Abscesses.—Subcutaneous abscesses have been described as concomitants of pneumonia. One case was encountered. From an abscess in the arm a type of pneumococcus was obtained similar to that isolated from the sputum. Two other and rarer kinds of abscesses were investigated. They were gluteal abscesses occurring at the site of injection of quinine-urea, used in the routine treatment of pneumonia. A pneumococcus was isolated in both instances. Unfortunately, in one case it was not typed. In the other, however, a type was secured which tallied with that previously isolated from the sputum. Perhaps some mishap at the time of the injection had permitted the quinine to devitalize the tissues, and so allowed the blood-borne organisms to settle there. The abscess, in the case that was typed, gave rise to a pyrexia, which subsided on evacuation of the pus.

SUMMARY

1. The pneumococcus most commonly found in the eye, nose, and accessory sinuses belongs to Group IV.

2. In acute otitis media and mastoiditis, Type III strains and Group IV organisms were found in about equal numbers. The type-specific strains showed a greater tendency to infect the meninges.

3. Attention is drawn to the important part that the streptococcus plays in acute middle-ear and mastoid disease. *Streptococcus pyogenes* was found in the majority of cases.

4. The most prevalent type of pneumococcus in cases of lobar pneumonia was found to be Type II.

5. In cases of empyema due to pneumococci, Type I strain was present in a large percentage.

The type serum used in this investigation was obtained from Dr. Wadsworth and Miss Kirkbride, of the Division of Laboratories and Research, Department of Health, State of New York, to whom I wish to express my indebtedness.

I take this opportunity of thanking Dr. Logan for his encouragement in compiling this paper.

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BLACK HAIRY TONGUE*

BY

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The condition known as hairy tongue appears to be more common in France than in England. General interest was first aroused by Raynaud in 1869, who likened the curious appearance to that of a field of corn laid low by the wind, a description which has struck successive observers as very appropriate. He also described the presence of numerous round bodies in the lesion, which he believed were fungus spores similar to those of ringworm. Much controversy took place among subsequent writers as to the relation of these spores to the disease, and it was established that though they were often present they were sometimes absent, as in the carefully described cases of Féréol. It was not until 1901 that Lucet identified these spores as yeast cells. He carefully investigated the yeast he obtained from a case, and it has since been known as *Cryptococcus linguae pilosae*. Attempts to transmit the condition failed. Dessois (1878) made inoculation experiments on his own tongue without success, and though "a sort of epidemic" of black tongue was seen in the Hospital for the Aged at Issy, Professor Chantemesse never succeeded, in numerous attempts, in transferring the condition to a healthy tongue.

A few cases have been recorded in England. R. Lake¹ of Barnes in 1891 had a typical case that showed the spores. The curious tongue described by Balfour-Graham,² in which the dorsum "looked exactly like the surface of a dog's nose," was probably of a different category, perhaps the result of mercurial treatment. Another case was described by Hunt and Leslie Roberts³ at a meeting of the Liverpool Medical Institution in December, 1902. Other organisms have been suggested as a cause. Dinkler, in 1889, found the hairs covered with a Gram-positive filiform bacillus, as did Morelli in 1893. Guégan (1909)

announced the discovery of a new species of oöspora, a fungus showing a mycelium composed of bacillary elements and bearing conidiophores and chlamydo-spores, which he believed, in symbiosis with the yeast of Lucet, was the causative organism. This organism is now classified in Brumpt's *Parasitologie* as an actinomyces. Weidman also isolated an organism which he believed was an actinomyces. Valuable recent observations are those of Catanei⁴ (1928), who watched a case in a man, aged 80, for two years, and made four examinations of the hairs. On each occasion the yeast of Lucet was present, along with other moulds and bacteria, but none of these were pathogenic to animals, and inoculations into the healthy or scarified tongue of monkeys were without result. Charpy⁵ attributed the disease to a nerve lesion, traumatic or functional, while Barnard⁶ believed it was a disease of old people, and was an overgrowth of the filiform papillae due to the lack of normal rubbing of hard food. He states that he has known examination candidates mistake the condition for melanotic sarcoma. Heidingsfeld,⁷ as a result of biopsy examinations, believed there were two forms of the disease—a spurious or evanescent, and a true or permanent, the latter dependent on a primary tendency to hyperkeratosis.

The nature of the pigment in these cases is uncertain, and we regret we did not investigate it fully in the case reported below. The prussian blue reaction for iron was negative. According to other observers it is insoluble in acids and alkalis, and bleaches in the mouth on treatment with hydrogen peroxide, but in our case a treatment on the spot with peroxide had no effect. Pigment-forming moulds have been reported in the lesion from time to time, but not with sufficient constancy to be considered an etiological factor. The yeasts of Lucet and Green are described as producing a certain amount of brown discoloration of the media, but in our case this did not take place.

The hairs are filaments of more or less keratinized epithelium attached to the summits of the filiform papillae. We consider the condition is probably a great exaggeration of the thick fur often seen in disease. An acid reaction of the mouth seems to be the essential underlying factor, whether produced by excess of fermentable food, gastritis, or paucity of saliva in the aged. The acid

* Read at a meeting of the Liverpool Medical Institution.

reaction favours the growth of yeasts and filiform acidophilous bacilli, and adhesion of the epithelial scales to each other. Once the condition begins the organisms are protected in the crypts between the filiform papillae, and by their fermentative power help to maintain the acidity of the mouth.

