

cornea is opened by ulcerations, and staphyloma results. Erysipelas, phlegmonous inflammation, and extensive suppuration may occur in those parts where the eruption is most confluent, and even gangrene

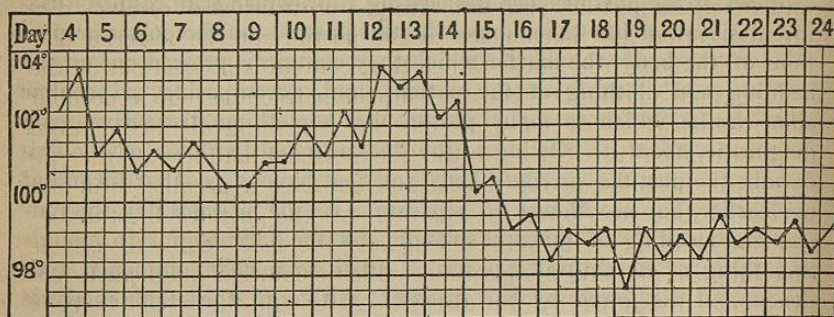


FIG. 52.—Range of Temperature in Mild Confluent Variola.

results in extreme cases. The systemic state, as might be expected, is quite in harmony with the condition of the skin and mucous membrane. During the initial or invasion stage, the temperature reaches the highest point human temperature ever attains, and declines but little, sometimes not at all, and always slowly when the eruption appears, continuing at 104° to 105°. The stomach is very unsettled, and vomiting is incessant, scarcely anything being retained. The urine is scanty, and loaded with albumin. If the patient pass through the dangers of the invasion fever, the eruption and suppuration stages, there will occur in the stage of desiccation extensive losses of substance of the skin of the face, eyelids, and eyes, and of the scalp, so that very great deformity, with baldness, will result.

#### HÆMORRHAGIC VARIOLA.

It is important not to confound hæmorrhage into the pustules, or *hæmorrhagic variola*, with *purpura variolosa*, which is the hæmorrhagic diathesis superadded to the phenomena of variola. Again, the hæmorrhagic rash of the invasion stage—merely petechiæ—is quite distinct from the other forms. There may occur, with hæmorrhage into the vesicles, extravasations of blood into the adjacent parts. Only a portion of the eruption may be affected by hæmorrhage into the pustules, or it may be general over the body. Blood may escape into the papules, or not until the stage of vesicles is reached, but the most usual condition is for the hæmorrhage to occur when the pustule is well umbilicated. It usually takes place by degrees, beginning on the lower extremities. The mucous membranes of the mouth and throat are marked by extensive ecchymoses, and diphtheritic exudations spread over the tonsils, palate, and pharynx. With these troubles are associ-

ated a spongy state of the gums, and hæmorrhages from the nose, gums, kidneys, uterus, and, if pregnancy exists, abortion followed by metrorrhagia. The general condition corresponds. The profound alteration in the composition of the blood manifest under these circumstances is accompanied by very great prostration of the vital forces. But there are great differences in the gravity of these cases, as there are in the extent of the hæmorrhagic extravasations; in some epidemics the hæmorrhagic pustules are not numerous, and the general condition not unfavorable.

