taken (1) that they are powerful enough, (2) that they do not at the same time increase the work of the heart proportionately (or out of proportion), and (3) that they do not divert blood from the coronary circuit by an equal or greater dilating action upon the other systemic vascular beds."

A. W. F.

MOORE, D. C., AND KARP, MARY: *Intravenous Alcohol in the Surgical Patient: a Preliminary Report.* Surg., Gynec. & Obst. 80: 523–525 (May) 1945.

"Alcohol in its various forms has been a part of the medical profession's armamentarium since medieval times. . . . Dr. Vincent O'Conor has utilized 5 per cent alcohol for his operative cases since June of 1941. His excellent results with this method have stimulated our interests and have led us to expand its use to other surgical specialties. This report is based on an analysis of the last 150 cases. . . . When 1000 cubic centimeters to 3000 cubic centimeters of 5 per cent or 10 per cent alcohol in 5 per cent glucose is administered intravenously over a 24 hour period, the patient experiences a dulling of memory and concentration. He has a sense of well being and loss of anxiety. Respirations are increased, the blood pressure shows no significant change, the pulse may increase slightly, there is a vasodilatation, but the body temperature remains the same or decreases slightly. Alcohol does not have any bronchoconstrictor action and seldom any bronchodilator action as shown from determination of the dead space of breathing. Nausea and vomiting, acidosis, and headache are not concomitant symptoms when the alcohol is used intravenously; they do occur, however, when it is taken orally in comparable doses. There is an increase in the flow of urine which is due to the fluid intake, not to the diuretic effect of the alcohol alone. Ninety to ninety-nine per cent of the alcohol is completely oxidized in the body. Approximately 2 per cent is excreted in the urine, and from 0.2 per cent to 0.5 per cent is eliminated by the lungs. In our series of cases blood analyses have shown 0.2 milligram to 1.0 milligram alcohol per cubic centimeter of blood immediately after and during the course of administration. If the blood concentration of alcohol is above 0.5 to 0.7 milligram, the patient shows signs of inebriation. The amount in the blood varies with the rate of infusion, metabolic rate, and tolerance of the patient. The official U. S. Navy test has been used in our determinations. . . . The normal individual metabolizes approximately 10 cubic centimeters of pure alcohol per hour. . . . This basic fact must be kept in mind when the drug is administered. A 5 per cent alcohol solution, therefore, will contain 10 cubic centimeters of 95 per cent alcohol per 200 cubic centimeters of fluid. In 1 hour this amount will be entirely metabolized in the average individual. Cautious additional amounts above this figure will give the milder forms of euphoria and intoxication which are needed for clinical results, as these vary with the individual tolerance. Therefore, it is best to judge the rate of infusion by the subjective signs. The clinical uses of intravenous alcohol are mirrored through its many physiologic effects. It has a special value in those cases in which nausea, vomiting, and paralytic ileus prevail. . . . One thousand cubic centimeters of 5 per cent glucose in normal saline will provide 200 calories. With the addition of 50 cubic centimeters of 95 per cent alcohol, the caloric intake is increased to approximately 600 calories. Thus, a solution of 5 per cent alcohol and 5 per cent glucose in physiological

saline tends to protect the body proteins, carbohydrates, and fats, because it is a utilizable source of energy which is not stored. Vitamins may be added to the alcohol solution without rendering the vitamins inactive.

"The sedative and analgesic qualities of the 5 per cent alcohol solutions are very dramatic. With spinal anesthesia, which is used in 22.2 per cent of our urological surgical cases, we have employed 5 per cent alcohol as a supplement during the entire operative procedure. Patients who have this form of medication, doze, relax, lose all apprehension, and often have no memory of the surgical interlude. Postoperatively, the 5 per cent alcohol solution has been continued with the most gratifying results. The use of an opiate or other sedative may be eliminated entirely if the rate of flow of the intravenous alcohol is regulated to the patient's needs. We do not permit more than 3000 cubic centimeters of the 5 per cent alcohol over a 24 hour period. We usually find 1000 to 2000 cubic centimeters adequate. The value of intravenous alcohol in postoperative recovery is twofold. Not only is it given as a sedative and analgesic, but as a safeguard against the possibility of atelectasis and other pulmonary complications. The respiratory rate and tidal exchange remain the same or are increased. . . . In 5 per cent and 10 per cent solutions, it is beneficial in patients troubled with heart diseases. It increases the dilatation of the blood vessels and possibly the coronary arteries, so that even though fluids are given intravenously, the blood pressure is not significantly increased. In cardiacs, one may use a 10 per cent solution of alcohol, thereby decreasing the actual amount of fluid intake necessary to maintain the required calorie intake. In the debilitated and morbid patient we have eased restlessness and pain. In the cancer patient who has previously been made comfortable with fluids and morphine, we have markedly reduced the necessity for opiates. In the alcoholic, who is approaching or has developed delirium tremens due in part to the sudden withdrawal of his customary alcoholic intake, we have been successful in controlling him with intravenous alcohol when all other medications in the usual dosages have failed.

"The complications that have occurred from the intravenous infusion of 5 per cent or 10 per cent alcohol have been minor. Occasionally, when the fluid had been given too rapidly, there has occurred restlessness and inebriation. It is singular that few cases have needed restraint. The infusion can be discontinued or slowed, with the resultant return to the quiet state of well-being. Occasionally the administration has been complicated by the sclerosed vessel. This occurs more frequently with the 10 per cent than the 5 per cent solution. We have had one partial ulnar nerve paralysis which may have been caused by subcutaneous alcohol in the cubital fossa. Because of this occurrence, we suggest the use of blood vessels other than those in the cubital fossa, and recommend that the beginner at venipuncture use saline for the cannulation of the needle before changing to alcohol. In numerous cases the alcohol has run subcutaneously without causing symptoms other than slight discomfort. This has been relieved by warm, moist applications." 13 references.

J. C. M. C.

FIRTH, J. B., AND STUCKEY, R. E.: *Decomposition of Trilene in Closed Circuit Anaesthesia.* Lancet 1: 814–816 (June 30) 1945.

"A number of fatal cases have been reported following 'Trilene' (trichlorethylene) anaesthesia using the closed circuit technique. Our investigations