

sudoriparous glands. The change in the condition of the urine, at an early stage of the disease, consists entirely in the increased excretion of water, there being neither albumen nor sugar present. With the further progress of the mucoid changes in the kidney, and the encroachment of the connective tissue on the Malpighian tufts and tubules, the urine becomes albuminous.

The uterine functions do not appear to be affected by the progress of the disease. If the malady appears at the climacteric period, the disturbances belonging to this period are not necessarily related to the development of this affection.

**Course, Duration, and Termination.**—Myxœdema pursues a progressive course, and has apparently been little affected by remedies. It develops slowly, the appearance of œdema being secondary to the anæmia. As it develops there is a constantly increasing weakness. The mind, at first torpid, becomes a prey to hallucinations. The temper, at first amiable and slow to anger, becomes irritable. At or near the close of the malady stupor comes on, and the end may occur in coma. As the changes progress in the various organs concerned in assimilation, the nutrition fails, the muscular force is quickly expended, fixed attitudes are maintained with difficulty, and all exertion is finally accomplished with great difficulty. The blood becoming watery, and the urine albuminous, a true œdema finally comes on. The whole duration of an uncomplicated case is about six years. Intercurrent diseases may end life meanwhile. Death may occur from exhaustion, by uræmic poisoning, or by cerebral coma.

The prognosis, from our present stand-point, must be regarded as unfavorable. Nevertheless, increasing experience justifies the expression of some confidence in the good effects of remedies now utilized in the treatment.

**Therapy.**—Recognizable causes—as child-bearing, lactation, the affections incident to the climacteric period, bad hygiene, depressing moral emotions—should, as far as possible, be removed.

Remedies belonging to the group of nervous tonics—as arsenic, iron, massage, faradism, and a generous diet—have in many cases done great good, and in a few have effected cures. Pilocarpus and warm baths have been very useful in some instances, the effect of both being to promote the action of the sudoriparous glands. Ord reports that in three cases the disease almost wholly disappeared under the use of pilocarpus—ten to sixty drops of the fluid extract being given four times a day.

The author believes that the method of treatment known as central galvanization will prove to be an important aid to other measures. In a case now under observation, great improvement has followed the use of extract of ergot and arseniate of iron—two grains of the former, and one tenth of a grain of the latter, three times a day.

## GENERAL OR CONSTITUTIONAL DISEASES.

### ERUPTIVE FEVERS.

#### VARIOLA.

**Definition.**—*Variola* is an eruptive disease characterized by the presence of pustules, which make their appearance at the end of the third exacerbation of the initial fever, when the temperature declines, but this period of diminished fever or of apyrexia is followed by a secondary fever, or fever of maturation. *Small-pox*, or *pock*, is the name in common use, which was formerly employed in contradistinction to the *big pock*, or *syphilis*—the word “pock” meaning *pustule*.

**Causes.**—Small-pox prevails under all conditions of soil and climate, its distribution at the present time being regulated by the degree of protection afforded by vaccination.\* It occurs at all ages, and even the *fœtus in utero* is attacked, and it may be so early as the fourth or fifth month of utero-gestation. Both sexes appear to be equally susceptible. Race exercises an influence which is quite decided—the dark races, negroes especially, possess a peculiar liability. During the actual existence of typhoid fever, scarlet fever, and measles, there is an immunity against the small-pox poison, and the susceptibility of individuals varies at different times. As a rule, those who have been attacked once possess complete protection against future seizures, but there are numerous exceptions. The author has met with examples of small-pox occurring twice and three times in the same individuals, and notwithstanding vaccination. The susceptibility to a new attack may be acquired in a few months, but usually not until many years have elapsed. Mild attacks are apparently less protective than severe ones against future recurrence of the disease. Small-pox is spread by a peculiar virus whose nature is unknown. It is true, minute organisms on which the toxic activity is supposed to depend have been found in vaccinia, and also in the pustules of variola, but their position, as

\* “*Traité de Climatologie Médicale*,” *op. cit.*, vol. iv, p. 370.

