tion. If one wants to evaluate the utility of a diagnostic maneuver, it goes without saying that the maneuver cannot be assumed accurate a priori and that another independent criterion for diagnosis must be used. To be sure, the authors used clinical findings, but a clinical diagnosis of pulmonary embolism is next to impossible (*1*). Seven of the 28 patients had the diagnosis confirmed by angiography and this is, of course, important, but an inductive conclusion based on seven out of seven is far weaker than one based on the implied 28 out of 28. The further conclusion that pulmonary embolism can be excluded by a pattern of abnormal ventilation in areas of abnormal perfusion is based on 43 patients with suspected embolism whose final diagnosis of obstructive airway disease was made by scan and clinical findings. I would not deny that such a diagnosis of obstructive airway disease can be accurate, but I do wonder how the positive diagnosis of one disease can exclude the superimposition of another suspected condition. Again, angiographically proven cases are needed. (I do not assume angiography is 100% accurate, but at this point it is still the standard for comparison, short of autopsy.)

The same sort of fallacy may be present in the paper "Evaluation of a ^{133}Xe ventilation technique for diagnosis of pulmonary disorders" by Farmelant and Trainor (*J Nucl Med* 12: 586–590, 1971). Whether the fallacy really is present is difficult to judge because the diagnostic criteria for various patients are not stated in the article.

The above-mentioned papers are useful in that they catalog the variety of patterns that might be observed with ventilation and perfusion scanning and, indeed, the authors may be correct in thinking that a certain combined scan pattern indicates the diagnosis of pulmonary embolism, but this conclusion is not a logical consequence of the presented data.

PETER B. SCHNEIDER
Beth Israel Hospital
Harvard Medical School
Boston, Massachusetts

REFERENCE

1. POULOSE KP, REBA RC, GILDAY DL, et al: The diagnosis of pulmonary embolism: A correlative study of the clinical, scan, and angiographic findings. *Brit Med J* 3: 67–71, 1970

REPLY BY FARMELANT AND TRAINOR

Dr. Schneider raises a germane point that we slighted. The criteria for classifying patients, particularly those categorized as having pulmonary embolization, should have been stated.

However, we believe that the diagnosis of pulmonary embolism can be quite certain in some clinical situations without angiography or postmortem examination. In our group of 15 patients classified as having pulmonary embolism, all showed clear chest x-rays and none had clinical evidence of bronchospasm, i.e., wheezing was not present. One had angiographic confirmation and serial changes in the perfusion scan. Four had active thrombophlebitis and serial changes in the perfusion scan. Three had only serial changes. Four patients had active thrombophlebitis and multiple perfusion defects, but repeat scans were not obtained. In three additional patients, one of whom had active thrombophlebitis, the diagnosis rests on the purely clinical considerations. These latter seven patients had combinations of acute onset of cough, chest pain, dyspnea, hemoptysis, and fever with no evidence of pneumonic infiltrates. Our problem was in getting angiograms in patients whose primary physician was convinced of the diagnosis on clinical grounds backed by the perfusion scan.

In short, while absolutely convincing evidence of pulmonary embolization may be absent in seven of our 15 patients, the diagnosis did not rest on the discrepancy between the perfusion and ventilatory defects at the time the study was in progress. At present, rightly or wrongly, this criterion is being relied on quite heavily in this hospital.

MELVIN FARMELANT
JAMES TRAINOR
St. Vincent Hospital
Worcester, Massachusetts

REPLY BY ISAWA

Because of the ready availability of lung scans in the diagnosis and management of pulmonary embolism, frequency in the use of pulmonary angiography is certainly decreasing unless surgery is contemplated. It was true in the patients reported in our recent article (*1*). As questioned by Dr. Schneider, we do not think that concurrent small emboli were completely excluded in the group of patients who were diagnosed to have obstructive airways disease, but perfusion abnormalities in these patients were mostly explained on the basis of obstructive airways disease as evidenced on aerosol inhalation scans.

When alveolar ventilation is disturbed by airway obstruction, perfusion is promptly diminished (*2–4*).