blanket should be laid upon a sofa or a bed, and upon this a sheet, wrung out of cold water. The naked child is then laid upon it and wrapped in the blankets. An intense glow of heat quickly follows the preliminary chilling, and from time to time the blankets may be unfolded and the child sprinkled with cold water. The good effects which follow this plan of treatment are often striking, particularly in allaying the delirium and jactitation, and procuring quiet and refreshing sleep. Parents will object less, as a rule, to the warm bath gradually cooled than to any other form of hydrotherapy. The child may be removed from the warm bath, placed upon a sheet wrung out of tolerably cold water, and then folded in blankets. The ice-cap is very useful and may be kept constantly applied in cases in which there is high fever. Medicinal antipyretics are not of much service in comparison with cold water.

The throat symptoms, if mild, do not require much treatment. Applications may be made with a spray, and if the laryngitis becomes severe the measures should be used which will be mentioned under croup. Cold applications to the neck are to be preferred to hot, though it is sometimes difficult to get a child to submit to them. In connection with the throat symptoms the ears should be specially looked after, and a careful disinfection of the throat by suitable antiseptic solutions should be practised. When the inflammation extends through the tubes to the middle ear, the practitioner should either himself daily examine the conditions of the drum, or, when available, a specialist should be called in to assist him in the case. The careful watching of this membrane day by day and the puncturing of it if the tension becomes too great may save the hearing of the child. With the aid of cocaine the drum is readily punctured. The operation may be repeated at intervals if the pain and distention return. No complication of the disease is more serious than this extension of the inflammatory process to the ear.

The nephritis should be dealt with as in ordinary cases, and indications for treatment will be found under the appropriate section. It is worth mentioning, however, that Jaccoud insists upon the great value of milk diet in scarlet fever as a preventive of nephritis.

Among other indications for treatment in the disease is cardiac weakness, which is usually the result of the direct action of the poison, and is best met by stimulants.

Many specifics have been vaunted in scarlet fever, but they are all useless. J. C. Wilson recommends chloral in one or two grain doses for a child of two or three years.

VIII. MEASLES.

Definition.—An acute, highly infectious disorder, characterised by an initial coryza and a rapidly spreading eruption.

Etiology.—The infection of measles is very intense and immunity against attack not nearly so common as in scarlet fever. It is a disease of childhood, but unprotected adults are liable to the infection. Indeed, measles is more frequent in adults than is scarlet fever. Within the first six months of life the liability is not so marked, though I have known infants of a month and of six weeks to be attacked. The sexes are equally affected. The contagion is communicated by the breath and by the secretions, particularly those of the nose. It may be conveyed by a third person and by fomites.

The disease is practically endemic in large centres of population, and from time to time spreads and prevails epidemically. It occurs at all seasons, but prevails more extensively during the colder months. There is no infectious disease in which recurrence is more frequent. There may be a second, third, or even a fourth attack.

The contagion of the disease is unknown. No one of the various organisms which have been described meets the requirements of Koch's law.

Morbid Anatomy.—Measles itself rarely kills, but the complications and sequelæ combine to make it a very fatal affection in children. There are no characteristic post-mortem appearances. The skin changes are those associated with an intense hyperæmia.

There is a catarrhal condition of the mucous membranes, particularly of the bronchi. The fatal cases show almost invariably either broncho-pneumonia, capillary bronchitis with patches of collapse, or less frequently lobar pneumonia. The bronchial glands are invariably swollen. Pleurisy is less common. During convalescence from measles there is a special liability to tuberculous invasion, and tuberculous broncho-pneumonia claims a large number of victims. The bronchial glands may also be affected.

The gastro-intestinal mucosa may be hyperæmic. Swelling of Peyer's glands is not at all uncommon and may reach a very intense grade in the patches.

Symptoms.—Incubation.—This is about ten days, but the limits are variable, and it may be as long as twenty days. The disease has been frequently inoculated. In such cases the incubation period is less than ten days.

Invasion.—The disease usually begins with symptoms of a feverish cold. There are shiverings (not often a definite chill), marked coryza, sneezing, running at the nose, redness of the eyes and lids, with photophobia, and within twenty-four hours cough. These early catarrhal symptoms are more marked in measles than in any other infectious disease of children. There may be the symptoms so commonly associated with an on-coming fever—nausea, vomiting, and headache. The tongue is

furred. Examination of the throat may show a reddish hyperæmia or in some instances a distinct punctiform rash. Occasionally this spreads over the whole mucous membrane of the mouth with the exception of the tongue. The temperature at this stage is usually high, reaching from 103° to 104°, ascending gradually through the second and third days.