accidental or causative, has not yet been made out. The transparent fluid of the pustules, before it becomes yellow and turbid, is most active, but the dried pustules are only less active. The morbid principle is not confined to the patient, but diffuses in the atmosphere about him, and extends a variable distance. Ventilation and large air-space dilute the poison; hence a close room, with a number of persons, especially having small-pox, occupying it, concentrates the poison, making communication more certain. There is no period, from the initial fever to the final desquamation, at which the disease may not be communicated to the susceptible, but the stage of suppuration is the most virulent. All articles which have been about the person or bedding of the patient, especially those having a rough surface to which it may adhere, may retain the poison for a long time, and it may be conveyed from the patient, and from his bedding or clothing, to the clothing of another. The bodies of those dead of variola communicate the disease, probably until the virus is destroyed by putrefactive decomposition. The persistence in the activity of the poison and its power to resist external influences are very great. When preserved from the contact of air, it retains its activity for months and years. The spread of small-pox is affected by the immunity derived from attacks of the disease, but especially by the protective influence of vaccination. The exemption derived by the latter is less permanent than the former, and in many cases terminates after some years. It happens in this way that every few years a part of the population of civilized communities reacquire their susceptibility to the poison, and furnish the material for an epidemic.

**Pathological Anatomy.**—The most important changes are those concerned in the formation of the pustules. The first step is the appearance of a small hyperæmic spot in the entire thickness of the derma, at and through a papilla. A swelling ensues in the part, especially in the outer layer of cells of the papilla, and pushing up the epidermis forms a papule. An exudation of a transparent fluid now takes place from the papillary layer, which, pushing aside the cells and the epidermis above, forms a vesicle. The cells are separated into groups, and not from each other, are compressed by the exudation, form an apparent network, in the meshes of which the lymph is contained.\* While the upper cells of the papilla and the epidermis are engaged in the formation of the vesicle, the papillæ themselves are swollen by enlarged and tortuous vessels, and by an exudation of serum. A central depression—an umbilication—forms in the vesicle, which is perforated by a hair-follicle, or the duct of a sweat-gland. This is due to the fact that the epidermis is continuous with the hair-follicle, and the duct of the sweat-gland also, so that this portion of the vesicle can not rise—in

\* "Untersuchungen zur Anatomie des Blatternprozesses," von Dr. H. Anspitz und Dr. S. Basch, in Virchow's "Archiv," Band xxviii, p. 337, *et seq.*

fact, the accumulation takes place around it—whence it follows that a central depression must exist. Pocks without being so situated—not perforated by a hair-follicle or sweat-gland—also have this umbilication. Under these circumstances, we may adopt the explanation of Anspitz and Basch, who hold that this appearance is due simply to the more rapid swelling of the periphery of the pustule. When fully ripe the umbilication disappears, to reappear again in drying, owing to the more rapid desiccation of the center. In the case of confluent variola, the adjacent papilla may become inflamed, and partial necrobiosis occur, causing great destruction of tissue. There is nothing peculiar and distinctive in the hæmorrhagic form, this condition being due merely to the substitution of blood for serum. The hæmorrhage may be confined to the pustules, or may extend into the neighboring papilla, and, in the worst cases, the whole cutis and subcutaneous tissue may be infiltrated with blood. Pustules are formed on the mucous membrane, and simultaneously catarrhal, croupous, or diphtheritic inflammation takes place. The mucous membrane nearest the external skin, and most exposed, is most certainly and severely affected. The nose, tongue, tonsils, palate, and pharynx, and the orifice and internal portion of the Eustachian tube, are more or less infiltrated with pus; the tongue loses its epithelium to a considerable extent, and pustules extend down the trachea to the bifurcation, and also to a short distance down the œsophagus. The liver, spleen, kidneys, and heart are affected by granular and fatty degeneration, and in the hæmorrhagic form there are numerous hæmorrhages and ecchymoses throughout the body—in the serous and mucous membranes, and in most of the viscera.

