sary metabolic activity. The advantages of such a principle are threefold: (1) With adequate precautions in the use of a closed system with no leakage it permits the employment of certain anesthetic mixtures which, though in themselves are highly explosive, in many operations are pharmacologically indicated for the well-being of the patient. (2) The closed system with carbon dioxide absorption results in a thorough elimination of carbon dioxide so that respirations are quiet. It also permits the anesthetist to assure control of respiration when indicated. (3) There is a tremendous saving in the quantity of gaseous agents necessary for maintaining anesthesia, which is an important item when expensive agents such as cyclopropane are used. . . . Another advancement in inhalation anesthesia is in intratracheal intubation. This procedure insures an unobstructed air passage from the lips or nostrils to or near the bifurcation of the trachea by means of a special tube or catheter. . . .

"Spinal anesthesia has been the subject of much controversy. The chief objections are: (1) the possibility of harmful effects to the central nervous system; (2) its circulatory depressive effect, and (3) its limited and frequently too short duration. These objections result not because of the use but rather the abuse of this type of anesthesia. . . . The method of continuous or fractional spinal anesthesia, devised and reported by Lemmon, is becoming increasingly popular particularly for operations of unpredictable duration. . . . While intravenous anesthesia dates back to 1872 it is only with the introduction of short acting barbiturates such as evipal soluble and sodium pentothal that intravenous anesthesia has become a more satisfactory procedure. . . . It is the author's opinion that the best results are obtained when the barbiturates are used as a primary anesthesia only in minor procedures, such as short bone and joint operations, encephalography, and other short neurologic procedures, and painful dressings, or as a complementary agent together with adequate oxygen, for the comfort of the patient when spinal anesthesia is the primary anesthesia." 35 references.

J. C. M. C.

BRACE, D. E.: *Premedication, Anesthesia, Oxygen and Plasma Therapy, for the War Gas Casualty.* Bull. New York Med. College, Flower and Fifth Avenue Hospitals **5**: 101–106 (June–Oct.) 1942.

"The problems that are of interest to the anesthetist in war gas poisoning may be grouped under the following headings: (1) The treatment of pain incidental to war gas casualties with local anesthetic drugs. (2) The treatment of hypoxia or oxygen want that accompanies war gassing. (3) Methods of anesthesia when surgery must be completed on war gas casualties. . . . Pain in the area affected is one of the most serious complications of war gas poisoning. . . . With that group of gases classified as pulmonary irritants the mucous membranes of the upper respiratory tract and the conjunctiva of the eye are the sites of the most intense pain. In addition to the creation of pain these irritants disturb the activities of vital reflexes and alter essential secretory mechanisms, and as a result breathing is seriously affected. . . . The methods and drugs recommended for the relief of pain in the upper respiratory tract of the conscious patient include the use of local anesthetic agents. It must be remembered that such drugs applied to the mucous membrane are rapidly absorbed and large quantities must be used, therefore the concentration should be kept in the minimum effective range. Duration of such anesthesia is enhanced by the use of vaso-

constrictor drugs such as adrenalin, but the use of vaso-pressors is not recommended because of their systemic effect. . . . Local drugs usually recommended include cocaine solutions in 2–5 and 10 per cent dilutions, however, stronger solutions than 2 per cent should not be used. . . . The aqueous solutions are considered better than the oily solutions in the presence of inflammation. Other agents which have been suggested are the 0.5 to 2 per cent metycaine, 1 per cent nupercaine and 2–4 per cent pontocaine. . . . Lozenges containing local anesthetics such as nupercaine, benzocaine and anesthesan, menthol, chloroform, etc., may have some value. For the conscious gas patient the use of opiates for pain is questionable, the deciding factor being the degree of hypoxia present. . . . If morphine is used for pain the pharmacological effects should be established immediately; this is accomplished by administering the drug intravenously. . . . Scopolamine has been recommended in combination with morphine for pain in the apprehensive individual. A particularly favorable action of the combination is the pain relief and the added cortical depression. These drugs used together simplify the psychic control of the patient which should be a desirable factor in controlling gassed patients, moreover the cholenergic effects of scopolamine seem to decrease the central respiratory depression of morphine. . . . The derivatives of barbituric acid have no place in the treatment of pain as they are not analgesic in therapeutic doses and relieve pain only when unconsciousness is produced with anesthetic doses. The barbiturates have been shown experimentally to cause bronchial constriction which might be of serious import in the presence of hypoxia. Other sedatives and hypnotics such as aspirin, bromides, avertin and paraldehyde are condemned. . . .

