maintenance. It is, however, advisable towards the close of the anaesthetic gradually to admit air to the circuit and simultaneously to allow slightly less absorption, so that the patient leaves the theatre with alveolar nitrogen and carbon dioxide tensions as near the resting normal as possible and is less likely to have the depressed respiration which is almost as bad for his ward sister as for him.

Dr. Maidlow also holds that the use of an endotracheal tube necessitates the use of more curare to relax the larynx. I would suggest that cocaine would make the larynx more tolerant of the tube without predisposing to post-operative respiratory depression.—I am, etc.,

Woodford Green, Essex.

DONALD V. BATEMAN.

d-Tubocurarine

SIR,—May we, as manufacturers of *d*-tubocurarine chloride, comment on the paper by Dr. Gordon Ostlere (April 5, p. 448)?

Nomenclature of Curare Preparations.—We suggest that in order to avoid confusion the general term "curare" should not be used as it has been in the past when referring to preparations of the drug. "Curarine," as originally issued by us, was solid crystalline *d*-tubocurarine chloride. For the convenience of the profession this has been replaced by "tubarine," an aqueous solution of *d*-tubocurarine chloride.

Sterility.—The extemporaneous preparation and sterilization of solutions containing *d*-tubocurarine chloride is no longer necessary, as tubarine is a sterile solution. Attempts to sterilize *d*-tubocurarine chloride solutions by heat will probably cause a partial decomposition of the salt; this may account for some of the variations in response reported and possibly for some of the side-effects.

Stability.—Ostlere states that "The potency of these preparations remained fairly constant as long as required, in some cases up to six months." It is not clear whether he is referring to all the preparations he lists or only to the solutions made up by him. The method of preparing tubarine ensures its stability over considerable periods under normal conditions of storage.

Curare Preparations and Hypertension.—In the same issue of the *Journal* (p. 445) Drs. J. A. Hobson and Frederick Prescott describe their experiences with tubarine in electric convulsion therapy. They noted no spectacular rises in blood pressure, and, in fact, they deliberately included hypertensives in their series without untoward results. We do not consider that hypertension *per se* is a contraindication to the use of tubarine either in electric convulsion therapy or general surgery. In the well-ventilated patient undergoing an operation with relaxation secured by tubarine the blood pressure rarely rises more than 10–15 mm. Hg (Prescott, F., Organe, G., and Rowbotham, S., *Lancet*, 1946, 2, 80).—I am, etc.,

JOHN CURTIS.

Burroughs Wellcome and Co.,
London, N.W.1.

Tubocurarine and Blood Pressure

SIR,—I was interested to note that Dr. Gordon Ostlere (April 5, p. 448) reports that blood pressure very commonly rises after the administration of curare. The early work on this subject (Griffith) shows no effect on the heart and no rise or fall in blood pressure.

I have of necessity used curare in an open or semi-open circuit and have stepped up the oxygen percentage to 50 or more. By this means, with or without squeezing the rebreathing bag, it is possible to keep the patient well oxygenated, but it is more difficult to ensure that one is giving the patient a flow of mixed gases of at least 5 litres a minute. I think that the explanation of the increase in blood pressure noted may in some cases be due to a rise in blood CO₂ content due to diminished pulmonary ventilation, and in the absence of precise evidence to the contrary would not attribute this vasopressor action to curare or "tubarine." I have myself noted a rise of blood pressure from 150/100 to 180/120 at the end of an operation for closure of perforated gastric ulcer. I used a somewhat similar technique to that described by Dr. Ostlere, and the patient's colour and general condition were good, but there was then paralysis of the intercostal muscles. The blood pressure became normal

(140/100) after artificial respiration. I shall be interested to see what blood-pressure changes have been recorded by anaesthetists using tubarine in a closed-circuit machine with CO₂ absorption.—I am, etc.,

Newport, Mon.

K. STEVENSON THOM.

Pethidine

SIR,—The communication by Miss Josephine Barnes (April 5, p. 437) on the use of pethidine in labour is of interest to the staff at the County of Lanark Maternity Hospital and the Motherwell and Wishaw Hospital, where the administration of pethidine during labour has been a routine practice for over two years. During that time 4,000 cases were given this preparation, with beneficial results in most instances. The effects of the drug were similar to those so accurately described by Miss Barnes.

Miss Barnes noted that effective analgesia was experienced by 55% of the patients. My impression is that a higher percentage would have been gained by giving larger doses of pethidine. At one time we also administered it in quantities of 100 mg., but we found that greater benefit could be obtained by increasing the dose to 200 mg. It is a preparation which every practitioner should include in his obstetrical outfit.—I am, etc.,

Bellshill, Lanarkshire.

SAMUEL J. CAMERON.

Safety in Electric Convulsion Therapy

SIR,—In their article (April 5, p. 445) on the use of *d*-tubocurarine chloride and thiopentone in electric convulsion therapy Drs. J. A. Hobson and F. Prescott have discussed the question of additional therapeutic procedures which they claim to lessen the incidence of the traumatic complications of this treatment. They have sought, therefore, to minimize these risks by the use of curare, and, because this substance produces subjective sensations at least as terrifying as leptazol, have been driven to anaesthetize their patients with thiopentone as a preliminary. Surely a case can be made for adopting a more practical view of the traumatic risks of E.C.T. In my experience, if the patient is placed on a firm surface with a small horse-hair pillow under the thoracic spine, no mechanical restraint is necessary and compression fractures of the spine with symptoms of pain in the back are almost unknown. X-ray photographs show that under these conditions both lumbar and dorsal spine are in very slight hyperextension. A lumbar pad merely increases the extension of the lumbar spine without altering the position of the thoracic spine unless the pad is very large. If these fractures were likely to produce later disability, we should surely by now have heard of some in the eight years that have passed since E.C.T. was commenced at this hospital, but none have so far come to our notice. Such risks from fracture must, from the patient's point of view, weigh lightly when compared with the much more serious risks of curare and thiopentone. Indeed, the authors admit that four deaths have so far been reported in the literature from curare-controlled convulsions.

Drs. Hobson and Prescott further claim that a rise of blood pressure is prevented by curare. For the normal individual this is not important, occurring as it does in ordinary exercise, while the work of American authors has shown how well hypertensive patients tolerate E.C.T. Finally, it is claimed that the unpleasantness of E.C.T. is eliminated. If this is all that is desired, then it seems that thiopentone alone would be sufficient, but let us recognize that E.C.T., properly carried out with modern apparatus, is not particularly unpleasant and that most of our patients complain not of the treatment itself but of the loss of memory and confusion that sometimes follow. In this sphere much can be done with co-operative patients in explaining that these temporary symptoms may be expected.

A therapeutic diagram can be drawn which is a complete circle of medication. If we start with a convulsant drug, such as leptazol, fractures are controlled by curare, while curare is controlled by thiopentone. In the event of an overdose of thiopentone, we come back to the convulsant for its antidote. One wonders what therapeutic heights will be reached if this crescendo of medication is allowed to continue.—I am, etc.,

Warrington, Surrey.

RONALD ARTHUR SANDISON.