**Symptoms.**—The period intervening between the reception of the materies morbi and the outbreak of the malady is called the *period of incubation*. This is not a fixed period, although tolerably constant, the variations being due probably to the differences in susceptibility, to the action of the poison. The most usual period of incubation is from ten to thirteen days (Curschmann), which is the time generally agreed on by the authorities, but in some instances it has been as short as five and as long as fourteen days. During the stage of incubation we may suppose that the multiplication of the poison is taking place, but there are no objective nor subjective sensations indicative of the process until the *stage of invasion*. This stage sets in suddenly with a violent rigor, only comparable to that of an intermittent, or of pneumonia. Sometimes there are several chills or several hours of chilliness. Fever begins at once, and in a short time rises to 103° or 104° Fahr., at which it continues, there being a slight morning remission. The fever may rise higher after the first day, to 105°, even 106°, and continue at that rate until the period of eruption. The pulse is strong, full, and bounding, and ranges in adults from 100 to 140; in children

to 160. The action of the heart is strong and heaving, there is some difficulty of breathing, often considerable dyspnoea is present, the carotids beat vehemently, the face is red, the eyes injected; there are an intense headache and sleeplessness, or sleep is disturbed by frightful dreams. Appetite is entirely absent, thirst is incessant, and nausea and vomiting with constipation usually occur. There is present in all cases more or less pain in the back, but in the largest number this takes the form of agonizing suffering, the pain being at the same time acute, lancinating, shooting down through the hips and thighs into the lower limbs, and heavy, tensive, boring pain felt deeply in the spine. The pronounced backache is accompanied by the equally pronounced headache, which possesses similar characteristics. There may be some confusion of mind in the milder cases occurring toward evening, and in other cases active delirium, especially in subjects addicted to alcoholic excess. It was a dictum of Sydenham, revived by Trousseau, that the mildness and shortness of the stage of invasion furnished a guide to the character of the attack. "When the eruption makes its appearance at the end of the second day or the beginning of the third, it is necessarily confluent; when it appears at the end of three and a half to four full days, or is postponed to the fifth, it is certainly discrete" (Jaccoud). Although there is a measure of truth in the former propositions, they are by no means exact. The author agrees with the dictum of Jaccoud. If the eruption appears after four full days of the preliminary fever, it is never confluent; it is either discrete or coherent. Although definite conclusions as to the severity of the disease can not be drawn from the date of the appearance of the eruption, yet the severity of the symptoms during the stage of invasion does furnish a measure of the probable violence of the disease. Besides the regular phenomena belonging to the stage of invasion, there are certain inconstant symptoms which possess a high degree of importance. These are convulsions, delirium, and dyspnoea, which have been briefly referred to, and certain initial or prodromal rashes which have not thus far been discussed. Following the division of Curschmann, these rashes may be arranged in two groups, *erythematous* and *hæmorrhagic*. The erythematous form is general to the whole surface, and assumes either a scarlatinal or rubeolous appearance. The hæmorrhagic eruption consists of minute points of hæmorrhagic extravasation into the epidermis. When these are combined, the hæmorrhagic spots appear like petechiæ or an erythema. The favorite site for these initial rashes is the lower portion of the abdomen, the genitals and thighs forming a triangle which has been designated the triangle of Simon. "A brachial triangle" is formed of the rashes along the side of the trunk, extending into the axilla, the inner side of the arm, and over the pectoral muscles. The erythematous eruptions tend to spread over the whole surface of the body. These erup-

