cells, 13,000 per c.mm. He had slight congestive symptoms, and stated that the intervals between the development of these symptoms were longer than they used to be. On February 8th the Wassermann reaction was retested and found negative (he was still continuing anti-syphilitic treatment). On the 25th the congestive symptoms were again intense, and a venesection was performed, only 250 c.cm. of blood being removed owing to difficulties due to the high viscosity. The blood count was: red cells, 10,300,000 per c.mm.; haemoglobin, 120 per cent.; white cells, 21,600 per c.mm. The viscosity time for whole blood with the same tube was 23 minutes. The Wassermann reaction was again negative.

As the patient here described has been seen at one time or another by probably every physician in Sheffield, I regret if I have not asked the permission of all of them to publish the case. I am indebted to Dr. Margaret Platt for the viscosity tests.

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INTRANASAL TREATMENT BY IONIZATION IN HAY FEVER, VASOMOTOR RHINITIS, AND OZAENA

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In the eighteenth century, when the static machine was the only source of electrical supply, Privati and L'abbé Nollet discussed the possibility of introducing medicinal substances into the body by means of electricity. The discovery of the electric cell in the early part of the nineteenth century and the subsequent rapid advance in electrophysics made possible the application of the galvanic current to the human body. Throughout the nineteenth century many reports were written of the results obtained by the electrolytic introduction of substances into both human and animal tissues. In 1833 Fabre-Palaprat claimed remarkable success in the treatment of malaria by the electrolytic introduction of quinine through the healthy skin. A wider interest in the subject of ionization in electrotherapy was created by Leduc when he published the first of his series of papers in 1900, while his address before the Radiological Section of the British Medical Association in 1907 resulted in the more general adoption of the method in this country. Since then Stevenson, Cumberbatch, Friel, and others have, by their writings, assisted the growth of the seed planted by Leduc.

Experience has taught us that physiological and chemical changes are effected by the action of the galvanic current on the body tissues, and that hyper-irritable areas are rendered less sensitive. In 1924 I first began to note the effect of zinc chloride and zinc sulphate solutions on the sensitive areas of the nasal mucosa. These areas are particularly affected in hay fever and vasomotor rhinitis. They are situated mainly on the surface of the inferior turbinate bone, the lower border of the middle turbinate, and the adjacent surface of the nasal septum. They readily respond to the changing humidity and temperature of the inspired air. Their reactions are controlled by a delicate nerve mechanism involving, it is thought, a nerve centre in the medulla oblongata, which receives impulses through the fifth, tenth, and eleventh cranial nerves and the sympathetic system. The normally maintained physiological balance may be upset by a variety of factors—extrinsic, acting through the inspired air, intrinsic, acting through the blood stream, and reflex, from stimulation of distant parts of the vagus and

sympathetic system. The clinical expressions of the imbalance so produced are congestions of the nasal mucosa, sneezing, rhinorrhoea, and itching of the inner canthus, nasal vestibule, roof of mouth, neck, and, as is sometimes experienced in hay fever, of more distant skin surfaces. Drake (*British Journal of Dermatology*, 1928) associates an asthma-eczema-prurigo complex with these clinical manifestations, which he ascribes to a dysfunction or disharmony of the autonomic nervous system. It is outside the scope of this article to consider the debatable causes of this nasal imbalance, or its relation to the specific or allergic phenomena in general. Intranasal ionization is essentially a local treatment, and, at least in hay fever, the relief of symptoms seems to be independent of any exciting cause.

