acting under Dr. Kerr Love's guidance. The School Board of that city has the assistance of a consulting otologist, a consulting ophthalmologist, and a consultant for mental deficiency. Holding central and official positions, these experts can point out and advise upon a multitude of side-issues that directly or indirectly concern their special subjects.

Similarly, in the projected Scottish Board of Health and the English and Welsh Ministries of Health, there should be appointed expert aural, ophthalmological and mental deficiency advisers. In the case of the last named this will be inevitable when the machinery for dealing with the feeble-minded is included, and it is also clearly needed for the other two special branches.

In the Ministry it is expected that there will be departments for venereal diseases, school medical inspection, medical treatment of school children, hospital accommodation, care of the expectant mother, and the propagation of knowledge on health subjects, and the work of these departments will, in some instances, of necessity overlap. The factors in the prevention of deafness lie in every one of them. The aural adviser, therefore, efficiently to carry out the work of prevention of deafness must be in such a position that he can act through all departments by advising on every point connected with it. He should be able to bring his weight to bear in appointing competent otologists to fever hospitals, to school inspection staffs, to school clinics. He should be able to ensure that the treatment of children's ears is efficiently carried out *by aurists* and not paralysed by pernicious "care" committees, who, by multiplying forms, wasting stationery, and red tape generally, come between the doctor and the nurse and their object—the child.

Properly organised and efficiently directed, the otological apparatus of the Ministry of Health could do great things, preventing misery to uncounted thousands, and saving wealth to the State in sound citizens and money hitherto expended in dealing with preventable conditions.

M. Y.

AURAL BACTERÆMIA (AS APART FROM PYÆMIA).[1]

By Richard Lake, F.R.C.S.

As far as I know, Gruening, of New York, was the first person to describe aural bacteræmia, and the most important contributors to the subject have been Duel, Kerrison, Shepherd, Richardson, and Oppenheimer.

Bacteræmia may be defined as a morbid condition of the blood, due to the presence in it of living micro-organisms. Aural bacteræmia requires a little more minute description. That is to say, it is a morbid condition of the blood, in which living bacteria are present in the blood-stream. It has to be distinguished from conditions in which there is a casual entry of bacteria or their products into the blood, such as occurs in pyæmia, causing a separate and distinct series of clinical symptoms. These symptoms are sometimes dependent upon the sudden influx into the blood of bacteria and septic clot, and in addition to the symptoms due

[1] Paper read before the Otological Section of the Royal Society of Medicine, London, April 19, 1918.

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to the bacteria, the condition gives rise to those due to mechanical causes, *i. e.* the presence of foreign bodies in the blood, giving rise to static abscesses in different parts.

These abscesses are, as we shall see, a comparatively rare condition in bacteræmia.

Ætiology and Pathology.—The cases of aural bacteræmia which have come under my observation may be divided clinically into pre- and post-operative. Again, one may divide these cases into two classes. In the first class of case the bacteria which have succeeded in finding an entrance into the blood are unable to live in it for any length of time, and are soon destroyed by the inhibitory action of the blood. In the cases which belong to the second class the inhibitory action of the blood is in abeyance, and the bacteria remain during the course of the disease constantly, or almost constantly, in the circulation.

The presence of the bacteria is indicated by the temperature. During the time the temperature is rising, and until it attains its maximum, bacteria are found in the greatest numbers in the blood. As the temperature falls they diminish in number; in those cases in which they are constantly present the temperature never falls very low. In such cases we must be particularly careful, as they are very apt to terminate fatally. This applies also to cases in which the rise and fall of the temperature is excessive.

A study of the literature of the subject, and the results of my own investigations, indicate that the various forms of streptococci are more frequently the cause of this condition than staphylococci.

Where the ordinary symptoms of lateral sinus infection, as shown by the presence of rigors and of pyæmic abscesses, are not present, the involvement of the lateral sinus is comparatively rare, but at least one case has been reported in which relief was obtained by removal of clot from the sinus when there were no symptoms pointing to lateral sinus infection. The causation of this condition should be sought for in the anatomical peculiarities of the mastoid. Although bacteræmia is not peculiar at all to aural cases, it is comparatively rare in bone disease elsewhere. What apparently happens is that pus is held up in the small cellular spaces of a mastoid which is affected either by an acute or chronic osteitis, with its engorged mucosa, and its numerous widely-opened uncontractile vessels, through which the bacteria contained in the part must find their way readily into the blood-stream. Bacteræmia appears most frequently as a complication of acute otitis media and sub-acute otitis media, especially in those cases in which the mastoid process is principally involved in the inflammatory process, as apart from the middle ear and its immediate neighbourhood. In other instances it occurs in cases when the acute symptoms subside, mastoid tenderness is almost absent, even if it does not entirely disappear, and there is perhaps a tendency to a recurrent form of the acute condition. In the majority of instances the patients are young, and most frequently children.

Very rarely in bacteræmia, as apart from pyæmia, do we get the formation of abscesses in distal parts. They may, of course, be connected with some slight clot-formation of some smaller blood-vessels, but they certainly are not of necessity combined with disease of the lateral sinus, as seen in Case 3.[1]

[1] For cases see Meeting of the Otological Section of the Royal Society of Medicine, April, 1918 (p. 123 of this issue).

