a prompt disappearance of atelectasis, this method of treatment was slow in being accepted. Only within the past few years has it been employed more and more extensively in the prevention and treatment of postoperative atelectasis."

"The problem presents itself as to the person best qualified to carry out bronchoscopic aspirations of the tracheobronchial tree during and following operation. The ideal situation would be for a trained and experienced bronchoscopist to be available for this procedure. This, however, is not always possible. In certain instances the surgeon may have the training necessary to perform bronchoscopy, especially if he is interested in thoracic disease, but this is the exception rather than the rule."

"It would appear that the trained anesthetist would be in an especially favorable position to take over this duty. It is the anesthetist who watches the patient most closely for evidence of aspirated secretion and vomitus during operation and immediately thereafter. With his training and skill in the introduction of intratracheal tubes, he should be especially adapted to learning the technique of bronchoscopy. Undoubtedly, in the not far distant future every qualified anesthetist will be required to have fundamental training in the field of bronchoscopy."

A. W. F.

HENDERSON, YANDELL: *Tonus and the Venopressor Mechanism: The Clinical Physiology of a Major Mode of Death.* Medicine **22**: 223–249 (Sept.) 1943.

The author's interest in physiology extends over almost a half century. This paper appears to be an attempt to recapitulate and correlate his theoretical concepts of the mechanisms by which oxygen is distributed to the tissues and carbon dioxide removed therefrom. The dissertation runs approximately as follows:

It appears probable that no living muscle ever completely ceases its tonic pull. Always a few of the motor nerve fibers to it are discharging impulses into it and a few of its bundles of muscle fibers are stimulated to contract. This circumstance involves continuance of the pumping action of the discrete muscle bundles as they relax and contract thereby filling, compressing and emptying their intercalated capillaries and veins. This is the principal but not the only aid that muscle tone affords to venous return. The state of tonus in muscles maintains an intramuscular pressure higher than that of the environmental atmosphere and the pressure in the thorax is subatmospheric—the difference between these two pressures constituting the effective venous pressure.

The most significant influence upon the motor centers is chemical, the blood gases. The blood gases, particularly carbon dioxide, exert an influence upon motor nerve centers that is manifested in muscular tension and in activity of the intramuscular booster pumps. That is, under normal conditions the amount of carbon dioxide produced in the body determines alike the volume of air breathed, the volume of venous return and thereby the volume of blood circulated.

"Experimental shock" results from overventilation through the causal sequence: 1. acapnia; 2. depression of tonic nerve centers; 3. decrease of booster activity; and 4. failure of venous return.

Spinal anesthesia "shock" is due to paralysis of motor roots which puts a stop to the activity of the booster pumps and lowers intramuscular pressure, hence venous return fails.

When the tonic influence of the motor centers fails, skeletal muscles be-

come flaccid, intramuscular pressure falls, venous return diminishes, arterial pressure falls. This is the first, or circulatory, stage of shock. When circulation decreases to a volume-flow insufficient for minimal oxygen requirements, tissue asphyxia develops, capillary walls are damaged, and a leakage of serum from the capillaries sets in. This is the second, or asphyxial, stage of shock.

In hemorrhage, loss of hemoglobin causes asphyxia. Death in hemorrhage is due to a pathological process initiated by asphyxia. Decrease in carbon dioxide and bicarbonates, an "acarbia," is probably concerned in pathological changes in "shock." If after the loss of blood has ceased, minute-volume of breathing gradually increases, death ensues; if minute-volume decreases, the animal survives.

The paper exhibits the advantages and the disadvantages of a prolonged and unremitting "point of view."

A bibliography of sixty-seven references is appended.

A. S.

TAYLOR, N. B., AND MOORHOUSE, MARGARET S.: *The Use of Isinglass as a Blood Substitute in Haemorrhage and Shock.* Canad. M. A. J. **49**: 251–262 (Oct.) 1943.

These authors find isinglass to be a safe and effective transfusion material. The supply is almost unlimited and it can be manufactured relatively cheaply on a large scale. The efficiency of a transfusion material depends upon the size and shape of its molecule, in relation to the "pores" of the capillary walls. The particle size is also influenced by conditions in vivo, namely the pH, temperature, electrolyte concentration, and the presence of other colloids and organic compounds. Collagen molecules have much greater length than breadth thus pass less freely from the circulation than do larger but globular molecules as the molecules of serum albumin.

The true criterion of the effectiveness of a blood substitute is the restoration of the blood volume and its maintenance to the time when fluids produced by natural processes can take its place. Isinglass disappears from the circulation at a fairly rapid rate but not, apparently, until it has been replaced by plasma protein. There is evidence that the injected protein of isinglass is later utilized by the body in the manufacture of plasma protein. Immediate effects of isinglass injection are about the same as when blood is injected.

A series of experiments done illustrates the value of a solution of isinglass in treatment of shock caused by acute hemorrhage. In the case of shock caused by muscle damage, transfusion either with blood or with isinglass was found to be relatively impotent.

As now prepared, isinglass has mild pyrogenic action but is free from antigenic action. The livers and kidneys of animals which had received repeated injections of isinglass were found to be normal.

A. S.

HINGSON, R. A., AND EDWARDS, W. B.: *Continuous Caudal Analgesia: An Analysis of the First Ten Thousand Confinements thus Managed with the Report of the Authors' First Thousand Cases.* J. A. M. A. **123**: 538–546 (Oct. 30) 1943.

"In our series of 1,150 cases, 1,050 or 91.3 per cent, have been managed through labor and delivery without resorting to any other form of analgesia or anesthesia. . . . The special malleable needle technic with the closed apparatus has been used by us in 1,000 of our cases. . . . In our hands it has given increasing satisfaction with the minimum of complications. . . . We prefer a 1.5 per cent solution of metycaine in isotonic solution of sodium chloride or isotonic solution of three chlorides because of (1) the high analgesic effi-