laid upon the mental features. Delirium may be marked even with slight fever. In the cases with great cardiac weakness stimulants should be given freely, and during convalescence strychnia in full doses.

The intense bronchitis, pneumonia, and other complications should receive their appropriate treatment. The convalescence requires careful management, and it may be weeks or months before the patient is restored to full health. A good nutritious diet, change of air, and pleasant surroundings are essential. The depression of spirits following this disease is one of its most unpleasant and obstinate features.

XIII. DENGUE.

Definition.—An acute infectious disease of tropical and subtropical regions, characterised by febrile paroxysms, pains in the joints and muscles, and sometimes a cutaneous rash.

The disease was first noted in Java toward the close of the last century, and it was probably described by Rush in 1780. During this century many epidemics of it have been reported, particularly in India, Africa, and the southern United States. S. H. Dickson gave the most satisfactory account of the disease as it appeared in Charleston in 1828. Since that time there have been three or four wide-spread epidemics, confined chiefly to the Gulf States and rarely extending beyond the 32nd parallel.

Etiology.—Many observers regard it as contagious, and Dickson mentions in the history of his own household that during the epidemic of 1828 all were attacked, whereas in the epidemic of 1850 he and the cook (the only ones remaining in his household of those who composed it in 1828) alone escaped. The question can scarcely yet be considered settled. The disease spreads from place to place, and is conveyed by ships and along railroads. It is remarkable among epidemics as practically affecting all members in a community who have not been protected by a previous attack. Matas, in his excellent account,* states that one attack does not protect from subsequent infection. It attacks all races equally. The disease is stated to attack animals.

McLoughlin, of Texas, has found in the blood of patients a micrococcus, which he regards as the special agent and has been able to cultivate. The slides which he kindly sent me show a streptococcus-like organism, but it is impossible yet to speak definitely as to the relations which it bears to the disease. If it be true that animals are subject to the affection, the subject could be conclusively worked out during the next epidemic. Some writers have held that dengue is only a modified form of yellow fever. It has in some instances preceded the development of this disease.

* Keating's Encyclopedia of Diseases of Children, vol. i.

As the disease is never fatal, no observations have been made upon its pathological anatomy.

Symptoms.—The period of incubation is from three to five days, during which the patient feels well. The attack sets in suddenly with headache, chilly feelings, and intense aching pains in the joints and muscles. The fever rises gradually and may reach as high as 106° or 107°. The pulse is rapid and there are the other phenomena associated with acute fever—loss of appetite, coated tongue, slight nocturnal delirium, and concentrated urine. In the initial stage there may be an erythematous rash. In a majority of the cases the pains in the muscles, joints and bones are of a most aggravated character, and the patients speak of them as of a boring or breaking character, hence the popular name "break-bone fever." The large and small joints are affected, sometimes in succession, and they become swollen, red, and painful. The pains shift about, and in some cases cutaneous hyperæsthesia has been noted. In some instances there is a tendency to hæmorrhage, from either the nose, lungs, stomach, or bowels. Eugene Foster speaks of having seen black vomit, similar to that of yellow fever, and in three instances alarming hæmorrhage from the bowels, which in one case persisted for three months and caused death.

The fever gradually reaches its height by the third or fourth day, and the patient enters upon the apyretic period, which may last from two to four days, and in which he feels prostrated and stiff. At this time, in a large number of cases, an eruption is common which, judging from the description, has nothing distinctive, being at times macular, like measles, at others, diffuse and scarlatiniform, or papular, or lichen-like. In other instances the rash has been described as urticarial, or even vesicular. A second paroxysm of fever then occurs, and the pains return. Certain writers describe inflammation and hyperæmia of the mucous membrane of the nose, mouth, and pharynx. Enlargement of the lymph-glands is not uncommon, and may persist for weeks after the disappearance of the fever. Convalescence is often protracted, and there is a degree of mental and physical prostration out of all proportion to the severity of the primary attack. By far the most distressing symptom is the pain, which all who have experienced the disease speak of as agonising and intolerable, and more severe than that experienced in any other acute fever.

Complications are rare. Insomnia and occasionally delirium, resembling somewhat the alcoholic form, have been observed. A relapse may occur even as late as two weeks. Briefly, the course of the disease may be described as consisting of a febrile paroxysm of three or four days; a remission of variable duration, which may be wanting; and a second paroxysm of about three days. The average duration of a moderate attack is from seven to eight days.

The *diagnosis* of the disease rarely offers any special difficulties, prevailing as it does in epidemic form, and attacking all classes indiscriminately. Isolated cases might be mistaken at first for acute rheumatism.

