

there is no reason why the same should not hold good for man; and the figures published annually from the Pasteur Institute show that in persons bitten by animals known to have been rabid, the mortality after inoculation is only about 0.60 per cent.

**Pseudo-rabies.**—This is a very interesting affection, which may closely resemble hydrophobia, but is really nothing more than a neurotic or hysterical manifestation. A nervous person bitten by a dog, either rabid or supposed to be rabid, develops within a few months, or even later, symptoms somewhat resembling the true disease. He is irritable and depressed. He constantly declares his condition to be serious and that he will inevitably become mad. He may have paroxysms in which he says he is unable to drink, grasps at his throat, and becomes emotional. The temperature is not elevated and the disease does not progress. It lasts much longer than the true rabies, and is amenable to treatment. It is not improbable that a majority of the cases of alleged recovery in this disease have been of this hysterical form. In a case which Burr reported from my clinic a few years ago the patient had paroxysmal attacks in which he could not swallow. He was greatly excited and alarmed at the sight of water and was extremely emotional. The attack lasted for a couple of weeks and yielded to treatment with powerful electrical currents.

#### XXIV. TETANUS.

(Lockjaw.)

**Definition.**—An infectious malady characterized by tonic spasms of the muscles with marked exacerbations. The virus is produced by a bacillus which occurs in earth and sometimes in putrefying fluids and manure.

**Etiology.**—It occurs as an idiopathic affection or follows trauma. It is frequent in some localities and has prevailed extensively in epidemic form among new-born children, when it is known as tetanus or trismus neonatorum. It is more common in hot than in temperate climates, and in the colored than in the Caucasian race. This is particularly the case with tetanus following confinement and in tetanus neonatorum. In certain of the West India Islands more than one half of the mortality among the negro children has been due to this cause. In a majority of the cases there is an injury which may be of the most trifling character. It is more common after punctured and contused than after incised wounds, and frequently follows those of the hands and feet. The disease usually appears within two weeks of the injury. In some military campaigns tetanus has prevailed extensively, but in others, as in the late civil war, the cases have been comparatively few. Idiopathic tetanus is rare in man, but it has sometimes followed exposure to cold or after sleeping on the damp ground.

The infectious nature of tetanus was suggested by its endemic occurrence and from the manner of its behavior in certain institutions. Veterinarians have long been of this belief, as cases are apt to occur together in horses in one stable. In the United States attention was early called to this feature by the prevalence of the disease in the eastern end of Long Island.

**The Tetanus Bacillus.**—The observations of Rosenbach, Nicolaïer, and Kitasato have demonstrated that there is in connection with the disease a specific organism which can be isolated and cultivated. The bacillus forms a slender rod with rounded ends and may grow into long threads. It is a motile, grows at ordinary temperatures, and is anaërobic. With small quantities of the culture the disease may be transmitted to animals, which die with symptoms of tetanus. An extremely interesting fact is the separation by Brieger, from the cultures as well as from a subject dead of tetanus, of poisonous substances capable of producing the disease. Of these ptomaines one, *tetanin*, causes the characteristic symptoms of tetanus; another causes tremors, convulsions, and subsequently paralysis; and a third causes at once intense clonic and tonic spasms. Another point of interest is the fact that protection in animals can be procured by inoculating an animal with the blood of another which has had the disease. The organism has been found in the earth and in putrefying fluids, and Nicolaïer has caused the disease by inoculating with different sorts of surface soil.

**Morbid Anatomy.**—No characteristic lesions have been found in the cord or in the brain. Congestions occur in different parts, and perivascular exudations and granular changes in the nerve-cells have been found. The condition of the wound is variable. The nerves are often found injured, reddened, and swollen. In the tetanus neonatorum the umbilicus may be inflamed.

**Symptoms.**—After an injury the disease sets in usually within ten days. In Yandell's statistics at least two fifths, and in Joseph Jones's four fifths, occurred before the fifteenth day. The patient complains at first of slight stiffness in the neck, or a feeling of tightness in the jaws, or difficulty in mastication. Occasionally chilly feelings or actual rigors may precede these symptoms. Gradually a tonic spasm of the muscles of these parts develops, producing the condition of trismus or lockjaw. The eyebrows may be raised and the angles of the mouth drawn out, causing the so-called sardonic grin—*risus sardonicus*. In children the spasm may be confined to these parts. Sometimes the attack is associated with paralysis of the facial muscles and difficulty in swallowing—the head tetanus of Rose, which has most commonly followed injuries in the neighborhood of the fifth nerve. Gradually the paroxysms extend and involve the muscles of the body. Those of the back are most affected, so that during the spasm the unfortunate victim may rest upon the head and heels, a position known as *opisthotonos*. The rectus abdominalis muscle has been torn across in the spasm. The entire trunk and limbs may be perfectly rigid—*orthoto-*



