touch, but afterward fever set in, the temperature rising in some cases to 101°, 103°, and 104° F. In a few severe cases, where the skin was actually cold, the patient complained of heat, insisted on throwing off the bed-clothes, and was very restless. The pulse in the height of the illness became quick, counting in some cases 100 to 128. The above were the symptoms most frequently noted. Other symptoms occurred, however, some in a few cases, and some only in solitary cases. These I now proceed to enumerate. Excessive sweating, cramps in the legs, or in both legs and arms, convulsive flexion of the hands or fingers, muscular twitchings of the face, shoulders, or hands, aching pain in the shoulders, joints, or extremities, a sense of stiffness of the joints, prickling or tingling or numbness of the hands lasting far into convalescence in some cases, a sense of general compression of the skin, drowsiness, hallucinations, imperfection of vision, and intolerance of light. In three cases (one that of a medical man) there was observed yellowness of the skin, either general or confined to the face and eyes. In one case, at a late stage of the illness, there was some pulmonary congestion and an attack of what was regarded as gout. In the fatal cases death was preceded by collapse like that of cholera, coldness of the surface, pinched features, and blueness of the fingers and toes and around the sunken eyes. The debility of convalescence was in nearly all cases protracted to several weeks.

"The mildest cases were characterized usually by little remarkable beyond the following symptoms, viz., abdominal pains, vomiting, diarrhœa, thirst, headache, and muscular weakness, any one or two of which might be absent."

Many instances are on record of poisoning by canned goods, particularly meat. Some of these, according to John G. Johnson, have been cases of corrosive poisoning from muriate of zinc and muriate of tin used as an amalgum, but poisonous effects identical with those just described have followed the use of canned meats.

Certain game birds, particularly the grouse, are stated to be poisonous, in special districts and at certain seasons of the year.

(2) **Poisoning by Milk Products.**—Poisoning by cheese has long been known. In Michigan, in 1883 and 1884, there were nearly 300 cases of cheese poisoning, and from pieces of the cheese Vaughan separated a substance which he called tyrotoxicon. Since that date other outbreaks have been reported. Apparently to this poison also are due the outbreaks following the use of milk, several of which are reported in the manual by Vaughan and Novy. Still more numerous of late years have been the cases due to poisonous ice-cream, in which also the tyrotoxicon has been found.

The symptoms are those of acute gastro-intestinal irritation, and are similar to those already detailed by Ballard.

(3) **Poisoning by Shell-fish and Fish.**—Perhaps the most serious form of *ichthysmus*, as the disease is called, is that produced by the mussel,

many epidemics of which have been studied of late, more particularly an outbreak at Wilhelmshaven. Brieger has separated a poison which he has called *mytilotoxin*. It has been shown that this exists chiefly in the liver of the mussel. It does not yet appear to be settled whether there is a special poisonous variety or whether the mussel only becomes toxic under certain conditions. The latter seems to be the most probable view, as Schmidtmann found that the non-poisonous mussels soon became toxic when placed in the Wilhelmshaven bay, while those from the bay soon lost their toxic properties when placed in the open sea.

The symptoms of mussel poisoning follow the eating of either raw or cooked mussels. The symptoms are those of an acute poisoning with profound action on the nervous system, and without gastro-intestinal symptoms. There are numbness and coldness, no fever, dilated pupils, rapid pulse, and death occurs sometimes within two hours with collapse symptoms.

Poisoning occasionally follows the eating of oysters which are stale or decomposed. The symptoms are usually gastro-intestinal. Certain fish also cause poisoning, more particularly the salted sturgeon used in parts of Russia, which has sometimes proved fatal to large numbers of persons. In the middle parts of Europe the barb is stated to be sometimes poisonous, producing the so-called "*barben cholera*." In China and Japan various species of the *tetrodon* are also toxic, sometimes proving fatal within an hour, with symptoms of intense disturbance of the nervous system. Several other poisonous forms are known, which produce symptoms described as *ichthysmus paralyticus*.

VI. GRAIN POISONING.

(1) **Ergotism.**—The prolonged use of meal made from grains contaminated with the ergot fungus (*claviceps purpurea*) causes a series of symptoms known as ergotism, epidemics of which have prevailed in different parts of Europe. Two forms of this chronic ergotism are described—the gangrenous and the convulsive or spasmodic. In the former, mortification affects the extremities—usually the toes and fingers, less commonly the ears and nose. Preceding the onset of the gangrene there are usually anæsthesia, tingling, pains, spasmodic movements of the muscles, and gradual blood stasis in certain vascular territories.

The nervous manifestations are very remarkable. After a prodromal stage of ten to fourteen days, in which the patient complains of weakness, headache, and tingling sensations in different parts of the body, perhaps accompanied with slight fever, spasmodic symptoms develop, producing cramps in the muscles and contractures. The arms are flexed and the legs and toes extended. These spasms may last from a few hours to many days and relapses are frequent. In severer cases epilepsy develops and the

patient may die in convulsions. Mental symptoms are common, manifested sometimes in a preliminary delirium, but more commonly, in the chronic poisoning, as melancholia or dementia. Posterior spinal sclerosis occurs in chronic ergotism. In the interesting group of 29 cases studied by Tuczek and Siemens, nine died at various periods after the infection, and four post-mortems showed degeneration of the posterior columns. A condition similar to tabes dorsalis is gradually produced by this slow degeneration in the spinal cord.

