

harbored the Löffler bacillus but were not sick. They were immunized for eight weeks, being more or less exposed during this period. Later we had another outbreak. Six adults refused immunization and one of them, just nine days after exposure, contracted the disease. The five remaining members of this household now allowed me to inject them. One, however, was not absolutely protected; for five days later a mild form of the trouble appeared in her. To return to the history of Ida G.; she never developed patches and seemed well although her temperature ranged from 99 to 99.6 and 100.6 for ten days and the bacillus was ever present and is still present sixteen days after the onset of her attack. She in turn infected the above-mentioned insusceptible case Isa G., and a sister who January 22 and 23 were respectively taken sick. Up to this date their throats were free but now showed the Löffler bacillus. The boy's temperature was 103 before administering the extra dose of 500 units of antitoxin but fell in twenty-four hours to 102.2. Throats of both were in the same condition as the previously described case. They were now sent home and escaped my farther observation. Daily cultures were now being made and the institution kept open. The urine examined in all these cases before and after receiving antitoxin, proved negative. Seven other inmates (none of whom became ill) developed a Löffler bacterial growth upon January 25, 29, 30, 31, February 3 and 4, respectively, viz., 3, 7, 8, 9, 12 and 13 days after exposure. These, the unrecognized contagion bearers, are during an epidemic, the most difficult subjects to deal with, and at any time a menace to others. In the cases that contracted the disease after antitoxin administration I was able to trace the infection as contemporaneous with the original source. The disease as thus contracted was also incipient or bacillary only.

Rashes appeared in 12 out of 269 subjects injected with antitoxin or a little over 5 per cent; a proportionately slight evil as compared to the benefit derived. Arthritis obtained in two cases; in one after a dose of No. 3, and in the other after a small immunizing dose. In the first case although croup, the cultural finding was negative. Both knees were here involved, while in case No. 2 it was the shoulder and wrist of the side injected. Edema, redness and an erythematous rash of one leg appeared in a little girl eight days after the reception of an immunizing dose. Her culture showed the pseudo-bacillus, although she was exposed to a Löffler bacillus infection. Her brother, who received some of the contents from the same bottle, developed urticaria. I saw another case of urticaria in a child who was subject to this malady. In still another instance, after an immunizing dose, a child who had previous attacks of eczema, now exhibited an additional outbreak. A papular rash appeared in five patients; in two, eight days, and in one, six days after the injection. A fourth subject was first seized by a papular affection followed by an urticarial eruption and left facial edema involving the left eyelid. No urine could be obtained for examination; nor was an analysis made in any of these cases. In an adult, eight days after injection an erysipulous-like rash appeared at the injection site in the anterior upper thoracic region and extended upward and outward to the point of the shoulder, inward to the middle sternal line and downward to the nipple. There was great pain and stiffness in all the joints of the upper extremity of that side, general pain, malaise and some rise

of temperature. Ichthyol ointment was applied by the attending physician who reported rapid improvement.

I have noticed that most patients have complained of pain and soreness after the injection and many children manifested much uneasiness the night after the administration of antitoxin. A few older patients returning to me some time after such a procedure complained that they had not felt well since. I saw a number of cases of unquestionable laryngeal diphtheria of great severity in which repeated cultures failed to demonstrate the Löffler bacillus. In some instances, this was due to the fact that the cases were seen at a late day when the field was overwhelmed with staphylococci and streptococci, and in others to the use of various antiseptic solutions and sprays. But again in many other cases where the last mentioned conditions obtained, I was able to secure cultures. Wherefore in some cases and not in all is a query requiring an answer.

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CLINICAL NOTE UPON AN OVERDOSE OF PROTO-NUCLEIN.

BY H. V. WÜRDEMAN, M.D.

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A female child, aged 3 years, parents of upper class; subject of malnutrition, from whom large amount of pharyngeal adenoids had been removed six weeks before; in addition to diet and general regimen had been given proto-nuclein tablets, 5 grs. each, taken twice to three times a day (Reed & Carnrick's). Had taken these for about a month. Great benefit as regards general health, the condition of the nose, throat and ears had followed. The improvement was mainly ascribed to removal of the adenoid tissue and restoration of nasal breathing. This child was addicted to eating lead pencils, pieces of chalk, etc., and had previously taken medicine of some kind in large quantity without knowledge of the parents.

