is in some other countries, as to the evolution of the disease. But in 1905 I adopted a definite scheme of classification of the stages of trachoma which enabled us to appreciate the need for different modes of treatment in different stages. This classification was published first in 1912 (Report of the Ophthalmic Section of the Department of Public Health, Government Press, Cairo, p. 7), after a trial in Egypt for seven years. It is still used in all hospitals and schools in Egypt.

Before treatment it is advisable to make certain that the conjunctival change is really due to trachoma by observation of early pannus vessels with the corneal loupe or slit-lamp.

There is no doubt that in some people trachoma is a very mild disease, requiring very mild treatment, and this is more frequent in some countries, such as India, than in others, such as Egypt.

Equally with Wright I regret that there has been no marked improvement in the methods of treatment during the last 30 years.

6. Lieut.-Col. Wright says, "In view of the fact that there is such widespread interest in the problem (of the aetiology of trachoma) and that the recent literature indicates a more concentrated effort, it may not be out of place to suggest that an attempt be made to abstract the international literature and present it under the different headings of investigation in an orderly and abbreviated form available to future investigators in any of the different fields for easy reference." As President of the International Organization against Trachoma I am glad to inform him that Dr. Wilson, the Director of the Memorial Ophthalmic Laboratory in Egypt, has consented to undertake this task, as his contribution to the annual meeting of the Organization, which will take place at the time of the International Congress of Ophthalmology in December, 1937.

CONCRETIONS IN A LACRYMAL CANALICULUS CAUSED BY ACTINOMYCES*

BY

A. CHARLOTTE RUYS, M.D.

AMSTERDAM

Dr. A. Hagedoorn who observed the patient and made the diagnosis supplied the clinical data.

A COUNTRY woman, 30 years of age, suffered from epiphora and discharge for more than 2 years. A little swelling and redness was noticed at the site of the right lower canaliculus. On pressure

*A paper read before the Ophthalmological Society of Holland, December 16, 1934.

a purulent secretion was observed flowing from the lower punctum. On syringing the tear sac there was no interference with the passage of fluid. Smears of the pus showed a mass of fine filaments and many leucocytes.

The bacteriological examination of the pus gave the following results. Smears stained with Gram's method showed leucocytes and masses of long irregular filaments. The thicker parts were mostly Gram-positive, the thinner ones Gram-negative. Many filaments seemed to break down into little rods. True branching was not seen with certainty. With a platinum needle little flakes of pus could be obtained from the lacrymal duct. These were cultivated on different media, namely glycerine-agar, glucose-agar, liver-agar and Saboureaud-agar. The media were incubated aerobically and anaerobically both at 24° C. and at 37° C. Most media remained sterile. Perhaps this is due to the lysozyme of the lacrymal fluid. Only within one of the glucose-agar plates incubated aerobically for 3 days did a whitish mass grow out from the border of a flake of pus imbedded in the agar. In subcultures it proved to be a pure culture of Gram-positive filaments. The strain was rather pleomorphic depending on the medium used. The filaments were varying in size, the broth cultures especially showed many short rods. Only by dark field illumination and in the hanging drop could the branches be seen with certainty. The filaments and rods had no club-shaped ends and did not grow in rays. With Gram's method the culture forms were more evenly Gram-positive than the filaments directly from the pus.

In the beginning the culture grew both aerobically and anaerobically. After a few subcultures however it grew much better anaerobically. Aerobically at the bottom of the fluid media growth occurred only, not on the surface of the plates. No growth was obtained at 24° C. On solid media the culture was of a dull white colour, it had an irregular appearance and was adherent to the medium. In glucose broth it occurred in form of bread crumb-like masses at the bottom, the fluid remaining perfectly clear. On morphological and cultural characteristics we decided that the strain belonged to the genus Actinomyces.

After the diagnosis had been made, the canaliculus was slit up. The duct contained several clumps of soft yellowish material, which did not adhere to the wall and could easily be removed. After this treatment the patient had no further complaints.

The clumps consisted of filaments but showed no rays. Again we succeeded in cultivating an actinomyces which proved to be the same as the strain formerly isolated.

In the literature there are many records of concretions in the lacrymal ducts which consisted of actinomyces, streptothrix or leptothrix.

FIG. 1.—Smear from the pus (Gram-stain) ×1,500.

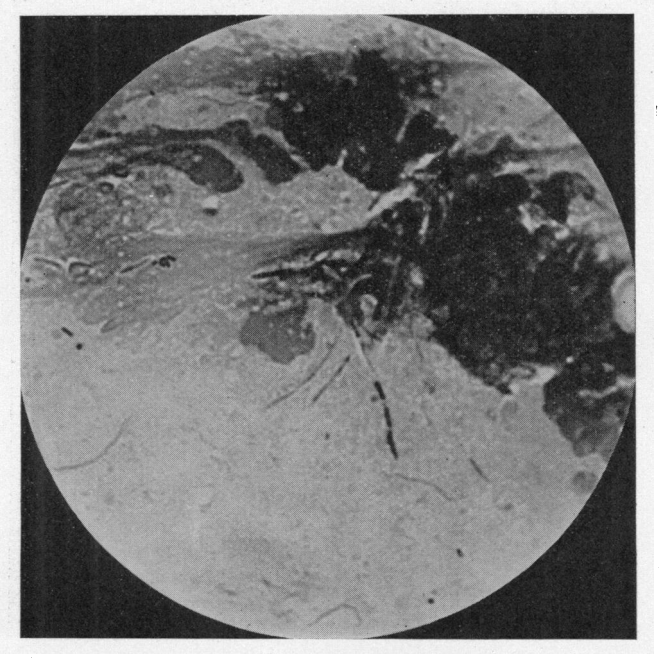

FIG. 2.—Smear from the pus (Gram-stain) ×1,500.