"Oxygen therapy for patients poisoned with chemical agents is not comparable with the oxygen therapy as we ordinarily think of it for patients with circulatory or respiratory disease. First, there is the added factor of irritation and subsequent pathology of respiratory tract tissues exposed to the gases. Second, there exists in serious cases lower tract obstruction from edema, fluid or organized fibrous membrane. Third, in some instances, as in poisoning from mustard gas, inhalations of high oxygen atmosphere greatly enhance the pain and cannot be tolerated. The primary requisite of oxygen therapy for patients exposed to chemical warfare agents is to overcome obstruction, as this is the factor that produces hypoxia. . . . The oral pharyngeal catheter has been frequently adjudged to be inferior to other techniques, the method is simple, convenient and requires a minimum of equipment and is fairly efficient. With a flow of 6 to 8 litres of oxygen per minute oxygen percentage in the alveoli may be raised to approximately 50 per cent; this concentration is adequate if severe circulatory collapse is not a factor. . . . If pulmonary edema is present two other procedures have been suggested, first, helium and oxygen mixture with 70 per cent helium and 30 per cent oxygen. . . . This mixture or oxygen alone is efficiently delivered with a Boothby apparatus. . . . Oxygen or mixtures of oxygen and helium under positive pressure have also been recommended; this may be accomplished by a face mask or with a special hood so that the pressure of the respiratory atmosphere is maintained at about 5 millimeters of mercury during both phases of respiration. Such pressure increases the gradient drive of the gas on inspiration and serves to ventilate a large number of alveoli, and when the expiratory phase is carried out against slight pressure, gases trapped in the air sac distal to

the obstruction are more efficiently diffused. The use of positive pressure also aids in the reabsorption of edema fluid. Subcutaneous oxygen may be of some value although the experimental and clinical evidence is not extensive. . . . When surgical intervention becomes necessary for the war gas casualty the anesthetist is faced with problems of major magnitude. Further handicap among anesthetists is the lack of agreement as to the method of choice, but there is no lack of opinions or dearth of statements regarding indications and contraindications to spite the fact that there is scarcely no clinical experience or experimental basis for the opinions expressed. . . . A conscious patient with an operation in progress, even though painless, as with local or regional anesthesia, who has severe irritation of the respiratory tract or any degree of oxygen want will not be coöperative or comfortable, and the patient's condition may be made worse if sedatives or hypnotics are given in sufficient volume to depress mental and physical activities for the completion of the procedure. This lack of coöperation constitutes a major contraindication for the employment of these techniques. Despite the many and enthusiastic reports of the intravenous barbiturates their use with these casualties must be reviewed critically as these drugs probably have no place in the treatment of cases suffering from oxygen want and impending circulatory collapse. Inhalational anesthesia need not be avoided if the gases, ethylene, nitrous oxide and cyclopropane, are judiciously used. . . . If these patients are viewed as potential subjects who will have the fatal syndrome of respiratory obstruction, oxygen want, pulmonary edema, right heart failure and complete circulatory collapse, more can be done by proper inhalational anesthesia to interrupt this course of events than by other known methods of surgical anesthesia. The supportive treatment for these patients is important. In the presence of pulmonary edema and signs of right heart failure the use of digitalis, stimulative drugs and intravenous fluids is condemned because of high venous pressure and a constricted peripheral circulatory system. The analepties have no value for these patients and it is only when circulatory failure occurs that vasoconstrictors or small volumes of plasma should be considered."

J. C. M. C.

JOHNSON, C. R., AND MANN, F. C.: *The Effect of Anesthetics on Gastric Tonus and Motility with Special Reference to Acute Gastric Dilatation.* Surgery **12**: 599–614 (Oct.) 1942.

"It is generally agreed that in acute dilatation of the stomach there is a loss of gastric muscle tonus with the result that accumulated secretions and gas can balloon out the relaxed viscus. There is regurgitation of variable amounts of fluid. Dehydration, symptoms of toxemia, and collapse are features of the condition if it is progressive and unrelieved. . . . There are, undoubtedly, multiple etiologic factors. In the majority of cases, however, the condition has occurred postoperatively, and in these cases it has occurred most frequently following laparotomy among patients who have had a general anesthetic. It has been only natural to look to the effects on the stomach incident to operation, either the operative procedure itself or the anesthetic or both, in seeking an explanation of this complication. . . . In order to evaluate more properly the question of anesthesia as a possible etiologic factor in acute gastric dilatation, it was decided to make a comparative study of the effects of anesthetics, including some of the newer agents and combinations of agents, on the gastric tonus and motility of the dog under the following conditions: