

and she was almost moribund. From that date onwards for a fortnight she was given 2 ml. "anahaemin" daily, but at the same time she took two capsules of "benadryl," 50 mg. each t.d.s., and to my great relief and hers no urticaria appeared. For the past three weeks she has been given 2 ml. "anahaemin" twice weekly, and the dose of "benadryl" has been reduced gradually to one capsule taken after the injection only. As an experiment, on two occasions the "anahaemin" has been given without "benadryl" at all, and each time a mild urticaria of the arms and legs has appeared.

She is now very fit, and is continuing on once-weekly injections of the liver followed by one capsule "benadryl," with no untoward effects. No haematological examinations have been done on this occasion, partly for financial reasons and chiefly because the diagnosis of pernicious anaemia had been established in the past.—I am, etc.,

Bournemouth.

JAMES NICHOLSON.

Treatment of Osteoarthritis by Lactic Acid Injection

SIR,—I am grateful to Dr. R. Mawson for his article (Nov. 9, p. 691), and I envy him his power of lucid exposition and graphic description. As originator of this method of treatment I find little to cavil at, and if I differ from him in certain details of technique I hope he will not think me captious. During the last twelve years I have been responsible for the injection of approximately 10,000 cases, and this experience has led me to the following conclusions.

(1) It is a mistake to use a local anaesthetic. I use much finer needles than Dr. Mawson—e.g., for hip-joint a needle $3\frac{1}{2}$ in. (9.4 cm.) with a bore of 0.55 mm., for the knee a needle of 20 S.W.G. bore. (Incidentally, why, oh why do the manufacturers cut down the length of the needle with the bore?) I attribute my complete absence of sepsis to these two factors.

(2) I very rarely use the anterior approach to the hip-joint, for the reason that effusion in the joint (more often experienced than I had thought likely) or an excessive amount of peri-articular thickening may displace the vascular packet and the femoral nerve laterally, and in stout patients the pulsation of the artery is not easily felt.

(3) For the wrist-joint proper I inject via the anatomical snuff-box: but the division of this joint into radio-carpal and ulna-triangular ligament-lunate articulations is an artificial discrimination remote from clinical reality—vide Prof. Seddon's x-ray movies of the wrist or the average case of atrophic arthritis, where the ulnar side of the wrist is frequently more seriously affected than the radial; and I agree with Dr. Mawson that it is frequently useful to enter the wrist-joint via the ulnar side. In any case the synovial cavity communicates on the proximal side of the triangular ligament with the inferior radio-ulnar joint, and on the distal side with the radio-carpal articulation.

(4) I believe from x-ray examination that if severe pain is complained of immediately after injection the point of the needle is under the periosteum or the cartilage. I have not experienced it since I formed the practice of withdrawing the needle a short distance before pushing the plunger. Deliberate infiltration of the thickened capsule does not cause undue pain.

(5) The use of acid injection in active atrophic arthritis is not recommended. My admittedly inadequate observations of the joint pH in this phase tend to show that it is certainly not alkaline.

The suggestion has been made repeatedly that the procaine is the active ingredient in the improvement gained: Warren Crowe, however, using acid potassium phosphate without procaine, obtained highly satisfactory results; and in any case, most procaine solutions have a pH figure well under 7.—I am, etc.,

Sunderland.

W. GRANT WAUGH.

Immunization against Whooping-cough

SIR.—It is very encouraging to read in the *Journal* of Nov. 9 (p. 699) that the Medical Research Council is initiating in certain limited areas, in co-operation with the medical officer of health of those particular areas, experimental inoculation against whooping-cough. Its results and conclusions will be awaited with great interest.

The following comments are from the point of view of a G.P. interested in this subject for close on 20 years. (Sugare H., and McLeod, J. W., *Lancet*, 1929, 2, 165.) There is great need in this country for a more extensive study of immunization against this disease, which causes such impairment of health and loss of school attendance. Several extensive investigations of its value have now been carried out, chiefly in Denmark and the United States. Their results are very favourable and point to its successful prophylactic use.

It is suggested that facilities for active immunization against whooping-cough should be made available by the public health authorities in the same way as in diphtheria, taking into account the view that the injections should commence about the age of 6 months. Combining the injections against whooping-cough with those against diphtheria has also been used. Preliminary trials have been favourable in doses of 0.5 and 1 ml. at intervals of four weeks. This combined vaccine is now generally available. More extensive trial is required, however, before assessment of the efficacy of its prophylactic use can be established.—I am, etc.,

Leeds.

H. SUGARÉ.

The Fenestration Operation for Otosclerosis

SIR,—In the interesting article by Mr. I. Simson Hall (Nov. p. 647), the passive part attributed to the *stapes*, one of the most fascinating mechanisms in the body, appears to me rather misleading.

In 1931 I challenged the theory, held at that time, that the function of the secondary membrane was limited to permitting the passage along the *scalae* of movements generated at the *fenestra ovalis*, and I give a brief summary of the main points in support of my present view. In the case of a cone, such as that of the *membrana tympani*, with its base attached to the *sulcus tympanicus* and its apex directed inwards, any movement inwards would be arrested, and its pressure sustained by its attachment to the *sulcus*. The pressure of the apex on and the resulting movement of, the *malleus* would represent a negligible fraction of the energy of a sound wave. I maintained that, mathematically, pressure on the interior of a cone of radiating fibres would produce movement of the apex inwards, towards and not away from the base.

Subsequently, in my little work *Hearing and Equilibrium*, published photographs of an improved model (Figs. 1 and 2) which, in my view, demonstrated conclusively that the hypothesis was correct, and that pressure, insufficient to produce extension of the fibres, tends to convert the cone into a segment of sphere, which expands as the pressure exceeds that strength. In the case of the *membrana tympani* the effect of the initial change is a movement of the apex and manubrium outwards toward the plane of the *sulcus*, while that of the second change is a movement in the reverse direction; movements respectively supplementing weak, and resisting excessive, movements of fluid generated at the *fenestra rotunda*. The only light pressure which would resist, instead of assisting, the outward movement would be any directly on the handle of the *malleus*; but owing to the downward direction of the inner end of the external canal and the further extension downwards of its roof, waves sweep down towards the *fossula rotunda*, across rather than against the membrane, and the short process of the *malleus* diverts pressures, which would otherwise reach the handle, to the membrane on either side. In the middle ear the depth, direction, and position of the *fossula ovalis* protects the surface of the *stapes* from pressures created by sound waves, while not interfering with the action of the ossicles. Finally the fluid movements generated by the secondary membrane are immediately to and from the *scala tympani*; while, on the contrary, those by the *stapes* are directed across the entrance to the *scala vestibuli*, a construction which, for reasons given elsewhere, does not affect its supplementary action.

Action of the *tensor tympani*.—Waves do not penetrate the *membrana tympani*; movements in the middle ear in harmony with sound waves are generated by its deep surface. Those from its lower more vertical part are directed immediately towards the *fossula rotunda*; while those from its upper relatively more horizontal part are mainly directed to the region above the *fossula ovalis*. The *tensor tympani* responds to sound in a manner resembling the response of the iris to light. As sound becomes excessive it forces the *stapes* into the *fenestra ovalis* with