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 3¼ 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 periarticular 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 *p*H 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 *p*H 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. (Sugaré, 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. 2, 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*, I 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 a 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 towards 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, on 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

increasing strength, thus preventing excessive movement of the fluid. Simultaneously it raises the tension of the membrane, reduces the amplitude of the movements generated by sound waves and, consequently, of the movements generated by its deep surface towards the *fossula rotunda*. It would be difficult to conceive a more beautifully co-ordinated arrangement for the rapid appropriate conversion of a supplementary into a protective mechanism.

The apparatus consists of a cone of elastic tissue ribbed with comparatively inelastic material, and sealing the upper glass vessel, thus simulating the *membrana tympani* separating outer and middle ears. Two straws (B and S) lie side by side across the base of the cone, but S is hinged at H, and has a looped attachment at L to a small vertical straw resting on the apex of the cone, while A serves as a guide and an indicator for the upward movement of S. S thus simulates the *malleus*.

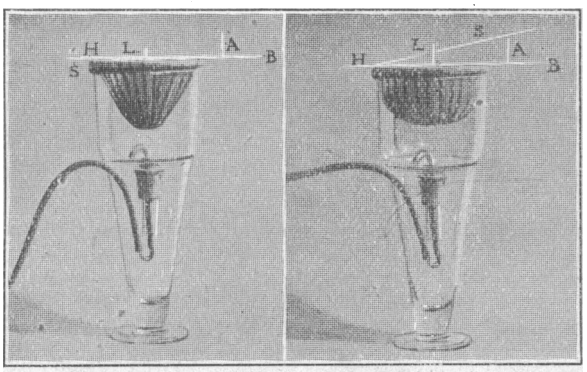

Fig. 1 Fig. 2

In Fig. 1 the atmospheric pressures are equal on the two sides of the membrane, while in Fig. 2 the glass chamber is partially evacuated with the cone assuming a more hemispherical shape and its apex unexpectedly rising as a consequence of the inelasticity of the radiating ribs.—I am, etc.,

H. MACNAUGHTON-JONES.

Facial Palsy Accompanying Acute Mastoiditis

SIR,—With regard to Mr. Arthur Miller's letter (Sept. 28, p. 474), it seems to be worth mentioning that high power magnification now enables one to view the horizontal or intratympanic portion of the facial canal much more clearly than before. The pinkish-yellow nerve appears to be very thinly covered by bone, so thin in fact that one suspects that an actual dehiscence is present, only to find that there is a covering of very transparent bone. Personally I am surprised that facial palsy is not more common when the tympanic cavity is the site of severe inflammatory changes.—I am, etc.,

London, W.1. IAN G. ROBIN.

SIR,—May I comment upon the sulphonamide treatment of Case 4 of facial palsy accompanying acute mastoiditis as reported by Dr. Kenneth R. Ogilvie (Aug. 24, p. 263), as this is a matter of considerable importance. The history as reported gives no information as to the onset or duration of the preliminary attack; and apparently, although otorrhoea was present, the only treatment was "a sulphonamide—2 g. daily for five days."

It is a golden rule in cases of otorrhoea that the ear must be kept "clean and dry," and this suffices for the great majority of cases—at least in this part of the world. With regard to sulphonamide therapy, it is unfortunate that indiscriminate and ill-informed use of sulphonamides is so widespread. Sulphonamides are not without their dangers, but it must be realized that insufficient dosage is worse than useless, for not only does it fail to cure but it does develop resistance to sulphonamides in organisms that are otherwise susceptible, and may lead to a false sense of security. I consider it wrong and dangerous to give sulphonamides to ambulatory patients.

In the case in question 2 g. daily for five days was a totally inadequate dosage, and from the information given was probably administered not early enough. In cases of acute otitis media the administration of sulphonamides must be in adequate dosage, be commenced early, be conducted with the proper safeguards, and under careful supervision. Neglect to observe these conditions has been responsible for much unwarranted criticism of the use of these drugs in acute otitis media. To reserve chemotherapy for "cases which show a tendency to spread outside the mastoid process . . ." is to subject many patients to the risk of operations, illness, and expense which could be avoided by early and sufficient intelligent care.—I am, etc.,

Brisbane. ERNEST CULPIN.

Transmesenteric Hernia

SIR,—The recent correspondence on this relatively uncommon subject has produced interesting differences of opinion concerning its aetiology. As I recently had the opportunity of operating on one of these cases I would like to add my support to the view of its congenital origin so well stressed by Mr. E. G. Dolton (Nov. 2, p. 667).

In my case there was a history of apparently intermittent obstruction extending over a fortnight, and the patient when seen was *in extremis*. There had been no history of abdominal injury. At operation it proved impossible to reduce the prolapsed small gut, and as the obstructing twist was seen in the terminal two inches (5 cm.) of the ileum and was not gangrenous, a rapid lateral anastomosis between the lower portion of the distended ileum and the caecum was done. Unfortunately, on completion of the operation, a tragedy supervened. The patient vomited violently and aspirated a quantity of vomitus, dying in a few moments despite all attempts at aspiration and cardiac massage, etc. I should add that the stomach had been emptied and spinal analgesia employed, but it was found necessary to supplement this by inhalation anaesthesia.

At the subsequent necropsy it was found that the opening in the mesentery measured four inches (10 cm.) at its greatest diameter and was approximately circular. Twelve feet (3.6 m.) of small gut had herniated through the opening, explaining the difficulty in attempting to reduce it at operation. But the important point was that a very careful and detailed examination of the edges of the opening was possible, and this left no doubt whatever that it was in fact a congenital development. Blood vessels of normal size ran along the free margin and anastomosed to complete the pattern before entering the gut. There was no evidence of any previous inflammatory changes and no evidence of healed blood vessels, which must have been torn if the defect had been caused by injury. The very shape of the defect—almost circular—must, I think, dispose of the possibility of trauma, since massive haemorrhage must have resulted.—I am, etc.,

Londonderry. W. V. BEACH.

Fewer Strengths of Insulin Preparations

SIR,—Originally there was only one strength of insulin solution—20 units per ml. Now there are three strengths on our market—20, 40, and 80 units per ml. Each batch has to be carefully and expensively standardized, checked, labelled, and issued. The manufacturers and the M.R.C. carry out this long-accepted labour ingrained by pharmacopoeial regulations, and it remains for a clinician to state that it would be both helpful in practice and economical in production to omit the weakest solution—20 units per ml.

For many years my diabetic clinic and many others have never used the weakest solution—U.20—nor found it necessary. Even if an unusually small injection of under 10 units is being given, it can be measured accurately enough in U.40 strength. In doses of over 10 units U.40 should always be used for the benefit of small-bulk injections. For the same reason, for still larger doses U.80 should be used instead of U.40.

Mistakes in insulin dosage are all too frequent and would be minimized with only two strengths. Other countries have been worse off, and the Americans have produced 10, 20, 40, 80, and 100 units per ml. strengths. They now propose only two—40 and 80 units per ml. Surely there will be unanimity over this simple suggestion. The clinicians give their blessing, the M.R.C. and the *Pharmacopoeia* add theirs and change the regulations, the manufacturers bless everybody and act quickly—I hope.—I am, etc.,

King's College Hospital, S.E.5. R. D. LAWRENCE.