tions or rashes of the stage of invasion are by no means constant in their appearance; many cases and some epidemics are entirely free of them. In the last epidemic of small-pox, the author, then practicing at Cincinnati, saw a number of them, and it was common to hear reports of cases in societies of the coincident appearance and development of scarlet fever or measles and small-pox. They usually appear on the second day, but they may appear on the first or third. Their duration is short, the erythematous lasting from twelve to twenty-four hours, the hæmorrhagic a day or two or longer. The invasion stage of variola is sometimes diversified by the appearance of the hæmorrhagic condition or diathesis (*purpura variolosa*), and this is often confounded with the comparatively innocent hæmorrhagic rash. *Purpura variolosa* sets in in the usual way with severe rigor and pains in the head and back, very high fever, and great prostration. In from eighteen to thirty-six hours a very intense scarlatiniform eruption spreads all over the body except the face. Petechiæ and considerable patches of hæmorrhage appear in the skin and vary in size from mere points to an irregularly rounded figure about an inch in diameter, which remain discrete or apart on the extremities, and confluent on the abdomen, forming irregular masses. The face swells and is red; the conjunctivæ are injected, and the eyes, apparently sunken in their orbits, are surrounded by large, dark rings formed by the effusion of blood into the lids. The tongue is swollen and coated with a heavy, yellowish fur, and the pharynx, tonsils, and palate are covered with a membranous exudation, which emits a horrible odor. A severe cough, with watery and bloody expectoration, comes on, and there are nausea and vomiting, with bilious and bloody evacuations, and offensive bloody stools. The urine contains a large amount of albumin, which presently becomes bloody and thick. If pregnancy exist, miscarriage takes place, and the patient is carried off with the severe and uncontrollable hæmorrhage. The mind usually remains unaffected, though there may be delirium and coma, and death ensues somewhere from the third to the sixth day after the attack began. The body has a frightful appearance at and immediately subsequent to death; it turns black and is bloated, the features being horribly distorted and swollen. In such cases death appears before the eruption can develop, or it is so obscured as not to be recognizable.

*Stage of Eruption.*—The characteristic eruption makes its appearance at the end of the third exacerbation of the fever—usually on the evening of the third or the morning of the fourth day—and is seen first on the forehead, about the eyes and mouth, on the hairy scalp, and then extends to the body and the extremities. The eruption at first consists of a red point, effaced by pressure, slightly elevated, somewhat hard, and rolling under the finger like a small shot in the skin. The manner of distribution of the eruption varies somewhat. There

are four forms in which the eruption may be arranged: the *discrete*, or each pustule separate and distinct; the *corymbic*, or placed in clusters or patches; the *coherent*, in which the individual pustules come in contact; and the *confluent*, in which the pustules unite or flow together without a line of division between them. In the ordinary typical case, the eruption is completed and no new pustules make their appearance after twenty-four to thirty-six hours. They tend to locate about the hair-follicles, the orifices of the sebaceous and of the sudoriparous glands. On the second day of the eruption, and the fifth day, including the initial stage, the red point is enlarged and elevated into a papule. On the third day of the eruption the papules are transformed into vesicles filled with a transparent, serous fluid; the vesicles increase in size during the next day or day and a half, and on the fifth day of the eruption, and the eighth day of the disease, the serous fluid of the vesicle becomes milky and presently purulent. When the vesicle is fully developed, a central depression or umbilicus appears, and at the bottom is seen a hair-follicle, or duct of a sweat or sebaceous gland, but many distinctly umbilicated are not around a hair-follicle or gland-duct, showing that this appearance is in part due to the more rapid development of the peripheral portion, as suggested by Anspitz and Basch. If the summit of the vesicle which now appears milky be punctured, a drop only of fluid will escape, because of the cellular arrangement of the body of the pustule. While the appearance of the eruption does not indicate suppuration in all the forms, except the confluent, until the

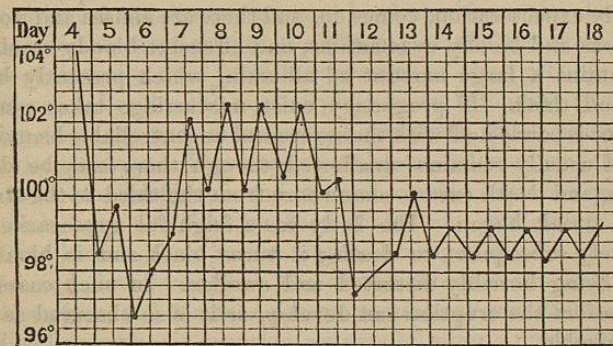


FIG. 50.—Range of Temperature in Discrete Variola.

eighth day, the fever of suppuration really begins on the seventh. In the confluent and the extensive coherent forms, the fever of suppuration may set in on the sixth day of the period of eruption. There may be, therefore, considerable variation in the duration of the stage of eruption.

