THE EXANTHEMATA: THEIR CAUSAL RELATION TO DISEASES OF THE EAR.*

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OCCURRENCE: Long before oto-laryngology was developed as a special branch in the practice of medicine, tissue and functional changes in the ear, nose and throat in patients suffering from the exanthemata, were recognized as frequent sequels of these affections. The progress of research has not only strengthened this relationship, but has also established many facts strongly supporting the proposition. Prominent among the findings of this investigation is, for instance, the almost constant presence of the streptococcus in the parent affection, its complications and sequels.

For the consideration of this question, it is necessary at the start to consider the occurrence and the distribution of diseases of the ear, nose and throat in the exanthemata.

Holt¹ states that "the only constant lesions of measles are those of the skin and mucous membrane, chiefly of the respiratory tract." There is catarrhal inflammation of the nose, pharynx, larynx, and large bronchi. In severe cases there may be membranous pharyngitis and laryngitis. A physician once told me that his preceptor would often remark, when talking of measles, that he could diagnose a case of measles while tying his horse to the hitching post, provided he could hear the patient cough. While I do not believe much in any such long distance diagnosis, nevertheless few laryngeal affections produce more distressing conditions and distinctive dry, hard cough.

In *Scarlet Fever*, all agree that the angina is perhaps the most frequent and important condition. Kyle² regards "the diseased throat the most regular in its appearance of all symptoms of scarlet fever." In both affections we have acute rhinitis.

Having briefly referred to inflammatory conditions of the nose and throat in the exanthemata, let us consider the presence of ear disease in the exanthemata.

Downe gives the following statistics of 501 cases of tympanic involvement: There originated during measles 131 cases, or

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26.1 per cent; there originated during scarlet fever, 63 cases, or 12 per cent. These two diseases together giving origin to 38 per cent, or more than one-third of the cases, which were unselected. A study of the best authorities reveals the fact that ear complications in scarlet fever are variable and range from ten per cent in moderate epidemics to thirty-three per cent in severe types, whereas the percentage is as high as seventy-five per cent where the throat symptoms are severe. Dr. A. B. Duel found "in a study of 6,000 cases of infectious fevers treated at Willard Parker Hospital, under the most favorable conditions, that acute purulent otitis media developed in twenty per cent of the cases of scarlet fever, ten per cent of the diphtheria cases, and five per cent of the cases of measles." J. M. Dodson³ states that "about ten per cent of the cases of acquired complete deafness and dumbness can be traced to scarlatina, not including the many cases of partial impairment of hearing." Holt⁴ states: "As a cause of permanent deafness and deaf-mutism, no disease of childhood compares in importance with scarlet fever."

ETIOLOGY.

BACTERIA. A number of the infectious diseases are of bacterial origin. The analogy of these diseases strongly indicates that scarlet fever, measles, etc., have their ultimate origin in a micro-organism, the demonstration of the identity of which will, we trust, in the near future, crown the efforts of our bacteriological colleagues. A great variety of bacteria have been cultivated from the throat, blood and other tissues of exanthematous patients. Not less complex is the effort to isolate the identity of the infectious cause of the different affections of the nose, throat and ear, for here also there is a large group of bacteria.

Although the identity of causal bacterial organism in the diseases under discussion is lacking, there are, nevertheless, certain salient facts and concomitant conditions which constitute a lesson with which all of us should be familiar, and upon which depends, in a large measure, the ultimate welfare of the patient. The streptococcus previously referred to, is perhaps the patient's greatest foe. It is a menace to his larynx and lungs in measles; an enemy to his ears in scarlet fever and his worst foe in small-pox.

Hektoen⁵ states: "Since the earliest application of micro-biologic methods to the study of scarlet fever the streptococcus has claimed the lion's share of attention. At present the streptococcus is held by some to be the actual cause of the disease, while others, and, I

think, the majority, look upon it as essentially a second invader. Numerous investigations have indicated that streptococci occur upon the tonsils of scarlet-fever patients in far greater abundance than in health; furthermore, that they gradually disappear as convalescence progresses." He finally concludes, first, "that the predominant feature of the bacteriology of the throat in scarlet fever is the constant presence of large numbers of streptococcus pyogenes;" second, "that the overwhelming majority of complications and of deaths in scarlet fever is due to invasion of the tissue and blood by this microbe." He believes, also, "that the chief significance of the scarlatinal virus would seem to lie in its power to open the door, so to speak, to streptococci." What has been said of the streptococcus in scarlet fever represents fairly well its relation to small-pox, of which it has been said "the disease would be relatively harmless were it not for the streptococcus invasion." The same micro-organism holds a conspicuous place in measles. Inasmuch as this coccus plays so conspicuous a part in the production and continuation of ear infections, and since we have noted, also, its importance in the exanthemata, the relation of these affections to those of the ear, is, after all, a very logical one. An almost, or, perhaps, equally intimate relationship could be shown to exist between other micro-organisms prominent in the exanthemata and very common in ear diseases, but, for obvious reasons, time prevents individual discussion of them here.

