Fig. 1.

sufficient gut beyond the forceps to admit convenient suturing (Fig. 2). Then the two forceps are clamped together in

Fig. 2.

parallelism, as in Fig. 3, the combination being conveniently held in one hand. For suturing, a posterior peritoneal stitch

Fig. 3.

may be first inserted (1), and then the mucous and muscular coats united (2). This stage is seen half completed in the figure. Finally, the posterior peritoneal stitch is again picked up and used to unite the anterior peritoneal surfaces. The union is shown completed in Fig. 4, the bowel contains water without leakage, and the union is secure.

The chief advantages of this instrument are the possibility of union in layers, the steady approximation of the ends of bowel for anastomosis, the use of only one hand for holding the approximated ends, the absence of any marked internal

Fig. 4.

diaphragm when the union is complete, and the availability of the independent forceps for use as intestinal clamps.

THE PRESENCE OF DIPHTHERIA BACILLI IN ATROPHIC RHINITIS.

[A PRELIMINARY COMMUNICATION.]

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THE presence of Klebs-Loeffler bacilli in the nasal cavities of persons suffering from atrophic rhinitis was first noticed by Bellfante and Vedova¹ in 1895, and these observers expressed the opinion that the disease was caused by an attenuated form of the diphtheria organism. Their observations were subsequently confirmed by Attilio.²

Fraenkel and Loewenberg³ have ascribed the causation of the disease to a diplobacillus (closely resembling Friedlaender's pneumo-bacillus) which they have named the bacillus mucosus. The constant presence of this bacillus has been confirmed by Abel and others, and I mention it here as it was frequently present in the cases dealt with in the present paper. The bacillus mucosus is, however, generally believed to be the cause of the fetor and not the direct exciting cause of the disease "atrophic rhinitis."

Atrophic rhinitis has to be distinguished clinically from disease of the nasal fossae resulting from congenital or acquired syphilis, from rhinitis sicca, and from a form of atrophy which follows hypertrophic rhinitis such as is common amongst the tobacco workers of this city. Ozaena is a symptom common to all these conditions but it is only a symptom, and the correct diagnosis of the disease must be made from a consideration of the history and the rhinoscopic appearances. True atrophic rhinitis is distinguished by the pallor of mucous membrane, the shrinking of the bony structures, the formation of crusts, the penetrating character of the ozaena, the cachexia induced in the sufferer, and the presence of a leucocytosis.

Excluding as far as possible other diseased conditions of the nose such as I have already named, I have made bacteriological examinations of the nose in 23 cases of atrophic rhinitis. Twenty of these cases were females and one a male; in two I have no note of the sex. The ages varied from 9 years to 57 years, the average age being 22 years, only three of the patients being more than 25 years of age. The average duration of symptoms was seven years, but in one case the condition had been present forty-five years. In 75 per cent. the sense of smell was absent or defective, and with one exception ozaena was noticeable in all the cases either by the patient or other persons.

The material for bacteriological examination was taken from the nose by means of sterile cotton-wool swabs, and from these films were prepared and cultures made. The films were stained by methylene blue, Gram's or Meissner's stains. The culture media employed were glycerine agar, serum agar, and occasionally broth. Many of the cases were examined on several occasions.

In twenty of the twenty-three cases (87 per cent.) a bacillus was found resembling in morphological and cultural

characteristics the Klebs-Loeffler bacillus. In seventeen the organism was described as the "long" and in three as the "short" variety of the diphtheria bacillus. The only other organisms frequently present were *B. termo*, various micrococci, and the *B. mucosus*, the last being noted in sixteen cases (69.5 per cent.).

Two questions naturally arise in connexion with this organism: (I) Is it present in the normal nose or in diseased conditions of the nasal mucous membrane other than atrophic rhinitis? (II) Is it a true diphtheria bacillus?

I.

In order to determine the first point a series of examinations of healthy noses of children and adults was made at the Bristol General Hospital. In no instance was a bacillus detected in any way conforming to the type of the long diphtheria-like bacillus found in cases of atrophic rhinitis. In 58 per cent. of young children and adults a short diphtheria-like or pseudo-diphtheritic type of bacillus was present in the nose. In this connexion I should like to emphasize the fact that so common is this type of organism in the healthy nose that a report of its presence should never lead to a diagnosis of diphtheria unless well-marked clinical symptoms are also present.

A series of cultures was also taken from the noses of persons suffering from ozaena secondary to congenital or acquired syphilis, rhinitis sicca, and lesions other than atrophic rhinitis. In none of these were diphtheria-like bacilli present, but the *B. mucosus* was found in more than half the number. From these observations we may conclude that the type of "diphtheria-like" bacillus to be described is peculiar to the condition—atrophic rhinitis.

II.

The second question is not so easily answered. There are a large number of bacteria closely resembling the diphtheria bacillus, and at least twenty different types of the true Klebs-Loeffler bacillus, so that the possibility of error is very great.

In morphological and cultural characteristics the bacillus of atrophic rhinitis closely resembles the Klebs-Loeffler bacillus, and they cannot be differentiated by mere microscopical examination. In this statement I am supported by several competent authorities, to whom I have submitted specimens.