#### VARIOLOID.

Varioloid is a form of variola modified by previous vaccination, by a former attack of variola, or by some special insusceptibility to the action of the poison. It is, however, at the present time, almost wholly the influence of vaccination, which so modifies small-pox as to cause it to take the mild form or varioloid. The protective influence of vaccination, or of an attack of the real disease, is at first complete, but the longer the time which elapses from the date of the vaccination the less protective its influence; but in many persons, it is true, this protection continues throughout life. It is a peculiarity of varioloid that it presents numerous points of departure from the typical course of variola. Thus the stage of invasion may be one or two days, or three or four; and the temperature declines very abruptly at or just after the appearance of the eruption, and descends to or below normal, and it remains at normal until the stage of suppuration, when it assumes a transient rise of not more than one or two degrees. The initial or invasion rashes of the erythematous variety belong to varioloid, and not to variola, and the more decided the rash the less abundant the pustules. Great diversity and difference, as compared with variola, exist in respect to the manner of development and characteristics of the varioloid eruption. It does not always appear first on the face, but on the chest, abdomen, or extremities; it may all appear simultaneously over the body, or there may be a very slow eruption of the pustules. While the structure of the varioloid pustule does not differ from that of variola in respect to development, there are remarkable variations. The eruption, although it may apparently be as complete as variola, never goes through the development of the latter, and they abort at different stages. They may not proceed beyond mere papules; they may develop into vesicles and then dry up; they may become pustules, surrounded by a red areola, but the surrounding skin is not swollen, and from the fifth to the seventh day of the eruption desiccation occurs. The pustules containing a sero-purulent fluid dry up without discharging, and, although an hyperæmic spot remains for a short time, no scar is left. The eruption on the mucous membrane is usually slight, and produces but little disturbance.

Course, Duration, and Termination.—The discrete, corymbic, and coherent forms are severe, according to the extent and number of the pustules, and pursue a course of great uniformity. The most formidable of all the varieties is that known as *purpura variolosa*—the hæmorrhagic condition or diathesis superadded to small-pox. Death takes place in this form before the characteristic eruption appears or has time to develop; rarely do any cases live beyond the sixth day of the disease. The confluent form, although largely fatal, is not invariably so. The termination is usually by pneumonia, pleurisy, or pericarditis, especially the last two. When recovery ensues, the convalescence is tedious, and interrupted by various complications, especially abscesses of the skin. Very often the termination is by pyæmia. The hæmorrhagic pustular form is characterized by great intensity of the lumbar pain, and by remarkably low temperature, which may persist throughout. On the other hand, the temperature through the initial stage and subsequently may be very high. This form is more protracted than *purpura variolosa*, and almost as fatal. The mortality, however, is very much affected by the number of pustules into which hæmorrhagic extravasation has taken place. The author has in one epidemic seen at least four cases recover out of six of the hæmorrhagic form, but the pustules of the face were chiefly affected. The course of small-pox is modified by various complications. Numerous points of inflammation exist throughout the brain and spinal cord in some cases. Serious complications on the part of the eye have already been mentioned, consisting of ulcerations of the cornea, panophthalmitis, hæmorrhage into the retina, etc. Chronic otitis, caries of the bones, and permanent loss of hearing result, and the voice is hurt by chronic inflammation of the larynx. The mortality is much affected by the age of those attacked: at the extremes of life, notably in infancy, the mortality is greater. In women, owing to the accidents growing out of pregnancy, the mortality is greater than in men. Alcoholic excess greatly increases the danger. All those circumstances lessening the vital power of individuals impair the power of resistance to the disease. The more extensive the eruption, as has been stated, the greater the danger. Next to the extent of the skin affection, as a measure of prognosis, stands the pustulation of the mucous membrane. Diphtheritic affections of the throat and inflammation of the larynx are very dangerous complications. The duration of any case depends on the form, extent of the eruption, the complications, etc. An ordinary case of discrete variola will not run its course under five or six weeks.

Treatment.—We postpone vaccination, a means of prophylaxis, for separate consideration. We possess no means of treatment to modify the course or shorten the duration of small-pox. All specifics may be dismissed with the assertion that they have, one by one, proved worth-

