

The two methods are complementary, and the highest standards of fracture treatment demand that both should be used. I submit that the indications are as follows:

Excision and primary skin suture to be used as the first line of treatment, open drainage and enclosure in plaster to be adopted only when this has failed: (1) if the wound is less than six or eight hours old; (2) if the skin flaps can be sutured without tension; and (3) if the patient can be under observation for a few days.

Excision, free drainage of wound, and complete enclosure in plaster to be used: (1) if the wound is more than six or eight hours old; (2) if the skin has been avulsed or is of doubtful viability; (3) if the skin flaps cannot be approximated without tension; and (4) if the patient must be evacuated at once and cannot be kept under observation.

Amputation to be performed only when the main artery is destroyed, so that gangrene is inevitable.—I am, etc.,

Liverpool, October 6.

R. WATSON-JONES.

* * We welcome Mr. Watson Jones's criticism of our review of Professor Trueta's book, but still maintain that the results obtained by Trueta's methods can truly be described as "astounding."—ED., *B.M.J.*

Anaesthesia in War Time

SIR,—Since the war of 1914–18 the spinal route has gained prominence for anaesthesia of the abdomen and legs. Its usefulness during hostilities merits more notice than "G. D. G." gives it in his admirable discussion in the *Journal* of October 7 (p. 744). Some arguments follow.

In war, hospital organization has to prepare for big rushes of work and for transplantation, since hospitals may have to move suddenly. Cutting down "impedimenta" counts, in which respect "spinal" scores. The handy Luer-Lok syringes and needles, heralded by Pilkin and beautifully adapted to the work, fit compactly in a pocket case, and twelve ampoules of anaesthetic pack into a cardboard container. The relative uniformity of dose facilitates use. Posturing the patient preparatory to puncture is routine, and will, of course, entail extra care in already wounded patients, and, in some leg wounds, a small dose of evipan. It is fair to assume even in a C.C.S. that tables could be sloped into a mild Trendelenburg position.

Administration takes but a few minutes. Supervision may be left to an experienced nurse showing aptitude for reassuring patients if timid. The anaesthetist fully conversant with the technique, having injected the drug and seen the operation proceeding satisfactorily, would be available to render the same service to a second patient, and so on, dealing with four or more cases in the course of an hour. Multiple surgical teams often work in one large theatre or adjacent theatres, and the anaesthetist would be on call to deal with a threat of unexpected deterioration in any patient. Great economy in apparatus and personnel results and helps the staff to cope more quickly with sudden crowds of casualties. Subsequent management of the patient is easy and orderly, involving little more than the rule of the recumbent posture for a day or two. It is, in fact, automatic, as the patient is self-controlled, whereas restraining the violent antics of strong men during recovery from (or induction into) general anaesthesia often greatly taxes the nursing personnel and wounded structures. It avoids the danger of using inhalants where a patient arrives with mucosa already inflamed by poison gas or ordinary respiratory infections, and eliminates the risk of ether explosions, which is no less in circumstances of war.

The value of spinal anaesthesia may, from the foregoing, seem assured. Before adopting it we must also cater by other means for wounds above the mid-dorsal region and comply with two requisites. First, an anaesthetist (or sometimes the surgeon) should be skilled in the procedure. Intrathecal injection entails certain refinements in administration which, like its possible pitfalls, are only mastered by experience. Secondly, investigations of the ability of the war wounded to withstand the fall of blood pressure consequent on spinal anaesthesia must be carried out. Thus, exsanguination (as in ruptured ectopic gestation) is a partial contraindication.

Shock from wounds of leg or belly is not necessarily a bar, for when the pain derived from the wound is eliminated by the anaesthetic the comfortable relief not only calms but revives the patient. The resilience of a soldier's physique diminishes some of these dangers. The best single guide to safety of spinal anaesthesia will be the blood pressure, which is tested as a pre-operative routine. Already doctors of belligerent States may have collected manometric evidence on this crucial point. Certainly such data are essential prior to the regular use of the method for war wounds. As a possible boon to hospital authorities and the victims of war, spinal anaesthesia may have a place in war surgery, as it undoubtedly has in peace.—I am, etc.,

Bristol, Oct. 14.

A. WILFRID ADAMS.

SIR.—The remarks of "G. D. G." call for some comment. It can hardly be denied that chloroform and ether anaesthesia, requiring as it does nothing more complicated than bottle and mask, is likely to prove the most widely applicable method under war conditions, but the insistence on Shipway's apparatus largely removes the advantages of simplicity and portability, and even familiarity, to a large number of medical men.

