wakes in the morning, perhaps without fever and feeling comfortable. The attack may recur the following night with greater severity. In unfavorable cases the dyspnœa becomes more and more urgent, the cyanosis deepens, the child, after a period of intense restlessness, sinks into a semi-comatose state, and death finally occurs from poisoning of the nerve centres by carbon dioxide. In diphtheritic laryngitis the onset is usually less sudden and is preceded by a longer period of indisposition. As a rule, there are pharyngeal symptoms. The constitutional disturbance, too, is more severe, the fever higher, and there may be swelling of the glands of the neck. Inspection of the fauces may show the presence of false membranes on the pillars or on the tonsils. This, however, is held by some not to be an invariable evidence of the diphtheritic nature of the inflammation. Fagge held that non-contagious membranous croup may spread upward from the larynx just as diphtheritic inflammation is in the habit of spreading downward from the fauces. Ware, of Boston, whose essay on croup is perhaps the most solid contribution to the subject made in this country, reported the presence of exudate in the fauces in 74 out of 75 cases of croup. These observations were made prior to 1840, during periods in which diphtheria was not epidemic to any extent in Boston. In protracted cases pulmonary symptoms may develop, which are sometimes due to the difficulty in expelling the muco-pus from the tubes; in others, the false membrane extends into the trachea and even into the bronchial tubes. During the paroxysm the vesicular murmur is scarcely audible, but the laryngeal stridor may be loudly communicated along the bronchial tubes.

Diagnosis.—Membranous laryngitis must be distinguished from ordinary simple laryngitis and from certain spasmodic affections. Simple catarrhal laryngitis rarely induces such severe symptoms, occurs more suddenly, nearly always at night, and the hoarseness and implication of the voice are not nearly so marked. The presence of preceding symptoms is one of the most important diagnostic distinctions between the false and the true croup. By hoarseness, dyspnœa, and signs of membrane on the fauces or tonsils the existence of membranous laryngitis may be definitely determined. Occasionally simple laryngitis induces swelling sufficient to cause marked dyspnœa and hoarseness and may, indeed, prove fatal. Of course, true membranous laryngitis may follow the catarrhal form. In laryngismus the attack comes on suddenly and is not associated with either cough or hoarseness. The child is seized with a difficulty in breathing; the inspirations are crowing in character, and the dyspnœa rapidly becomes urgent, so that symptoms of suffocation supervene, sometimes within less than a minute; the spasm then relaxes and the child appears to be in its normal condition. It is most commonly met with in rickety children.

The diagnosis between diphtheritic and non-diphtheritic membranous laryngitis is by no means easy, and, as mentioned above, many excellent authorities hold the diseases to be identical. The following are the chief points of distinction, which refer to general rather than to local conditions: The

non-specific affection generally begins in the larynx and the fauces are but slightly, if at all, affected. It is not infectious. Cases develop in institutions under circumstances most favorable to the spread of the disease, but other children are not attacked. It has none of the serious asthenic symptoms of diphtheria, and it is not followed by paralysis. It occurs almost exclusively in very young children, whereas diphtheritic laryngitis is not at all uncommon in adults.

Prognosis.—True croup, whether simple or diphtheritic, with a mortality of from sixty to eighty per cent, is an extremely fatal disease. When it attacks healthy children and is not secondary to some febrile affection, the outlook is more hopeful. Even a very limited exudation may prove fatal. On several occasions, in performing post-mortems in fatal cases, I have been astonished to find such a slight involvement of the larynx; in some instances scarcely more than a granular exudation covering the cords and folds. A fatal result is almost inevitable when the disease extends to the bronchi.

Treatment.—As the cases rarely come under observation until the membrane is formed, the main medicinal indication is to favor its separation. The air of the room should be saturated with moisture from an atomizer and the throat should be sprayed with lime-water.

In young children topical application to the larynx itself is extremely difficult and in many instances impossible. Good results have followed the passage of a sponge-probang with a strong solution of nitrate of silver. It is an easy matter to recommend such measures, but very difficult to carry them out. The administration of a brisk emetic will sometimes bring away portions of the false membrane; ipecacuanha or the turpeth mineral is the most suitable. Of late years there has been a return to the mercurial treatment of membranous laryngitis, but I have not seen such results from its use as would justify a recommendation of it. Continuous hot applications to the throat are usually much more grateful than the ice-bag, so highly recommended by some practitioners. With the first indication of defective aëration of the blood it is well to let the child inhale oxygen, which may be conveniently passed into a tent made of sheets on the bed.

In very many cases the obstruction reaches such a grade that the propriety of intubation or tracheotomy is raised. One great advantage of the former is that it may be suggested at an earlier stage with more likelihood of gaining the consent of the parents.

The statistics of tracheotomy are not very satisfactory, as only a fourth to a third of the cases recover.