less, from sarracenia to zylol. The treatment is therefore symptomatic. Assertions as to the value of special remedies, or plans of treatment, must be received with caution, since the almost universal practice of vaccination modifies the behavior of cases—effects which may be readily mistaken for the influence of the medication employed. When the case is one of varioloid, but little treatment is necessary. In the confluent form, treatment is as little important, because without effect. During the stage of invasion, the high temperature and the cerebral disturbance are the points to which we direct attention. To allay restlessness, delirium, and fever, bromide of potassium and chloral are the most efficient remedies. If the headache and backache are very intense, the hypodermatic injection of morphine should be practiced occasionally. The bromide, some believe, has the power to modify the eruption. When the secondary fever develops, the best remedies are quinine in five-grain doses, and bromide of potassium to allay cerebral excitement. So common is it for the delirium to assume a maniacal character that the utmost care is necessary to prevent accidents. Chloral is not advised to be given at this period by the stomach, because of its highly irritant effect on the fauces, but it may be given by the rectum. Morphine, or opium in some form, will be indispensable to relieve the painful sensations experienced by the patient. Depression of the powers of life will be best antagonized by the free use of carbonate of ammonia and alcoholic stimulants. From the beginning, proper aliment is necessary. Milk, eggs, animal broths, oysters, and beef-juice, should be given regularly from the beginning, every three hours. Ice is always grateful, and should be allowed freely. When there are many pustules in the mouth, ice should be held in the mouth as much as possible, and ice will best serve to allay nausea. If there is much vomiting, the hypodermatic injection of morphine is the most efficient remedy to arrest it. An ice-bag to the head and to the spine will afford much relief to the pain. For the eruption on the face numberless expedients have been resorted to, with a view to prevent pitting. The French employ, and, as they think, advantageously, a mercurial plaster. It is probable that a mask of some unctuous material, thoroughly applied to exclude the air, has a beneficial effect. The author has used with apparent advantage the glycerite of starch, freely applied by a large brush several times a day. As the papules are about to develop into vesicles, the tincture of iodine should be painted over them thoroughly. There are good reports from this practice. Of all the local applications, there is nothing so serviceable, according to Curschmann, as water-dressings to the face and hands. Cold compresses are kept constantly applied. They not only give great relief to the local heat and burning, but diminish the swelling of the skin. If cold is not pleasant, warm applications may be used instead. For the mouth-eruption, solution of chlorate of potassa, and, if there is much

fetor, of carbolic acid, is useful. Astringents may also be used with advantage—such as fluid extract of hydrastis, of eucalyptus, and sub-sulphate of iron. When the crusts are falling off, warm baths assist in detaching them, and also allay the troublesome itching. Inunctions of lard, of suet, of vaseline, after the warm bath, are more effective. All the excreta of the patient should be at once disinfected by carbolic acid, sulphate of iron, iodine, etc. The air of the apartment should be also disinfected by the vapor of iodine, or by sulphurous acid, and the halls communicating with the room not less so. All articles about the patient should be destroyed, and the apartment renewed in all respects.

#### VACCINIA AND VACCINATION.

Vaccinia, or *cow-pox*, is a natural disease occurring in the cow and horse, and possibly some other animals. It is a vesicular disease, the eruption limited to the udder and teats, and occurs sporadically or as an epizootic. It seems to be peculiar to milch-cows, and is conveyed to others by the hands of milkers. It is the young cows who are chiefly affected, and the course of it is essentially the same, whether it arises spontaneously or is propagated by inoculation. In the natural disease the period of incubation is usually three or four days, but it may continue from five to eight. The udder swells, becomes hot and tender, and hard papules, the size of a pea, appear at the base of or on the teat. When the disease occurs by inoculation, if there be a crack or an abrasion of the skin, a papule may develop as early as the fifth day, but, if the skin be unbroken, not until the eighth or ninth day. In three or four days after their first appearance, the papule has acquired a distinctly vesicular character, and a central pit or depression is then to be seen. In four days more, or in about eight days from the first manifestation of the papule, the formation is complete. They vary in number from two or three to twenty or more, and their usual size is about that of a dime. Their shape is somewhat influenced by their position: on the teats they are oval; at the base of the teat round; but both forms may appear on the udder, and on the teats they may be coherent, even confluent. Their color varies somewhat, but they usually have a shiny, glistening, metallic luster of the margin, with a slate-colored center. They are surrounded by a narrow areola, pale-rose or damask-colored, and a band of induration. The color and tints of the vesicle and of the areola differ somewhat, according to color and texture of the skin. When the development is completed, at the end of eleven days, the lymph is abundant; the central depression disappears, and instead there is a conoidal elevation. If it now burst or is opened, a quantity of a straw-colored or amber-colored lymph flows out; but, if rupture does not take place, the lymph becomes turbid and purulent, and by the fourteenth day a crust of a