The treatment by zinc ionization of the hypersensitive areas in the nose has in my experience given relief in a higher percentage of cases than have other methods. The relief is obtained with relatively little discomfort and with few applications. The technique, simplified by use of the intranasal ionizer, was described in the *British Medical Journal* of June 27th, 1931 (p. 1115). Zinc chloride and zinc sulphate in 1 per cent. solution are equally effective, provided that a small amount of glycerin is added to the latter. Thin films of wool are soaked in the solution, wrung out flat, and applied to the sensitive areas of the nose. The exact application of the thin wool films to the middle turbinate, the adjacent septal surface, and the inferior turbinate is of the first importance, and should be carried out with the assistance of a proper illumination by direct or reflected light. The subsequent packing presses the films firmly in contact with the mucosa and fills the remaining space in the nose so that all the wool is in contact with the intranasal zinc rods. A range of current from 2 to 5 milliamperes is passed for fifteen to twenty minutes. Both sides of the nose may be treated simultaneously, unless the patient is particularly sensitive. A metallic taste is at once experienced, which serves as a useful indication that the current is properly applied. An interval of ten days should elapse between treatments. A careful inspection of the nose and sinuses should, if possible, be made in the quiescent period. Marked obstruction, or any factor liable to interfere with the efficiency of the nose, should be dealt with. Although an operation for obstruction or the removal of a pathological lesion may not directly affect the occurrence of hay fever, it does allow better access for treatment by ionization. Extreme cases of nasal obstruction cannot otherwise be adequately treated. The treatment may be given either before or during the hay fever season.

RESULTS OF TREATMENT

Hay Fever.—Of fourteen cases treated before the season, eleven had no attack during the following season. Three were not benefited. The average number of treatments was six, at fortnightly intervals. The return of any symptom, notably of itching of the eye or nose, is an indication for further treatment. In this quiescent period the ionization should produce a white film on the treated mucosa.

Seventy-seven cases were treated during attacks. Fifty-one were females and twenty-six males, the ages ranging from 10 to 62 years. Fifty-four had no further attacks, six were not benefited, and eleven failed to report. Most of the cases had two or three treatments. All were extreme cases, which had previously undergone various types of treatment without benefit. In some cases the symptoms were intensified for twenty-four to thirty hours, followed by relief; others were relieved with dramatic suddenness. The sneeze was the first symptom to disappear, and the itching, especially of the eye, the last. In many cases the eye continued to irritate although the sneeze and rhinorrhoea were relieved. The swollen, turgid tissues were contracted at the end of treatment, but the white film deposited on the mucosa of the quiescent cases was not seen. It is impossible for me to explain the action of ionization

in these cases. I have latterly observed an absence of any excoriation of the nasal vestibule on the treated side as compared with the untreated side in cases of non-seasonal watery rhinitis, which suggests that the chemical nature of the nasal secretion is altered, some irritant constituent becoming non-effective.

Vasomotor Rhinitis.—Twelve cases were treated, and in general the results were not so definitely satisfactory. Two cases were sufficiently relieved to require no further treatment. One of these is a medical man with a busy panel practice, who was considerably hampered in the performance of his duties, but who is now able to enjoy his work again. Four cases which have been treated at fortnightly intervals for six months are better, but still have occasional, but fewer and milder, attacks. Six patients did not have the patience to continue after two or three treatments. Most cases of seasonal and non-seasonal rhinitis have an apparently normal nasal mucosa during the quiescent period. In many cases a pallor or bluish tint is constantly present. In a few cases small cysts or even a well-defined polyp can be seen attached to the outer surface of the anterior part of the middle turbinate. The normal reddish hue of the nasal mucosa returns after successful treatment by ionization.

Ozaena.—The following is the only case of ozaena that I have seen cured. V. M., female, aged 24, was first treated by nasal ionization with copper sulphate 1 per cent. solution in January, 1931. Treatment was given for three months at fortnightly intervals, and continued at three- and four-weekly intervals from March to October. There has been no treatment since. Present condition (February, 1932): there are no scabs and no discharge, and the originally crusted and atrophied middle turbinates may now be described as oedematous. The odour has entirely vanished.

SUMMARY

Further details of the technique of intranasal ionization are described, and a report given of the results of the treatment in ninety-one cases of hay fever, twelve of vasomotor rhinitis, and in the only case of ozaena that has yet been fully treated. These results, which cover a series of cases treated during the last year, bear out the hopeful prognosis suggested in a previous communication.

Memoranda

MEDICAL, SURGICAL, OBSTETRICAL

STREPTOCOCCAL (HAEMOLYTIC) MENINGITIS: RECOVERY

We feel that the following case justifies publication, not so much on account of its happy issue, but because this appears to have been directly determined by treatment.