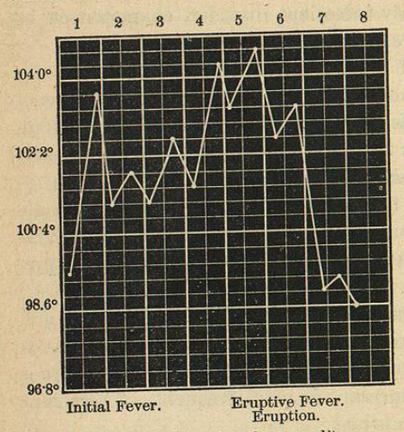

CHART X.—Measles (Strümpell).

Eruption. — Usually on the fourth day, when the fever and general symptoms have reached their height, the rash appears upon the cheeks or forehead in the form of small red papules, which increase in size and spread over the neck and thorax. When the eruption becomes well developed the face is swollen and covered with reddish blotches, which often have rounded or crescentic outlines. Here and there is an intervening portion of unaffected skin. At this stage the cervical lymph-glands may be slightly swollen and sore. The papules can now be felt with the finger. Sometimes they are quite shotty, but do not extend deep into the skin. On the trunk and extremities the swelling of the skin is not so noticeable, the color of the rash not so intense and often less uniform. The mottled blotchy character of the rash appears most clearly on the chest or the abdomen. The rash is hyperæmic and disappears on pressure, but in the more malignant cases it may become petechial. The general symptoms do not abate with the occurrence of the eruption. They persist until the end of the fifth or the sixth day, when in the majority of the cases all the symptoms become mitigated. Among the peculiarities of the rash may be mentioned the development of numerous miliary vesicles and the occurrence of petechiæ, which are seen occasionally even in cases of moderate severity.

Desquamation.—After persisting for two or three days the rash gradually fades and desquamation occurs in the form of very fine branny scales, which may be difficult to see and are wholly unlike the coarse exfoliation in scarlet fever.

The catarrhal symptoms gradually disappear and convalescence is rapidly established.

In epidemics of measles atypical cases are common. The rash may appear early, within thirty-six hours of the onset of the symptoms; or, on the other hand, it may be delayed until the sixth day. As in other exanthems, when many cases occur in a household, one of the children may

have all the initial symptoms and "sicken for the disease," as it is said, but no eruption appear.

The most serious variety of measles is that in which hæmorrhages occur—the *morbilli hæmorrhagici.* In general practice these cases are very uncommon. Occasionally in institutions, particularly when the hygienic surroundings are bad, one or two cases develop during an epidemic. It has been frequently seen in camps and when the disease is freshly imported into a native population, as in the Fiji Islands. During the civil war, as shown by Smart's statistics, some cases occurred.

In this form the disease sets in with much greater intensity, the rash becomes petechial, hæmorrhages occur from the mucous membranes, the constitutional depression is very great, and death occurs early from toxæmia.

Complications and Sequelæ.—These are met with chiefly in the respiratory system. The danger comes from the existing bronchitis, which is apt to extend into the smaller tubes and lead to collapse and broncho-pneumonia. When limited in extent this causes only aggravation of the cough and persistence of the fever (symptoms which gradually abate), and convalescence is rapid; but in debilitated children, more particularly in institutions and among the lower classes, this complication is extremely grave and is responsible for the high death-rate from measles in the community. In some instances the clinical picture is that of a suffocative catarrh, the result of a wide-spread involvement of the smaller tubes. The description of the condition will be found under the section Broncho-pneumonia. Lobar pneumonia is less common and perhaps less dangerous.

Laryngitis is not uncommon: the voice becomes husky and the cough croupy in character. Œdema of the glottis is very rare. Pseudo-membranous inflammation of the pharynx and larynx may occur and prove fatal. In debilitated infants severe stomatitis or even *cancrum oris* may develop.

Catarrhal inflammation of the middle ear is not very uncommon, and may proceed to suppuration and to perforation of the drum. The conjunctival catarrh rarely leads to further trouble, though occasionally the inflammation becomes purulent.

Intestinal catarrh is common in some epidemics, and there may be the symptoms of acute colitis.

Nephritis is an exceedingly rare complication.

Of the sequelæ of measles, tuberculosis is the most important—either an involvement of the bronchial glands, a miliary tuberculosis, or a tuberculous broncho-pneumonia.