On February 4 she was observed to be playing with a bottle which had contained proto-nuclein tablets, of which it is supposed twenty-five or thirty remained (125 to 150 grains or 8 to 10 grams). The bottle was found to be empty and a couple of the crushed tablets were removed from the mouth. She said she had eaten all that was there and parents are convinced of the fact. The child was brought to my office within an hour, when I could observe no apparent change from her general health. Advised half-hourly drinks of water with small lump of carbonate of magnesia. The spoiled child would not take the magnesia and drank the water only when she was inclined. Was seen at noon, when she appeared excitable, pulse full and fast (125). At 6 P.M. had been quite vivacious during afternoon; seemed otherwise well. Pulse 120, tongue clean, no pain. Had passed urine several times in her clothes (a general habit). Specimen could not be obtained. During the night she slept well and was seen the next morning, when nothing was observed. Since then child has been apparently well.

The ingestion of 8 to 10 grams (125 to 150 grains), from twenty-five to thirty times the usual dose of a presumably standard and fresh preparation, had no effect whatever beyond slight mental excitation and acceleration of the heart's action. We would not ascribe this to the environment, as neither the parents

nor myself had anxiety over the dose, as I have looked upon the preparation in the light of a condensed nutriment rather than as a drug. It is yet on trial with me, but in all cases in which I have used it no results have been observed which could be ascribed to the exhibition of the proto-nuclein itself. It has apparently no toxic effect, and is perhaps inert as regards any physiologic action.

805 Grand Avenue.

SOCIETY PROCEEDINGS.

Sanitary Conference of Pennsylvania.

Third Annual Meeting of the Associated Health Authorities of Pennsylvania, Jan. 23, 1896, at Harrisburg, Pa.

In the absence of the Governor, MR. CROSBY GRAY, First Vice President, called the meeting to order. Prayer was offered by Rev. B. B. Hamlin, D.D. On behalf of the Mayor of Harrisburg, DR. H. HAMILTON addressed the members in welcome to the city. Mr. Gray responded for the Association. A letter from Dr. L. Pierson, State Veterinarian, regretting his inability to be present, and on motion he was made an honorary member.

DR. R. L. PITFIELD, Assistant Bacteriologist to the State Board of Health, read a paper entitled

THE BACTERIOLOGICAL ETIOLOGY AND DIAGNOSIS IN DIPHTHERIA.

He alluded to the interesting and valuable improvements in medicine in the last fifteen years. Among these is the scientific study of diphtheria, particularly since 1883, when Klebs first described its bacillus; a year later Löffler confirmed this, isolated it and with it produced the disease in lower animals. Not only the etiology has been made known, but its absolute diagnosis has been developed and a specific cure has been obtained. Roux, Behring and others have shown the antitoxic serum as its specific. Medical men can with pride view this progress; chemistry to-day is on the verge of a revolution, while medicine is more firmly enthroned. The bacillus of diphtheria is a slender, little rod, varying in size, shape and internal structure. By its variability we are able almost at once to recognize it. It is often club-shaped, with rounded ends, a slender middle, or it is spindle-shaped with pointed ends. The shape and general morphology vary as the age and conditions of growth, such as the chemie reaction of its food. On a solid medium it grows little grayish colonies, which are rounded with irregular edges, and are like ground glass in that they do not reflect the light. If stained with an aniline dye, various parts take up the color with varying intensity; some stain deeply, others but little; this gives a characteristic appearance to the bacillus. Often if a blue dye is used, black points appear in its continuity which do not transmit light. The bacillus can not move independently nor form spores. It grows best at the temperature of the body, and exposure to heat above 58 C. kills it in a short time. It has never been found "wild," that is, it is a distinct parasite and differs from some other pathogenic bacteria in this way. Cholera, for instance, exists normally in certain waters all the year round as a native. The native home of the bacillus is in the human mucous membrane of the throat especially, from which it may escape by coughing, by saliva, by contact with spoons, forks, cups, handkerchiefs or by kissing. It is also found in the air-passages of chickens, kittens and other animals. It is rarely found in the air and thrives best in moist places, if warm and dark. It readily grows upon a culture medium devised by Löffler, and for diagnosis this is best. This is called the Löffler blood-serum mixture. It is prepared by collecting the blood from an ox in a clean, sterile jar which has been slightly warmed, and after the clot is formed the fluid or serum is drawn off in sterile pipettes. This serum is then mixed with bouillon, one part bouillon to three of serum. The former containing 1 per cent. of glycerin. A little of the mixture is run into sterile test tubes plugged with cotton wool. They are placed in a hot chamber at a temperature of 78 C. in such a way as to slope the surface of the serum and make a large surface oblique to the sides of the tube. These are kept in the apparatus an hour or more till the serum is coagulated into a firm, translucent jelly, then they are sterilized for three consecutive days in a steam sterilizer twenty minutes each day in order to kill all stray bacteria which may have gotten in. To make a diagnosis of diphtheria, a sterile swab which has been kept in a sterile test tube is firmly rubbed over the membrane in the throat and this is gently rubbed over the moist surface of the serum