HISTORY OF THE CASE

A farmer, aged 45 years, was seen by one of us (T. R. T.) on November 30th, 1931, complaining of extreme lassitude and malaise. There were no physical signs at this time to account for the symptoms. The patient had been in the habit of working on his farm from 4.30 a.m. to 7 p.m. for several years, and apart from earlier evidence of generalized arteriosclerosis and recurrent bronchitis his medical history was unimportant.

On December 3rd he first experienced headache, and was found to have a temperature of 101° , and a pulse of 100. For the next few days his condition did not alter greatly, except that a hacking cough developed and constipation was obstinate. Vomiting then began, and was accompanied by increased severity of headache, felt chiefly in the frontal and occipital region. Scattered rhonchi were detected in both lungs and moist sounds at the right base. Vomiting persisted until we saw this case together on the evening of December 9th, when the following abnormalities were observed. The patient was thin, flushed, and confused. He groaned continually, and complained bitterly of headache. Temperature 101° , respiration 26, pulse 100, and bounding in character. Thickened and tortuous arteries in arms and retinae. Signs

of partial collapse at base of right lung. Advanced pyorrhoea, imparting sweet odour to breath. Red, dry, glazed pharynx, and dry, furred tongue. Urine: specific gravity 1020, trace of albumin. The pupils were contracted, headache was severe and aggravated by the slightest movement of the head. There was moderate stiffness of the neck, and any attempt at flexion was resented. The tendon reflexes were diminished, the plantar responses flexor. Kernig's sign was absent. Occasional twitchings of the limbs were observed.

Lumbar puncture produced fluid which was slightly turbid, but not obviously under pressure. Investigation by Dr. C. Dukes gave the following results. Blood: leucocytes, 10,200 per c.mm. Cerebro-spinal fluid: turbid; 700 leucocytes per c.mm.; stained films revealed large number of streptococci; cultures gave a pure growth of haemolytic streptococci.

In view of the inflamed condition of the gums and pharynx it was thought probable that this area provided the portal of entry for the organisms, and that the meningitis was of blood-borne origin.

TREATMENT

On December 10th, 10 c.cm. of scarlatinal antitoxin (B. W. and Co.) was given intravenously, and this was repeated on the following day, together with 10 c.cm. intrathecally. The patient showed, after the first dose, some improvement in the condition of his mouth and in the relief of headache. Within six hours of the intrathecal injection his appearance was quite changed, all malaise having disappeared; this was accompanied by a return of appetite. A third intravenous injection was given on December 12th, from which date he made a rapid and uneventful recovery.

COMMENT

The transformation of an apparently moribund patient, suffering from a disease of high mortality, to a cheerful convalescent in the course of two days was most dramatic, and seems clearly referable to the efficacy of the serum employed.

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PROSTATECTOMY IN A NONAGENARIAN (AGED 95)

Dr. William S. Dickie, in the *British Medical Journal* of February 20th, records a case of radical cure for hernia in a male aged 90. This case raises the question of the suitability of elderly subjects for operative intervention. All of us must suffer from a natural reticence and shrink from disturbing that peace and sanctity due to the aged. It has been my lot to have operated upon rather more than my share of octogenarians of both sexes. Urgent situations, such as intestinal obstruction, acute gall-bladder, and acute appendix, have rendered operation inevitable for the saving of life or to overcome pain which rendered life intolerable. These are justifications for operation at any age, and the aged are no exception, especially as they withstand surgical shock in a remarkable way. Moreover, it generally happens that those who have lived to such great ages have the will to go on living, a factor notorious for its aid during convalescence. In more recent years I have performed a considerable number of successful prostatectomies in patients over 79 years of age, and in each case the subject and his relations have rejoiced in the result. Nonagenarians, however, undergoing this operation—and successfully—are sufficient rarities to justify publication. One, aged 95, I operated upon in collaboration with Mr. John E. Payne, F.R.C.S., of Eastbourne, in October, 1931. As an example of the will to live, this patient asked me before operation to cure his inguinal hernia at the same time, as his truss interfered with his golf! The operation was performed in two stages—the first on October 2nd and the second on October 16th. Urine was passed naturally on the eleventh day after prostatectomy, and he was healed and getting up on the twenty-first day. To-day he is in the best of health and has resumed his golf. In aged