ON THE DIPLOBACILLUS LIQUEFAICIENS OF PETIT: WITH REPORT OF A CASE SHOWING UNUSUAL DISTRIBUTION OF THIS ORGANISM.

By FRANK E. TAYLOR, M.A., M.D., M.Sc., F.R.C.S., D.P.H.
Clinical Pathologist and Bacteriologist, Queen Alexandra Military Hospital, Millbank.

It is passing strange that the discovery of the causal organism of diplobacillary conjunctivitis was delayed until the year 1896 to be independently discovered in that year by two separate observers, namely, Morax in Paris and Axenfeld in Marburg, especially when we consider that diplobacillary conjunctivitis constitutes one of the most commonly occurring infections of the eye, with a world-wide geographical distribution; that the organism is a large and distinctive diplobacillus readily stained by simple dyes like methylene blue and present in abundance in the conjunctival discharge of affected cases, being easily seen in smear preparations thereof; and, also, that it can be cultivated without difficulty on blood serum, in which it liquefies in such a way as to bring about the characteristic pitting in this medium.

A very closely allied organism which may be considered as a variant of the diplobacillus of Morax-Axenfeld was discovered in 1898 by Petit in three cases of painless superficial serpiginous hypopyon-keratitis. Morphologically and tinctorially the diplobacillus of Petit is indistinguishable from that of Morax-Axenfeld, but is distinguished from it by its greater range of growth both with regard to media and temperature, growing readily on the common media such as agar and gelatine, the latter of which it liquefies, and at temperatures ranging from room temperature to blood-heat. Hence in practice it suffices when a blood-serum liquefying diplobacillus is met with to inoculate an agar tube, when growth indicates the Petit type, and its absence the Morax-Axenfeld type. The frequency of diplobacillary infection of the conjunctiva may be gathered from the fact that Pfüger and Sidon found the diplobacillus in about ten per cent of all patients in Berne, whilst Erdmann encountered 342 cases in Rostock in five years, Axenfeld 529 cases in Freiburg in four years, and over 500 cases were observed in the University Eye Clinic in Bonn in the course of a single year.

During the last two years I have cultivated the diplobacillus thirty-eight times at the Royal Westminster Ophthalmic Hospital, being in seventeen cases of the Morax-Axenfeld type and in twenty-one of the Petit type.
Clinical and other Notes

Diplobacillary infections usually run a chronic course, the Morax-Axenfeld bacillus being associated with a chronic angular conjunctivitis or with a chronic blepharo-conjunctivitis, and the Petit bacillus with similar infections and also with cases of superficial serpiginous hypopyon-keratitis. Occasionally they give rise to much more acute conditions, for I have obtained diplobacilli on two occasions from cases of acute suppurrative conjunctivitis clinically diagnosed as, and indistinguishable from, gonorrheal ophthalmia, but in which no gonococci could be discovered.

On the other hand, the infection may be so mild and set up so little disturbance that it escapes recognition, and on several occasions I have obtained cultures of diplobacilli from apparently normal conjunctiva from which cultures were taken as a routine procedure for prophylactic purposes prior to operation involving a perforating wound of the globe.

Although the diplobacillus may be, and often is, found alone in the conjunctival sac this is not invariably the case, for I have found associated with it one or more (and often several) of the following organisms, namely, Bacillus xerosis, Staphylococcus albus, Micrococcus catarrhalis, Bacillus of Koch-Weeks, and Sarcina lutea.

As regards its distribution in the body, it was believed prior to 1897 that diplobacilli were only to be found in the conjunctival sac. In that year Briand published his Paris thesis pointing out that they could often be found in the nose, even in the absence of any sign of conjunctival infection, and his results have been abundantly confirmed by Erdmann, Treacher Collins, and Gifford. In the majority of these cases the nasal mucous membrane was quite healthy, but in a few of them a condition of chronic rhinitis was observed. Erdmann, moreover, proved the virulence of diplobacilli present in the nose, for implanting nasal secretion containing them into the healthy conjunctival sac, proved by cultures to be free from diplobacilli, set up typical angular conjunctivitis swarming with diplobacilli.

Biard considered that the diplobacilli could produce infection of the conjunctiva and he believed that this occurred by way of the lachrymal duct, although Erdmann, while confirming his results, believed it to occur more frequently through infection by handkerchiefs, fingers, etc.

Hitherto extra-ocular distribution of diplobacilli has been confined to the nose, and I am unable to find any mention of it being found in any other situation. In the following case the diplobacillus of Petit was obtained in cultures taken from the throat, and I have therefore thought it worth placing on record.

