by the streptococcal infection of the meninges which had obviously occurred before death. The cerebro-spinal fluid of this patient had given a positive reaction before death. A known positive cerebro-spinal fluid was inoculated from a culture of this streptococcus, with the result that a considerable degree of haemolysis was obtained.

With regard to the serums giving positive reactions in cases that were not apparently specific, we would explain the anomalous reactions as the result of decomposition of the serum, for we have found that as soon as the serum commences to show any turbidity the reactions will tend to become positive. In some of these cases decomposition had obviously commenced even when the blood was removed from the body.

CONCLUSIONS.

While, therefore, our observations lead us to consider that the reactions on the blood and cerebro-spinal fluid removed from the cadaver before decomposition has commenced will give reliable results, we agree with Luksch that decomposition is liable to alter the reaction, as may also a terminal microbial infection. This change, however, is not confined to the alteration of a negative to a positive result, but may alter a positive into a negative; and we would point out that decomposition may similarly influence the result of the test on fluids and serums removed during life.

To ensure satisfactory results on *post-mortem* material it is, therefore, necessary to remove the cerebro-spinal fluid and blood as soon as possible after death. The serum should be separated and inactivated at once, and the cerebro-spinal fluid should be carbolized, unless the test can be applied the same day. The same remarks apply with regard to the preservation of material removed during life.

REFERENCES.

¹ *Verhandl. der deutsch. patholog. Gesellschaft.*, 1910, xiv, p. 249. ² *Lancet*, 1910, vol. ii, p. 204. ³ *Ibid.*, November 11th, 1911. ⁴ *Proc. Roy. Soc. Med.*, July, 1910. For complete bibliography see *Syphilis from the Modern Standpoint*, McIntosh and Fildes (Arnold, 1911).

AN ACCURATE METHOD OF ESTIMATING THE VIBRATORY SENSE.

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EGGER in 1899 called attention to the sense of vibration felt when the foot of a vibrating tuning-fork is placed over subcutaneous bony points. The investigations of Bing showed that the sensation is probably conducted upwards in the posterior column of the white matter by fibres which do not decussate. In this country Williamson has shown that the vibratory sense is often lost when other forms of sensation are present. In peripheral neuritis, due to diphtheria, influenza, diabetes and alcohol, it may be lost at an early stage, and it may be an early sign in tabes.

The ordinary method of investigating the vibratory sense does not show the abnormal states which precede its complete or almost complete disappearance. In my investigations I have used the tuning-fork introduced and made by Edelmann of Munich for use in Schwabach's aural test for the absolute bone conduction of hearing. Its vibration frequency is 108.75 a second. Two pieces of steel are attached to the upper portion of the fork, arranged in such a manner that when the arms of the fork are vibrating a small window is seen between them; this disappears when the vibrations of the fork reach a definite amplitude. The moment that the window disappears I apply the fork to the subcutaneous bony point and start a stop-watch. The patient is instructed to give a signal at the moment when he ceases to appreciate the vibration; the watch is then stopped and the time recorded.

By this method on thirty normal individuals I found what period elapses before the sensation disappears at each bony point. The average periods, together with the maximum and minimum, are shown in the accompanying table. In the list there given it is noticeable that the average times over the sacrum and anterior superior spines are considerably less than the time for the other bony points. This is of interest, as Mott and others have found that the vibratory sense may be absent over the sacrum in cases of tabes

	Average.	Maximum.	Minimum.
	Seconds.	Seconds.	Seconds.
Internal malleolus ...	27	35	25
External malleolus ...	28	38	25
Tibia (middle of shaft, inner aspect)	29	37	25
Anterior superior spine ...	21	25	16
Sacrum ...	20	23	15
Sternum ...	30	36	24
Radius (lower end) ...	33	40	28
Ulna (lower end) ...	34	42	28

when still present at the other bony points. This would follow a general depression of the sensation, since it is appreciated over these points less readily than in the other situations.

When this test is applied to patients suffering from impairment of the vibratory sensation a numerical ratio to the average normal is obtained which accurately represents the degree of impairment. I have used a graphic method to demonstrate these changes; the height in the accompanying curves represents the time during which the sensation was appreciated. Superimposed in most cases is a normal average curve for comparison.

CASE I.—Diabetic Neuritis.

Male, aged 54, suffering from diabetes. Pain and tenderness along the right sciatic nerve was the only evidence of neuritis, both tendo Achillis jerks being present. In spite of this the

Fig. 1.—Case I. A, Internal malleolus; B, external malleolus; C, tibia; D, anterior superior spine; E, sacrum; F, sternum; G, radius; H, ulna. — — — Average normal; — — — right side; - - - - left side.

vibratory sense was one-half the normal over the tibia and external and internal malleoli of both sides, the right being only slightly more affected than the left.

