actinomycosis, and was clinically diagnosed as such before any micro-organism was even looked for.

Moreover, the arrangement of the micro-organisms in the tissues, the true branching, the uneven staining of the protoplasm, and the tendency to form swellings at the ends of the threads; all these points leave no doubt that it was a streptothrix infection (See Fig. 2).

As already said, I only found a single object resembling a club in the pus from one of the abscesses, but absolutely nothing else during life or *post mortem*. What the clubs are I do not venture to say, but I do not believe they are degeneration forms; for if tissues from actinomycotic cattle are stained by Gram's method a beautiful radial arrangement of clubs stained deep violet is shown, but I have never seen any mycelial thread stained.

I have seen two cases of human actinomycosis, and examined tissues from three others, and in only one case in which quantities of pus were coughed up were the clubs visible, and easily seen by squeezing out one of the "granules" found in the pus, and examining with a low power. In the other three cases the appearances were precisely similar to those in the present case.

The extracorporeal relations of these streptothricæ and their mode of infecting the animal are still unexplained, but there have been a number of researches, especially those of Jensen and Johne, cited by Crookshank, which point to their having origin amongst the cereals. Several experiments by different investigators tend to show a possible connection between the tubercle and Timothy grass bacilli and actinomycetes. For instance, Lubarsch and Schulze produced actinomycotic-like growths in animals from the Timothy grass bacillus and Eppinger's streptothrix. Bates produced mycelial growths with clubs in animals by injecting tubercle bacilli into the brain. The most extraordinary results were those of Friedrich and Nösske, who by injecting definite quantities of tubercle bacilli into the left ventricle of rabbits, produced a growth of tubercle bacilli, especially in the kidneys, composed of a dense mass of bacilli surrounded by a ring of clubs.

These experiments taken together seem to me to suggest a possibility of our finding the primary source of tubercle bacilli amongst the cereals or some other members of the vegetable kingdom.

In conclusion I wish to thank Dr. Wigham for the time and trouble he has spent in the photo-micrograph department on the photographs.

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NOTE ON THE DIALYSIS OF THE TOXINS
THROUGH COLLODION WALLS.

BY

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M.D. M.D.

THE details of our technique for the dialysis of living cultures have been previously described in this JOURNAL.¹ It is sufficient to remind the reader that it consists in cultivating a given microbe in a collodion sac suspended in some cultivating medium. The object of our present investigations was to see whether mild toxins dialyse, partially or wholly, through the walls of a collodion sac, and whether they then retain their pathogenic properties. The microbe chosen was the bacillus pyocyaneus, because its pathogenic properties had been already studied by several observers and one of us (R.), and because it secretes a colouring matter rendering its recognition easy.

We have observed that toxins pass through the collodion walls in small quantities, but that the time they take in doing

so is comparatively long, depending on the thickness of the tube and on the nature of the liquid in which the sac is suspended.

A comparison of toxin filtered through a Chamberland candle with toxin obtained by dialysis, showed that the first had greater pathogenic properties than the second. Nevertheless, we succeeded in reproducing with the latter all the symptoms without exception, typical arthritis even, provided the quantity injected was sufficiently large. A guinea-pig, for instance, injected with 20 c.cm. (per kilog. weight) of filtered toxin died in three hours, but more than double the quantity of the toxin obtained through dialysis of a culture of the same age and the same breed was necessary in order to kill an animal of the same weight in forty-eight hours or thereabouts. Even under such conditions death was not constant.

Nevertheless, whenever the dose of toxin obtained by dialysis exceeded 20 c.cm. (per kilog. weight) the animals died from cachexia after a shorter or longer period.

The pathogenic properties of the dialysed substances varied according to the length of the dialysis. The toxins dialysed from living cultures during ten to thirteen days, a short period of fever, diarrhoea, and sleepiness predominated, though diarrhoea was less frequently present than the other symptoms. Convulsions occurred but rarely, and were produced only by toxins which had dialysed during a period of thirty to forty days.

The dialysed toxin injected in the dose of 5 to 10 c.cm. (per kilog. weight) produced no or hardly any apparent symptoms, but conferred immunity. The colouring matter (pyocyanine) dialysed only when the sac was not too thick.

We have stated already that the nature of the liquid surrounding the sac of collodion had great influence on the amount of toxin which dialysed through. We noted that if a collodion sac filled with a bouillon culture was suspended in distilled water, the surrounding water became far more toxic than when the surrounding medium was bouillon or peptonised water. The naked-eye characters of the cultures also differed according to whether these were immersed in one or other of the liquids. The cultures made in sacs suspended in bouillon, for instance, lost the greater part of their water, become viscous, and resemble those made in collodion sacs introduced into an animal's peritoneum. The bacilli appeared deformed, many became granular, others assumed a coccil form, and those seemingly normal were less vigorously motile than usual.

We have studied only casually, so to speak, the virulence of bacilli in collodion sacs, and in the few experiments we have made this virulence appeared to follow no regular rules.

To resume, the various toxins of the bacillus pyocyaneus dialyse, but not in their entirety. The time they take in thus dialysing is comparative long, and their pathogenic properties vary according to the length of the dialysis.

It is extremely probable that the immunising substances are among the first to dialyse. Advantage might possibly be taken of this property in the manufacturing of vaccines.

REFERENCE.

¹ BRITISH MEDICAL JOURNAL, November 3rd, 1900, p. 1305.

A CASE OF RENAL COLIC ATTENDED BY THE
PASSAGE OF CASTS OF THE URETER
(URETERITIS MEMBRANACEA).

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IT is well known that renal colic may be caused by other conditions than the passage of a renal calculus, and such causes as the passage of uric acid or oxalate of lime crystals, tuberculous *débris*, or hydatids from the kidney have been recorded, and to these psorospermiosis has recently been added.

The passage of casts derived from the mucous lining of the ureter itself seems, if one may judge by the absence of literature on the subject, to be a rare occurrence, and the following case is therefore interesting.

History.—Mrs. P., a lady of just over 60, was first seen by me about fifteen months ago for repeated attacks of agonising pain in the left loin,