There are certain distinctive features, however, in the organism as seen in stained films taken directly from the exudate. The bacillus is more curved, thinner, and more highly metachromatic than the Klebs-Loeffler organism, in size, shape, and beading, closely resembling the tubercle bacillus. There is sometimes difficulty in obtaining a growth on agar or Kanthack's medium, as the colonies are inhibited or obscured by the abundant spreading growth of *B. mucosus*. For the same reason the process of isolation is tedious and difficult.

On Kanthack's medium short-sheathed varieties are common, and in broth and old agar cultures involution forms arise. The metachromatism is well brought out by Neisser's stain, and the bacilli are stained by Gram's method.

The most satisfactory test as to whether a given organism is the diphtheria bacillus or not is undoubtedly the inoculation test. Our University College is not licensed for this purpose, and there is consequently some difficulty in getting the work done. Cultures from two of the cases have, however, been submitted for examination, the one to a private laboratory and the other to the Jenner Institute of Preventive Medicine. In both instances the report has stated that the morphological and cultural characteristics are those of the diphtheria bacillus, and that the organisms were pathogenic to guinea-pigs, producing the same lesions as the Klebs-Loeffler bacillus. As a control, a culture taken from a case of tobacco-worker's rhinitis was submitted to the Jenner Institute, but neither by microscopical examination nor by inoculation could the diphtheria bacillus be found.

The constant occurrence of the diphtheria-like bacillus in cases of atrophic rhinitis is by no means conclusive evidence that it plays any part in directly exciting the disease. Possibly this might be demonstrated by means of special local inoculation experiments upon animals. The point I wish to emphasize is that this type of bacillus is found in atrophic rhinitis only, and in this respect it is unlike the *B. mucosus* which we have demonstrated in cases of rhinitis sicca and syphilitic disease.

CONCLUSIONS.

If the foregoing facts can be substantiated, and the identity of this bacillus with the Klebs-Loeffler bacillus can be esta-

blished, then we may regard atrophic rhinitis as a chronic form of nasal diphtheria.

In addition to the bacteriological evidence the following points may be considered in support of this theory:

1. In diphtheria the accessory sinuses of the nose are constantly infected. Bacilli may remain in the sinuses for prolonged periods, exciting a purulent, sero-purulent, or serous discharge.⁴

2. Chronic suppuration in the accessory sinuses is, in the opinion of many eminent rhinologists, the direct exciting cause of the conditions of ozaena and atrophic rhinitis.

3. Multiple cases of atrophic rhinitis in the same household occur from time to time, as one would expect if the process were a true infection. Thus Terez⁵ records twelve instances in which there were two or more sufferers in the same family. This is a point I have not inquired into amongst my own series of cases.

4. An attack of diphtheria may be the starting point of atrophic rhinitis. Only two patients in the present series dated the onset of symptoms from an attack of diphtheria, but the history of all was not inquired into.

5. Atrophic rhinitis, like diphtheria, attacks females more than males; it is a disease of early life, and induces a pronounced anaemia and leucocytosis.

6. Atrophic rhinitis has been successfully treated by diphtheria antitoxin. With regard to this point my experience has been so limited that I do not feel justified in saying more than that if repeated moderate doses of antitoxin are administered regularly, amounting in all to 20,000 units, marked relief of symptoms results.

7. In atrophic rhinitis the type of diphtheria bacillus does not alter during the progress of the case, a fact which Woodhead⁶ has recently found to hold true in acute faucial or nasal diphtheria.

Apart altogether from the theory that atrophic rhinitis is a chronic form of nasal diphtheria, there is a point arising out of this investigation which is of great practical importance, namely, in cultures taken from the nose, throat, or ears of persons suffering from atrophic rhinitis there may be found bacilli which on microscopical examination may be pronounced to be diphtheria bacilli, and this may lead rightly or wrongly to the patient's notification and detention. This is well illustrated by the following case:

D. R., aged 10, a schoolgirl, came under my care early in 1901, suffering from atrophic rhinitis of seven months' duration. Cultures from the nose showed the long diphtheroid bacillus I have described as present in such cases. At about the same time an outbreak of diphtheria occurred in the school which she was attending, and the health authorities took cultures from the nose and throats of all suspected children. Finding what they considered to be typical long varieties of diphtheria bacilli in the nose of the child, D. R., they excluded her from school on the grounds that she was suffering from diphtheria. In addition, I may remark they had the culture tested by Dr. Klein, who pronounced the organism to be a virulent diphtheria bacillus. As the organisms persisted in the nose the child was excluded from school for nine weeks, when I believe on my representations she was allowed a return. I have had subsequently the opportunity of making frequent bacteriological examinations from the nose of this case, and when last seen, sixteen months after first coming under observation, the long diphtheria-like bacillus was still present.

I mention this case simply as an example of what may and does happen. Further investigation is required in order to show whether the organism described is the true Klebs-Loeffler bacillus or a bacillus closely resembling this, and having pathogenic properties when injected into certain animals.

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THE BILBERRY.

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WELL may we pause over the bibliography of the bilberry in view of the interesting communication of Dr. Bernstein, published in the *BRITISH MEDICAL JOURNAL* for February 7th, 1903. His paper is attractive of interest and excitant of thought. Long have some of us dwelt with affection, and with hope of finding modern uses for some old drugs which were being lost to sight and to memory in the limbus of the past, and perhaps not without some practical success, upon