In the discrete form, a marked change takes place in the condition

of the patient when the eruption appears. The intolerable headache and backache subside or disappear entirely, the fever abruptly falls

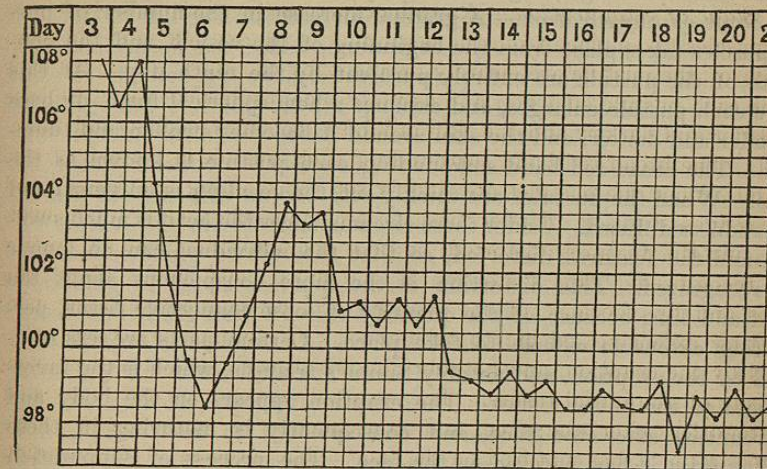


FIG. 51.—Range of Temperature in Coherent Variola.

to normal, even slightly below it, the nausea ceases, and the patient within a few hours passes from a condition of great suffering to one of comfort. It is only in cases of varioloid, or of variola, with few pustules, that the defervescence is so sudden. In the more severe discrete cases, or coherent, the decline of temperature, although considerable, does not reach the normal, and occupies a day or two of a remittent type, with considerable exacerbations. In the confluent form there is a mere abortive attempt at decline of temperature without much change. The pulse falls correspondingly to the decline of fever. An eruption appears on the mucous surfaces simultaneously with that on the skin: on the conjunctiva, pharynx, larynx, and trachea, and causing lachrymation, photophobia, difficulty in swallowing, and cough. In confluent cases the eruption may extend to the bronchi, to the intestine, urethra, and vagina. Very serious results may be derived from the pustules in these situations. Besides the symptoms above mentioned, there may be a violent conjunctivitis, ulceration of the cornea and staphyloma, with intense photophobia; constant flow of saliva, and dysphagia; toneless voice, croupy cough, and suffocative attacks; dysenteric discharges; painful urination; and a sense of burning in the vulva and vagina. In addition to these constant symptoms there are others that may be regarded as accidental. If stupor and delirium appear during the stage of eruption, these symptoms are of evil augury. If merely due to habits of alcoholic excess, they are less serious than if they arise spontaneously under an increased mobility or instability of

the nerve-centers, and changes in the composition of the blood. If there be maniacal delirium, with suicidal tendency, the result is usually death about the beginning of the stage of suppuration (Jaccoud).