brownish-black, or rather mahogany, color has formed, the areola and the marginal band of induration subsiding. The crusts shrink, dry, and fall off about the twenty-third day. The cicatrix is smooth, oval, or circular, according to the shape of the vesicle, and whitish in color. When the vesicles are handled, and ruptured as in milking, there will be seen large black scabs adherent at some points, and a raw, bleeding surface at others, while here and there appears a properly formed vesicle. Examination of the structure of the vesicle demonstrates a number of partitions, and the lymph contained in the spaces formed by them—an arrangement just like that of the small-pox vesicle. The vaccine disease may be produced by inoculation with lymph taken from other cows suffering with the disease; with the lymph of horse-pox, which is identical with the cow-pox; with humanized lymph, or retro-vaccination; and by the matter of small-pox, or variolation. The latter process has given origin to a good deal of controversy, owing to the difficulty of inoculating cows with the matter of variola, but it has been accomplished a number of times, the results being in all respects the same as ordinary vaccinia—so that the vaccine disease, as Jenner originally maintained, is variola, modified by transmission through the system of the cow.

Vaccination.—It would be a misapplication of space to discuss the value of vaccination as a means of saving men from the greatest scourge of modern times. Shall humanized, Jennerian lymph, or bovine virus be used to vaccinate? The following facts seem conclusive in favor of the latter: The carelessness in selecting and storing the humanized lymph and the vast numbers of transmissions have impaired the quality of the product, and, although, so far as the development is concerned, it still conforms to the original type, its protective influence seems less. Again, owing to carelessness in collecting the lymph, the syphilitic virus has been inoculated with vaccine. Much prejudice has been excited against humanized lymph, and hence any unavoidable accident occurring from its use would be referred to a supposed impurity. For these reasons bovine lymph is preferable. The objections to the latter are, that it is less certain, and that its action is violent, a good deal of constitutional disturbance being caused by it. The lymph should be preserved on quills, or ivory points; and, if transported a long distance, in hermetically sealed tubes. It may be mixed with glycerine when intended to be kept in sealed tubes some time. When vaccination is performed with humanized lymph, it is preferable to use that of the fresh vesicle on the seventh or eighth day—or “arm-to-arm vaccination.” The author has used successfully a number of times lymph that had been transported from Germany. The lymph is obtained from the vesicle of the seventh or eighth day, by carrying an incision around the outer border of the vesicle so as to open the several chambers of which it is composed, care being taken not to cut

or injure the skin. With a fine pipette the lymph may now be withdrawn, and mixed with two parts of glycerine and two of distilled water, and preserved in capillary tubes, sealed hermetically with sealing-wax. The utmost care should be exercised in the selection of the children furnishing the lymph, and in the stock from which the virus is derived. In practicing vaccination, the skin should be rapidly and carefully scraped until the true skin is reached, and it is ready to bleed. The lymph may now be brushed over this surface with a camel's-hair brush. Another mode is to make three or four horizontal and transverse cuts about four lines long, or to insert the virus on the point of a knife by a single puncture. A little blood, but not much bleeding, should be caused by the cuts or punctures. Three or four points should be selected on the arm or leg for inserting the virus, and far enough apart so that the areola—certainly the vesicles—can not coalesce. If the vaccination "takes," a papule makes its appearance on the third day at the site of the puncture or incision; on the sixth day a vesicle has formed, of a bluish-white color, having a raised border and a central depression; on the eighth day it is fully formed, distended with lymph, and a reddish areola surrounds it, which widens to two inches or more, and there is very considerable induration of the skin and subcutaneous areolar tissue. The areola begins to fade on the tenth day, and the contents of the vesicle become turbid, yellowish, and thick, begin to dry, and by the fourteenth day a brown, mahogany scab or crust has formed, but is not detached until about the twenty-third day. A genuine crust is circular, has a rounded and elevated border, a central cup or depression, and it has a dark-brown or mahogany color. The cicatrix left is circular, depressed, radiated and foveated, and is usually permanent, becoming after a time paler and whiter than the surrounding integument. More or less constitutional disturbance attends vaccination in children with a mobile nervous system: fever, when the vesicle is at its maximum; restlessness at night, etc. An eruption of roseola may take place, or a papular eruption—a lichen—may appear. In scrofulous children an eczema may be produced from the irritation caused by the development of the vesicle, or an otorrhœa may follow, etc. The lymph is usually held responsible for such accidents, but in strumous subjects the slightest wound may be followed by the same cutaneous troubles. As the protection is for a period which varies in different individuals, and, although for the whole life in most subjects when properly done, expires in others in a few years, it is necessary to repeat it at certain periods. Revaccination, practiced now in the great Continental armies, has had a remarkable influence in checking small-pox, and, as these statistics are on an enormous scale and are accurate, the lesson taught us by them ought to be heeded. When there is some special exposure to contagion, vaccination should be practiced; but as a rule, and entirely irre-