Corporal E., 4th Grenadier Guards, reported sick on July 6, 1915, complaining of sore throat, with difficulty of swallowing and some stiffness about the front of the neck. There was an intense diffuse redness of the whole pharynx, with a little purulent exudation on the left tonsil, but no sign of membrane could be detected. There was also slight swelling and tenderness of the glands beneath the angles
Clinical and other Notes

of the lower jaw. He was sent to the Laboratory at the Queen Alexandra Military Hospital, Millbank, for a bacterioscopic examination of the throat. Swabs were taken and sloped blood serum tubes were inoculated. A gargle of chlorate of potash was ordered. On the following day growth on the blood serum had produced liquefaction with the characteristic pitting, stained preparations showing the presence of typical short, stout Gram-negative diplobacilli in almost pure culture, the only other organisms present being a few Gram-positive micrococci. No Klebs-Löffler bacilli could be found. Attention was now directed to the conjunctiva, both of which were normal, being quite free from any trace of inflammation, and this was confirmed by Temporary Lieutenant D. Heron, R.A.M.C., Ophthalmologist to the Hospital. Swabs were taken from both conjunctiva and inoculated on to blood serum, but no pitting resulted. Swabs were also taken from both nasal cavities and similarly treated, and diplobacilli were obtained from the left nostril, but not from the right.

Subcultures on agar from the pitted serum showed a copious greyish-white growth, which microscopic examination showed to consist of staphylococei mixed with large numbers of Gram-negative diplobacilli. By plating on serum the diplobacillus was obtained in pure culture. It was then found to grow readily on agar, producing a yellowish-grey confluent somewhat translucent growth. Growths also occurred on gelatine at 20° C. with liquefaction of the medium.

Two days later the pharyngitis was much less intense, but diplobacilli were again obtained from both the throat and left nostril. A gargle of zinc sulphate (gr. 1, ad. 1 oz.) was now given with instructions to irrigate the nasal cavities. Two days later cultures taken from swabs showed that the diplobacilli had disappeared from the throat but were still present in the nose, and the same findings were obtained on July 17, when the patient returned to duty.

It would thus appear that the pharyngeal infection was a staphylococcal one and that the diplobacilli were not the causal organisms seeing that they still persisted after the pharyngitis had cleared up.

It was also pointed out how speedily the diplobacilli were banished from the throat after a gargle of zinc sulphate had been given, and how persistently they remained in the nose, probably as the result of the difficulty experienced by the patient in carrying out the nasal irrigation with the zinc sulphate lotion.

Finally, considering the absence of diplobacilli from the conjunctival sac, their ready disappearance from the throat and their persistence in the nasal cavities lined by healthy mucosa, we may conclude that this patient is a chronic carrier of the diplobacillus of Petit in the nasal fossæ and that the diplobacilli obtained from the throat were derived from this source.
UNIVERSAL ARM SUSPENSION.

BY MAJOR M. SINCLAIR.
Royal Army Medical Corps.

This is composed of a movable wooden top and a fixed wooden perpendicular.

The lower perpendicular pole, L.P. (2 in. by 2½ in.), 5 ft. in length, is fastened to the top of the bed by means of a flat bit of timber, F (4 in. by 1 in.), 2 ft. 4 in. long, and bolted with two bolts to the pole with the bed headrail between them on the extreme right or left of bed.

The pole, L.P., has two sets of hinges, anterior and posterior, to enable it to be used for right or left arm, anterior for left and posterior for right. These hinges are set at 16 in. apart, the upper hinge being 4 in. from the top of pole, L.P. They also allow the top to swing 180°.

The hinges are composed of two parts—

![Hinge Diagram]

thus allowing the top to be easily moved, when the suspension is required for right or left arm as the case may be. By this method two male parts are fixed to the upper perpendicular, U.P., and four female parts to the lower perpendicular, L.P. In alternate suspensions, male and female parts are reversed. The top has a perpendicular part, U.P., and carries two fixed horizontals, L.H. and U.H., and a movable arm, M.A., which is hinged to the upper perpendicular, U.P. This top can be completely removed from the pole by pushing the top upwards, and thus separating the male from the female hinges. This renders it applicable to right or left arm. The upper perpendicular, U.P., is made of the same material as the lower fixed perpendicular, L.P. (viz. 2½ in. by 2 in.) and is 3 ft. 2 in. in length. The two fixed horizontals, L.H. and U.H., are set at right angles one above the other. They are 2 ft. 8 in. in length, the material is 3 in. by 1 in. They extend 2 ft. in one direction and 8 in. in the other.

The upper U.H. rests on the horizontal L.H., which in turn rests on a block of wood, X, all three being screwed to the upper perpendicular, U.P. From the end of the shorter pieces of these two horizontals, two stays, S. (2 in. by 1 in.), are fixed to the top of the upper perpendicular to counteract the weight that has to be applied to the longer ends. No