*Stage of Suppuration.*—A gradual increase in the number of pus-corpuscles takes place from the beginning of the vesicle, and the contents of the pustule are entirely purulent by the ninth day. At this time each pustule enlarges, and assumes a hemispherical form, its base broader and darker, and the skin around it becomes swollen and tumefied. The broad red band surrounding each pustule is known as the halo. When the pustules are thickly set, the swelling is universal and the redness diffused. Under these circumstances the head is much swollen, and the features distorted, so that the individual can no longer be recognized. This distortion is the more conspicuous about the eyes and lips, because of the quantity of loose connective tissue, permitting extensive œdema to take place. Certain parts are less troubled by the eruption, and notably Simon's triangle, which is the favorite site of the initial rashes. The eruption appears on the body and extremities after the face, and consequently is maturing in these places after it has matured on the face. The process of suppuration in the pustules is accompanied by a symptomatic fever. A chill, or a succession of chills, mark its onset in some subjects, but this remark is true of those cases only in which the appearance of the eruption was coincident with a defervescence of the fever, or at least with a considerable decline. When the fever has persisted from the beginning, it is increased by the suppuration, and assumes a somewhat different type, becomes remittent, the daily variations being as much as two degrees. The range of temperature and the pulse-rate, as well as the various kinds of disturbance accompanying the fever, are greatly influenced by the extent of the suppuration. The temperature will rise to 104°, 105°, or 106° Fahr., and the pulse to 100, 120, 140, or higher. With the development of the secondary fever, there will appear all of the distressing sensations which marked the initial stage. The headache and backache again become severe, the whole surface of the body is full of the pain and irritation of the suppurating sores, there are great restlessness and wakefulness, and an active or low-muttering delirium comes on. Frequently the delirium is maniacal, and the patients difficult to restrain: they jump out of the bed, or out of the window, or escape into the streets. In children, the heat and burning of the face are so great that they will scratch the parts, covering their hands and the bedclothes with blood, and greatly increasing the local inflammation.

The drying of the pustules begins about the eleventh day—rarely earlier, more frequently later—and in the order which the eruption followed. The drying begins before the disappearance of the fever of suppuration, for, when the face-pustules have completed

their evolution, those of the extremities are just suppurating. When the desiccation begins, a honey-like exudation is poured out on the surface of the pustules, which, drying, forms an adherent coating. The contents of the pustules also desiccating, a brownish scab results. Before desiccation has taken place in the pustules on the posterior portions of the body, the matter which they contain is pressed out on the bedding and clothing of the patient, and, decomposing, a peculiar odor results, which to many persons has something distinctive, even diagnostic, about it. Owing to the thickness and hardness of the epidermis, the pustules on the hands and feet have a peculiar form and dry earlier, but are slower to separate. As the pustules dry, the redness and swelling of the skin subside, and the face begins to assume something of its natural appearance, albeit somewhat roughened, reddened, and disfigured by the disease. Although the whole body is marked by cicatrices, the face is peculiarly disfigured. The pustules involving the true skin, and closely placed, extensive losses of substance may occur, especially about the nose. Ulcers penetrating the cornea, protrusion of the lens, and various opacities, result. A depressed and radiated cicatrix, becoming whiter than the surrounding skin, is left at the site of every variola pustule. As the crusts are detaching, there is often an intolerable itching, and injury is done by children who increase the area of inflammation by the violence of the scratching. Erysipelas may occur and furuncles form during the progress of the dermatitis. The hair usually falls out, and the nails sometimes drop off.

#### CONFLUENT VARIOLA.

The description above given applies to the ordinary cases of small-pox: to the discrete, the corymbic, and the coherent. There are some peculiarities of other forms which require particular consideration. The approach of the confluent form is announced by the greater violence of the initial or invasion stage, and by the earlier appearance of the eruption. When the eruption appears it spreads over the body quickly, and indeed, in some cases, it seems to be on the face, body, and extremities simultaneously. At once the papules approximate, and their entire formation is prevented by the closeness of arrangement, so that large numbers coalescing form immense vesicles filled with sero-pus. While the face and features are hidden under huge bullæ of pus, the pustules on the rest of the body may be merely coherent. The mucous membrane is attacked with similar violence; the pustules flow together, and diphtheritic exudations spread over the fauces, pharynx, nares, and Eustachian tubes. The tongue is greatly swollen, and protrudes from the mouth. Pustules form in the larynx, the cartilages are invaded, abscesses develop, and œdema of the glottis ensues. The parotid and sublingual glands swell enormously. The