

authorized names have been invented, such as scarlatina morbillosa, and morbilli scarlatinosa.

The *prognosis*, as given in most cases, is too unfavorable in scarlatina, and too favorable in measles, for all the apparently recovered patients should not be regarded as actually cured, as tuberculosis, which very often develops after measles, and goes on unchecked, carries off many; thus, if the observation were only conducted far enough, it would be seen that the ratio of mortality is not so very favorable after all.

To repeat, very few children die during the florescence or immediately after the desquamation, especially if they have already passed the first year, but then the subsequent tuberculosis always attacks several per cent. of all ages.

Etiology.—Measles is contagious to a high degree, so that by us in Munich almost every person who is not yet impregnated with the virus is attacked by it. The contagion is extremely subtle, and no direct contact with morbilli patients is at all necessary for an infection. Occasionally it is very easy to prove its having been transmitted by a third person.

Most of the attempts at vaccination with the blood of morbilli patients, whose exanthema was at the stage of florescence, are said to have taken effect, and tolerably benign, normal measles appeared between the seventh and tenth day. But, as the process was not thereby localized, and the course being about the same as when the children have been accidentally infected, these inoculations have therefore no practical value whatever.

The contagion of morbilli does not prevail to the exclusion of all other infections. Thus varicella, small-pox, and intermittent-fever patients, have been seen to be affected with it. When scabious patients get measles the scabies usually heals spontaneously and remarkably quickly; due, perhaps, to the itch animalcule perishing by the contagion or the material alteration of the cutis.

Finally, the remarkable connection between measles and whooping-cough is yet to be mentioned. It has been observed that the contagion of one relieves the other, measles being particularly often followed by whooping-cough, and a certain relation between the two affections might readily be assumed to exist.

Treatment.—We have no specific remedy for the contagion of measles. All those measures hitherto suggested have not stood the test. Inoculation, as already stated, is not practicable, for, that which is obtained with much labor the children usually acquire themselves, namely, normal measles. Isolation of the patients affected with measles, and all persons who have any intercourse with them, is the

only sure means of preventing infection. But, during the prevalence of an epidemic, this can only be done by a change of place, and is principally indicated in pronounced cases of tuberculosis, in which measles invariably induce a rapid advance of the cachexia.

The simple and regular measles require an entirely expectant treatment. Energetic measures, such as abstraction of blood, tartar emetic, or laxatives, in many instances impede the uniform course, without removing the danger or threatening symptoms against which they have been employed.

The best protection against an irregular course and against sequelæ is a uniform, tolerably high temperature of the room, 65° F., so long as the children are in bed, 67° F. when they are about to get up. The patient should not leave the bed as long as any trace of the eruption is still to be seen, and should be confined to his room for at least two weeks, and in unfavorable seasons of the year for a still longer time, after the eruption has totally disappeared.

Heavy feather beds, under which, according to the old style, patients were kept covered up to the chin, induce too much perspiration, rendering them liable to take cold with all the greater certainty. Horse-hair mattresses and plain woollen blankets answer every purpose. It is of the utmost importance to ventilate the room thoroughly, and that can be best accomplished when the patient has two adjoining rooms for use. Children reared in a cleanly manner find it very disagreeable to pass several days without having their faces and hands washed, a management which is still prescribed by many older physicians. All the morbilli patients that I have treated were washed, face and hands, twice a day with lukewarm water, and I have never perceived the least bad effects from this practice. This useless torture, the deprivation of washing-water, should therefore be totally discarded.

The diet should be absolutely antifebrile, so long as any traces of fever are perceptible. To forbid food when the appetite has returned is cruel, and only retards the convalescence. Children never make themselves sick by eating bland, unsweetened nutriment, such as milk, soup, and wheat-bread. Where there is a disposition to diarrhoea, constipating food must be allowed; but, where constipation exists, mildly-opening nutriment and drinks should be given.

