long way. . . . If the operator wishes to work inside the mouth, fairly smooth anesthesia can be maintained by dropping Vinethene on gauze held over the nose of the patient, after the induction is completed in the regular way. . . . We have found Vinethene particularly useful in supplementing nitrous oxide anesthesia that is not giving adequate relaxation. . . . For prolonged operations under general anesthesia, ether holds its place, as it has for over ninety years. . . .

"Maintenance of a free airway is particularly difficult in operations on the jaw, mouth, or neck. For that reason, no technic of administration of general anesthesia has yet been devised that offers the safety for the patient and excellent operating conditions for the maxillo-facial surgeon than is provided by the endotracheal method. We have come to regard it as a necessity in our work." 2 references.

J. C. M. C.

HARKINS, H. N.: *Treatment of Shock in Wartime.* War Med. 1: 520–535 (July) 1941.

"Everything that has been said concerning shock in peacetime applies on a larger scale and in increasing tempo to shock in wartime. . . . Unlike some other types of battle or aid raid casualties, shock can be prepared for to a large extent. The subject of shock in all its aspects thus has a peculiar timeliness. . . . James Latta, of Edinburgh, Scotland, in 1795 used the term shock. It had been applied less definitely by Le Dran in 1743 and by Woolcomb in 1770. . . . Early interest in shock was chiefly confined to military surgeons, but during the nineteenth century and the first fourteen years of the present century physiologists gave the subject most attention. . . .

"The definition of shock on which the present paper is based is that it is a progressive vasoconstrictive oligemic anoxia. . . . It has often been observed that certain diseases arouse special interest in certain countries. . . . Interest in shock is predominantly American. Short, of Bristol, England, noted as long ago as 1913 that, judging from the literature, most of the interest in shock centered in the United States and England, especially in the United States. This was true also during and after World War I. . . . Irrespective of the fact that many of Crile's early ideas on shock have not stood the test of time, his inspiring example interested other American surgeons in the subject. Possibly this fact alone explains a portion of the preponderance of attention directed to shock on this side of the Atlantic. During the present war the same disparity continues, and one finds few references to shock in the current literature of the Axis powers, while in the British Medical Journal, the Lancet and many American medical periodicals the subject receives considerable attention. . . .

"The Division of Medical Sciences of the National Research Council has several subdivisions, among which are the Committee on Shock, Transfusions and Blood Substitutes (Dr. W. B. Cannon, chairman), the Subcommitte on Shock (Dr. Alfred Blalock, chairman) and the Subcommittee on the Use of Plasma and Serum (Dr. C. C. Sturgis, chairman). The committee has chosen physicians who have specialized in the aspects of shock to do research in their own laboratories as part of the preparedness program. Recently (November 1940) a bulletin on shock (51 pages) was distributed to the various collaborators. The bulletin contains preliminary reports of the various projects under way, so that there may be no delay in making the results obtained by one group available to all for the common good. In Great Britain the Medical Research Council, in its committee on traumatic shock and on

blood transfusion, has organized its work in a similar way. The subject of shock was considered so important that a recent 20 page bulletin, M. R. C. War Memorandum No. 1, was entitled 'The Treatment of Wound Shock.' This brochure is compactly written and contains much information. . . . Recent emphasis has been on the adaptation of treatment to modern mobile warfare, especially in the use of easily transportable preserved whole blood or plasma. A series of articles from the Edinburgh and South-East Scotland Emergency Blood Transfusion Service deserves attention. New equipment and the results of the use of stored blood were described by Stewart and his associates. Brown, Dennison, Ross and Divine reported on the use of blood transfusions in the treatment of soldiers wounded in the battle of Flanders. The method of blood transfusion described by Bashford is particularly applicable to rural or wartime conditions, under which hospital facilities are not obtainable. Yott described a method of collecting blood by suction and of administration by pressure which requires only one bottle and hence reduces the chances of contamination. Possibly this method is applicable to wartime conditions. Brewer, Maizels, Oliver and Vaughan have recently presented a study on the relative merits of fresh and stored blood. This work comes from the four London Blood Supply Depots. . . .