Among the rarer sequelæ of measles are paralyses. Hemiplegia is very rare, but cases of paraplegia have been described. Thomas Barlow *

* Medico-Chirurgical Society's Transactions, 1887.

reports a fatal case in which the symptoms occurred early, the paralysis extended rapidly and involved the upper limbs, and death took place on the eleventh day. Marked vascular changes were found in the gray matter of the spinal cord, and were believed to depend on an early disseminated myelitis. Examination of the peripheral nerves was not made. Similar cases are met with in the literature, and they probably come under the division of the post-febrile polyneuritis, though of course it is not impossible that some of them, such as Barlow's case, may be due to a rapidly ascending myelitis.

Diagnosis.—From scarlet fever, with which it is most likely to be confounded, measles is distinguished by the longer initial stage with characteristic symptoms, and the blotchy irregular character of the rash, which is so unlike the diffuse uniform erythema of scarlet fever. Occasionally in measles, when the throat is very sore and the eruption pretty diffuse, there may at first be difficulty in determining which disease is present, but a few days should suffice to make the diagnosis clear. It may be extremely difficult to distinguish from rötheln. I have more than once known practitioners of large experience unable to agree upon a diagnosis. The shorter prodromal stage, the slighter fever in many cases, are perhaps the most important features. It is difficult to speak definitely about the distinctions in the rash, though perhaps the more uniform distribution and the absence of the crescentic arrangement are more constant in rötheln.

The conditions under which measles may be mistaken for small-pox have already been described. Of drug eruptions, that induced by copaiba is very like measles, but is readily distinguished by the absence of fever and catarrh.

Prognosis.—The mortality bills of large cities show what a serious disease measles is in a community. Among the eruptive fevers it ranks third in the death-rate. The mortality from the disease itself is not high, but the pulmonary complications render it one of the most serious of the diseases of children.

In some epidemics the disease is of great severity. In institutions and in armies the death-rate is often high. The fever itself is rarely a source of danger. The extension of the catarrhal symptoms to the finer tubes is the most serious indication.

Treatment.—Confinement to bed in a well-ventilated room and a milk diet are the only measures necessary in cases of uncomplicated measles. The fever rarely reaches a dangerous height. If it does it may be lowered by sponging or by the tepid bath gradually reduced. If the rash does not come out well, warm drinks and a hot bath will hasten its maturation. The bowels should be freely opened. If the cough is distressing, paregoric and a mixture of ipecacuanha wine and squills should be given. The patient should be kept in bed for a few days after the fever subsides. During desquamation the skin should be oiled daily, and warm baths given to facilitate the process. The convalescence from measles is the most important stage of the disease. Watchfulness and care may prevent serious pulmonary complications. The frequency with which the mothers of children with simple or tuberculous bronchopneumonia tell us that "the child caught cold after measles," and the contemplation of the mortality bills should make us extremely careful in our management of this affection.

IX. RUBELLA (*Rötheln, German Measles*).

This exanthem has also the names of *rubeola notha*, or epidemic roseola, and, as it is supposed to present features common to both, has been also known as hybrid measles or hybrid scarlet fever. It is now generally regarded, however, as a separate and distinct affection.

Etiology.—It is propagated by contagion and spreads with great rapidity. It frequently attacks adults, and the occurrence of either measles or scarlet fever in childhood is no protection against it. The epidemics of it are often very extensive.

Symptoms.—These are usually mild, and it is altogether a less serious affection than measles. Very exceptionally, as in the epidemics studied by Cheadle, the symptoms are severe.

The stage of incubation ranges from ten to twelve days.

In the stage of invasion there are chilliness, headache, pains in the back and legs, and coryza. There may be very slight fever. In 30 per cent of Edwards's cases the temperature did not rise above 100°. The duration of this stage is somewhat variable. The rash usually appears on the first day, some writers say on the second, and others again give the duration of the stage of invasion as three days. Griffith places it at two days. The eruption comes out first on the face, then on the chest, and gradually extends so that within twenty-four hours it is scattered over the whole body. It may be the first symptom noted by the mother. The eruption consists of a number of round or oval, slightly raised spots, pinkish-red in color, usually discrete, but sometimes confluent.

The color of the rash is somewhat brighter than in measles. The patches are less distinctly crescentic. After persisting for two or three days (sometimes longer), it gradually fades and there is a slight furfuraceous desquamation. The rash persists as a rule longer than in scarlet fever or measles, and the skin is slightly stained after it. The lymphatic glands of the neck are frequently swollen, and, when the eruption is very intense and diffuse, the lymph-glands in the other parts of the body.

There are no special complications. The disease usually progresses favorably; but in rare instances, as in those reported by Cheadle, the symptoms are of greater severity. Albuminuria may occur and even