

Smallpox vaccination carried out at the appropriate age under strict aseptic conditions, preferably by the single scratch method, with instruments reserved solely for the purpose, and the wound covered by an aseptic dressing until the scab falls off, is invariably safe and successful. I have never known it to be otherwise. On the other hand to advise people to postpone vaccination "until it is needed" is to court disaster. It may be too late.

Smallpox vaccination provides full protection for three years and partial or residual immunity for many more years which results in a revival (or boost) of immunity with a diminished risk of severe local reaction in any subsequent revaccination which may be required.

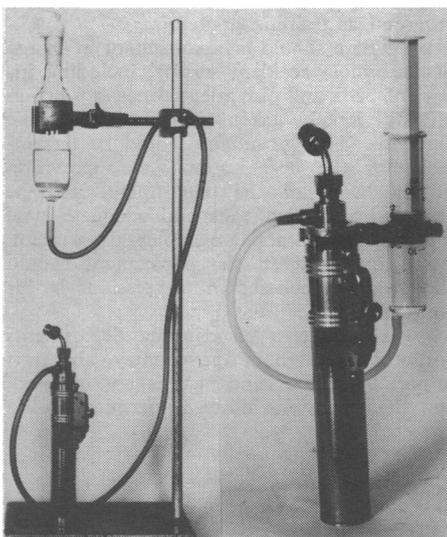
In these circumstances there seems to me to be no valid reason to give up this most useful measure, at least not until smallpox has been completely eradicated from every part of the world—I am, etc.,

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Mass Immunization Technique

SIR,—The Porton Needle-less Injector was designed for mass immunization and three have been used very successfully by Oxfam workers in the cholera epidemic amongst the refugees from East Pakistan. Under these conditions the Injector is connected to a vaccine reservoir of suitable size (50-500 ml) by a length of Neoprene tubing (Fig. 1). For satisfactory operation the tubing must be completely filled with vaccine, free of bubbles, and the injector fully primed. The instrument can be adjusted to give doses of 0.1, 0.25, 0.5, 0.75 or 1 ml as required. Most vaccines and therapeutic agents for use in small quantities by injection are usually prepared in ampoules of 0.5 to 10 ml which have to be opened and poured into the reservoir. For mass immunization the total volume of vaccine to be used usually exceeds 50 ml and the reservoir can be as large as required.



Circumstances do occur, however, when the technique of needle-less injection is of value but for various reasons only a small

volume is likely to be used and the large reservoir and attached tubing inhibit the use of the technique. Under these conditions the following procedure is recommended. The material to be injected should be taken from the ampoules into a suitable syringe. A short length of Neoprene tubing (about 20 cm) is then attached to the nozzle of the syringe, and when all the air has been expelled the free end of the tubing is pushed on to the side arm of the injector. The syringe reservoir is then attached to the injector by means of a pair of spring clips held together by a small bolt (Fig. 2). One clip grips the injector and the other the syringe. If the syringe is filled to a little more than the marked capacity the tubing can be filled and the injector primed for use in the usual way so that the piston descends to near the normal capacity level of the syringe. Any size of syringe between 2 and 50 ml can be used in this way.

This modification enables the needle-less injection technique to be used when only small total volumes of material are needed or are available. The method makes for greater economy and allows the operator total freedom of movement since the injector is not connected to a static reservoir. It can be used at any angle or in any position. When empty the reservoir can be discarded and a fresh loaded syringe attached to the Neoprene tube. If a bubble is introduced into the tube it can easily be withdrawn into the reservoir. This method may be of particular value when a large number of 0.1-ml inoculations need to be given—for example, typhoid and cholera vaccines, or in skin testing, and removes the necessity for numerous graduated syringes and/or repeated changes of needle—I am, etc.,

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Scotland's Anaesthetists

SIR,—Dr. G. D. Parbrook (31 July, p. 293) rightly draws attention to the current shortage of anaesthetists. However, his decision to ignore the existence of the important S.H.O. grade and his failure to relate the number of anaesthetists to the population are hard to understand. The registrars are recruited from the S.H.O. grade and any expansion of the number of anaesthetists in training must start in this grade. It is perhaps unfortunate that Dr. Parbrook's article appeared in an issue of the *B.M.J.* that advertised 68 anaesthetic vacancies (p. xiv), only one (S.H.O. at Perth) being in Scotland.