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Symptomatology.—In aural cases one invariably finds that one has to deal with a mastoiditis, either of recent origin, or, perhaps, of some duration, but not a really chronic suppuration. Or quite frequently there are no signs or history of aural discharge, and no evidences in the drum itself that there has been any trouble in the middle ear. There may be bulging of the posterior meatal wall. There will be tenderness—more or less marked—over the mastoid area, either in the region of the antrum or elsewhere in the mastoid process. The temperature is not of necessity very high. It may be anywhere from 100° to 104°F., or even 105°, but there will be no history of rigors. I have only once seen even a questionable one; in fact the absence of rigors in the course of the disease seems to me to mark the difference between pyæmia and pure bacteræmia, like the distinction made in pre-bacterial days between septic poisoning and septic infection and pyæmia—not too definite. The patients generally have a peculiar characteristic appearance. They are usually bright-eyed; the complexion is often muddy, especially if the bacteræmia has lasted more than a short time. Cerebration is, if anything, more active than normal; there is certainly no clouding of the intellect. The patients are frequently—in fact generally—quick, and there is even what one might call a cerebral stimulation. Delirium seems to be usually absent. Babinski's sign is absent, and the cerebro-spinal fluid normal. The appetite is not necessarily much affected, though there will probably be a certain amount of thirst. The temperature tends to have a fall and rise at intervals of twenty-four to forty-eight hours. If an operation is done there generally is a definite fall in the temperature chart, even to normal, though in most cases of bacteræmia a rise will occur again within a few hours. The blood taken for investigation should be taken either close upon or at the height of the temperature rise.

Prognosis.—The prognosis in bacteræmia, when it can be separated from pyæmia, is not bad.

Treatment.—In mild forms of bacteræmia no specific treatment is necessary—that is to say, cases in which a series of successive cultures made from the blood shows a steady diminution in the number of microbes. I think myself, however, that one should always open the mastoid if one had reason to suspect that it had been the original source of infection, without waiting to observe whether the bacteria diminished in number or not; that in such cases pus should be searched for and evacuated, and this should, perhaps, be considered as the most important preliminary treatment; one should not proceed to examine the lateral sinus unless one found disease so intractable as to justify a second operation. One should remove the whole of the cancellous bone as deeply as necessary, leaving only hard bone, and being perfectly certain that every possible focus of suppuration has been removed. If marked signs of disease are found one would at the same time incise the tympanic membrane and freely enlarge the aditus. In addition to operative treatment the following three methods may be of use, all of which I employ simultaneously:

(1) Treatment by autogenous vaccine, and while this is being prepared, for the sake of saving time, one uses a stock vaccine of the correct microbe, or anti-streptococcic serum is used as in Cases 2 and 3.

(2) One should then employ the best blood antiseptic which is available; in my opinion the best is urotropin. This should be given in full doses.

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(3) Finally, normal saline solution should be used liberally, preferably, of course, by subcutaneous injection. Failing this, it should be administered by rectum. This method cannot be employed for very many days at a time. Even in quite small children one should use at least a quart of normal saline, and in adults two to four quarts a day in severe cases.

As regards urotropin, this must, as I have previously said, be administered in full doses, despite the fact that it is said to—and undoubtedly does at times—have a bad effect upon the kidneys. As long as the saline solution is used freely, it is extremely doubtful whether renal irritation would ever be produced, or any of the other disturbances attributed to this drug, on account of its great dilution. But, to my mind, its extreme value in combating bacteræmia more than compensates for any risk that may be run in the direction of the condition of the kidneys.

CARCINOMA OF THE LARYNX: LARYNGO-FISSURE; PATIENT FREE FROM RECURRENCE AFTER ONE YEAR.[1]

By E. Hamilton White,
Montreal.

The patient, a male, aged fifty-eight, was first seen on June 8, 1917, complaining of weakness of his voice after talking for a short time. He had noticed this in March, 1917, and had an impression that he might have injured his throat in some way by a hard particle of food.

Apart from this weakness of his voice he had no complaints or discomfort in his throat. The general history was without interest beyond the fact that he had been a heavy smoker for some years.

The examination of the larynx showed a small reddish tumour at the junction of the posterior and middle thirds of the left vocal cord. The tumour was about the size and shape of half a small pea; there was no limitation of movement of either cord. The mucous membrane of the larynx showed no congestion, so that the tumour showed up well with sharply defined margins.

The general physical examination by Dr. W. F. Hamilton showed nothing of moment, and the Wassermann blood test was negative.

The patient was told that in all probability the condition was malignant and he consented to whatever operative measures were thought advisable.

On June 21, 1917, the projecting tumour was removed with local anæsthesia by direct laryngoscopy, and Dr. Oertel reported the tissue malignant (epithelioma).

On June 26, 1917, laryngo-fissure was carried out under chloroform anæsthesia. Dr. Garrow, who had seen the case with me in consultation, kindly assisted.

After median tracheotomy, the larynx was opened and the left cord removed by stripping it off with the perichondrium. The left arytenoid cartilage was removed along with the cord, making a wide removal without approaching the site of the tumour at any point. Sections of

[1] *Reported at the Montreal Medico-Chirurgical Society on February 7, 1919.*

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