*nos.* Flexion to one side is less common—*pleurosthotonos*; while spasm of the muscles of the abdomen may cause the body to be bent forward—*emprosthotonos*. In very violent attacks the thorax is compressed, the respirations are rapid, and spasm of the glottis may occur, causing asphyxia. The paroxysms last for a variable period, but even in the intervals the relaxation is not complete. The slightest irritation is sufficient to cause a spasm. The paroxysms are associated with agonizing pain, and the patient may be held as in a vise, unable to utter a word. Usually he is bathed in a profuse sweat. The temperature may remain normal throughout, or show only a slight elevation toward the close. In other cases the pyrexia is marked from the outset; the temperature reaches 105° or 106°, and before death 109° or 110°. In rare instances the temperature may reach a still higher point. Death either occurs during the paroxysm from heart-failure or asphyxia, or is due to exhaustion.

**Diagnosis.**—Well-developed cases following a trauma could not be mistaken for any other disease. The spasms are not unlike those of strychnia-poisoning, and in the celebrated Palmer murder trial this was the plea for the defence. The jaw-muscles, however, are never involved early, if at all, and between the paroxysms in strychnia-poisoning there is no rigidity. Certain cases of the so-called cephalic tetanus in which there is difficulty of swallowing might be mistaken for hydrophobia, but in this disease there is never the stiffness of the jaws nor paroxysms in which the cervical and dorsal muscles are affected. In tetany the distribution of the spasm at the extremities, the peculiar position, the greater involvement of the hands, and the condition under which it occurs, are sufficient to make the diagnosis clear.

**Prognosis.**—Two of the Hippocratic aphorisms express tersely the general prognosis even at the present day: "The spasm supervening on a wound is fatal," and "such persons as are seized with tetanus die within four days, or if they pass these they recover."

The mortality in the traumatic cases is not less than eighty per cent. (Conner); in the idiopathic cases it is under fifty per cent. According to Yandell the mortality is greatest in children. Favorable indications are—late onset of the attack, localization of the spasms to the muscles of the neck and jaw, and an absence of fever. Most of the cases of Rose's head tetanus, the so-called *tetanus hydrophobicus*, recover.

**Treatment.**—The patient should be kept in a darkened room, absolutely quiet, and attended by only one person. All possible sources of irritation should be avoided. Veterinarians appreciate the importance of this complete seclusion, and in well-equipped infirmaries there may be seen a brick padded chamber in which these cases are treated.

When the lockjaw is extreme it may be impossible to feed the patient, under which circumstances it is best to use rectal injections, or to feed by a catheter passed through the nose. The spasm should be controlled by chloroform, which may be repeatedly given at intervals. It is more satis-

factory to keep the patient thoroughly under the influence of morphia given hypodermically. Chloral hydrate, bromide of potassium, Calabar bean, curara, Indian hemp, belladonna, and other drugs have been recommended, and recovery occasionally follows their use. As the toxic agents appear to be produced by bacilli at the site of the lesion, thorough cleansing and antiseptic treatment should be carried out.

## XXV. SYPHILIS.

**Definition.**—A specific disease of slow evolution, propagated by inoculation (acquired syphilis), or by hereditary transmission (congenital syphilis). In the acquired form the site of inoculation becomes the seat of a special tissue change—*primary lesion*. After an interval of two or three months constitutional symptoms develop, with affections of the skin and mucous membranes—*secondary lesions*. And, finally, after a period of three, four, or more years, granulomatous growths develop in the viscera, muscles, bones, or skin—*tertiary lesions*.

### I. GENERAL ETIOLOGY AND MORBID ANATOMY.

The nature of the virus is still doubtful. Lustgarten found in the hard chancre and in gummata a rod-shaped bacillus of 3 or 4  $\mu$  in length, which he claims is specific and peculiar to the disease. This organism closely resembles the smegma bacillus, which is found beneath the prepuce, but from its occurrence in gummatous growths it is hardly possible that they can be identical. Further observations are required before the question can be considered settled.

Syphilis is peculiar to man, and cannot be transmitted to the lower animals. All are susceptible to the contagion, and it occurs at all ages.

**Modes of Infection.**—(1) In a large majority of all cases the disease is transmitted by *sexual congress*, but the designation *venereal disease*, *lues venerea*, is not always correct, as there are many other modes of inoculation.

(2) *Accidental Infection.*—In surgical and in midwifery practice, physicians are not infrequently inoculated. It is surprising that infection from these sources is not more common. I have known personally of six cases. Midwifery chancres are usually on the fingers, but I have met with one instance on the back of the hand. Lip, mouth, and tonsillar sores result as a rule from improper practices. Wet-nurses are sometimes infected on the nipple, and it occasionally happens that relatives of the child are accidentally contaminated. One of the most lamentable forms of accidental infection is the transmission of the disease in humanized vaccine lymph. This, however, is extremely rare. The conditions under which it occurs have been already referred to (see Vaccination).

(3) *Hereditary Transmission.*—This may be, and is most common,