Correspondence

Scavenging of Anesthetic Gases

To the Editor:—The report of Friedman Mor et al.,1 described how the rebreathing bag of a circle absorber system had collapsed completely because the negative-pressure-relief valve in a Dupaco Clean OR scavenging system had stuck in the closed position. However, this cause was not verified in the report. We would like to point out another possibility. According to Whitcher et al.,2 impedance at the exhaust valve is often necessary to keep the rebreathing bag filled, when this scavenging system is in use. In fact, this is an inborn error of the system, and not an occasional failure. It is due to the impracticability of balancing suction to waste gas flow, because the suction is continuous, and the waste gas flow intermittent. Thus, suction may periodically exceed the waste gas flow, and the resistance to flow through the negative-pressure-relief valve can result in emptying of the rebreathing bag.

It is almost dogmatic that scavenging of waste gases must take place after they have passed the exhaust valve. This is based on the assumption that waste gas evacuation thereby does not influence the conditions within the anesthetic circuit itself. However, Sharrock and Leith3 demonstrated that even though evacuation of gases takes place from reservoirs outside the exhaust valve, subatmospheric pressures of considerable magnitude may be built up within the circuit.

We would like to draw attention to another principle of scavenging, in which calibrated evacuation of waste gases is applied directly to the anesthetic circuit by means of an ejector flowmeter.4 In this method, the gas evacuation takes place at a constant rate from a closed reservoir, i.e., the anesthetic circuit, and a balance is achieved by equilibrating the gas evacuation rate to the fresh gas inflow. It is possible to determine whether this equilibration has been obtained by the extent of filling of the breathing bag, which now also functions as a reservoir bag. The evacuation rate of the ejector flowmeter is adjustable with considerable accuracy, and under visual control within the range 0 to 15 liters min\(^{-1}\). Equilibration of gas evacuation to fresh gas flow is thus easily carried out at any time during anesthesia. An exhaust valve and a negative-pressure-relief valve inserted in the circuit no longer serve as integral parts of the scavenging system, but merely as precautionary measures. The ejector flowmeter can be used in conjunction with circle-absorber systems, rebreathing circuits, anesthetic ventilators, and pediatric circuits4 without difficulty. This principle of scavenging has proved to be safe and easy to handle in clinical practice.

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1. Friedman Mor Z, Stein ED, Orkin LR: A possible hazard in the use of a scavenging system. Anesthesiology 47:302-303, 1977

Nitrous Oxide and Bone Marrow Function

To the Editor:—The study by Kripke et al.1 is an important contribution to our understanding of the difficult problem of the effect of anesthetics on bone marrow. It is unfortunate that details of "intermittent" exposure to nitrous oxide are not given, since precise details of timing are known to be important. We are cited as finding that prolonged exposure to nitrous oxide has a suppressant effect on marrow stem cells in culture.2 In fact, we found that 48 hours' exposure to nitrous oxide, 75 per cent, had no significant effect on growth, although marked suppression was found during exposure to halothane, 1 per cent, and also to halothane, 0.75 per cent, plus nitrous oxide, 75 per cent.

There are ample data about the effects of prolonged exposure to nitrous oxide on peripheral blood counts of rats (reviewed by Kripke1), but animal studies in this field are bedevilled by species differences in sen-
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Anesthesiology
V-49, No 1, Jul 1978

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REFERENCES

(Accepted for publication January 19, 1978.)

John F. Nunn, M.D.
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In reply:—It is a pleasure to respond to the letter of Drs. Nunn and Sturrock. Their studies of the cellular effects of anesthetics have established the standard for all workers in this exciting field.

They raise three concerns: The first is the lack of details in our recent publication on the use of intermittent nitrous oxide. In that paper, we cited our earlier publication as a reference for the method. The second concern relates to our citation of their paper suggesting an effect of nitrous oxide on the growth of bone marrow stem cells in culture. After rereading their paper, I remain with the impression that cell suppression by nitrous oxide alone was nearly significant, suggesting a subthreshold concentration for this model. Thus, when mixed with subthreshold halothane, the occurrence of an additive effect was not surprising. Nevertheless, I will accept their statement that "nitrous oxide, 75 per cent, had no significant effect on growth..." The third relates to fear, possibly needless, of prolonged use of nitrous oxide in man. Some of our experiences regarding its safety for prolonged use as an analgesic in man were previously reported. We concur that the safety of nitrous oxide for prolonged use should be reviewed.

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REFERENCES

(Accepted for publication January 19, 1978.)

Anesthesia Does Not Cause Metabolic Stress

To the Editor:—In their otherwise excellent review, Drs. Blackburn, Maini and Pierce state that: "the induction of anesthesia initiates the (metabolic) response to injury, while most surgical procedures 60 to 90 min in duration do not augment this stress further." We believe that this statement is not correct. First, the documentation given for the above statement is incorrect, since the article referred to deals with the extent and composition of postoperative weight loss. Second, several studies have shown that anesthetic

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