spective of contagion, revaccination should be done about the fifth year, after the second dentition, and at puberty. If properly done at these times, further vaccination will be unnecessary.

#### VARICELLA.

**Definition.**—*Varicella* is a febrile affection, characterized by the appearance of a vesicular eruption with the first elevation of temperature, the vesicles drying up and falling off in from three to five days, the elevation of the temperature ceasing at the same time. It is known in common language as *chicken-pox*.

**Causes.**—That it is an independent, specific affection, propagated by some peculiar poison, is now generally admitted. Its identity with varioloid has been and is still maintained by some authorities, but on insufficient grounds. It is a disease of childhood, and rarely attacks any one above ten years of age. It occurs both sporadically and as an epidemic. The mode of communication is unknown, and, although contagious, is not actively so.

**Pathological Anatomy.**—The eruption is both discrete and corymbic—vesicles occur singly and in groups, and they vary in size from a pin's-head to a pea, reaching sometimes the size of a silver dime. They may be few in number, from ten to thirty, or they may be numerous, reaching one thousand. They consist of perfectly transparent vesicles, containing a clear, watery, sometimes yellowish fluid, faintly alkaline in reaction. They form on a spot which is slightly hyperæmic, and are surrounded by a faint areola, which is, however, often absent. They continue at their maximum not longer than a day, when they begin to be flaccid, dry in the center, and form a small, yellow, or brownish crust, which falls off in two or three days, leaving a faint reddish spot which disappears entirely in a few days, and sometimes a cicatrix, which, however, is shallow and very rarely permanent.

**Symptoms.**—The eruption of the vesicles is the first symptom to attract attention, for there is no fever of invasion, and no prodromes that have been accurately studied. With the appearance of the eruption, a rise of temperature begins, but it is not often the case that the temperature rises high enough to be a subject for solicitude, the thermometer marking one, two, rarely three degrees above normal. The eruption first appears on the trunk, and then extends quickly to the extremities. The hairy scalp usually contains a number. At first a spot of roseola appears, and on this is quickly projected a vesicle. Between the first crop of vesicles, on the next day, are seen a number of roseola-spots, and on these other vesicles make their appearance. But few appear on the face, and those chiefly on the forehead. The disease reaches its maximum on the second day and then declines, the fever disappearing, the vesicles drying up and dropping off. The vesicles

also appear on the mucous membrane of the mouth and on the genitals. The general symptoms are trivial. With the fever there are thirst, anorexia, and constipation. Sleep is disturbed, and much itching is complained of, especially in the scalp. The eyes are apt to be irritable, and it occasionally happens that vesicles appear on the conjunctiva, but the popular notion that chicken-pox is hurtful to the eyes is unfounded.

**Treatment.**—There is nothing to be done but await the termination of the case by the natural mode.

#### MEASLES—RUBEOLA.

**Definition.**—*Measles* is an eruptive fever, with catarrhal symptoms referable to the broncho-pulmonary mucous membrane, self-limited, and terminating in about two weeks.