Chloroform has acquired a bad reputation mainly for two reasons—the frequency of cessation of breathing during deep anaesthesia and the occurrence of primary syncope. The cessation of breathing that so commonly occurs is the main cause of so many anaesthetists and surgeons disliking chloroform intensely; it gives everyone concerned such a fright. Yet Dr. Primrose of Glasgow has pointed out that this is really the action of a defence mechanism of the body to prevent fatal overdosage. It is an indication to cease administration of the anaesthetic, and the patient will recover spontaneously. It is, however, the statement that chloroform and ether are suitable agents for the rapid induction of anaesthesia and, still more, the suggestion that analgesia and not full anaesthesia is all that is required before commencing operations that arouse the most serious misgivings.

It was pointed out to me some years ago that in cases of primary syncope under chloroform it nearly always happens that (1) the patient was not fully anaesthetized, and (2) some manipulation, however slight, had been begun. I am convinced that it is for this reason that such procedures as manipulations, circumcisions, etc., have a particularly bad reputation in this respect. The operation is short, there is a tendency to give just a "whiff" of anaesthetic, and the shock-producing part of the procedure is reached early. To avoid this catastrophe no anaesthetist should be hurried in the induction of chloroform and ether anaesthesia, and nothing whatever should be done until full anaesthesia is reached. The old adage, "plenty of air and plenty of chloroform," should be taken to mean not chloroform in large doses but deep enough anaesthesia. "Plenty of time" would be a better expression. Lastly, my recent experience would indicate that as regards recently qualified men capable operators of the more common gas-oxygen machines are not likely to be as scarce as might be supposed.—I am, etc.,

Burnley, Oct. 12.

A. DUFF.

SIR.—Your correspondent "G. D. G." gives the impression that in the last war British and French anaesthetists showed a superiority to their American colleagues by their fearless use of chloroform, and praises their greater speed in administration. His opinions are based on war-time experience and as such deserve respect, but might I quote from Henry K. Beecher's *Physiology of Anaesthesia* (p. 256):

"For years laboratory workers have been warning of the dangers inherent in the use of chloroform; yet the employment of this toxic agent continues in many clinics, chiefly abroad. Presumably the users justify this course by considering that damage follows the use of chloroform only in the exceptional, badly managed case. This is not correct. It has been rightly said that chloroform anaesthesia is synonymous with chloroform poisoning. . . . Susceptibility to the drug varies greatly from animal to animal and from man to man. A brief anaesthesia with chloroform may produce little liver damage or it may prove fatal."

Laboratory experiments show that in every case of chloroform anaesthesia some liver damage is produced. The

extreme (and unpredictable) case constitutes delayed chloroform poisoning, but in all the others a less degree but analogous form of poisoning is produced, which increases to a maximum for forty-eight hours after the administration. Much work has been done on this, and surely it does not become the British to belittle the more reasoned attitude of the Americans to the agent. Even apart from laboratory work, it is known clinically that the special inherent dangers of chloroform administration—relative overdose and primary cardiac failure—are particularly formidable, especially in the young athletic type, the very class of patient which, as your correspondent points out, is the one under consideration, and especially in the emotional and terrifying surroundings which are known to predispose to hyperadrenalism and consequent ventricular fibrillation.

If hurry must be a factor to provide for, why cannot the safer agents, as vinesthene, alone or in combination with ether, be used for induction prior to ether? The accumulated knowledge of a century should be sufficient to relegate chloroform to a last resource, to be used when no other is available. It is as well to remember that the first warning fatality in chloroform induction occurred in no more than a year following its introduction as an anaesthetic agent.—I am, etc.,

Birkenhead General Hospital, Oct. 7. R. L. WYNNE, D.A.

Radium Precautions

SIR.—Having read Mr. A. R. Greatbatch's memorandum (*Journal*, October 14, p. 782) I am surprised that it was ever considered necessary to stop radium treatment, and I am more than ever pleased that the Royal Sussex County Hospital did not send its radium to be buried in London (a curious place to choose anyway), but continued to use it.

Excluding bomb treatment, the amount of radium employed in any one case is not large, and the chance of that patient being blown to bits (a necessary precursor to the scattering of the radium) must be very small. I wonder how many patients in Barcelona were actually blown to bits while in hospital. It is true that we anticipate bigger raids, but (1) our defences are much better, and (2) London, for example, is much bigger and the patients, therefore, more dispersed.