(2) **Lathyrism** (*Lupinosis*).—An affection produced by the use of meal from varieties of vetches, chiefly the *Lathyrus sativus* and *L. cicera*. The grain is popularly known as the chick-pea. The grains are usually powdered and mixed with the meal from other cereals in the preparation of bread. As early as the seventeenth century it was noticed that the use of flour with which the seeds of the *Lathyrus* were mixed caused stiffness of the legs. The subject did not, however, attract much attention until the studies of James Irving, in India, who between 1859 and 1868 published several important communications, describing a form of spastic paraplegia affecting large numbers of the inhabitants in certain regions of India and due to the use of meal made from the *Lathyrus* seeds. It also produces a spastic paraplegia in animals. The Italian observers describe a similar form of paraplegia, and it has been observed in Algiers by the French physicians. The condition is that of a spastic paralysis, involving chiefly the legs, which may proceed to complete paraplegia. The arms are rarely, if ever, affected. It is evidently a slow sclerosis induced under the influence of this toxic agent. The precise anatomical condition, so far as I can ascertain, has not yet been determined.

(3) **Pellagra.**—This is a nutritional disturbance due to the use of altered maize. The disease occurs extensively in parts of Italy, in the south of France, and in Spain. It has not been observed in this country. It prevails extensively among the poorer classes, particularly in the country districts, and appears to be associated in some way with the use of maize which (according to most authorities) is fermented or diseased. In the early stage the symptoms are indefinite, characterized by debility, pains in the spine, insomnia, digestive disturbances, more rarely diarrhœa. The first clear manifestation of the disease is the pellagral erythema, which almost invariably appears in the spring. This is followed by desiccation and exfoliation of the epidermis, which becomes very rough and dry, and occasionally crusts form, beneath which there is suppuration. With these cutaneous manifestations there are digestive troubles—salivation, dyspepsia, and diarrhœa—which may be of a dysenteric nature. After lasting for a few months improvement occurs in the milder cases and convalescence is gradually established. In the more severe and chronic forms there are pronounced nervous symptoms—headache, backache, spasms, and finally paralysis and mental disturbance. The paralytic condition affects the legs and leads gradually to paraplegia. The mental manifestations, which

are rarely met with until the third or fourth attack, are melancholia or suicidal mania. Finally, there may be a condition of the most pronounced cachexia.

The anatomical changes are indefinite. Chronic degenerative changes have been found, particularly fatty degeneration and a peculiar pigmentation in the viscera. The measures to be employed are change in diet, removal from the infected district, and, as a prophylaxis, proper preservation of the maize.*

VII. SUNSTROKE

(*Heat Exhaustion; Insolation; Thermic Fever; Heat-stroke; Coup de Soleil*).

Definition.—A condition produced by exposure to excessive heat.

It is one of the oldest of recognized diseases; two instances are mentioned in the Bible. It was long confounded with apoplexy. The Anglo-Indian surgeons gave admirable descriptions of it. In this country the most important contributions have come from the New York Hospital and the Pennsylvania Hospital; from the former, the studies of Swift and Darrach, from the latter, the papers of Gerhard, George B. Wood, the elder Pepper, and Levick. In New Orleans, Bennett Dowler studied the disease and recognized the difference between heat exhaustion and sunstroke. Very little has been added to our knowledge of the disease since the publication of a monograph by H. C. Wood. Two forms are recognized, heat exhaustion and heat-stroke.

Heat Exhaustion.—Prolonged exposure to high temperatures, particularly when combined with physical exertion, is liable to be followed by extreme prostration, collapse, restlessness, and in severe cases by delirium. The surface is usually cool, the pulse small and rapid, and the temperature may be subnormal—as low as 95° or 96°. The individual need not necessarily be exposed to the direct rays of the sun, but the condition may come on when working in close, confined rooms during midsummer. It may also follow exposure to great artificial heat; thus the stokers in the Atlantic steamships sometimes succumb to the effect of the great heat in the engine rooms.

Sunstroke or Thermic Fever.—The cases are chiefly found in persons who, while working very hard, are exposed to the sun. Soldiers on the march with their heavy accoutrements are particularly liable to attack. In the larger cities of this country the cases are almost exclusively confined to workmen who are much exposed and, at the same time, have been drinking beer and whisky.

Morbid Anatomy and Pathology.—*Rigor mortis* occurs early. Putrefactive changes develop with great rapidity. The venous engorge-

* The most elaborate discussion of the subject is by Jules Arnould in the Dictionnaire Encyclopédique des Sciences Médicales, tome xxii, 1886.