The case we report below yielded readily to a liquor potassae mouth wash. In other cases the lesion is said to disappear and recur in spite of treatment. In our view the essential treatment is to maintain an alkaline reaction in the mouth.

The patient was a man of 45, who had discovered a lesion on his tongue ten weeks before coming under observation. His tongue showed a triangular black hairy patch, the base at the circumvallate papillae and the sides a little distance from the margin and tip of the tongue. The hairs could be pushed in various directions with a spatula, but brisk scraping was necessary to remove them. They were longest at the centre and back of the lesion, where they measured up to three-quarters of an inch in length. The hairs were elastic, and stretched on attempting to pull them out. When removed the black colour was seen to occupy only the upper half of the hair, the remainder being white.

The patient was edentulous, but had good plates. He complained of a burning sensation over the tongue. He had rubbed off the growth once, and also stopped a bismuth mixture which he was taking for indigestion, without effect. After making the examination the growth was again briskly scraped away, and a liquor potassae and carbolic mouth wash prescribed. The patient reported that the lesion became gelatinous, and he scraped it away easily, so that it had disappeared a week later.

Pathological Findings.—Microscopically the hairs were not true hairs, but were composed of elongated masses of epithelial cells and scales. The pigment appeared as a diffuse brown coloration of the cells. The epithelial masses were covered on all sides with an enormous number of yeast cells, along with a Gram-positive filiform bacillus. Aerobic and anaerobic cultures on agar and 2 per cent. dextrose agar gave a growth of a few sarcinae and streptococci and very numerous colonies of a yeast and of a bacillus. The latter was finally identified as an acidophilus bacillus. It was non-pathogenic to guinea-pigs and rabbits. The yeast grew readily on dextrose agar, forming a white growth with no late pigment formation. Microscopically it showed round or oval forms, with sausage-shaped cells in some fluid media. Repeated tests for ascospore formation by placing an actively growing culture on plaster-of-Paris blocks standing in distilled water were negative, nor were ascospores seen in old cultures on carrot, potato, etc. In this respect it is identical with the yeasts obtained from cases of hairy tongue by Lucet, Guégan, and Green.⁶ It produced acid and gas in dextrose, saccharose, and levulose, but had no effect on maltose, mannite, or lactose. These fermentation reactions are identical with those obtained by Lucet and Guégan. The pathogenicity of the yeast for laboratory animals was as follows. Doses up to 2 c.cm. of a saline suspension (strength 550 million per 1 c.cm.) given intraperitoneally to guinea-pigs (five experiments) or subcutaneously (three experiments) caused a local suppuration which healed readily and did not cause a generalized infection. Tested on two mice and two rats 0.5 c.cm. of this emulsion, given subcutaneously, was without effect. Three rabbits received intravenous injections of 0.5, 1.5, and 2 c.cm. respectively, and all survived.

Comment on Pathological Findings

From the morphology the yeast must be classed as a cryptococcus. It may be noted that had ascospores been found the yeast would correspond with certain of the common saccharomyces used in industry for brewing beer, etc. Hansen has shown that yeasts may lose their power of ascospore formation permanently if cultivated at a temperature of 32° to 37° C., and it seems likely that this cryptococcus is a saccharomyces which, owing to a long stay in the mouth, has become asporogenic. Yeasts are common inhabitants of the mouth and skin.

Greenbaum and Klauder found yeasts on the skin in thirty-nine out of 150 unselected cases. These were saccharomyces or cryptococcus, of the same types that they isolated from their cases of yeast dermatitis. An examination of swabs from the tongue in seventy patients chosen at random in the casualty department of the Liverpool Royal Infirmary revealed the presence of yeasts in thirty-two, of which five showed mycelium formation (monilia).

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A CASE OF "BLACK TONGUE"

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After seeing several ordinary, or minor, cases, it is sometimes useful to describe an extreme case, which may throw some further light on a subject usually dismissed by the textbooks in one or two paragraphs.

Report of Case

The patient, a man aged 52, living in comfortable circumstances, came to see me complaining of chronic irritation of the throat and a cough which caused him continual annoyance, although it was not very serious. He had had this for eighteen months, and had been told that it was due to septic teeth, several of which he had had removed, but without any amelioration of the symptoms.

On examination I found an extensive pale brown spongy mass occupying the posterior half of his tongue. I removed this growth with a pair of forceps, and it came away in several long strips, leaving the tongue underneath looking approximately normal to the naked eye. The strips of growth were placed in a white dish and dried rapidly, assuming a dark purple colour, which was in marked contrast to the previous pale brown of the appearance noted when upon the dorsum of the tongue.

A fresh piece of growth was sent to the Laboratories of Pathology and Public Health, where the membrane was reported to consist of a "budding yeast-like fungus" of the monilia type.

On culture the growth was extensive, and brown in colour, and the sugar reactions were those of the *Monilia macroglossia*, which is identical with the *Cryptococcus linguae pilosae* found in cases of black tongue.

Commentary

The following points emerge from consideration of this extensive and long-standing case:

1. Black tongue may spread over the posterior third of the tongue, and is not confined to localized patches anterior to the circumvallate papillae.

2. The dark colour is caused by the fungus, and not necessarily by any changes in the papillae of the tongue itself.

3. The disease may be of long standing, and yet not cause any hypertrophy of the papillae, either filiform or circumvallate.

4. The hypertrophy of the filiform papillae, so often noticed before, is probably due to continuous irritation of the tongue at one particular spot where the fungus has taken a firm hold.

5. The growth of the fungus is the primary condition, and may exist without any lingual hypertrophy.