The treatment of irregular measles, of complications, and of sequelæ, is a problematical one, for no really marked effects have been observed from almost all the remedies recommended.

Measles with marked synochal, inflammatory character, tolerate very well Dj — Dij of nitre; serious head-symptoms in very robust,

older children are very quickly subdued by a few leeches. In the torpid, nervous form, mineral acids, cinchona, and wine, are indicated. Severe cough is palliated by narcotics, belladonna, bitter-almond-water, or opium. Grave cerebral symptoms call for cold affusions of the closely-shorn head. Exanthemata that have disappeared too rapidly, or been retarded, are best treated by counter-irritants, sinapisms, and the like. Clysters with diluted vinegar have also been recommended for that purpose.

Severe diarrhoea must, in all cases, be controlled by opium and astringents; slight diarrhoea, in otherwise well-nourished children, exercises a favorable influence upon the cerebral symptoms.

The diphtheritic affections of the mucous membranes improve under the internal administration of carbonate of potassa, in large doses, at least \mathfrak{Dij} — \mathfrak{Dij} pro die, and locally, so far as the parts can be reached, they should be pencilled with a solution of nitrate of silver. For real sepsis, profuse hæmorrhages from the mucous membrane, gangrenous diphtheritis, and ecchymosis of the cutis, the utmost tonic and stimulating measures, with large doses of wine, quinine, musk, and naphtha, must be employed. Washing the body with chlorine-water has also been recommended. I cannot, however, conceal the fact that, in real septic cases, all these methods of treatment have always failed me.

Pulmonary tuberculosis, which comparatively often develops after measles, may stop, like that originating spontaneously. Large doses of quinine—from two to four grains given at one time every other day—exercise a favorable influence upon its course. A year's constant use of cod-liver oil strengthens the nutrition, and perhaps, also, guards the organism against new tuberculous attacks. Country air, sea-baths, and a rational inuring, are the best prophylactics against the progress of tuberculous affections.

(3.) RUBEOLÆ (*Rötheln*).—There is scarcely another disease upon which the views of authors differ so vastly as upon rubeola. Some look upon it as a modified scarlatina, others as measles, and still others as an amalgamation of both. Erythema, urticaria, even typhous and cholera exanthema, have been described as rubeola; and the confusion finally became so inextricable that later writers have denied the existence of the disease entirely, and ascribed all obscure and doubtful cases to some of the above-mentioned affections. This later view I also entertained till the spring of 1865, when I became better informed. At that time eleven persons—three adults and eight children, from six months to eight years of age—came under my care. Without any distinct prodromata presented, they all had an eruption of exanthema, which differed in no respect from that of measles. My

friend *Lindworm* at the same time had five additional cases to treat, and, upon inquiries, several physicians in Munich recollected having seen at that time a peculiar fever, "a febrile urticaria with a measles-like exanthema." Neither before nor since that time have I met with this eruption. It is proper to remark that this disease was not immediately preceded nor soon followed by any epidemics of measles or scarlet fever. The phenomena presented by this affection are sketched by *Köstlin*, of Stuttgart, in the following manner: In the winter of 1860-'61 an extensive epidemic of rubeola prevailed in that city during five or six months. The exanthema was not smooth, but slightly papulous, had a yellowish tint, not confluent, but formed short or long, serpentine, seldom straight lines, which, in most instances, covered the entire body. The exanthema was not infrequently accompanied by considerable itching of the skin. The eruption, as a rule, disappeared in two or three days, sometimes even sooner. In most instances it appeared, and ran its course without the least catarrhal symptoms, and without fever. Though mild, this exanthema was extremely infectious, infecting whole families. Several children were even twice attacked during the same epidemic. It appeared at the same time in various other cities and towns in Wurtemberg.