The presence in the upper respiratory tract of bacteria, which cause the majority of ear affections, is, per se, comparatively unimportant. If with this state of affairs, however, we join conditions always existing in the exanthemata, the risk to the ears is much increased. In the latter case, we have a throat and nose whose secretions are infected, there is hyperemia and congestion of all the mucous membrane of the throat, pharynx, epipharynx, and even of all the accessory sinuses. Normal ventilation and drainage of these cavities are impaired, hence there will result rarefaction of air in the middle-ear spaces and consequent effusions with maceration of the mucous membrane of the Eustachian tube and middle-ear. The patient's resistance is lowered by the toxins, there is general weakness, and nearly every condition present to favor the extension of the infection to the ear. The remarkable fact is that otitis is not more frequent, when we consider that coryza, in healthy patients, often causes ear diseases. These conditions afford an opportunity for the introduction, nourishment and development of

micro-organisms which bring about alterations in the ear which vary from mere adhesive process to the most complicated suppurative changes.

SEASON: The exanthemata and the exudative, as well as the purulent forms of otitis, seem to prevail at corresponding seasons of the year, so far as season bears any casual relation to the former. Of course, measles has no regard for season.

AGE: The ages during which most exanthemata occur correspond closely with the age when the ear is least in condition to withstand harmful influences. Even the adhesive process of later life, probably, have their foundation laid during the tender period of infancy and childhood. In the child, and especially at puberty, there is a physiological turgescence of the mucous membrane of the nose. This nasal fullness mechanically obstructs breathing, inhibits proper tubal drainage, and disturbs tympanic ventilation, thus perverting the essential functions to a healthy physiological oral state.

ADENOIDS: Many are of the opinion that adenoids increase the patient's susceptibility to the exanthemata. On the other hand, it is a fact that the exanthemata tend to enlarge the adenoids, but whether one agrees with the former or not, the latter fact establishes the fitness of the topic in the subject under consideration. Twenty to thirty per cent of our American children have adenoids. I am placing a conservative estimate upon prominent men's reports when I state that fifty to eighty per cent of permanent deafness and persistent suppuration of the ear occur in cases who have, or formerly had, adenoids. In the young child, the naso-pharynx is very low and relatively small. The Eustachian tube is almost horizontal and is not only relatively, but absolutely, wider at birth, and during infancy than in the adult. The post-nasal opening is small, thus obstructing nasal respiration, in consequence of which there is an imperfect supply of oxygen. Sucking is so embarrassed that nutrition and development are impaired. A child that has an anatomically small naso-pharynx, a small post-nasal opening, a large horizontal Eustachian tube, a state of malnutrition, a lowered resistance, an abundance of infectious micro-organisms flourishing in a copious nasal discharge, is certainly liable to ear disease if attacked with any of the febrile diseases.

Although the prophylaxis of ear disease in the febrile conditions belong naturally to our general practitioners, I wish to urge, in conclusion: 1. More general adoption of thorough removal of

adenoid vegetations; 2. The complete removal of hypertrophied or diseased tonsils; 3. The early evacuation of pus from the tympanic cavity by paracentesis, because the streptococcus is nearly always present in otitis due to febrile diseases.

BIOGRAPHY.

1. HOLT: Diseases of Infancy and Childhood, p. 960.
2. KYLE: Diseases of the Nose and Throat, p. 445.
3. DODSON, J. M.: *Ill. Med. Jour.*, p. 526, May, 1907.
4. HOLT: Diseases of Infancy and Childhood, p. 949.
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The Pathogenesis of Perforating Ulcer of the Nasal Septum.

F. SCHIFFERS, *Rev. Hebdomadaire de Laryngol., d'Otol. et de Rhinol.*, April 23, 1910.

The loss of substance in the antero-inferior part of the nasal septum known as the "perforating ulcer," is familiar to the rhinologist, but its etiology is doubtful. Schiffers discusses the various theories advanced, explaining the presence of this ulceration. The nervous origin has no foundation and the bacterial advanced by Hajek and Weichselbaum is doubtful, nor does he believe that the bacillus of Loeffler is responsible. In examining the ulcerative process, we find that it results from a mortification which, commencing from a point on the mucous membrane extends itself in size and depth so as to form a truncated cone with a superficial base. Most frequently the nasal hemorrhages have their origin in the anterior part of the septum, the seat of this ulceration. The author concludes from this that the theory most in accord with the clinical facts and the anatomic pathology is that the pathogenic cause is an infarct at least in the majority of cases. The simple pricking of a vessel may cause a thrombosis by the mere irritation of the endothelium. The traumatism which may start the ulcerated process by producing a lesion of the vessel need not be severe.

An ingenious surgical method of closing these perforations has been suggested by Dr. Max Goldstein, and is described in *THE LARYNGOSCOPE*, Nov., 1906, W. S.-Abs.) SCHEPPEGRELL.