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## A NOTEWORTHY SCIENTIFIC MEDICAL DISCOVERY.

In a brief article in the issue of the *Journal of Medical Research* for March, 1916, which has just come to hand, Dr. F. B. Mallory and Dr. E. M. Medlar, from the pathological laboratory of the Boston City Hospital, present a preliminary report of their epochal work on the etiology of scarlet fever. They have succeeded in isolating from the tissues of children dying early in the course of the disease, especially from the tonsils, palate, pillars of the fauces, root of the tongue, trachea, and lungs, a strongly gram-positive bacillus, growing in large and small clumps, in practically pure culture, between the epithelial cells. This bacillus stains well with ordinary dyes and shows a tendency to irregularity of staining in lightly stained preparations and in too strongly decolorized gram preparations. No polar bodies are present. In culture, the organism is slightly smaller

than the diphtheria bacillus, and varies from coccus-like to large bacillary forms. The authors further describe the cultural characteristics of this organism, which is a facultative aërobie, and feel it reasonable to infer from their observations that the disease—scarlet fever—may be due to this bacillus, which they have provisionally named *Bacillus scarlatinæ*, less virulent than the diphtheria bacillus and infecting practically the same locality. "The toxin causes necrosis and denudation of the covering epithelium and leads to an exudation of serum and polymorphonuclear leucocytes. Fibrin formation is usually absent or slight. On this account the primary gross lesions are inconspicuous and easily overlooked." The streptococcus, which has hitherto sometimes been regarded as the cause of the disease, is, therefore, to be considered merely as a secondary invader.

Assuming that these preliminary results are confirmed, of which there seems little doubt, the authors of this important piece of research have contributed to medical science a discovery of the first magnitude. It is only three years ago that Drs. Mallory and Hornor contributed, from the same laboratory, valuable knowledge on the histologic, mechanical lesion of pertussis and on the relation of the Bordet-Gengou bacillus to that lesion. This work was editorially described at the time in the issues of the JOURNAL for November 21, 1912, and January 2, 1913. Dr. Mallory's present contribution promises to eclipse in importance that of the former work. Yet both are evidences of the same type of effective scientific investigation.

With its wealth of clinical material, the South Department of the Boston City Hospital was logically the place where the discovery of the etiology of scarlet fever should have been made; but to make it, necessitated the insight, patience, and scientific genius of the true discoverer, and the necessary means for carrying out the investigation. The former were found in Dr. Mallory; the latter was provided through the influence of the mayor, to whose initiative the opportunity for accomplishing the work was due. The credit for this part of the work is recognized as follows by Dr. Bradford in a letter to the mayor, commenting on the discovery recently announced, and published in the daily press:

"As you know, a scientific fact is not accepted until it is confirmed by other observers, and it will be some time before investigators will have the opportunity to confirm Dr. Mallory's researching. He is, however, so careful a

man, and so restrained in his statement, that there can be little doubt of the importance of the work and of the probable far-reaching consequences.

"When General Leonard Wood was governor of Cuba, he risked his reputation and adverse criticism by ordering a substantial financial grant for the investigation of yellow fever. A narrower-minded man would have hesitated to do this, but Gen. Wood is not afraid, when right, of criticism. The results were, as you know, that yellow fever is no longer a scourge in properly governed communities.

"I have been informed that Dr. Mallory's recent work was due to your initiative and aided by Dr. Mallory's interest. You have, therefore, earned not only the thanks of the profession and of the community, but also, like General Wood, a life-long satisfaction for your share in an undertaking which may prove of inestimable help to humanity."

Dr. Mallory's discovery, if confirmed, is the first step, but a long and important one, toward what may be expected to prove the ultimate control of scarlet fever, like that of diphtheria. It demonstrates the etiological agent of the disease and its primary essential lesion, and clears the way for further investigation in the search for a vaccine or antitoxin by which it may be prevented, controlled or cured. Such treatment and control of this very serious infection would be an immense advance in clinical medicine, in the prevention of infant mortality, and in the betterment of the general public health. Such a piece of research successfully completed is not only a notable credit to its authors and a matter of congratulation to the Boston profession, but it is a valuable and beneficent contribution to the progress of medical science, in the knowledge and control of human disease, suffering and death.

#### IMPORTANT NEW DATA ON BOTULISM.

It has been known since Van Ermengem's studies (*Ztsch. f. Hyg. u. Infec. Krank.*, 1897, xxvi, 1; *Arch. de Pharmacol.*, 1897, iii, 213, 499), that the bacillus botulinus produced a toxin of high potency, which caused a profound and characteristic effect in the body. The bacillus itself is not pathogenic and does not grow in the body under ordinary conditions, but under certain fairly definite conditions elaborates its toxin in food products, and when these are eaten, poisoning quickly ensues. Unlike most

bacterial toxins, this one is absorbed from the gastro-intestinal tract, and therefore its presence in food is particularly dangerous.

The bacillus botulinus is an obligative, anaerobic, spore-bearing bacterium, which requires darkness and moisture for growth. These conditions are excellently fulfilled in canned foods, and less perfectly in meats, such as sausages. The clinical picture of botulism represents a central nervous system involvement rather than a primary attack on the gastro-intestinal tract, and shows paralysis, especially of the ocular muscles, weakness and a characteristic absence of sensory symptoms. The course progresses to a bulbar palsy. The disease has been almost universally considered to arise only from the ingestion of meat which contained the toxin of bacillus botulinus. It has also been generally considered that animal proteids were necessary for the development of the bacillus and the elaboration of this toxin. Danger of poisoning was, therefore, supposed to be limited strictly to animal food.

In a recent communication important new data are presented by E. C. Dickson from the division of medicine of the Leland Stanford, Jr., University School of Medicine (*Jour. A. M. A.*, 1915, lxxv, 492), who gives experimental and clinical proof that the bacillus botulinus may develop on certain vegetable proteids, as well as on those of animal origin. The value of this contribution is self-evident, as it at once incriminates canned vegetable foods as a possible source of botulism, a possibility which is enhanced by the spore-bearing character of the bacillus and by the often inefficient sterilization of home-canned vegetables and fruits.

Dickson found a number of cases which were probably botulism, due to ingestion of canned vegetables or fruits. One such case, with autopsy, was reported as such by Wilbur and Ophuls (*Arch. Int. Med.*, 1914, 589), where botulism followed ingestion of a salad made from home-canned beans. An epidemic of 21 cases with 11 deaths was reported from Darmstadt by Landmann (*Hyg. Rundschau.*, 1904., xiv, 449). Two other reports were collected by Dickson, both of epidemics in California, where probable botulism followed ingestion of home-canned pears and apricots. With these exceptions, which had previously attracted little attention, botulism has been held to be due strictly to ingestion of animal proteids containing the toxin.

A series of experiments was carried out by