All medical staffing statistics must be related to population, as both surgeons and anaesthetists exist to give a service to a section of the population. Scotland has approximately 10% of the population of England and Wales and Dr. Parbrook's Table IV shows that the number of consultant posts in surgery and anaesthetics in Scotland is respectively 16% and 13% of that in England and Wales, but the seriousness of the shortage of anaesthetists is not so much in numbers as in maldistribution of slender resources. In England and Wales there are 4.8 anaesthetists for 100,000 population while in Scotland there are 6.5. However, there is a gross disproportion of anaesthetic

staffing between the peripheral and city areas as can be illustrated by the fact that Ayrshire has four anaesthetists per 100,000 while Glasgow has 14.—I am, etc.,

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SIR,—Dr. G. D. Parbrook (31 July, p. 293) may be correct in arguing that there is a need to increase the number of doctors in training for consultant anaesthetist posts, but the statement that there is "a shortage of senior anaesthetists in Scotland relative to England" needs closer examination.

His case is based on the ratio of consultant surgeons to consultant anaesthetists being unfavourable to Scotland. However, in 1968 there were 10.4 consultant "surgeons" for every 100,000 people in Scotland compared to 6.7 in England, comparable figures for consultant anaesthetists being 2.93 and 2.36. ("Surgeons" includes the specialties in Dr. Parbrook's Table IV plus ophthalmology, gynaecology, and dental surgery.) No comparative figures for surgical operations are available for the same year, but at that time each "surgeon" in Scotland was responsible for 600 inpatient discharges compared to 740 per "surgeon" in England and Wales, with this relativity still applying when trainees in the senior registrar and registrar grades are included (340 to 415).

Applying the number of surgical discharges to anaesthetists the following emerges:

	Scotland	England and Wales
Consultant anaesthetists	2,160	2,110
Consultants plus senior registrars, plus registrars	1,310	1,290

Surgical inpatient discharges per anaesthetist 1968.

Patients, as represented by surgical discharges, are to my mind a better indirect measure of anaesthetic work-load than "surgeons," and on this score there is no significant difference between the two countries. The best measure would be the number of fully utilized theatre sessions, and unless it can be shown that the greater number of Scottish surgeons serving a similar sized population to their English and Welsh colleagues generate more of these, then the argument that there is a relative shortage of anaesthetists in Scotland cannot be sustained.

While I cannot agree with some of Dr. Parbrook's conclusions, he must be congratulated on shining some light on the problems of staffing and training. The complexities of manpower planning in medicine are immense, and are often underestimated in the present discussions on career structure.—I am, etc.,

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Halothane Hepatitis

SIR,—Professor B. R. Simpson and his colleagues (24 July, p. 245) have mistaken the aim of our study (3 July, p. 18). It was not intended to supply an answer to whether halothane is the causal element in "post-

halothane jaundice." As we stated in our introduction, we set out to determine on the basis of the hypothesis, derived from clinical reports, that multiple halothane anaesthetics are a factor in the development of jaundice, whether a time interval between the anaesthetics could be defined in which this danger particularly exists. In this, we feel we have succeeded in at least reducing the uncertainty.

Our survey of the general surgical population exposed the incidence of and the time intervals between multiple anaesthetics, which until then were almost unknown. We then compared this information with that which we obtained from the Committee on Safety of Drugs of patients who developed jaundice after halothane and had been reported to them, and also of patients reported in the literature. There was a striking and important difference between the general surgical population and the reported cases when the intervals were up to one month. We also showed from other data that the chance of an anaesthetist meeting a case of jaundice after halothane was very small indeed.

We said that this complication (for example post-halothane jaundice) could be avoided if halothane were stopped altogether. However, we also emphasized the rarity of the condition and the fact that this solution would be unacceptable to the majority of anaesthetists. It was because this was so that we set out to define the risk—but not the cause. Our conclusion at least supplies some guidance and comfort for clinicians like ourselves who until now were uncertain what practical measures could be taken until the real cause of jaundice after halothane anaesthesia is finally tracked down. Until then we must stand by the final paragraph of our conclusions which, incidentally, includes a similar opinion to the one expressed by Dykes (quoted by Professor Simpson).

We said "... in spite of the rarity of jaundice, it is reasonable to avoid halothane when it has been administered to the same patient during the previous four weeks. However, this advice assumes that there is an equally effective and safe alternative with which the anaesthetist is familiar. Otherwise, it might mean that by avoiding a rare cause of morbidity and mortality a more common one is introduced."—We are, etc.,

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Halogen Anaesthetics

SIR,—I am too old and have been retired too long to be able to make any useful suggestions about the treatment or prevention of halothane jaundice, but I could, if permitted, make some observations on its possible aetiology.