Symptoms.—The symptoms which I have observed may be comprised in a few words. The exanthema differs in no respect from that of morbilli; small round spots of the size of lentils cover the entire body, occasioning, in most instances, a considerable amount of itching. At some places these spots stand so closely together that they coalesce and form irregular figures. They also rise somewhat above the level of the normal integument, and the finger, in lightly passing over them, perceives an unequal hardness. The eruption differs, however, very much from measles in respect to its duration. It completely disappears by the end of the first, or, at the longest, by the end of the second day, and the desquamation that succeeds it is very insignificant, barely noticeable. The same is true of the catarrhal symptoms. Although, along with an intense eruption of the exanthema on the face, the eyelids swell up, and the conjunctivæ are somewhat injected, still bronchial catarrh is uniformly absent, which, in morbilli, on the contrary, is a pathognomonic, never-failing symptom. Scarcely any precursory stage was noticeable in most of our cases, and the indistinct febrile phenomena disappeared so completely after the first day, with the fading of the exanthema which soon followed, that by the third day it was totally impossible to keep the children in bed, and they quickly recovered without the first sequela.

Treatment.—This is purely expectant. Internally, dilute acids, and, externally, cold ablutions, to relieve the intolerable itching of

the skin, were the only remedial means employed in this most harmless of all acute febrile exanthemata.

(4.) *VARIOLA, SMALL-POX.*—Genuine human small-pox is the most positively declared of all acute exanthemata. It, however, occurs comparatively rarely, on account of the compulsory vaccination that is in force at present in almost all civilized countries, and in time will probably be totally supplanted by the milder forms of variolosis, also called *variola modificata*, and by *varicella*.

By *variola* is understood a febrile, contagious, pustular, eruptive disease, whose course is uniform. It may be divided into several periods.

Symptoms.—Three distinct stages are distinguished. (1.) The stage of incubation and of prodromorum; (2), that of florescence of the exanthema; and (3), that of desiccation.

(1.) *Stadium Incubationis et Prodromorum.*—The period from the reception of the contagion to the eruption of the exanthema fluctuates between eight and fourteen days. The first few days of this period usually pass without any signs manifesting themselves; but in the last three days preceding the eruption severe symptoms are observed. I shall limit myself here to a delineation of the prodromata, as they occur in a child under one year, taking it for granted that a knowledge of the course of small-pox in adults has already been acquired from other sources. Small-pox now occurs only in very young children, for vaccinated persons are totally exempt from it, and by us, in Germany, vaccination is usually performed before the end of the first year.

If they have been infected a few days previously with genuine or modified *variola* poison, we observe slight gastric symptoms, such as loss of appetite, coated tongue, vomiting, and constipation. There will also be observed excitement of the vascular and nervous system, hot skin, frequent pulse, great restlessness alternating with stupor, starting up from sleep with an outcry, gnashing of the teeth, convulsions, and occasionally syncope, with rapid collapses. All these symptoms, which certainly have nothing characteristic about them—for the subjective pain in the back and loins, so constant and marked a symptom in adults, is not available in infants who do not speak—become aggravated throughout the next three days, regular exacerbations come on toward the evening, till, finally, the exanthema breaks out.

(2.) *Stadium Eruptionis et Florescentiæ.*—The first signs of the eruption are seen on the face; thence it spreads upon the trunk, and the upper, and lastly upon the lower extremities. The eruption is completed in from twenty-four to forty-eight hours.

The small-pox pustule has the following history, viz.: a red, slightly-elevated spot is first perceptible upon the skin, differing in no

respect from the exanthema of measles. In the centre of this red spot a small tubercle develops, and upon this tubercle a still smaller vesicle appears, which enlarges very rapidly, so that on the second day it has reached the size of a pin's head; on the third, that of a lentil; and finally, the primary red point is transformed into a tense, little blister, of the size of a split pea, with a central depression.

These originally red points do not all go through this metamorphosis; a great many of them never become vesicles, but disappear entirely in a few days, especially those on the lower extremities. On the feet, in particular, the eruption is feebler than on any other part of the body.

