WHEELER, D. W.: *Shock; Its Nature and Therapy.* U. S. Nav. M. Bull. 41: 93–106 (Jan.) 1943.

"Experience with wartime casualties, up to the present time, shows that a large number of cases of extensive burns, compound fractures, multiple flesh wounds, and blast injuries are certain to result. The common factor in all such conditions is shock. . . . Shock is difficult to define satisfactorily. In my mind, the most adequate definition is, 'Shock is a symptom-complex resulting from a "progressive vasoconstrictive oligemic anoxia."' . . . There are remote and immediate causes of shock. Among the predisposing causes are fear, anxiety, cold, hunger, and dehydration. There are important racial and personal factors. The immediate cause of shock includes any severe injury, which allows fluid to escape from the vascular tree. . . . Primary shock is immediate, following injury, fear, or surgical procedure and is known as syncope. . . . This disturbance of physiology seen in primary shock is amenable in its early stages to vasoconstrictor drugs and the administration of fluids. Primary shock may continue and establish secondary shock. Secondary shock may not appear for several hours or a day. This delay has been attributed in war injuries to the fact that the wounded man often bleeds slowly over a considerable period of time. He is transported long distances in a stretcher exposed to cold; both are factors which bring on shock where it could be averted under the conditions in civilian practice. . . .

"Owing to the inherent nature of warfare, the fighting forces are subjected to periods of long exposure in all kinds of climate, to rations which are meager and inadequate, to the lack of water, to nervous and physical strain of fighting. The lack of adequate protein and water in diet makes the fighter more vulnerable to trauma and infection. To prevent shock, every effort must be made to restore these deficiencies by sufficient fluid intake, adequate food providing a large amount of protein and essential vitamins. Warm, dry clothing should be provided as soon as available. It becomes the duty of every medical officer to understand the four methods of controlling hemorrhage: 1. Cover bleeding wound with a tight dressing with the part elevated. 2. Pack the wound with sterile gauze and apply pressure over the artery supplying the area. 3. Ligate large visible bleeders. 4. Apply a tourniquet if all other methods fail. . . . The importance of cold in aiding the development of shock was shown by the Shock Committee during the First World War. Warmth, then, certainly seems advisable, but too generalized heat of too high a degree might precipitate a too sudden capillary dilatation increasing the deficiency between blood volume and volume capacity of the vascular system. Hot drinks should be given as soon as possible. The use of vasoconstrictive drugs in secondary or hematogenic shock seems contraindicated because there is already vasoconstriction present and its continuation would be distinctly harmful to the individual. . . . The use of sedative drugs, such as the barbiturates, retards the development of shock and is of value in gaining rest and quiet. Morphine is advised in ½-grain doses except in head injuries. . . . Since the initiating factor of shock is a reduced blood volume due to loss of fluid, the treatment of the underlying pathology by replacement of fluid is in reality the sine qua non of shock therapy. Of the six avenues of administration, two are rapid enough to be effective, namely the intravenous and intramedullary routes. . . .

"Whole blood used in transfusion has all the qualifications for restoring

the lost fluid in shock due to hemorrhage. In other forms of shock with hemoconcentration, the cellular elements of blood are so plentiful that plasma or serum replaces the fluid elements adequately. . . . Massive or adequate transfusions are advocated by the Mayo Clinic. . . . Infusion of adequate amounts of plasma is extremely important in relieving shock. Failure of a severely wounded and shocked patient to recover after receiving 2 to 3 pints of blood or plasma probably means that further quantities must be administered. In some severely burned patients, as much as 8 to 11 quarts were used in individual cases. . . . The importance of oxygen in the treatment of shock is stressed to relieve anoxia. . . . The use of adrenal cortical extract in therapy of delayed shock is still in the experimental stage. It seems to offer great promise. . . . Adequate proteins in the diet are building stones for plasma proteins but if additional large quantities of plasma protein are given by vein, there may be an intoxication. Administration of abundant carbohydrates and fat is necessary to prevent this intoxication. The National Research Council recommends the following vitamin requirements for general nutrition and wound healing: Vitamin A, 5,000 U; thiamin, 2 mg.; ascorbic acid, 75 mg.; riboflavin, 3 mg.; nicotinic acid amide, 20 mg.; and vitamin D, 400 U. . . . Plasma is the keystone of therapy—whether liquid or dried, natural or concentrated makes little difference as long as the quantity is sufficient—the prevention of shock is the most important part of therapy. Prevention includes the replacement of fluids before shock is fully developed. Once the vicious circle is started, it rapidly becomes irreversible." 42 references.

J. C. M. C.

GOVIER, W. M.: *Studies on Shock Induced by Hemorrhage. III. The Correlation of Plasma Thiamin Content with Resistance to Shock in Dogs.* J. Pharmacol. & Exper. Therap. 77: 40–49 (Jan.) 1943.

"It has been shown in previous communications that the administration of thiamin to dogs in which shock has been induced by hemorrhage results, in many instances, in a prolongation of survival time and in a return to normal of the elevated keto acid, blood sugar, and blood lactic acid levels which occur in shock. Since dogs show marked variability in resistance to shock and response to treatment with thiamin, studies were made to determine whether or not any relationship exists between the amount of plasma thiamin and resistance to shock. . . . Thirty-seven dogs were used. . . . Resistance to shock induced by hemorrhage in dogs anesthetized with pentobarbital-sodium is significantly greater in those animals having high plasma thiamin levels than in those showing low plasma thiamin values. Dogs having high plasma thiamin values withstand more bleeding before developing severe hypotension than do animals having low plasma thiamin levels. Dogs fortified with thiamin before bleeding show a constant tendency for their blood pressures to return to normal after hemorrhage, whereas low thiamin animals develop persistent hypotension early, after small amounts of hemorrhage. The incidence of intestinal hemorrhage after bleeding is much greater in dogs low in thiamin than in animals having high plasma thiamin levels." 14 references.

J. C. M. C.

BARNARD, M. A.: *Shock.* New York State J. Med. 43: 228–230 (Feb.) 1943.

"Shock, always of interest to the surgeon, obstetrician, and physician,