and then the tube is carefully replugged and put in an incubator and kept at the temperature of the body, 37 C. for twelve or more hours. If the case be diphtheria, on the surface of the serum will have crept a fine, delicate frosting of raised beads, close together, of a grayish color, semi-translucent; these are heaps of diphtheria bacilli, grown on the serum. With a delicate, flattened platinum wire, well flamed, a few of these are lifted off and gently rubbed on the surface of a clean cover slip, on which a drop of water has been placed. This is dried, stained with an alkaline solution of methyl blue, mounted, and when the lens is brought to bear on it, the field will be found full of delicate, little rods lying in all directions, often in clumps of a dozen or singly. By careful study the organism is seen to vary in size and general appearance, as before mentioned. This and the fact that it takes the stain in varying intensities enables one to make the diagnosis, especially if the culture appears normal to the naked eye. The diagnosis is best done if the swab is rubbed over the membrane before antiseptics have been used. We may find many other organisms, as yeast, molds and other bacteria, especially the staphylococcus, etc., which often cause abscesses. One strongly imitates the diphtheria bacillus in producing a membrane, and in its culture a frosting only a little whiter, but under the microscope it is seen to consist of a chain of little rounded bodies called cocci, which are in some way held together, and there is often a string of eight to sixteen. This organism is also the cause of many inflammatory diseases as erysipelas, puerperal fever, septicemia, and perhaps scarlet fever. Many apparently simple sore throats both with or without a membrane are caused by it. As the diphtheria bacillus developed in the throat, it produced a poisonous alkaloid called toxin, which penetrates the cells of the mucous membrane and the protoplasm of these coagulates, causing them to swell up and turn white as they die. This is the origin of the yellowish white membrane from which the disease takes its name. It is full of dead organisms. Often it mechanically interferes with breathing, especially if it grows on the larynx, and frequently in young children and even adults it causes death by suffocation. The poison penetrates the mucous membrane, the tonsils, lymphatic glands and the whole system, causing fever, depression, rapid pulse, and often paralysis of important nerves, not only of the limbs, but of the circulatory apparatus and the diaphragm: the heart is often overwhelmed and death results from acute poisoning. If the toxin is collected from old cultures by filtering off the germs, it will produce the same effects if given in large doses by injection to small animals; four drops will kill a guinea-pig in twenty-four to forty-eight hours; yet no germs were injected. The worst cases are where there is a mixture of diphtheria bacilli and the streptococci. Both toxins are absorbed and death ensues from the same poisoning. Serum tubes often show this mixture. Thus we are enabled to say if a case is diphtheria alone, or a mixed infection. Many epidemics of sore throat are caused by this streptococcus, and often have a membrane like diphtheria. The diagnosis is of great importance in those cases where the precious remedy, antitoxin, can be employed, for sore throats which are simply follicular tonsillitis need no antitoxin. Dr. Bissell, of Buffalo, says: "It is generally admitted that it is often impossible to make an accurate diagnosis either from a clinical or anatomic lesion or from both. There are no constant differences that separate the simple non-contagious forms of inflammation from the diphtheritic type and it is but a very small proportion of cases that an early and reliable diagnosis can be reached by any data obtainable. In Willard Parker Hospital 30 to 50 per cent. were found to be non-diphtheritic. Such a case with lowered vitality, if sent to a diphtheritic ward would almost surely be attacked by the more dangerous disease. In suspected cases it was found that 72 per cent. were real diphtheria. Children often are attacked by membranous croup, which is a mild diphtheria, killing more by suffocation than poisoning. I believe that in older people with more vitality the same organism is often present but causes only a temporary headache and fever. In epidemics the character of the disease varies much, from a low grade of virulence, perhaps a croup, to the most fatal form; yet the more fatal form may result from exposure to the milder. High vitality enables many to throw off the attack and no membrane forms; yet safety demands isolation of all such. It has been seen in thirteen families with no isolation, forty-eight children exposed to one with a mild form, 50 per cent had diphtheria subsequently. But where strict isolation was practiced, only 10 per cent. had the bacilli. All should be under suspicion till cultures showed the absence of the contagion. The bacillus does not often survive out of the human body and is easily killed by sunlight, heat and chemicals. It is spread more by direct contact than by the air, and has been found in emanations from