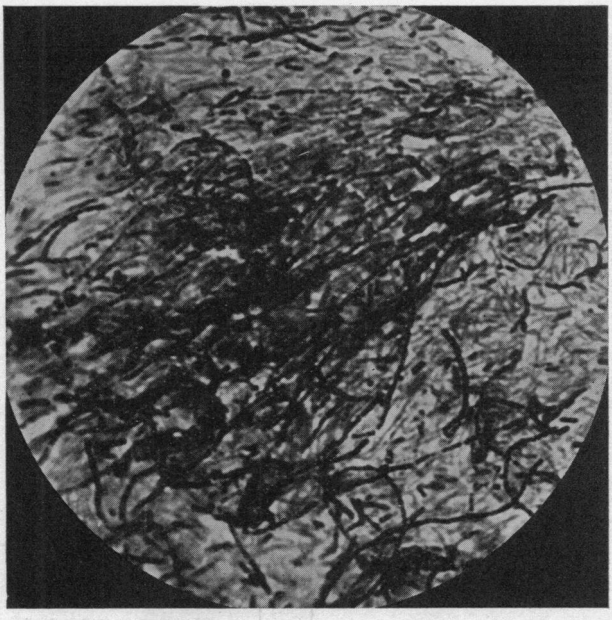

FIG. 3.—Smear from a concretion (Gram-stain) ×1,500.

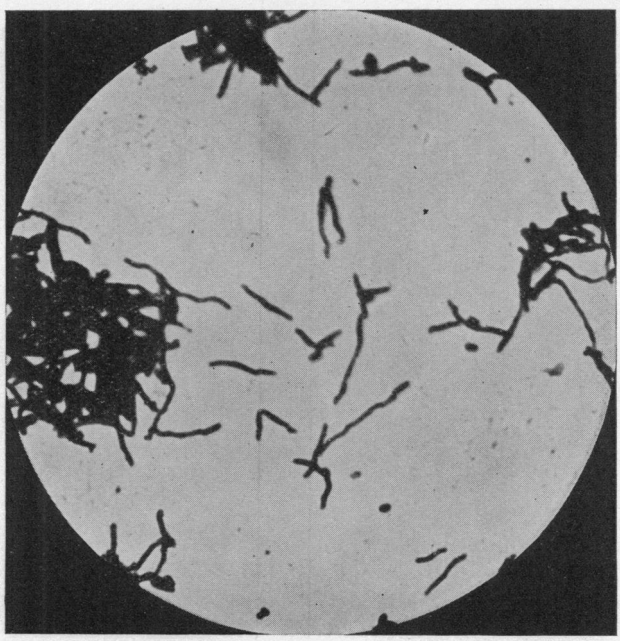

FIG. 4.—Culture in glucose broth (Gram-stain) ×1,500.

James[1] describes a case with a concretion in the upper lacrymal duct caused by streptothrix. Wissmann[2] describes a pure culture of streptothrix isolated from a like concretion. Ginzburg[3] records two patients, one of whom had drusen, the other not. He thinks the first case was an actinomyces, the second a streptothrix infection. Wirtz[4] found in the lacrymal duct of a patient a chalky concretion with many filaments; however he did not obtain growth on artificial media, and considered it to be a leptothrix infection. Wanka[5] also describes a case of canaliculitis due to a leptothrix invasion, but he did not succeed in cultivating the micro-organism. A survey of the literature was given by Axenfeld,[6] and by Herrenschwand.[7]

As it is very difficult to make a diagnosis on smears without cultures it is not quite certain these were really cases of a leptothrix infection.

Following the opinion of Lieske,[8] Topley and Wilson[9] and other authors, streptothrix and actinomyces are now considered as all belonging to the same genus actinomyces. Formerly the presence or absence of drusen was considered satisfactory for ranging a strain to the genus actinomyces or to streptothrix. As however this phenomenon depends on the reaction of the host and not on peculiarities of the parasite this is not sufficient evidence for making two genera.

Thus in most instances the concretions in the lacrymal ducts described in the literature are caused by actinomyces. It is not certain whether leptothrix also plays a rôle.

REFERENCES

1. **James.**—*Brit. Jl. of Ophthal.*, p. 499, 1929.
2. **Wissmann.**—*Klin. Monatsbl. f. Augenheilk.*. Bd. LI, p. 287.
3. **Ginzburg.**—*Klin. Monatsbl. f. Augenheilk.*, Bd. LXVIII, p. 628.
4. **Wirtz.**—*Klin. Monatsbl. f. Augenheilk.*, Bd. LXVIII, p. 385.
5. **Wanka.**—*Klin. Monatsbl. f. Augenheilk.*, Bd. LXXI, p. 237.
6. **Th. Axenfeld.**—Die Bakteriologie der Augenheilkunde. Jena, 1907.
7. **F. v. Herrenschwand.**—Die Pathogenen Mikroorganismen des Auges. Berlin, 1927.
8. **Kolle, Kraus, Uhlenhuth.** — Handbuch der Pathogenen Mikroorganismen. Bd. V.
9. **Topley and Wilson.**—The Principles of Bacteriology and Immunity.