in the asthmatic condition—namely, the measurement of airway resistance either by the body plethysmograph, the interrupter technique, or by means of plotting flow against transpulmonary pressure during flow. Although these other indices give useful information they are not as practical as the indirect M.B.C. in assessing the change in the asthmatic condition, and anyhow not many people are equipped with body plethysmographs. Asthma by definition means difficult breathing, and in the great majority of the cases of asthma it is simply the "bellows" function of the lungs that becomes impaired. The indirect M.B.C. (or F.E.V.) gives an overall measure of this bellows function whatever the cause of impairment may be, and is now widely used as an index of change in asthma and other lung conditions.—We are, etc.,

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REFERENCES

- ¹ Bernstein, L., D'Silva, J. L., and Mendel, D., *Thorax*, 1952, 7, 255.
- ² Kennedy, M. C. S., *Proc. roy. Soc. Med.*, 1953, 46, 539.

T.A.B. Reactions

SIR,—Dr. A. J. Zuckerman (11 July, p. 119) reported that in seven recipients of intradermal T.A.B. vaccine the severity of the local reaction was as marked as that encountered following the use of subcutaneous vaccine. Twelve members of the staff of this laboratory were also recently given David Bruce Labs. intradermal T.A.B. vaccine. All developed a zone of erythema, oedema, and slight local tenderness ranging from 2 in. to 3 in. (5–7.6 cm.) in diameter within 24 hours of inoculation. The highest oral temperature recorded was 98.6° F. (37° C.), but marked malaise and nausea was experienced by two persons who had previously received normal T.A.B.C. vaccine. Those of us who have experienced inoculation by both subcutaneous and intradermal methods are agreed that the intradermal is the most acceptable and would not go so far as Dr. Zuckerman in saying that local reaction was of equal severity.

I think the author of your leading article (4 July, p. 2) refers to the intradermal inoculation of the normal "Wellcome" T.A.B.C. vaccine when he states that by that method "occasionally the skin at the site of injection may become tender." The apparent anomaly between our experience and this statement may be explained when considering the total number of organisms injected with each vaccine. 0.1 ml. of the normal "Wellcome" T.A.B.C. vaccine contains 250 million organisms, but 0.1 ml. of David Bruce Labs. special intradermal T.A.B. vaccine contains 500 million organisms. The latter might therefore be expected to produce a more marked skin reaction.—I am, etc.,

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Protection Against Tetanus

SIR,—May I be permitted to express my disapproval of the conclusions reached by the members of the Advisory Group on Pro-

tection against Tetanus quoted in the *B.M.J.* (25 July, p. 243)? They recognize that "active immunization is the only measure which affords reliable protection against tetanus," but they do not express any definite opinion about tetanus antitoxin. They state in at least two places that its use should be "considered."

As an alternative to the use of tetanus antitoxin, they suggest thorough wound treatment and the use of antibiotics "until the wound is healed." Surely this cannot be the policy of the Ministry of Health in 1964? Thorough wound toilet is the only treatment for a wound, and when it is carried out correctly antibiotics are not necessary unless either the circumstances under which the wound was obtained, or the general condition of the patient, make the development of infection either likely or undesirable.

Injections of "combined short- and long-lasting penicillin" is both unnecessary and dangerous. In my casualty department we have had a patient who was made desperately ill for four days by the injection of a depot type of penicillin. Sudden death has occurred and has been reported by many.^{1,2} May I suggest that antibiotics for all until their wounds are healed is both unnecessary and undesirable? The number of penicillin-resistant organisms which this procedure would produce would be very serious. The use of tetanus antitoxin should be discontinued, but penicillin should not be substituted.

Thorough wound toilet makes the use of either tetanus antitoxin or prophylactic antibiotics unnecessary. Everyone who deals with the problem of tetanus recognized that the hazards of the administration of tetanus antitoxin are great. There is some reaction in at least 35% of cases, and Dr. A. G. Freeman (25 July, p. 247) draws attention to the fact that responsible opinion does not seem to be in touch with patients. The Ministry of Health should use its influence to see that active immunization is both easily available and widely practised.—I am, etc.,

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REFERENCES

- ¹ *Brit. med. J.*, 1951, 1, 1269.
- ² *Ibid.*, 1958, 2, 456.

