and protein molecules which are of a rather specific character, probably similar to those studied by Schulman (recent papers in the *Transactions of the Faraday Society*). Such complexes may be dependent on the existence of a particular polar group in the oil. Consequently, we can anticipate that the specific action of cod-liver oil, if verified, is due to immobilization of toxic substances by specific adsorption. If the nature of the active oil molecules could be ascertained it seems probable that more active preparations could be obtained.—I am, etc.,

Biochemical Laboratory, Cambridge, Feb. 1. J. F. DANIELLI.

Penetrating Chest Wounds

SIR,—As I belong to the "new generation of medical officers" referred to by Dr. F. G. Thomson in his article in the *Journal* of January 13 I was most interested in the report of his experiences of penetrating chest wounds. Although I have no experience of gunshot wounds of the chest, certain practices and principles which have evolved from the progress of thoracic surgery since the last war seem to me applicable to these types of wounds, and it is for this reason that I hope the following comments may seem pertinent rather than impertinent.

In Dr. Thomson's discussion of the treatment of infected haemothorax and empyema reference is made to the "intolerable pain" caused by a drainage tube which is fixed in position by firmly stitching it to the skin; on this account water-seal drainage necessitating a long extra-thoracic connexion is condemned. In civil practice an empyema which has been drained by rib resection is frequently closed firmly round a drainage tube which is connected to a tube passing under water in order to aid re-expansion of the lung; at its point of exit from the chest the tube is transfixed with a safety-pin moulded to the shape of the chest and fixed to the skin with half-inch adhesive plaster after applying friars' balsam. By this means the tube is held firmly in place and no pain is experienced. Dr. Thomson recommends drainage by a self-retaining intercostal catheter to which a "flutter-valve" is adapted. I think there is general agreement that such a catheter inserted by means of a trocar and cannula under local anaesthesia is the correct treatment of an empyema in a patient who is unfit for rib resection, but I would suggest that the self-retaining capacity of the catheter should be reinforced by safety-pin transfixion as already described, and that water-seal drainage is cleaner and more reliable than the "flutter-valve."

I was most interested to observe that 16 per cent. of 250 cases seen at an advanced base hospital were suffering from pulmonary collapse, but was surprised that shift of the mediastinum *towards* the side of the collapse was not referred to as the means whereby this lesion can be distinguished from haemothorax; such shift manifests itself clinically by displacement of the heart and often the trachea, and is readily confirmed by radiology if facilities are available. It has been shown conclusively that lobar collapse is produced by bronchial obstruction; in gunshot wounds of the chest pulmonary collapse presumably results from obstruction of a bronchus by tenacious mucus or even blood clot which fails to be expectorated. This explanation is readily understood, whereas the statement that "the lung appears to be stunned by the concussion" means very little.

The author suggests that the early closure of penetrating chest wounds is a "very doubtful procedure" owing to the high incidence of infection of the wound, which subsequently breaks down. If the pleura becomes infected after thoracotomy in civil practice the wound very rarely breaks down if the pleura has been drained from the time of the thoracotomy, whereas it usually does so if no drainage has been provided. Although this type of case is not directly comparable to penetrating chest wounds, as no tissue from the chest wall is excised, is it not probable that the risk of breakdown would be minimized by pleural drainage at the time of wound excision, so that the internal surface of the wound is not constantly bathed with pus if pleural infection ensues?—I am, etc.,

London, W.1, Jan. 30. OSWALD S. TUBBS.

Treatment of War Wounds and Infected Fractures

SIR,—The treatment of war wounds and infected fractures by the closed plaster or Winnett-Orr method is one which is likely to be adopted during the present war, and the recent correspondence in the *Journal* is of great interest. Mr. R. Watson Jones has very concisely stated the indications for its use and also for the ideal treatment for these cases—namely, primary suture (*Journal*, October 21, 1939, p. 826). He has not emphasized, though, that under conditions likely to prevail in the field it may be difficult to get the wounded to a properly equipped and staffed operating unit within the optimum time for treatment by primary suture, and it would appear, therefore, that the closed-plaster method would have to be used in the majority of cases.

None of your correspondents has mentioned the experience of several French surgeons who have had the opportunity of seeing many of the Spanish wounded treated by the closed-plaster method. They give it only qualified approval, and insist, as Dr. Trueta does in his recent book, on the importance of the closed treatment being "employed only by those qualified by training to plan and undertake the first stages of the technique." In a recent paper M. Paul Mathieu in *La Presse Médicale* (October 18, 1939, p. 1413) draws attention to some of the dangers which may follow its use: (1) the danger of reactionary oedema, which by constricting the circulation may give rise to serious complications necessitating amputation; (2) the difficulty of observing the wound under the plaster: suppurative arthritis, sloughing of the skin at pressure points, abscess formation, etc., have all been observed by these French surgeons in the Spanish wounded, and—a point to be remembered—these complications frequently develop silently, without pain, without swelling, and with little disturbance of temperature. Another danger—although not common in the Spanish cases owing to the arid nature of the soil, but obviously one which would be of greater frequency in the more cultivated battlefields of Western Europe—is from gas-gangrene infection. This condition could set in without the surgeon's knowledge if he is unable to watch the wound. It must be conceded, though, that a thorough excision of the wound is a *sine qua non* of the treatment, and if this is done properly such disasters should be rare. Nevertheless the risk is a real one and has not been sufficiently emphasized. The closed plaster is considered by the French surgeons to be of advantage in allowing the easy and comfortable evacuation of the wounded, particularly over long distances, and the rarity of dressings is a boon and a blessing.

It would seem, therefore, that while the closed method gives excellent results in hands such as those of Dr. Trueta it has many pitfalls for the inexperienced, and, above all, for those who fail to appreciate the importance of thorough excision of the wound. Unsatisfactory results could be minimized if these young and inexperienced practitioners who now find themselves faced with these very problems had the benefit of a course of instruction on lines such as that provided by the French medical service at the Centre d'Etudes at d'Enseignement Médico-chirurgical at Bouleuse during the great war.—I am, etc.,

Feb. 2. E. J. MOYNAHAN, M.R.C.S.

Treatment of Gas Injuries to Eye

SIR,—During the past four or five months correspondents—in about twenty letters—have written on the treatment of gas injuries to the eye. In these communications eight writers recommend irrigation with a lotion of bicarbonate of soda, of which the strengths mentioned vary from 5 to 10 grains to an ounce; the A.R.P. Handbook No. 2, p. 17, advises 10 grains to a pint; and Handbook No. 3, p. 60, a 2 per cent. boric acid or a normal saline solution. Four correspondents recommend the lavage to be followed by instillation of cod-liver oil, and others that cod-liver oil or liquid paraffin be used for both early irrigation and later treatment. Another suggestion is the use of cod-liver oil with glucose. One writer points out that liquid mustard gas is soluble in water to less than 1 per cent. and its solubility in liquid paraffin