**Causes.**—According to Lombard, measles appears in all parts of the globe, but is much less severe in the tropics and in extreme northern countries. It is a contagious disease, which may be communicated not only by immediate contact with the sick, but the morbid principle adheres to fomites, to articles of clothing, etc., by which it may be conveyed long distances, and by means of the healthy. It has been communicated by inoculation. The nasal mucus seems rich in the morbid principle. Measles prevails widely as an epidemic, and it occurs also in the sporadic form. Susceptibility to it is not the same in all individuals. Infants at the breast are not liable. The two sexes are affected with equal frequency. During an epidemic, not all exposed to the epidemic influence have the disease. One attack, as a rule, gives exemption from future attacks; but to this dictum there are numerous exceptions. It is a disease of childhood especially, although infrequent in infants at the breast, and a few cases have been reported in which measles existed at birth. The atmospherical conditions which favor the production of bronchial attacks promote the epidemics of measles, which are therefore more numerous and severe in the fall, winter, and spring. The period of the disease when the contagion is most active is probably when the eruption is at its maximum; but the contagious principle is present from the beginning to the end of symptoms.

**Pathological Anatomy.**—The eruption of measles is in dark-red, sometimes rose-colored, spots, sharply defined, about the size of a pin-head to three pin-heads, disappearing on pressure, and immediately recurring when the pressure is removed. These spots have a lenticular shape, are usually discrete, and separated by tracts of normal skin, but may be coherent, forming an extended area of diffused redness, with punctations of deeper red, while the intervening skin is untouched. The spots are slightly raised above the general surface, and each spot may be

surmounted with a very minute papule; but this papule is not always present. The eruption of measles, with or without a papule, makes the skin rough. The spots appear on all parts of the body, but more on the face and trunk than on the extremities; and they are more apt to cohere on the face and to be more abundant in this situation also, and of a brighter color. The exanthem appears first on the face, then on the neck, throat, upper part of the chest, and abdomen. It may develop fully on the face and continue there unchanged for a day or two before appearing elsewhere. The duration of the eruption at its maximum of development is not more than a half-day or a day, when retrocession goes on rapidly, beginning usually in the evening or at night, where the exanthem first came out, and in twenty-four hours the skin is pale. As the retrocession is going on, an exacerbation may occur, when the spots will appear again, almost to their original development; but this is exceptional, and, if it happen, fading will soon (in a few hours) go on again. Some color remains for a few days at the site of the eruption—a brownish or yellowish stain—and, in the case of hæmorrhagic extravasation, which may take place in the skin during the height of the eruption, the petechial spots pass through the ordinary changes. More or less exfoliation takes place in the form of furfuraceous scales, and only from the spots; large patches, like those of scarlet fever, are not known in measles. The mucous membrane is affected, as well as the skin, but in a different form. An intense hyperæmia of the nares, pharynx, palate, larynx, and conjunctiva, comes on with the initial stage. To this state of hyperæmia are superadded dark-red spots, appearing with and corresponding to the skin exanthem, although not resembling it very closely. Minute papules are also seen to develop, but not in connection with the red spots. Retrocession of the mucous-membrane exanthem occurs a little earlier than that on the skin. In the measles of the war of the rebellion, intestinal changes were constantly observed, and consisted of enlargement of the solitary glands, more or less thickening of the patches of Peyer, and swelling of the mesenteric glands. The spleen was always enlarged by increase of the splenic pulp, and the kidneys were intensely hyperæmic, the urine containing albumen. The blood was thin, the fibrin slight in quantity and feebly coagulable, the red corpuscles diminished and the white in excess.

**Symptoms—Invasion Stage.**—The onset of the disease is announced by a feeling of weariness, muscular soreness, headache and backache, and a succession of irregular chills, the temperature then rising to 100° or 101° Fahr. These symptoms, which mark the beginning of the prodromal or invasion stage, succeed to the incubation stage. From the period of exposure to the appearance of the eruption there are fourteen days, according to the most accurate observations. As four of these are occupied by the invasion stage, the period of incuba-