number of anesthesiology training programs continue to use flammable anesthetics. Those that do cite teaching as their principal justification. That in 25 of these programs 94 or fewer flammable anesthetics/year were administered raises doubts about whether the exposure is adequate to develop proficiency in their use. Whatever the merits or demerits of flammable anesthetics, it is evident that their use will eventually terminate if the trainee anesthesiologist does not gain familiarity with them. Aside from teaching aspects, there was considerable scepticism, even by those who still use flammable agents, concerning their need.

The reasons for discontinuing the use of flammable agents included pharmacologic considerations, the electrical environment of anesthetizing locations, and expense. In planning new hospital construction or upgrading existing facilities, that nonflammable anesthetizing locations are less costly to build and maintain, and the patient as well as members of the operating room team are less at risk from explosion, fire and electrical shock, must be taken into account. Flammable anesthetizing locations are subject to special physical and procedural requirements beyond those mandated for nonflammable anesthetizing locations. Electrical equipment, including wiring, fixtures, receptacles, and appliances, must be explosion-proof or located 5 feet above the floor and spark-proof. This severely curtails the use of electromedical devices. Electrostatic precautions against the ignition of flammable agents are onerous. In this regard, conductive flooring must be provided and maintained; special fabrics for apparel, sheets, drapes, etc.; conductive footwear, breathing tubes, etc., are required, and all must be periodically tested for conductivity. Finally, there are special requirements for storage of flammable agents, including ventilation, fireproofing, conductivity, and location. When anesthetizing locations that meet the requirements for flammable anesthetic agents are subsequently designated areas where only nonflammable agents are to be used, it is no longer necessary to comply with these special requirements.

DERYCK DUNCALF, M.D.
Professor of Anesthesiology
Albert Einstein College of Medicine
Bronx, New York 10467
Chairman
Department of Anesthesiology
Montefiore Hospital and Medical Center
Bronx, New York 10467

REFERENCES

3. JCAH Accreditation Manual for Hospitals, 1976
4. JCAH Standards, Survey and Procedures Committee: Ruling on Conductive Floor Testing, February 24, 1977

(Accepted for publication November 18, 1977.)

Prevention of Ventilator Hazards

To the Editor: — In their article, Drs. Sears and Bocar described a possible mechanism for obstruction of the breathing circuit. Although the specific case they reported involved a Monaghan 300 Ventilator, the hazard also exists with other anesthesia ventilators. They recommended that the reservoir bag outlet be removed from the selector valve and that the selector valve handle be left in the horizontal position. Unfortunately, this remedy sets the stage for a different but also potentially dangerous human error. If the bag/ventilator selector is accidentally turned to the vertical position, the breathing circuit would be opened to atmosphere and the ventilator outlet obstructed. What is even more likely and more hazardous is that the selector valve handle can be partially deflected, creating a substantial leak in the breathing circuit that may be difficult to detect. Neither the sound nor the bellows movement of the ventilator would be altered appreciably, even though a fraction of the intended tidal volume would be ventilating the room instead of the patient's lungs.

One would expect that a singular error such as this would be recognized by the anesthetist and corrected before any irreversible sequelae occurred. However, in concert with other factors that may predispose to error or in conjunction with a second, simultaneously occurring error or failure, such a relatively simple oversight could lead to a catastrophic outcome.

To eliminate this hazard fully, the selector valve should be removed from the ventilator outlet. Of course, the convenience of switching between controlled and manual ventilation that is afforded by this valve would then be lost, but the same effect is created by just removing the reservoir bag outlet. Since there are not objective, quantitative data on the

Anesthesiology
48:299–300, 1978
frequency of this particular cause of breathing circuit obstruction, any arguments for or against use of these selector valves must remain purely subjective. Nevertheless, we would caution against implementing the specific solution recommended by Drs. Sears and Bocar.

**Jeffrey B. Cooper, Ph.D.**  
_Deputy Chief_  
_Bioengineering Unit_

Anesthesiology  
48:300, 1978

_To the Editor:_—Sears and Bocar describe a serious complication associated with the use of a ventilator.1 However, the anesthesiologist using the ventilator was at fault. Had the anesthesiologist checked the system before using it, the hose leading from the bellows selector valve would have been found to be on the wrong outlet and placed correctly. The suggested modification of the ventilator would have prevented the problem, but so would a more careful application of fundamental anesthetic procedures.

Anesthesiology  
48:309, 1978

_In reply:_—The modification of the selector valve proposed by us provided a simple and expedient solution to a disturbing problem, since the connecting hose does not adapt easily to the bellows outlet without the selector valve. Dr. Cooper correctly notes that with the bag/ventilator selector in the vertical position the breathing circuit would be open to the atmosphere and the ventilator obstructed. In our experience this situation has been readily recognized by failure of the bellows to rise and through the routine inspection and auscultation of the chest after the patient has been connected to the ventilator. Also, in our experience, important leaks in the system are detected early through the routine assessment of patient ventilation immediately after the initiation of mechanical ventilation. I agree with Dr. Cooper’s suggestion that the selector valve should be eliminated, since the potential problems appear to outweigh its one advantage. Perhaps our deliberations will lead to its demise.

Without question, human error in the use of the equipment was the primary factor in the accident described. However, the increasing use of instrumentation in anesthesia multiplies the opportunities for such errors, and this knowledge would appear to provide adequate justification for our attempts to lessen that potential.

Bertram E. Sears, M.D.  
_Professor of Anesthesiology_  
_University of Oklahoma Health Sciences Center_  
P.O. Box 26901  
_Oklahoma City, Oklahoma 73190_

(Accepted for publication November 18, 1977.)

**Sedation vs. Relief of Anxiety**

_To the Editor:_—Forrest et al.,1 in their work on the subjective effects of premedication, have touched on a most interesting subject. The essence of their article is the inability of a number of intramuscularly administered premedicants to improve the ease of induction of general anesthesia and to allay apprehension. The authors make the correct distinction between sedation and relief of anxiety, which are