With regard to the storage of radium not actually in use, I regret that although the Board of the Royal Sussex County Hospital granted my request that we should continue to use our radium, they decided to avail themselves of the generous offer of a member of the Board to pay the cost of a bore-hole, and to proceed with this work, which, in my opinion, is quite unnecessary. The chance of a direct hit on any one building is small: the chance of one particular part of the building being hit is even smaller. What, then, are the chances of a bomb passing through roof and floor after floor of a substantial building (gradual resistance as against solid concrete), penetrating into the basement, through sandbags, and waiting to burst until it strikes a small steel safe containing drawers of comparatively plastic lead, in which the needles lie—and these needles must be finally burst open if radium dust is to be expelled. It is a common experience that even if this extremely unlikely sequence of events occurs the masonry of a building is likely to fall in over the damaged lower parts, and so spread would be prevented.

It is quite obvious that in war one must take certain risks. In this war we run the risk of being over-organized to such an extent that by the time we have carried out all the safety regulations we shall have no heart to strive for victory. I suggest that we should go about our work as nearly normally as possible, even if this means taking risks. In this way we may preserve our patients' lives and our own morale.—I am, etc.,

Hove, Oct. 14.

H. J. McCURRICH.

SIR.—As provincial radiologists may we say how much we endorse Dr. S. Cochrane Shanks's letter in the *Journal* of October 7 (p. 741).

This is an evacuation area, and since the war our population and demands for radium treatment have increased, more especially as many cases formerly sent to London hospitals have now to be treated locally. In spite of this fact the

Radium Commission saw fit to bury our stock of radium at the outbreak of war, and no information is forthcoming as to when it will be returned. We fear that if the date of its return is delayed patients may be buried as well as radium.—We are, etc.,

G. P. NORMAN.
E. OWEN FOX.

Eastbourne, Oct. 9.

SIR.—May I reply briefly to Mr. Stebbing and Professor Russ (*Journal*, October 14, p. 782). There is a deep and growing anxiety in the minds of many of the profession about the existing radium situation: a feeling that the risks of radium being scattered by bomb explosion are remote, and that the risks of poisoning from this scattering are still more remote. May I suggest that the Radium Commission issue a statement indicating the evidence for their belief that the risks of poisoning from radium inhalation were grave enough to warrant withholding, during the past six weeks, radium treatment from those who urgently needed it.—I am, etc.,

London, W.1, Oct. 16.

S. COCHRANE SHANKS.

Gas Protection for Tracheotomy Cases

SIR.—In the *Journal* of September 16 (p. 622) Mr. W. A. Mill refers to the necessity of providing gas protection for tracheotomized patients. It may interest readers to know that a patient here who underwent total laryngectomy by Mr. Colledge last April has had his gas mask adapted by Messrs. Mayer and Phelps. The canister has been removed from the mask and is now carried strapped to the front of the chest. A stout rubber tube connects it with a soft rubber attachment similar in appearance to the face-piece of a gas-anaesthesia apparatus. This is fastened over the tracheotomy opening by means of a strap round the neck. The rest of the mask simply constitutes a protection for the face and eyes, and is not connected with the canister.—I am, etc.,

Glasgow, October 10.

DEREK BROWN KELLY.

Treatment of Pulmonary Oedema from Gas

SIR.—After reading Colonel E. M. Cowell's articles about chemical warfare (*Journal*, October 7, p. 736, and October 14, p. 778), may I suggest the treatment of pulmonary oedema of gas casualties by the immediate intravenous injection of 10 c.cm. of a 10 per cent. or, still better, 20 per cent. calcium solution. This injection has already proved effective for a long time in many types of acute oedema, toxic or angioneurotic. Its effect seems to depend on two factors. The hypertonic solution withdraws extravasated fluid back into the circulation and at the same time the calcium reduces the permeability of the capillary walls.

Since the technique is simple, requiring only a 10 c.cm. syringe and an ampoule, it would be possible to give this treatment at a first-aid post. It is to be expected that the results would be best if the injection were given as early as possible, perhaps even prophylactic. There are many calcium preparations for intravenous injection. At the moment the most satisfactory ones are, in my opinion, solutions of calcium laevulate, available up to 10 per cent., or calcium gluconogalacto-gluconate, available up to 20 per cent. The last preparation is also suitable for deep intramuscular injection.—I am, etc.,

London, W.5, Oct. 15.

H. L. WINTER.

Psychological Casualties in War

SIR.—It is regrettable that Dr. Maurice Wright has not seen fit to answer the criticisms of his two articles on psychological casualties during war in your issues of September 9 and 16. I made my last letter (September 30, p. 701) vigorous enough, I thought, to stimulate a response, and Dr. Wright will be aware that the validity of a writer's views is bound to be questioned if it is seen that he is not prepared to support his opinions when challenged. On one point in particular I asked for evidence—his statement that there were very frequent relapses among those cases treated by rapid methods. From