

# Book Reviews

## Resources and the American Economy, 1960–2000

**Resources in America's Future.** Patterns of requirements and availabilities, 1960–2000. Hans H. Landsberg, Leonard L. Fischman, and Joseph L. Fisher. Published for Resources for the Future by Johns Hopkins Press, Baltimore, Md., 1963. xx + 1017 pp. Illus. \$15.

Natural resources are plentiful enough so that shortages in supplies will not interfere with continued expansion of the American economy, at least not before the beginning of the 21st century. This major finding emerges from the first thorough study made during the last several years and concerned with the future use of United States resources. The result could easily have been guessed on the basis of less detailed study. Yet the present study is important because assumptions based on careful investigation are needed in formulating resources policies. As a capstone of efforts by well-known scholars at Resources for the Future, the findings reported in *Resources in America's Future* will be taken seriously, as they deserve to be.

Let it be granted that debate and decisions about resources will continue to take place in the context of a passive role of resources in growth. Then, instead of concern about whether resources will permit growth, major concern should be centered on how to adjust supplies to changing demands for particular resources—land, water, metals, and various energy sources. It is clear that policy problems related to particular resources will abound. How far does this study go toward finding solutions to problems for particular resources? By estimating the needed expansion of supplies, it goes some of the way. But its very comprehensiveness prevented the depth necessary to provide a definitive policy analysis for each resource.

The numerical work consists of projecting difference between demand and supply as they change with time. The amount by which the increases in demand exceed change in supply indicates the seriousness of adjustment problems with respect to each resource. Consistency is achieved through unified consideration of (i) population and gross national product, (ii) the resultant consumption of resource-using goods, and (iii) the availability of each resource for use in producing the goods. Numbers are put through their paces impressively by applying ratios, identities, and the like. The judgments that underlie the numbers are the heart of the study. To argue for these judgments requires length. The text begins with a 66-page summary and then contains 400 pages of basic analysis, followed by about 500 pages of appendices.

The projections, like most projections, are conditional; they assume that changes in population, technology, and other factors associated with growth will continue about as they have in recent decades. Probably nothing is so certain as that some of the high-low ranges will be broken through long before the year 2000. At least, one expects this on the basis of our luck with past projections. One could make a case for (i) estimating unconditional high-low ranges (to allow for the possibility of sharp changes in the nature of economic growth) and for (ii) considering whether some resource policies that are planned as insurance against extreme possibilities appear rational. In such considerations, the attention in this volume to a range of likely outcomes would be supplemented by explicit consideration of less likely outcomes.

Regardless of whether we consider likely or unlikely outcomes, we need to estimate how alternative adjustments

can eliminate differences in supply and demand. This study contains informed discussion of possible adjustments but does not attempt serious prediction of how such adjustments will be accomplished. In response to the pressure for a moderate increase in agricultural cropland, which may emerge by 2000 A.D., one possibility is to increase cropland at the expense of woodland, while another is to reduce the amount of cropland needed by feeding corn cobs, algae, and paper to livestock. Adjustments prominently mentioned to satisfy increased demand for metals include the expansion of our imports and the development of technologies that can use lower grade ores. Today only an insignificant amount of electricity is generated by nuclear reactors, but projections are that reactors will generate about half of the power used in this country in 2000 A.D. Other new energy sources are mentioned—the sun, wind, and geothermal heat; a cell that converts bacterial growth to electricity; and a cell that generates electricity from the reaction between gases.

Estimating which of the alternative adjustments will occur for each resource, and under what price and cost circumstances, will be difficult. A partial guide to expected adjustments can be obtained by using a benefit-cost analysis, a procedure often used to evaluate natural resource investments, to compare alternatives. Adjustments that will be needed to expand production several years hence will now have unfavorable benefit-cost ratios that will become favorable in the future. The book contains comments about closing gaps by allowing prices to rise, which has the effect of decreasing the demand and inducing expansion of the supply. Serious probing of benefit-cost and demand-supply response to price will be required if we are to act wisely in our attempts to solve particular resource problems. In the absence of such probing, we will be likely to over or under estimate the ease with which gaps can be closed.

Actions must be devised that are politically and administratively operational. Each resource has its own intricacies in this regard. Consider this comment on planning for multiple use of land (p. 46): "To the extent that small parcels of vacant land now bypassed or surrounded can be filled in with urban development, the demand on nearby farm land will be reduced. With the necessary public support, the

techniques of urban land use planning can help bring about a more efficient and an aesthetically pleasing pattern, with increased emphasis on reservation of parks, nature areas, farm land, and open spaces separating built up portions." Most of the policy homilies like this sound reasonable. They are side comments flowing tangentially from the empirical results, and they may be viewed as calls for more specific policy analysis.

