carbon dioxide in oxygen had no visible beneficial effect on the respiration of any narcotized cat fetus for the first hour or two after birth. A few of the guinea pigs, not so heavily narcotized and already executing more normal rhythms of breathing, did respond to the carbon dioxide. Heavily narcotized cat fetuses died when left in the carbon dioxide mixtures for several hours, although several recovered in atmospheres containing a high percentage of oxygen alone. Cyanosis was relieved and regularity of breathing improved as recovery from the narcosis gradually took place. The newborn animals delivered after doses of about one-half anesthetic value were especially interesting. Litter mates were delivered simultaneously and placed in the warm chambers, one in oxygen-air mixture and the other in oxygen-carbon dioxide-air mixture. No difference in the rate or depth of their respirations could be observed for more than two hours. It was perfectly clear that their breathing was unaffected by the powerful respiratory stimulant, carbon dioxide. As soon as the narcosis began to subside and the animals began to move about, we could observe an increase in depth of respirations of the specimens in the carbon dioxide mixture. Later this was occasionally followed by an increase in the rate as well. The respirations of the animals in the oxygen-air mixtures increased in rate but decreased in depth at the time the narcosis subsided. Ultimately they became equal to those of the non-narcotized control animals."

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TYNES, A. L.; NICHOL, W. W., AND WIGGIN, S. C.: *Anesthesia for Military Needs.* War Med. 1: 789–798 (Nov.) 1941.

"In war one is deprived of the conditions and equipment available for managing anesthesia during peacetime. One must be prepared to take care of a large number of casualties in a relatively short time. . . . Every effort . . . will be made both in the battalion aid station and in the collecting station to provide for the comfort of the wounded and the prevention of shock. Both morphine and rapidly acting barbiturates will be available and will be given as needed. . . . For short emergency operations in the surgical trailer attached to the casualty-clearing station, the anesthetic of choice will be pentothal sodium given intravenously in fractional doses. Intravenous anesthesia has the decided advantage of rapid induction and recovery, so that there need be no delay in the further evacuation to the rear. For the more severely shocked patients who already give evidence of tissue anoxia, oxygen will also be available and can be administered by a small portable apparatus. When the mobile surgical unit is set up farther to the rear as a part of the surgical hospital, more time can be given to each case. The anesthetist will have an opportunity to devote more attention to preoperative medication. For several years, the method in general use in most of the Army hospitals has been to give 3 grains (0.19 Gm.) of sodium amytal or 1.5 grains (0.09 Gm.) of pentobarbital sodium two hours before the operation followed by morphine and atropine or scopolamine one-half hour before operation. In this connection it has been shown that shock developed much more slowly in anesthetized dogs subjected to trauma when the animals had previously been given adequate doses of sodium amytal or pentobarbital sodium. . . . Thus, if an early operation is anticipated the preoperative use of one of these barbiturates seems highly desirable not only in the surgical hospital but farther forward, in the collecting station or the battalion aid station. . . .

"Since in this unit there is no longer

an urgent need to evacuate the wounded patient as soon as the operation is completed, the anesthetic of choice will more probably be a mixture of nitrogen monoxide, oxygen and ether, administered with the portable anesthetic machine. In the event that the supply of gas cylinders becomes exhausted, ether will be administered by the open drop method. For the more severely shocked patients, general anesthesia may prove dangerous. A shocked, partially exsanguinated patient is already well on the road toward anesthesia. After a short induction period he may quickly pass into the deepest stage of surgical anesthesia. Under such circumstances, when the injury will permit, some form of local or regional anesthesia may best be employed. The safest anesthetic would seem to be a solution either of procaine hydrochloride or of metycaine, used in combination with some vasoconstrictive agent in order to delay the absorption and thus prolong the anesthesia. Local anesthesia is also satisfactory in reduction of simple fractures and in the treatment of the majority of severe injuries of the head. Infiltration anesthesia should never be used in the case of compound fracture, nor is it practicable to infiltrate a number of areas in the body in case of multiple severe wounds. For treatment of such injuries ether should be given by the drop method.

"Mention of the use of spinal anesthesia has purposely been omitted. It has no place in any medical unit forward of the surgical hospital, because of the high degree of mobility necessary for all such units. . . . This type of anesthesia will be of untold value in the evacuation hospital, where definitive surgical treatment is given for a large number of injuries of all types. In the evacuation hospital each surgical team will have the assistance of a trained medical anesthetist. Almost any type of anesthesia, including adequate preoperative and postoperative care, should be available. . . . Rectal anesthesia with evipal (C-C-cyclohexenyl-N-methylbarbituric acid) or avertin with amylene hydrate may be used for surgical treatment of injuries about the head or face or for patients who have been gassed. In such instances, however, we see little advantage of rectal anesthesia over intravenous injection of pentothal sodium with the additional administration of oxygen. Intratracheal anesthesia will also be available in the evacuation hospital. It will be of tremendous value in the surgical treatment of injuries about the face, in all surgical procedures involving the brain and in the treatment of penetrating wounds of the chest when it is desirable to maintain positive pressure. It may also be of life-saving value in the treatment of other types of injury in which it is difficult to maintain an open airway. . . . All of the anesthetic agents used in the evacuation hospital will, of course, be available also in the general and convalescent hospitals. . . . The anesthetist in charge should assure himself that a complete and accurate record of the anesthesia is kept in every case." 4 references.

J. C. M. C.

PHILLIPS, R. B.: *Wartime Anesthesia.* War Med. 1: 781–788 (Nov.) 1941.

"The fulfilment of the following conditions is essential to efficient wartime anesthesia: 1. Ease of carrying anesthetics and the apparatus for administering them and ease of assembling the latter. 2. The organization of individual anesthetics (excluding, of course, the inhalation types of anesthetic) into compact and sterilized individual kits. 3. The use, preferably, of nonexplosive anesthetic agents. 4. Training in the technics of inducing spinal and intravenous anesthesia for at least 25 per cent of the hospital corpsmen of the