Halothane and Oxytocin

SIR,—I wish to report the occurrence of deep cardiovascular shock which occurred under halothane anaesthesia immediately after the intravenous administration of oxytocin.

During an abdominal hysterotomy and tubal ligation on an 11-week pregnant woman because of chronic nephritis, under anaesthesia maintained with nitrous-oxide-oxygen and halothane, ergometrine (0.5 mg.) and oxytocin (5 units) were injected intravenously. Within one minute the patient became deeply shocked and apnoeic with dilated pupils. Cardiac arrest was suggested but discarded as a feeble pulse was palpable in the abdominal aorta.

At this point the vaporizer was turned off, and the patient's lungs were "washed out" with oxygen; within approximately 10 minutes her blood-pressure returned to its previous level, after 5 mg. of methoxamine had been given intravenously. Her colour and pulse gradually returned to normal, followed by spontaneous respiration, and the operation was completed satisfactorily.

Mayes and Shearman¹ have shown that oxytocin administered intravenously causes a significant and rapid fall of the blood-pressure in healthy conscious subjects, which is directly related to the amount of oxytocin injected. Associated E.C.G. changes included flattening, inversion, and occasional disappearance of the T waves, while similar E.C.G. changes were observed by Sjöstrand² after intravenous injection of adrenaline and during hypoxia. This might possibly represent a sympathetic reaction to hypotension.

In normal conscious subjects the cardiovascular effects of oxytocin injection would be minimal, but in a patient under halothane anaesthesia they are fraught with danger. But there is a danger in using oxytocin and halothane together because of the hypotension produced; this danger also exists with other hypotensive drugs—for example, rauwolfia³—when they are used with halothane.⁴

I am greatly indebted to Mr. H. H. Francis for his kind help and permission to publish this case. I also wish to thank Mr. M. Boyd and Miss A. N. Rogers for their help.

—I am, etc.,

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REFERENCES

- ¹ Mayes, B. T., and Shearman, R. P., *J. Obstet. Gynaec. Brit. Emp.*, 1956, 63, 812.
- ² Sjöstrand, T., *Acta physiol. scand.*, 1951, 24, 247.
- ³ Sadove, M. S., and Wallace, V. E., *Halothane*, 1962. Blackwell Scientific Publications, Oxford.
- ⁴ Llauradó, R., *Cirug. Ginec. Urol. (Spain)*, 1958.

Ampicillin for Typhoid Carriers

SIR,—Dr. Patricia Troy in her letter on the use of ampicillin for typhoid carriers (9 May, p. 1252) appears to ignore the fundamental pathology associated with the carrier state. These patients either have a chronic cholecystitis if they are faecal carriers, or a lesion in the kidney if they excrete the bacilli in their urine. None of the patients described by your correspondent appears to have been adequately investigated, as the results of both urine and faecal cultures are reported without any reference to tests which would identify the site of chronic infection. It is extremely unlikely that these patients had lesions in both the renal tract and the gall-bladder, and I would suspect that the "less reliably positive" urine cultures were due to faecal contamination.

The investigation of a faecal carrier involves cholecystography, and if this fails to demonstrate obvious gall-bladder disease the duodenum should be intubated and a specimen of bile obtained for culture. Urinary carriers should be requested to submit to an intravenous pyelogram, and this may have to be followed by cystoscopy and ureteric catheterization. I have yet to find a faecal carrier who did not have obvious gall-bladder disease with one or more calculi present. The last urinary carrier identified in these laboratories had gross disease of one kidney, including a stag-horn calculus and a chronic typhoid abscess in the renal pelvis.

Ampicillin may have some place in the treatment of typhoid carriers, but it can never replace surgery for the removal of irreversibly diseased foci which cannot be sterilized by antibiotic therapy. To obtain negative faecal cultures for at least a year tells us nothing