Determinants of a Manpower Supply

The Doctor Shortage. An Economic Diagnosis. RASHI FEIN. Brookings Institution, Washington, D.C., 1967. 211 pp., illus. $6. Studies in Social Economics.

Fein makes a competent and conventional projection for the next decade of the demand for medical service and the supply which will be available. In 1956 there were 305,000 physicians in the United States. The demand, under the influence of rising population, incomes, education, and medicare, will be for about 375,000 physicians in 1975. The supply of physicians, allowing for immigration and the increased use of auxiliary personnel (such as nurses), will be about 362,000—moderately less than the expected number demanded, but more relative to population than we have today. Extension of these numbers to 1980 or 1985 leads to much larger predicted shortages.

Fein has many sensible and suggestive things to say about the market for medical services, but his fundamental goal—the estimation of the prospective shortage—is not especially useful. It should be a cause for reflection that most long-run predictions assert a prospective shortage: Malthus on means of subsistence; conservationists on coal and then petroleum; academic statesmen on the number of professors or the means of university subsistence. And the remainder of the long-run predictions show surpluses: of air or water pollutants; of acres of abandoned automobiles. A long-run prediction almost inevitably verifies an arithmetical truism: even a small discrepancy between two annual rates of increase—and at best there will always be some error—accumulates powerfully in the process of protracted compounding.

Although Fein's doctorate is in economics, one might suspect that it is in medicine. The distinguishing logic of the economist turns on the rational choice among alternatives, whereas the noneconomist places heavy and often exclusive weight on technological determinants. Technologist Fein is confident that the quality of applicants to medical schools will rise because the number of college graduates will rise sharply. I would have found room for a paragraph, in a five-page discussion (pp. 80–85), at least to mention the fact that men are influenced in their choice of occupations by the earnings in these occupations. Similarly, the long chapter on the demand for medical service pays scarcely any attention to medical fees, nor are the effects of fees and earnings upon the provision of medical care to rural areas and the extent of specialization of physicians satisfactorily explored. Physician Fein tells us that group practice is more efficient than the organization of medical service on the basis of single practitioners and that we should use more substitutes for physicians (but perhaps not foreign-trained physicians). I am reminded of the fact that I once slipped on the ice in Minneapolis, and when I arrived at the university my office-mate—later a most distinguished president of the American Economic Association—made a careful examination of an injured arm but overlooked a fracture. We look forward to a study by Economist Fein.

GEORGE J. STIGLER
Charles R. Walgreen Foundation for the Study of American Institutions, University of Chicago, Chicago, Illinois

Photosynthesis

Energy Conversion by the Photosynthetic Apparatus. A symposium, June 1966. MARGARET DIENES, Ed. Brookhaven National Laboratory, Upton, N.Y., 1967 (available from Clearinghouse for Federal Scientific and Technical Information, Springfield, Va.). 524 pp., illus. Paper, $3.

This is a collection of some 40 papers presented at a meeting which concentrated on the energy conversion aspects of photosynthesis in bacteria, algae, and higher plants. A reference list and discussion follow each paper.

With the rapid publication of this volume (it was available about six months after the symposium was held), the low price, the comprehensive subject index, and the large number of participants from ten different countries, students of photosynthesis at all levels have an important source book of current research in the field. It is important to have these collections available every couple of years so that one may easily keep up with research developments in photosynthesis, which covers such varied disciplines.

The papers are collected into six different sections. In the first of these, entitled Energy Transfer and Primary Photochemistry, the fast initial light reactions and rapid energy-transfer reactions are discussed from the viewpoints of excitation and transfer, kinetics, reaction centers, and spectral changes both at a theoretical and at an experimental level. Much more seems to have been accomplished with photosynthetic bacteria than with higher plants because of the simpler system and structures involved.

Section 2, Electron Transport and Phosphorylation, covers aspects of light-induced changes of specific components in photosynthesis at both the cellular and the subcellular levels of various organisms, including mutants. The preparation and properties of subchloroplast particles, the study of a chloroplast enzyme, and the use of inhibitors and uncouplers in chloroplasts are also discussed. These approaches are resulting in a clearer view of how light induces the changes necessary for phosphorylation, ion flows, and conformational changes, to which the next section is devoted. Here newer ideas on how energy storage occurs and what may be associated with it are discussed.

In section 4, Structural Aspects, the structure of chloroplasts and chromatophores is analyzed by various techniques, from circular dichroism, optical rotatory dispersion, and x-rays to electron microscopy with freeze etching. Models of the chloroplast are put forward which help greatly in elucidating the chloroplast and membrane structures involved in photosynthesis. Much, however, still remains to be done before one can be more definite about the exact interpretation of the structures.

Oxygen Evolution and Chlorophyll Fluorescence (section 5) deals mostly with the problem of oxygen evolution, an aspect of photosynthesis about which we know very little. This is a very important reaction which has so far proved rather intractable but is now being tackled by various laboratories in earnest.

The last section has four papers on the widely different topics of manganese oxidation, chlorophyll-independent photochemistry, lipid oxidation, and labile CO_2 fixation products. As mentioned earlier, a comprehensive subject index rounds off this excellent symposium volume.

D. O. HALL
Department of Botany, King's College, London, England