The course of *variola*, as regards the form and duration of the exanthema, is precisely the same in children as in adults.

When the exanthema is not excessively diffused over the whole body, the general symptoms will subside materially after it has made its appearance. The great restlessness and delirium vanish, the pulse becomes slower and softer, the breathing more regular, but the specific *variola* odor is more marked after the eruption than before. Where the eruption on the mucous membrane of the eyes, nose, mouth, etc., is very abundant, no mitigation in the vascular and nervous excitement will be noticeable, for the severe pain induced by the process prevents the patients from becoming tranquil.

On the sixth day after the eruption, or on the ninth from the invasion, the suppurative fever—*febris secundaria*—appears also in children. The inflammatory areolæ around the vesicles become enlarged, the face swells so as to totally disfigure the patient, the skin again becomes hot, and such an intolerable itching supervenes that the child will scratch open the pustules, notwithstanding all the precautions that may be taken to prevent it. Thus it finally comes to the—

(3.) *Stadium Exsiccationis.*—It does not begin at once on the whole body; the pustules burst and dry up in the same order in which they appeared: thus, first on the face, next on the neck, on the wrists, on the trunk, and lastly on the lower extremities. Every pustule is nearly dried up by the ninth day after its appearance, or, if we include the two or three days of the prodromatory stage, on the eleventh or twelfth day of the disease all the pustules will have commenced to desiccate. Spontaneous bursting, or simple drying up without bursting of the pustules, hardly ever takes place in small children, for they cannot refrain from palliating the terrible itching by scratching or rubbing.

Thus brown thick crusts form upon the whole body, especially on the face. If left to themselves, these crusts will fall off in from four to five days, and leave behind a cicatrix covered with new epidermis,

which the patients frequently scratch off. Small-pox cicatrices have the same formation in children as in adults; but, as the cutis in the former is more delicate and thinner, the destruction is therefore more conspicuous, and the inequalities, which at first appeared very marked, become less unequal in the course of years.

During this period the pustules in the mouth become converted into flat superficial ulcers, and induce an augmented mucus and salivary secretion. The secondary fever disappears with the desiccation, the appetite returns, and the recovery progresses rapidly. Occasionally the nails are cast off.

The prognosis, in children under one year of age, is extremely unfavorable, for nearly sixty per cent. perish.

The principal danger to small children is, (1), from a violent prodromatory stage, where profound stupor or convulsions endanger life; and (2), from the secondary fever, which may assume a typhous or septic character.

The quantitative and qualitative variations are the same as in adults. Here also we have variolæ discretæ, cohærentes, corymbosæ, and confluentes; in qualitative regard, variolæ crystallinæ, siliquosæ, depressæ, cruentæ, gangrænosæ, etc.

The most frequent complications are: laryngitis, pleurisy, meningitis, intestinal catarrh, serious diseases of the eye, which frequently lead to phthisis bulbi, otorrhœa, and gangrene of the scrotum.

The most frequent sequelæ deserving to be mentioned are: furunculosis, abscesses of the cellular tissue, pyæmia, inflammations of the joints, necrosis of the bones, and, what is very remarkable in small children, scrofula in all its forms and localizations. The mortality in consequence of small-pox, in children under one year of age, is very great, for, as has been stated, barely forty per cent. recover.

Etiology.—Small-pox is contagious to a high degree, and, in fact, also infectious through the atmosphere, is communicated by contact and by inoculation. It is most infectious during the suppurative and desiccating stages. But the most important point in practice is that genuine small-pox generates small-pox in not only the unvaccinated children, *but that occasionally the mere contact with varioloid, and even with very mild varicella, may produce the genuine human variola in an unvaccinated child.*

Treatment.*—A prophylactic treatment is spoken of in many dis-

* As small-pox, unfortunately, is not so rarely met with in this country as it appears to be where the author has made his observations, we deem it proper to append some remarks in regard to its pathology and treatment. At the *post-mortem* examination of small-pox, there will generally be found congestion and infiltration of the mucous membrane of the alimentary canal and some of the internal organs, especially

eases, but in none can one be relied upon with so much certainty, and accomplished by such a simple, harmless procedure, as in variola. It is inoculation with the small-pox lymph from the cow, or

VACCINATION.

