these patients, with high airway resistance values, PEEP increased ventilation–perfusion abnormalities.

**Alain Tenaillon, M.D.**
**Jacques Labrousse, M.D.**
**Pierre Coriat, M.D.**
**Jacques Lissac, M.D.**

*Service de Réanimation Médicale*

**Hôpital Boucicaut**
75013–Paris, France

**Reference**

(accepted for publication December 14, 1978.)

*In reply:*—We appreciate the interest shown by Dr. Tenaillon *et al.* in our publication. It was interesting to see responses in arterial blood $P_{CO_2}$ to increasing increments of positive end-expiratory pressure in human subjects with acute pulmonary disease that were similar in kind to those seen in our animal model with acute induced pulmonary disease. That is, some patients responded with increases in arterial blood $P_{CO_2}$, while others showed decreases with comparable increments of PEEP. The finding that the latter group had high values for airway resistance, however, suggests that the pathophysiologic mechanism for our animal model studies and the patient studies reported by Tenaillon *et al.* were not comparable. High airway resistance is not a feature of oleic acid-induced acute hemorrhagic pulmonary edema. In addition, progressive decreases in cardiac output with increasing levels of PEEP were predictably found in our animal studies.

For these reasons it is not possible to state with confidence which gas exchange mechanism was responsible for a given increase or decrease in arterial blood $P_{CO_2}$ in the patient examples quoted. We can only surmise that the patients who experienced decreases in arterial $P_{CO_2}$ with increasing levels of PEEP must have had dramatic decreases in intrapulmonary shunt or regions with low $V_A/Q$ ratios. It would be interesting to know whether these patients were the ones with the most dramatic improvements in arterial blood $P_{O_2}$. Finally, the increases in arterial blood $P_{CO_2}$ in other subjects could well have been due to either production of areas of high $V_A/Q$ or increase in dead space ventilation, or both. We certainly agree with Tenaillon *et al.* that the use of high levels of PEEP can indeed produce $V_A/Q$ inequality leading to CO2 retention in man, as well as in dogs.

**Ronald Dueck, M.D.**
*Department of Anesthesiology*
*University of California, San Diego*
*3350 La Jolla Village Drive*
*San Diego, California 92161*

(accepted for publication December 14, 1978.)