Southern physicians say that occasionally yellow fever and dengue may be confounded.

Treatment.—This is entirely symptomatic. Quinine is stated to be a prophylactic, but on insufficient grounds. Hydrotherapy may be employed to reduce the fever. The salicylates or antipyrin may be tried for the pains, which usually, however, require opium. During convalescence iodide of potassium is recommended for the arthritic pains, and tonics are indicated.

XIV. CEREBRO-SPINAL MENINGITIS.

Definition.—A specific infectious disease, occurring sporadically and in epidemics, characterised by inflammation of the cerebro-spinal meninges and a clinical course of great irregularity.

The affection is known by the names of malignant purpuric fever, petechial fever, and spotted fever.

Etiology.—Since its recognition in Geneva in the early part of this century, numerous epidemics have been described in Europe and in America, the full details of which are to be found in Stillé's elaborate article.* In Europe it is remarkable with what frequency the disease has occurred in garrisons. In this country the disease was first seen in Massachusetts in 1806, since which date there have been epidemics in various localities at irregular intervals.

During the civil war, according to Smart's report, comparatively few deaths were caused by this disease.

Sporadic cases occur from time to time in the larger cities and country districts on this continent. After the first epidemic in Montreal in 1873 occasional cases occurred. In Philadelphia, since its appearance in 1863, there have been cases reported every year in the mortality bills. Without autopsy the diagnosis of many of these cases is extremely doubtful; but there can be no question that the disease, though rare, still lingers. Judging from my own experience in three of the hospitals of that city, and from the fact that in five years I saw only three instances, I would regard it as very much less frequent than the reports of the Health Office would seem to indicate.

The disease has broken out simultaneously in regions far distant from each other.

The epidemics have occurred most frequently in winter and spring. Neither soil nor locality has any special influence. The concentration of individuals, as in large barracks, seems to be specially favorable.

Children are much more susceptible to the disease than adults, though the susceptibility has differed in different epidemics. In certain places

* System of Medicine, Philadelphia, vol. i, 1885.

children alone have been affected; in others the disease has been chiefly among adults. It attacks males and females alike.

Certain epidemics have been most prevalent in country districts. In 1873 the disease prevailed along the valley of the Ottawa, in villages and country places, much more severely than in the cities of Montreal and Ottawa.

Over-exertion, prolonged marching in the heat, depressing mental or bodily surroundings, and the misery and squalor of the large tenement-houses in cities are predisposing causes.

The disease is not directly contagious; it is probably not transmitted by clothing or the excretions.

The nature of the virus is as yet unknown. In the meningeal exudation there is now found in many cases the lance-shaped coccus, similar in all respects to the pneumococcus. In other instances this microbe has been associated with the ordinary pus organisms. Cornil and Babes conclude that cerebro-spinal meningitis may be caused by several different, often associated, forms of micro-organisms, of which the lance-shaped coccus of Pasteur is the most common.

Morbid Anatomy.—In malignant cases there may be no characteristic changes, for the patient may die before exudation occurs. In well-marked cases the meninges of the brain and cord are inflamed. The following abstract of one of the Montreal cases, in which death occurred about the fifth day, gives a good idea of the condition in this disease: The brain contained an excessive amount of blood. The dural sinuses and all the veins and arteries were engorged. Some of the veins of the pia were as large as goose-quills. On the cortex there was much lymph beneath the arachnoid on either side of the longitudinal fissure—more on the right than on the left hemisphere. At the base there was a purulent exudate about the chiasma and inner parts of the Sylvian fissure, but none on the pons or medulla. There was no lymph in the course of the middle cerebral arteries. The ventricles contained serous exudate; the walls were not softened. The gray matter of the brain was deeply congested, but presented neither hæmorrhages, spots, nor softening. In the spinal cord the veins of the pia were engorged. On the posterior surface, from the cervical enlargement to the cauda equina, was a thick layer of grayish-yellow, lympho-purulent exudation, which in places produced irregular bulging of the arachnoid membrane. There were no changes in the thoracic or abdominal viscera. This picture corresponds closely with that presented by five other cases which I have examined. In one case, however, the amount of exudation on the hemispheres was large, and the convolutions were covered with a thick creamy pus. Foci of hæmorrhage and of encephalitis occur in some cases. The formation of abscess has been occasionally described. The involvement of the ventricles is less than in tuberculous meningitis. In the cases which I have seen the exudation, as is usual in the secondary meningeal inflammations, was most