

Correspondence

Ethylene Uptake in Man

To the Editor:—In an editorial in the May-June issue (page 279), Dr. Eger has raised two points of criticism of our study of ethylene uptake in man. Because these criticisms represent individual interpretations, we feel it is important to present other points of view in order to aid the understanding of contemporary work in this field.

The use of the term “uptake” in reporting the variation of attained alveolar concentration as a function of time is not original with us but, as Dr. Eger suggests, conforms to the standard practice of previous workers in this field (*Cf.* Kety, S. S., *Pharmacol. Rev.* 3: 1, 1951, page 23, *et seq.*). Our measured values, it is true, are not directly reported in ml./minute absorbed at the pulmonary capillaries, but are related simply to this value by a proportionality constant consisting of the alveolar ventilation, [Uptake = $\dot{V}_A(F_I - F_A)$]. This is particularly true of an insoluble gas (ethylene) given in low concentration (1 per cent) in which concentration and second gas effects do not enter. Therefore, we do not agree that ethylene uptake cannot be calculated from our data, assuming a knowledge of the alveolar ventilation.

We have chosen to express our results in the form of a ratio to equilibrium concentration (F_A/F_I) because it is this form which is most useful in using the data in studies of gas uptake mechanisms, *e.g.*, for compartment analysis. The absolute quantities of absorbed gas

are of less interest precisely because they *are* related to inspired concentration rather than a measure of the physiologic variables alone.

Finally, we are intrigued by the comments on agreement of predicted (Mapleson, W. W., *J. Appl. Physiol.* 18: 197, 1963) with experimental values. Agreement within 2 per cent (with values derived for an assumed “standard” man) is just that—no more, no less—and is excellent in view of the simplifying assumptions in the model and individual variation amongst subjects. Dr. Eger suggests it is in fact a disagreement of at least 100 per cent, with the equilibrium value as the standard reference. This argument can be carried to absurdity, *e.g.*, an observed value of 99.8 per cent compared to a predicted value of 99.6 is an equally large percentage error when so calculated. This is surely a most unusual way of expressing the accuracy of a result. Presumably when we were no longer able to measure a consistent difference between inspired and expired concentration, at a time when a small residual difference was predicted, the error might be said to be infinite.

ERNEST SALANITRE, M.D., HERBERT RACKOW, M.D., ROBERT M. EPSTEIN, M.D., GERALD WOLF, M.D.

*Department of Anesthesiology,
Columbia University
College of Physicians and Surgeons
New York City*