"DeGowin, Hardin and Plass, discussing the storage and transportation of blood for military purposes, stated that blood shipped by transport plane from Iowa City to Oakland, Calif., and back (3,539 miles, or 2,198 kilometers) was essentially unhemolyzed and reaction-free. Similarly, blood sent by hospital ambulances 500 miles (310 kilometers) was unharmed. It has been found practical to pack ten flasks of blood and the necessary ice in 10 gallon (40 liter) milk cans surrounded by commercial insulating covers. This obviates the use of special equipment in an emergency. Scudder and Sturgis recently summarized the use of plasma in the United States . . . Sturgis stated that centrifuging blood to obtain plasma is apt to generate heat, causing hemolysis. This can be overcome by the use of dry ice or by using simple settling, the latter giving a yield of approximately 75 per cent of plasma. Scudder has found the pH of plasma obtained by settling to be nearer normal than that of plasma obtained by centrifuging.

"Williams, working at the Merseyside War Blood Bank, pointed out that if blood bank bottles are autoclaved with included citrate solution, the action of the citrate solution on the glass gives rise to increased alkalinity. This alkalinity leads to hemolysis, but if the bottles are autoclaved, dry sterility is difficult to obtain, especially as regards the organism Bacillus subtilis. To get around the difficulty, a small amount of distilled water was included in the bottles at the time of sterilization. From the military standpoint, the symposium on shock in the February 1941 issue of the *Military Surgeon* is of interest. Hirsh gave an excellent historical review of the subject of blood transfusion. Gradwhol summarized new facts of military importance regarding blood groups, while Hubbard gave a general discussion of blood and plasma transfusions. Elliott and his associates reviewed the subject of blood plasma, especially the technic of preparation and preservation. Finally, the prevention and treatment of shock in the combat zone were discussed in two separate papers, one by Kendrick and one by Mattison.

"In New York a conjoint project sponsored by the Blood Transfusion Betterment Association and the New York Academy of Medicine has been

organized under the name of the 'Blood Plasma for Great Britain Project.' Stetten, in his recent review of the activities of the project, showed that up to Oct. 31, 1940, a total of 6,984 blood specimens had been taken in eight New York hospitals for this purpose. On the other side of the Atlantic, shock requires much attention. The recent article of Solandt on the work of a London emergency blood supply depot (of which he directed the southwest section) is of interest. The southwest depot is one of the four London depots and bleeds about 600 to 700 donors a week. Some whole blood is used for transfusion; some plasma is filtered at the Wellcome Laboratories, and the rest of the blood is used for preparation of serum for drying at Cambridge. A blood depot and a blood bank are essentially the same, depot being the British term. The depot system obviates the necessity of bleeding at night or on Sunday and has a great advantage when night transport for donors is difficult and even dangerous on account of the blackout and the barrage. Solandt stated that it seems likely that 'serum will largely replace plasma' in shock treatment.

"The recent report of Maycock on the results obtained by the nine blood transfusion services in the battles of Flanders and France is of interest. Few details are available about the use of plasma, of which there was comparatively little in Flanders. Officers of the service stressed the advantage of giving adequate amounts. They also emphasized the failure of a severely wounded and shocked patient to recover after receiving 2 to 3 pints (1 to 1.5 liters) of blood or plasma probably means that additional quantities must be administered. The highly mobile type of warfare imposed great difficulties on organization. The need for having each bottle of liquid accompanied with an apparatus for administration was essential under conditions of active service.