An eruption of pustules occurs in our domestic animals, and the pocks on the udder, in particular, have been known for a long time. Whether these always originate through contagion, or spontaneously, is not yet satisfactorily decided; their course, however, has been accurately observed. *Canstatt* reports as follows concerning it:

A few days before the eruption the cows eat less, give less milk, and the udder has an increased temperature. Soon after this, small reddish tubercles appear, especially on the external surfaces of the teats, which become converted into umbilicated pustules, and between the fourth and seventh day these have attained to complete maturity. The pustules have a pearly color, at first are filled with clear lymph, which subsequently becomes purulent, and they are surrounded by red areolæ. Touching the udder causes the animal marked pain. The pustules desiccate by the twelfth or fourteenth day, fall off, and leave circular cicatrices.

It was known for more than a hundred years that those who had to

the brain and lungs. The serous coat of the blood-vessels seems turgid and of a blood-red color. The pustules are found scattered over the mouth, pharynx, œsophagus, and rectum, particularly if the patient have succumbed during the suppurative stage. Occasionally they are seen in the larynx, trachea, and bronchi, and the urinary bladder. Where they have ruptured, the mucous membrane will be found covered with an adventitious membrane. Each well-formed pustule, when carefully dissected, will be seen to consist of two compartments, the upper one being the larger. These compartments are both filled with pus, and communicate with each other at the marginal borders. This septum is a layer of false membrane, deposited in the derma at an early stage of the disease, which, by removing the surface-layer of the pustule, is brought into view, presenting a bright-red or purple color, and is highly infecting. But the mature pustule is multilocular, and, when a transverse section is made, presents an appearance that has been compared to a severed orange.

The urinary secretion in variola undergoes certain changes corresponding with the gradations of the disease. During the eruptive fever the quantity is lessened, its specific gravity increased, its color deep red and turbid, and it sometimes contains traces of albumen. *Bequerel* states that, "in five cases with severe symptoms during the eruptive stage, the quantity of urine was diminished, amounting on an average to only twenty-three and a half ounces in twenty-four hours. There was no increase in the specific gravity, it being only 1020.6. It frequently precipitated uric acid, either spontaneously or by adding nitric acid, and in one case only was a trace of albumen discovered." During the suppurative stage "the urine retained the synochal character so long as the symptoms continued, remaining unaltered, and, in the cases in which the fever persisted, till fatal termination. Sediments containing muco-pus also appeared in it." During the period of desquamation, "it is either normal or limpid,"

feed or milk such cows would become infected, and it also became a notorious fact that these persons remained exempt from the genuine small-pox. But the first accurate test and experimental confirmation of this fact was not instituted till the 14th of May, 1796, when *Jenner*, for the first time, inoculated a child eight years of age with the matter taken from the hands of a milker. The counter-test was instituted in this child on the first day of July following, by inoculating it with genuine variola poison. The child remained unaffected. This experiment was subsequently repeatedly performed, and the first public vaccinating institution was established in London as early as 1799. Since that time this sanitary measure has spread and become renowned throughout the civilized world, and there is hardly a country now where vaccination in the first year of life is not prescribed by law.

Vaccination is best performed in the following manner: first of all, it should be stated that the child from which the matter is to be taken must be perfectly developed, entirely free from cutaneous eruptions, and free from febrile diseases. If it has been vaccinated eight days previously, it will now present several perfectly legitimate vaccine pustules. One of these is punctured with the vaccinating needle, held obliquely in such a manner that pure lymph only, unmixed with

while, in the putrid form, "it appears decomposed, ammoniacal, and not unfrequently of a dark-red color, from the presence of hæmatine."