Over half a century ago we had a similar problem in delayed chloroform poisoning, a similar deadly liver lesion, and this, with other factors such as the frights we got from the dreadful falls in blood pressure when giving ethyl chloride, made many of us feel that the halogen anaesthetics were a bad lot. Indeed, when this latest one with fluorine came in I remember remarking that I should be surprised if sooner or later trouble with it were not experienced. We moved on to

the safest of all general anaesthetics: ether and the hydrocarbons, cyclopropane, etc.

What pushed us off? I am afraid we must blame our surgical colleagues for this. They found that they could cope with their congested lists much quicker if they touched a Spencer Wells with the diathermy needle than if they tied the vessel off. Other factors that occur to me are: The techniques of regional blocks gave beautiful results in many cases but one must admit they were time consuming, and those hospitals that justifiably claimed excellent results from spinal anaesthesia were quite rightly frightened off by the awful, if remote, risk of arachnoiditis.—I am, etc.,

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Ketamine Anaesthesia

SIR,—We were very interested to read the comments by Professor J. W. Dundee and Dr. J. Moore (3 July, p. 46).

Our investigations were performed on patients anaesthetized with ketamine using dosages recommended by the manufacturers and preceded by their suggested anti-sialogogue premedication. The total dosage of ketamine averaged 0.19 mg/kg/min., which is similar to that used by other workers.^{1,2} We performed our tests at the termination of surgery whereas Professor Dundee and Dr. Moore tested their patients as soon as anaesthesia had been stabilized.

The timing and the nature of the laryngeal challenge are possibly two factors which may influence the likelihood of aspiration. This, together with the effect of varying the premedication, will require further investigation.—We are, etc.,

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¹ Corssen, G., and Domino, E. F., *Anaesthesia and Analgesia* . . . *Current Researches*, 1966, 45, 29.
² Stanley, V., Hunt, J., Willis, K. W., and Stephen, C. R., *Anesthesia and Analgesia* . . . *Current Researches*, 1968, 47, 760.

Accident and Emergency Services

SIR,—Publicity has been given recently in the national press and the *B.M.J.* to changes in the staffing of accident and emergency (casualty) departments. It is proposed that a career structure should be created and pilot training schemes are to be instituted. In the discussion which led to these decisions the Orthopaedic Group of the British Medical Association and the British Orthopaedic Association, whose consultant members are responsible for the management of over 80% of the casualty departments in the country, were not given an adequate opportunity to present their views or put forward their plans to improve the staffing situation in the accident and emergency departments.

For many years the British Orthopaedic Association has been concerned about the deficiencies of the accident services, and in December 1969 an accident services subcommittee of the executive was formed. A preliminary survey of the staffing of 125 departments throughout the country was carried out at Exeter on behalf of the British Orthopaedic Association, and a copy of the report has been forwarded to the Department of Health.

At the Belfast meeting of the British Orthopaedic Association in April this survey was presented, together with a report from the accident services subcommittee of the association, and the following recommendations were made.

(1) In view of the crisis of staffing the concentration of accident and emergency units by the closing of small uneconomic units should be speeded up. Many departments are still grossly inadequate in size, and the Department of Health must accelerate their programme of building new departments.

(2) The appointment of selected "casualty officers" as consultants in the accident and emergency departments should be undertaken with caution. There are some doctors with higher surgical qualifications who are skilled in casualty work, but the British Orthopaedic Association is certain that there are insufficient numbers of such men to man the casualty services, and does not consider it necessary for them to have consultant status. It emphasizes again the need for good doctors in the casualty departments and not highly trained surgeons. When such men are available the British Orthopaedic Association agrees that they should be employed, but that the path of training should be for "good doctors" rather than "casualty surgeons."

(3) There should be one experienced doctor on duty in the accident and emergency departments during the whole 24 hours each day of the week. Four such doctors will be required in each department to work a rota allowing time for sickness, holidays, study leave, etc. These doctors would be experienced in handling all forms of casualty work, and it would be essential to establish for them a permanent career grade which should be made financially competitive with ordinary general practice. Their experience should be gained in accident and emergency departments in the course of a year or two, and special courses would be arranged by regional hospital boards to assist their training. Provided that such a doctor was on duty in the department then the other medical staff in the department could be senior house officers or even pre-registration house officers. These should be regarded as training grades.

(4) There should be a consultant in charge of the whole accident service, including inpatient beds and outpatient clinics, a function already largely taken on by orthopaedic surgeons. The consultant should be responsible for the organization and supervision of the work of the department, and he should be enabled to spend adequate time in the accident and emergency department. Time for work in the department should therefore be included in the sessions in his contract.

(5) The pattern of manning departments will vary throughout the country, and it is important that a rigid plan is not imposed, and that some flexibility is permitted.—We are, etc.,

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