Occasionally, but not often, growing cities have made far-sighted acquisition of land for nearby parks, but these are exceptions. In the usual case, by the time need is recognized, land has become expensive, those who wish to use the land for private purposes exert severe pressure against its use for parks, and few individuals have incentives to press for public support to ensure overall planning of urban growth. Hard thinking will be required to devise policies that are both helpful and realistic, given an environment so resistant to changing our Topsy-like habits of city growth.

We now hear about plans for joint use of open areas for recreation and agriculture. The goal of reducing surplus agricultural production is compatible with increased use of the land for recreation. Even so, recreation has become a recognized purpose of federal resource projects only after much effort. This book implies that recreational and agricultural uses of land will become more competitive by the end of the century. That change will pose new problems in devising land use policies.

With respect to water one of the more serious conflicts brought out is that between sources of pollution and the use of water for recreation. Demands made on water by both uses will increase several fold. Since uses once established tend to be irreversibly set, this advanced attention is helpful. As with recreation, pollution is already a matter for increased federal activity. Efforts toward an integrated approach that attempts to influence use while there is still time should be continued at all governmental levels. But efforts should not be carried on with the assumption that an integrated approach will actually be followed. It is possible but by no means sure that an ideal blueprint of effective action will be followed. The actual resolution of conflicts is likely to involve interplay between

the changing technology of pollution control and piece-meal organizational arrangements. Recreation may lose out, except where multiple purpose projects can be devised in which recreation does not impinge very much on other uses. We must be prepared for the possibility that pollution will be abated chiefly only in areas where local population and industrial expansion would otherwise be severely hampered. In some cases the eventual outcome could be so far from the ideal that integrated planning would not be relevant. In the choice between requiring the treatment of waste by individual polluters and relying on community facilities, the latter—the easier policy to devise—may tend to be followed even if it is not indicated by considerations of cost. To make the most of this situation, efforts to further develop technology for community treatment facilities are needed.

These considerations related to predicting adjustments in supply and demand and to analyzing implications of policy processes are suggestive of how the projection results can be utilized. This book will be remembered for having imparted surer feelings about the setting of future resource problems.

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## Brain Function

**Frontiers in Brain Research.** John D. French, Ed. Columbia University Press, New York, 1962. xii + 285 pp. Illus. \$9.

At the formal opening ceremonies of the Brain Research Institute at the University of California (Los Angeles), on 14 and 15 October 1961, seven scientists, distinguished for their research in different aspects of brain function, presented papers in which they reviewed research in their respective fields; they emphasized current trends and attempted to look ahead to future problems and to techniques that may further the solution of these problems. These papers plus the opening remarks by J. D. French, in which he summarizes briefly the events leading to the establishment of the institute, and a historical review of the development of other brain research institutes, by H. W.

Magoun, make up the contents of *Frontiers in Brain Research*.

W. F. Windle discusses neuroanatomy in relation to the study of brain function. He illustrates with specific examples how neuroanatomical experiments may contribute to the understanding of experimental neurology.

A. F. Fessard considers the many "frontiers" between different disciplines that study the nervous system and cites experiments which are crossing these frontiers.

S. S. Kety reviews the history of neurochemistry and mentions areas of research where the neurochemist is beginning to communicate with his colleagues in other fields, such as neuroanatomy, neurophysiology, pharmacology, and psychophysiology.

P. W. Bailey surveys the contributions, past and potential, of neuropathology, and, as an elder statesman, takes the privilege of commenting critically and caustically about clinical disciplines whose future development depends upon better understanding of the brain but whose members, to date, have been negligent in their research effort.

J. H. Gaddum deals with a subject that is exciting to the scientist interested in central nervous system and to the clinical practitioner, namely, the biochemistry of the nervous system and, as viewed from the clinical standpoint, the effects of drugs on brain function.

G. W. Harris, in a chapter on the development of neuroendocrinology, gives a short historical introduction to his topic and then mentions current experiments on the interaction between the nervous system and the endocrine glands.

In the final chapter, R. Hassler calls attention to the interesting observations that have been made in pathological conditions of the brain of man. He points out how these observations may lead to experimental investigations in lower animals.

A brief review cannot do justice to this book; the specific examples given by the authors and their speculations about future research must be read in full. Each author has covered his topic succinctly, but the discussions are not superficial. This is not a book written for the educated layman; the authors use the technical languages of their disciplines. Any scientist interested in brain function, and especially the scientist carrying on investigations in one