a full array of monitors, which was cost prohibitive. An alternative
would be to use a second anesthesia machine for its monitors alone.
The latter was impractical due to space considerations in the operating
room. The data from Beebe et al. suggest that a much simpler approach
is sufficient. Our policy now calls for using either a Modulus II® or
Foregger F500® machine, changing the breathing tubes, fresh gas hose,
and absorber canister (which shouldn’t really be necessary) and purging
and ventilating the system with a 5 liter/minute fresh gas flow for 10
min. This is also similar to the suggestions of McGraw and Keon.2
Vaporizers can be removed from the Modulus II® at the request of the
anesthetist. In any event, it seems that the more stringent suggest-
tions from the 1982 American Society of Anesthesiologists Technical
Bulletin are no longer justified.*

An alternative approach to this problem could be to change nothing
except the breathing tubing and to insert a charcoal canister on the
inspiratory port of the absorber after or during purging [ironically,
data on the effectiveness of charcoal in removing anesthetics from a
low-flow system appeared in the same issue of Anesthesiology.3 Hy-
pothetically, the charcoal would absorb any residual anesthetic following
a purge.

We appreciate the availability of the results of this investigation. We
do, however, suggest that alternative interpretations and approaches
be considered for preparing an anesthesia machine for MH susceptible
patients.

Anesthesiology
70:562, 1989

In Reply.—The results of any study directly apply only to the model
tested. Because it is impossible to test every model, results are usually
extrapolated with appropriate modification to other situations. Our data
indicate that vaporizers should be removed from the anesthesia circuit.
It seems obvious that this can be accomplished by an isolation valve,
on machines so equipped.

Our study clearly indicates that the Air-Shields® ventilator releases
halothane during machine washout (compare the open squares in figure
3 with the filled squares in figure 4). These results also indicate that
the source is a component other than the bellows. Therefore, the test
of an uncontaminated ventilator suggested by Cooper and Philip is
redundant. It is not necessary to further identify the halothane source
because no part of the ventilator, other than the bellows, is easily ac-
cessible.

Our study evaluated simple modifications to an ordinary anesthesia
machine, and documented the residual halothane concentrations pro-
duced by each. Using our recommendations, residual anesthetic con-
centrations will be <1 PPM. For reasons discussed in our manuscript,
concentrations this low are unlikely to trigger malignant hyperthermia.
It is probable that somewhat higher concentrations are also safe: in
the absence of specific data, each anesthesiologist must determine the
residual concentration he or she finds acceptable. The concentration
chosen will presumably reflect the risks and costs associated with as-
suring extremely low residual concentrations.

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A Potential Complication of Fiberoptic Intubation

To the Editor.—The fiberoptic bronchoscope can be a useful aid to
tracheal intubation.1,2 We wish to report a potentially serious compi-
lcation associated with the use of this instrument.
A 41-yr-old man with an unstable fracture of the lumbar spine was
scheduled for posterior instrumentation and fusion under general
anesthesia. The surgeons had requested awake tracheal intubation and
positioning of the patient because of the unstable nature of the injury.
Following intravenous sedation and the topical application of local an-

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  tients susceptible to malignant hyperthermia. Anesthesiology
  69:395–400, 1988
2. McGraw TT, Keon TP: Malignant hyperthermia and the clean
  machine (abstract). Anesthesiology 69:A289, 1988
3. Jantzen JAH: More on black and white granules in the closed
(Accepted for publication December 11, 1988.)

We agree that activated charcoal hypothetically reduces residual an-
esthetic concentrations. Although charcoal does seem useful for re-
ducing anesthetic depth while maintaining a closed circuit, the Letters
to the Editor proposing this technique do not adequately evaluate its
safety for patients susceptible to malignant hyperthermia.1,2

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