The treatment of simple variola, when uncomplicated by any other disease, is as thoroughly expectant as the treatment of any other exanthema. Confinement to bed, cooling regimen, diluents, sponging the skin with tepid water, and the occasional use of a saline purgative, is all that is necessary. When the secondary fever sets in, febrifuge salines, such as potass. citras, or liq. ammo. acetat, or the effervescing salines, may be given. Sleeplessness may be relieved by opium, and, when the vital powers begin to fail, stimulants and a generous diet are indicated. Where the cerebral symptoms are severe, leeches, according to the age of the child, may be applied behind the ear, and mustard-draughts to the feet. Mineral acids are useful in cases which are complicated with hæmorrhages, and, if conjunctivitis exists, emollient poultices to the eyelids may greatly relieve it. If the eruption is tardy, a warm bath and sudorifics may hasten its appearance. During the secondary fever, small doses of opium will be found very serviceable, but this is contraindicated in the primary one, on account of the extreme excitability of the nervous system. In the graver forms, where the vital organs have been attacked, a more energetic treatment must be employed. If the disease has assumed an unfavorable type, from the very first, or the nervous symptoms are of a severe character, stimulants and tonics, with a nutritious diet, will have to be liberally administered. Symptoms indicative of serious internal congestion are best combated with dry cups and counter-irritation. Abstractions of blood, even topically, as a rule, are inadmissible in small-pox, particularly in the confluent variety, when the full quota of strength will be required to withstand the great drain upon the system from the extensive suppurating surface. Headache and delirium are best relieved by the application of ice to the head, or cold-water affusions repeated every two or three hours.—Tr.

blood, will escape. One or two minutes are always required before a large drop appears, for the reason that vaccine pustules,* as is well known, are not simple, but multilocular vesicles. After the needle has been wiped perfectly dry, it is dipped in this lymph in such a manner that its anterior and dorsal surfaces are moistened by it. The arm of the child to be vaccinated is grasped below the shoulder, the integument on the outer surface of the upper third is made properly tense, and the point of the needle is made to pierce the skin four or five times. The punctures ought not to bleed, and the vaccination succeeds best when a minute red dot only is seen afterward. The punctures should be at a distance of at least six lines from each other, for otherwise the pustules that are subsequently to appear will coalesce.

The summer is the most proper time of the year to vaccinate, because in winter the pustules have been observed to develop very slowly. The best age is between three and twelve months. Still, when epidemics of small-pox prevail, infants may be vaccinated a few days after birth. Those children about to be vaccinated must be perfectly well, and free from any of the troubles of dentition (vide p. 106).

Vaccinated children require no special treatment. They may be washed and bathed afterward as well as before, and, from the fourth to the tenth day, the arm may be wrapped up in a fine piece of linen, merely to prevent friction. The erythema surrounding the pustules is thereby also kept within proper bounds.

The transmission of the cachexiæ from one child to another by vaccination has only been proven in regard to syphilis. Scrofula and rachitis cannot be transmitted by vaccination; but, since the most correct views do not always prevail among the public in regard to this point, and in order to avoid all future reproach, it is best to take the matter from healthy children only, and who are entirely free from cutaneous diseases.

It is well to take the precaution to have vaccine lymph constantly on hand, in order that, in case an epidemic breaks out, it should not first have to be looked for or ordered. It is collected without any difficulty or trouble in the following manner: one or several well-developed eight-day vaccine vesicles of a healthy child are punctured several times, and a few minutes allowed for the escape of the drop. It will then have become tolerably large, when an ordinary glass capillary tube held slightly oblique with its end in the drop of lymph, may be charged. The capillary tube must be held parallel with the arm for this reason, that, in case the child should stir or become restless, it will not be injured by it. I remember once to have had a child under

* European authors generally use the word pustule for the vesicular stage of *vaccinia*.—Tr.