

pharyngitis, and exceptionally in fatal cases, where no membrane at all developed. Further, bacteriological studies have confirmed the opinions of those pathologists who held that there is no structural difference between the membrane in membranous croup and diphtheritic laryngitis. Personally, I have never been able to see the difference between the two. Whatever name you may choose to give them, the membrane in either case is *attached* at some points and is *free* at others, for reasons that were given many years ago by A. Jacobi. As a rule, it is a fibrinous exudation similar to many others found in other morbid states of the system. But I do not see any objections to the old theory as stated by Oertel,\* that some sort of a membrane may be created by necrosis (the so-called *coagulation necrosis* or *hyaline change*)† in the superficial layers of the epithelial cells, in some cases; but I must maintain, from my personal knowledge and frequent examinations of microscopic sections of the membrane *in situ* in the larynx and bronchi, that it can be shown to rest sometimes upon the topmost layer of epithelial cells, for I have seen the cilia of the cells beneath the membrane, and quite unaffected by the membrane lying on them.‡

As a rule, diphtheria is first seen either upon the tonsils, the uvula or pharynx, as a "fiery red" inflammation. From these points it spreads to internal parts, attacking this one or that; or several together; or a group or groups of muscles; one branch or several branches of the nervous system; some part of the vascular apparatus or genito-urinary tract. There is no reason to suppose that any part of the system is free from danger. Points of election are the muscles of the soft palate, the constrictors of the pharynx and some of the laryngeal muscles, thus causing regurgitation, imperfect deglutition, or embarrassed speech. Other muscles notably involved are those of the lower extremities, of the neck, and the sphincters. The muscle substance, when affected, exhibits ecchymoses, perhaps degeneration and atrophy. Any portion of the nervous system, and even the brain, may be attacked in several ways. There may also be endocarditis or

myocardial change. In a recent case reported by Howard,§ a laborer, 44 years of age, and previously of good health, died after an illness of 24 days, of heart failure. At the autopsy he was found to have had acute ulcerative endocarditis of both the mitral and aortic valves, and degeneration of the myocardium. On the surface of the ulcers were numbers of bacilli, while a thrombus that was stratified and adherent to the ulcerated surfaces was largely composed of bacilli. Similar bacilli were also found in the thrombi of the spleen and kidneys. And yet it is true they had no pathogenic effect when cultivated and inoculated upon guinea pigs and rabbits. But these few negative experiments do not necessarily upset the theory that the disease was diphtheria. For inoculation experiments on animals with the most virulent matter, do not always succeed, and besides, rabbits and guinea pigs are ill-suited with inoculation diphtheritic virus. Death is not uncommon from heart failure, but it is in most instances from acute degeneration of the myocardium. It will then be found that the right ventricle is distended with blood, as also are the venæ cavæ.

If the disease extends down the air passages, and it does so in about one-half the cases in severe epidemics, there will be laryngitis, or bronchitis, and perhaps bronchial pneumonia, with more or less pulmonary collapse, and effusion of blood and serum. Bronchial pneumonia is not an uncommon cause of death.

Below the diaphragm, all the organs such as liver, spleen and kidneys will show parenchymatous change, if there is profound constitutional disturbance. And they will be congested whenever by a pulmonary or cardiac complication the lesser circulation is interfered with. For the rising column of venous blood, unable to get into the lungs, is backed down upon the organs in and adjacent to the abdominal cavity. To return for a moment to the membrane; the larger and thicker it is, the more severe, as a rule, the attack. When it is deeply attached, and separates, it may leave an ulcerated, sloughing or gangrenous base, with more or less infiltration of the underlying parts, and implication of the neighboring lymphatic glands. The preponderating weight of evidence tends to establish the fact that it is at first a local disease,

\*Oertel, Ziemssen's Handbook, Vol. 1, 1874, p. 587.

†Weigert Virchow's Archiv., XXIX., p. 87.

‡Quarterly JI. of the Post. Grad. Med. Sch. and Hos., No. 1, 1885.

§Howard, W. T., Johns Hopkins' Hosp. Bull., 30, 1893