"The number of transfusions given can only be approximated, but it can be said that some 350 to 500 pints (175 to 250 liters) of stored blood and plasma were used between May 10 and the evacuation of Dunkirk. Certain technical points merit notice. Cannulation was seldom required (13 per cent at one casualty-clearing station and 2 per cent at another), although large quantities of blood were given to single patients. Cannulas were of use during aerial bombardments, when restlessness and nervousness increased among the wounded. Prolonged storing of blood, even for seven weeks in 1 instance, seemed to make little difference, and reactions were few. Likewise, transportation over rough roads, e.g., 100 miles (62 kilometers) from Arras to Brussels, seemed to exert no ill effect. The following quotation from one of the service chiefs is of interest: 'Transfusions were given to patients in beds, on stretchers, in clean rooms, in hovels. . . . Asepsis did not exist, antisepsis in most cases was almost impossible to achieve. I am convinced as a result of this experience that a transfusion could be given in absolutely any circumstances except in a vehicle.' And Maycock expressed doubt of the importance of this last restriction. Maycock finally concluded that either the wounded must be brought to the transfusion centers more quickly or the transfusions must be given nearer the battle line. Since blood requires refrigeration, the second objective is difficult to obtain without resorting to plasma.

"The use of Hartman's dried plasma contained in cellophane bags would seem to offer much in accomplishing these objectives. By a new improved method, Hartman dries and preserves his plasma in a single cellophane bag. When it is time for the infusion the plasma can be placed in a water con-

tainer to soak up enough water to put it into solution; it can then be administered to the patient. If necessity demands, the cellophane container can be placed in ordinary tap water, as its wall is impermeable to bacteria. This last point is of great importance, as it is of little avail to prepare dried plasma for easy transport to the front lines and then to have to ship along an extra load of sterile distilled water for dilution purposes. . . .

"The treatment of shock . . . includes: first, beginning treatment before the condition has progressed irrevocably; second, correcting the oligemia and preventing further loss of fluid, and third, maintaining adequate oxygenation of the tissues until the patient's own improved blood volume and circulation cause the anoxia to disappear spontaneously." 49 references.

J. C. M. C.

KELLOGG, J. F.; PHILLIPS, R. B., AND SAHLER, LEROY: *Cyclopropane Anesthesia in Military Surgery.* Mil. Surgeon **89**: 177–182 (Aug.) 1941.

"One may say that the explosiveness of cyclopropane forbids its use in military surgery. . . . Professor Horton of Massachusetts Institute of Technology states that statistics available do not indicate that any one anesthetic gas is more explosive than the others. . . . In military surgery especially, we must have anesthesia which is instantly available to the patient, and for wounded men, especially those with chest wounds, there is no better anesthesia than that given by cyclopropane." 11 references.

J. C. M. C.

ADAMS, R. C.: *Shock, Blood Transfusion and Supportive Treatment.* Mil. Surgeon **89** 34–41 (July) 1941.

"Shock, one of the real emergencies, is an acute physiologic disturbance, the onset of which may be sudden or gradual. Essentially, it is a condition of circulatory imbalance, which, if severe and untreated, may result in death. It can occur with or without physical trauma. Clinically, the most common causes are traumatic injuries, burns, surgical operations, intoxications (as from drugs or from metabolic or bacterial diseases), serum disease, and acute abdominal phenomena such as obstructions, perforations, peritonitis and pancreatitis. Psychic shock occurs without physical trauma and is common in war time. . . . That shock is a vicious cycle has been recognized by many and Cannon noted this phenomenon in seriously wounded soldiers. . . . Circulatory deficiency produces a variety of side effects which together tend to produce the vicious cycle. These include a deficiency of the metabolic processes, which results in lowered oxidation and heat production and capillary atony, which leads to transudation of plasma from the blood, increasing its concentration and viscosity. These factors lead to stagnation of the blood in the capillary regions, resulting in diminished arterial blood flow and venous return. Lack of oxygen in the tissues also is an important factor in that it increases the capillary permeability and hastens the onset of stasis. . . . Loss of blood by hemorrhage may produce deficient oxygen content in the tissues by reducing the blood volume, thereby causing capillary atony. . . . The direct loss of blood and tissue fluid is a contributing factor to the production of shock since the blood volume is lowered and oxygenation of the tissues thus becomes defective. . . . The diagnosis of shock is largely clinical but hemoconcentration is a valuable diagnostic sign. Some of the tests employed as diagnostic aids are the specific gravity of whole blood, specific gravity of the plasma and the hematocrit reading. The pathology of shock may be summed