CASE II.—Plumbic Neuritis.

Male, aged 32, suffering from lead poisoning. The right musculo-spiral nerve was markedly affected, the left very slightly.

Fig. 2.—Case II. A, Internal malleolus; B, external malleolus; C, tibia; D, anterior superior spine; E, sacrum; F, sternum; G, radius; H, ulna. — — — Average normal; — — — right side; - - - - left side.

The chart shows marked impairment over the radius and ulna of both arms, there being very little difference between the two sides. The legs are affected to a slight extent, although there was no other evidence that they were affected.

CASE III.—Traumatic Ulnar Neuritis.

Female, aged 34. The chart shows that her power of appreciating the vibrations was five-eighths of the normal over the right ulna.

Fig. 3.—Case III. A, Internal malleolus; B, external malleolus; C, tibia; D, anterior superior spine; E, sacrum; F, sternum; G, radius; H, ulna.

CASE IV.—Tabes.

Male, aged 54, with the signs of a typical tabetic. The vibratory sense is markedly impaired from the sacrum downwards, while the sternum, radius, and ulna are approximately normal.

Fig. 4.—Case IV. A, Internal malleolus; B, external malleolus; C, tibia; D, anterior superior spine; E, sacrum; F, sternum; G, radius; H, ulna. — — — — Average normal; ——— right side; ——— left side.

CASE V.—Disseminated Sclerosis.

The chart shows a lesion of a different type to that of the tabetic (Case IV). The impairment of the vibratory sensation is more disseminated, and involves chiefly the right arm and left leg, while the sacrum is normal.

Fig. 5.—Case V. A, Internal malleolus; B, external malleolus; C, tibia; D, anterior superior spine; E, sacrum; F, sternum; G, radius; H, ulna. — — — — Average normal; ——— right side; ——— left side.

CASE VI.—Spinal Syphilis.

Male, aged 28. The chart is of the same type as that of the case of disseminated sclerosis, but there is more marked involvement of the vibratory sensation.

Fig. 6.—Case VI. A, Internal malleolus; B, external malleolus; C, tibia; D, anterior superior spine; E, sacrum; F, sternum; G, radius; H, ulna. — — — — Average normal; ——— right side; ——— left side.

In this paper I have not attempted to discuss in detail the types of curves peculiar to any special disease of the central nervous system, but merely to describe a test by which slight impairment of the vibratory sensation can be recognized. Of its value in the early recognition of organic nervous disease and in the diagnosis between different diseases I hope to bring evidence in a later paper.

I wish to thank Dr. A. F. Hertz, Physician in Charge of the Neurological Department at Guy's Hospital, for his kindness in allowing me to examine the cases under his care.

THE CURATIVE VALUE OF LEISHMANIA CULTURE "VACCINE" IN ORIENTAL SORE.

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Preliminary Note.

THE chronic and obstinate nature of the Oriental sore in general and of the Cambay ulcer in particular is well recognized by all clinicians. The number of remedies and the variety of drugs which have been put forward from time to time as "specifics" for this disease, as also the scanty references on the treatment of this disease in text-books, may be taken as a fair index of the unsatisfactory nature of the therapeutics of this disease. In Cambay, the home of this disease on this side of India, all remedies, both internal and local, have lost repute to such an extent that people take the disease as one to which they have to submit as a matter of course (so long as their lot is cast in Cambay) until merciful Nature brings about a healing in her own time, this being, as a rule, anything between six to eighteen months, or even longer.

In these circumstances it has not been possible in Cambay to test the value of drastic measures (such as curetting of the lesions with sharp spoons and salting the surface so freshened with powdered potassium permanganate), as recommended by Nicolle¹ and Benoit Gonin.² Nor has it been possible to persuade patients in Cambay to submit to arsenobenzol injections for what is, after all, a benign malady. The only treatment which can be safely undertaken without the risk of scaring away the patients has until now consisted in the application of some non-irritating antiseptic oil or unguent. And of all these I may here record the efficacy of salol dissolved in olive oil. Salol dissolves easily in olive oil, over 1 drachm dissolving in 1 ounce of the oil. The oil, when rubbed into the skin, is well absorbed and it penetrates the tissues, and has probably some antagonistic action on the parasite without causing the least irritation. I have obtained very good results by applying the oil in the shape of a compress over the lesion before or after ulceration, and, except in those cases in which the ulcers have been already deep at the commencement of the treatment, the result is so satis-