consequently deserves no further consideration here. But erysipelas of the new-born child and nursing presents such important modifications, especially symptomatically and prognostically, that it seems to call for an especial description.

This kind of erysipelas is distinguished by a great and constant disposition to migrate, not limiting itself to any small or large portion of the body, but creeping over the *entire* surface of the skin. Adjacent parts are constantly attacked, while those previously affected fade gradually, and the disease is not arrested until the whole surface of the body has been implicated. In exceptional cases the pernicious process is not content with even this, but begins anew, at some place, and again wanders over a greater or less portion of the body.

The local symptoms do not differ from ordinary erysipelas—redness, swelling, warmth, and pain on pressure. The exanthema remains in its florescence from one to three days, and fades remarkably quickly as soon as it has attacked new parts.

The whole course, in the rare cases of recovery, lasts from four to five weeks. New-born children invariably succumb to it in a few days, and even infants several months old only recover very exceptionally.

Etiology.—In new-born children erysipelas almost always starts from the navel, and is especially often observed during an epidemic of puerperal fever, when, in fact, the navel never cicatrizes normally. In older children all possible injuries of the skin may supply a cause for this disease. Erysipelas most frequently follows vaccine and impetigo

pustules, but may also take its rise from a simple abrasion (intertrigo) of a cutaneous fold. But the great frequency with which these cutaneous excoriations occur on the one hand, and the rarity of erysipelas on the other, render a positive disposition to erysipelas necessary to account for its appearance in these cases.

Treatment.—All attempts to localize erysipelas, to prevent its spreading, have hitherto proved futile. Even *ferrum candens* (the actual cautery) has been tried, but has proved ineffectual to check the progress of the inflammation.

The internal treatment at any rate must be by tonics and stimulants. The English physicians claim to have derived benefit from *tr. ferri muriatici oxid.* in two-drop doses every hour. In the few children whom I have seen recover from erysipelas, I administered from two to three grains of quinine daily for several days, and a teaspoonful of Bordeaux brandy every hour for several weeks. Locally *ol. coccos* was only applied.

(8.) **INTERTRIGO (CHAFING).**—By intertrigo is understood a destruction of the epidermis covering the opposing surfaces of a cutaneous fold, resulting from the rubbing of the two surfaces against each other. It is seen most frequently between the nates, in the groins, the armpits, and on the neck. Corpulent children, moreover, may become chafed on all the cutaneous folds of the body, though otherwise possessing excellent health, and having the best attention; in lean children this only happens when the diapers, soaked in diarrhoeal excretions and urine, are allowed to remain in contact with the skin for some time.

Redness and moisture of the affected integumentary folds is the first degree of intertrigo. The epidermis next softens, and may be wiped off as a white mucus, when the cutis will be seen totally exposed, dark-red in color, and painful to the touch. The secretion, that now becomes considerable, may increase in amount sufficiently to form crusts. With cleanliness and proper treatment, the loss of epidermis is soon repaired; but where the subjects are cachectic or atrophic, and if the primary cause, the diarrhoea, continues, the erosions will assume an ulcerative form, may become coated with diphtheritic membranes, and in the worst cases even gangrenous.

The ordinary intertrigo of corpulent children, under an appropriate treatment, disappears in two or three days, that occurring in atrophic children never heals so long as the diarrhoea lasts.

Treatment.—As a prophylactic in corpulent children, *semen lycopodii* is very advantageously dusted in the cutaneous folds; it prevents the rubbing and contact of the surfaces, and by its feeble hygroscopic properties preserves them dry for some time. Usually, it is