The general treatment of these cases is of great importance. In the first place the child should be isolated, since it is often impossible to say whether the case is specific or not. Much of the success in the case depends upon careful nursing. There is no disease which requires greater care, coolness, and judgment on the part of the attendants. The diet should consist of milk and beef-juices. Water should be given freely to the child, and if the pulse shows signs of failing, stimulants should at once be administered. The extreme restlessness calls for anodynes, but they must be administered with great care; bromide and chloral are to be preferred to opium. In cases in which the dyspnœa comes on in paroxysms, as if due to spasm, I have seen great benefit follow the inhalation of chloroform.

V. SPASMODIC LARYNGITIS (*Laryngismus stridulus*).

Spasm of the glottis is met with in many affections of the larynx, but there is a special disease in children which has received the above-mentioned names.

Etiology.—A purely nervous affection, without any inflammatory condition of the larynx, it occurs in children between the ages of six months and three years, and is most commonly seen in connection with rickets. It is also associated with tetany. Often the attack comes on when the child has been crossed or scolded. Mothers sometimes call the attacks "passion fits" or attacks of "holding the breath." It was supposed at one time that they were associated with enlargement of the thymus, and they therefore received the name of *thymic asthma*.

The actual condition of the larynx during a paroxysm is a spasm of the adductors, but the precise nature of the influences causing it is not yet known, whether centric or reflex from peripheral irritation. The disease is not so common in America as in England.

Symptoms.—The attacks may come on either in the night or in the day; often just as the child awakes. There is no cough, no hoarseness, but the respiration is arrested and the child struggles for breath, the face gets congested, and then, with a sudden relaxation of the spasm, the air is drawn into the lungs with a high-pitched crowing sound, which has given to the affection the name of "child-crowing." Convulsions may occur during an attack or there may be carpo-pedal spasms. Death may, but rarely does, occur during the attack. With the cyanosis the spasm relaxes and respiration begins. The attacks may recur with great frequency throughout the day.

Treatment.—The gums should be carefully examined and, if swollen and hot, freely lanced. The bowels should be carefully regulated and as these children are usually delicate or rickety nourishing diet and cod-liver oil should be given. By far the most satisfactory method of treatment is the cold sponging. In severe cases, two or three times a day the child should be placed in a warm bath and the back and chest thoroughly sponged for a minute or two with cold water. Since learning this practice from Ringer, at the University Hospital, I have seen many cases in which it proved successful. It may be employed when the child is in

a paroxysm, though if the attack is severe and the lividity is great it is much better to dash cold water into the face. Sometimes the introduction of the finger far back into the throat will relieve the spasm.

Spasmodic croup, believed to be a functional spasm of the muscles of the larynx, is an affection seen most commonly between the the ages of two and five years. According to Trousseau's description, the child goes to bed well, and about midnight or in the early morning hours awakes with oppressed breathing, harsh, croupy cough, and perhaps some huskiness of voice. The oppression and distress for a time are very serious, the face is congested, and there are signs of approaching cyanosis. The attack passes off abruptly, the child falls asleep and awakes the next morning feeling perfectly well. These attacks may be repeated for several nights in succession, and usually cause great alarm to the parents. Whether this is entirely a functional spasm is, I think, doubtful. There are instances in which the child is somewhat hoarse through the day, and has slight catarrhal symptoms and a brazen, croupy cough. There is probably slight catarrhal laryngitis with it. These cases are not infrequently mistaken for true croup, and parents are sometimes unnecessarily disturbed by the serious view which the physician takes of the case. Too often the poor child, deluged with drugs, is longer in recovering from the treatment than he would be from the disease. To allay the spasm a whiff of chloroform may be administered, which will in a few moments give relief, or the child may be placed in a hot bath. A prompt emetic, such as zinc or wine of ipecac, will usually relieve the spasm, and is specially indicated if the child has overloaded the stomach through the day.

VI. TUBERCULOUS LARYNGITIS.

Etiology.—Tubercles may develop primarily in the laryngeal mucosa, but in the great majority of cases the affection is secondary to pulmonary tuberculosis, in which it is met with in a variable proportion of from eighteen to thirty per cent. Males are more frequently affected than females, possibly, as Bosworth suggested, because they are more frequently subject to catarrhal laryngitis, which is undoubtedly a predisposing cause. Laryngitis may occur very early in pulmonary tuberculosis. There may be well-marked involvement of the larynx with signs of very limited trouble at one apex. These are cases which, in my experience, run a very unfavorable course.

Morbid Anatomy.—The mucosa is at first swollen and presents scattered tubercles, which seem to begin in the neighborhood of the blood-vessels. By their fusion small tuberculous masses arise, which caseate and finally ulcerate, leaving shallow irregular losses of substance. The ulcers are usually covered with a grayish exudation, and there is a general thickening of the mucosa about them, which is particularly marked upon the