pletely solved in the abstract and examples are not concerned with the question 'what is the solution?' but rather with the simple matter of what the known solution looks like in the various concrete settings." Although several of the examples are concerned with the solution of simple problems within this more general framework, the book does not successfully relate these new techniques to classical methods, or demonstrate that the approach leads to the solution of new problems and a deeper understanding of old ones. Thus, its value lies primarily in its clear introductory exposition of functional analysis. An extensive list of references is included, and the text contains an abundance of exercises making it suitable as a reference for classroom use.

ALAN V. OPPENHEIM
Department of Electrical Engineering, Massachusetts Institute of Technology, Cambridge

One of Our Necessities

Mineral Resources. Geology, Engineering, Economics, Politics, Law. PETER T. FLAWN. Rand McNally, Chicago, 1966. 418 pp., illus. $9.

The circumstance that distinguishes modern industrial civilization from all its predecessors is its dependence upon mineral resources—metallics, nonmetallics, and fossil fuels. These resources are irregularly distributed about the earth; they occur in finite amounts, and most are exhaustible at present rates of consumption in a matter of decades or centuries. In view of the importance of this subject, and the dearth of recent, comprehensive books concerning it, the present book, written by an economic geologist, is particularly welcome.

As is the case with any other subject of comparable complexity, the published data on the world's mineral resources comprise an extensive library. The problem of reducing these data to a meaningful form within the scope of a single volume is therefore formidable. Of necessity, the data must be presented in a statistical form, but what data to present, and in what manner, is dependent upon what theoretical framework one chooses to use. One may use that of physical science, or that of business enterprise and its handmaiden, economics. One's treatment may be based on the physical and chemical properties of matter and energy, the geological occurrence and processes of origination of minerals, and the technological processes of their extraction and utilization, or on concepts of property and ownership, monetary value, and profitability of exploitation. The author of *Mineral Resources* has attempted to combine these two approaches, but in fact the treatment vacillates between them, with the heavier weighting apparently given to the second.

The business-economic framework is dominant in chapters 1, 4, 7, and 8, dealing with Minerals, Mineral Deposits, Reserves, and Resources; Lessons and Laws of Ancient History; Ownership of Mineral Deposits; and Minerals and Government. In these sections one of the more useful discussions pertains to the evolution of mining law in the United States, culminating in the "Law of the Apex," which originated as common law in California in the 1850's but which has by now become one of the most inhibitory influences to exploration in the U.S. mining industry.

The history of mineral exploitation from ancient to modern times is treated in chapters 4, 5, and 6, but so superficially as to be of little use to the otherwise uninformed reader. Obscure geographic place names and the names of mining districts are used extensively, yet only five maps are given in the entire book. Of these, four pertain to anicent Egpyt and the Middle East, and one is a boundary map of the North Sea.

The physical-science framework is used as the principal basis for chapters 2 and 3, on the geology of mineral deposits, and chapters 9, 10, and 11, dealing with modern mining practices, world distribution and reserves of minerals, and future supplies.

To me, the most informative section of the book is chapter 10, which includes tables giving the percentages of world production by geographical region for various minerals and the recent rates of production and "indicated reserves," by producing country or area, for selected key minerals. Of particular significance is the "reserves-production index," defined as the ratio of reserves to annual production. For most key minerals this is measurable in decades. For some, however, notably iron, aluminum, and coal, it is measurable in centuries.

As to the future, the author recognizes the necessity for stabilization of world population, but he has not faced with equal realism the impossibility of a continued exponential growth in the consumption rate of nonreplaceable minerals.

A great asset of the book is the extensive bibliographies given at the end of each chapter. On the negative side, the book suffers from a number of serious defects of editing and publishing. Some of the important tables are so poorly laid out that they are almost unintelligible.

Most of the contents of the book are factual, and the interpretations are characterized by good judgment. A significant exception is the discussion of extraterrestrial sources on pages 381 and 382. Despite the fact that the author had previously dismissed as visionary and impractical recent proposals for obtaining metals from such low-grade terrestrial sources as granites, he has been credulous enough to allot more than a page to a vastly more visionary project, now being financed by the National Aeronautics and Space Administration, pertaining to mining operations on the moon.

M. KING HUBBERT
U.S. Geological Survey, Washington, D.C.

A View of Terrestrial Space

L'Organisation de l'espace. Eléments de géographie volontaire. JEAN LABASSE. Hermann, Paris, 1966. 605 pp., illus. 75 F.

One of the remarkable success stories of the last 20 years has been the rise of France from the physical and psychological ruin of World War II. No small part of the French success has been due to carefully organized public leadership in economic planning. General Charles de Gaulle for the last ten years has so effectively upstaged everyone else on the French scene that we are apt to forget that the foundation for recent French prosperity was effectively laid by others who conceived and implemented the succession of four-year plans that commenced in 1947. Jean Labasse, a geographer, planner, and banker, is an influential member of a group of relatively young men who have provided much of the intellectual motivation for French planning.

Labasse has been interested particularly in regional organization and land-use planning. In *L'Organisation de l'espace* he presents a comprehensive

account of his observations and reflections. Because the effective use of space, that is, earth-surface space, is a subject of growing importance in almost every country, and because Labasse considers problems of many countries, his book deserves attention far beyond French borders.

It is impossible to translate exactly the key phrase *géographie volontaire* that appears in the subtitle of Labasse's book. The nearest I have been able to come is "creative geography," although "man-made geography" is another possible interpretation. Creative geography as Labasse describes it is intimately concerned with land-use planning and comprehensive land management. But it is something more, for the end product of the organization of space is a healthy and well-balanced region that has a coordinate, rather than a subordinate, place within a nation. *L'Organisation de l'espace* takes the position that the needs of the whole man must be the point of departure for successful development and that the landscape, no less than factors susceptible of statistical analysis, is the measure of success in development policy. To Labasse man is at least as much an inhabitant as a producer. In this Labasse follows the tradition of the masters of French human geography, like Vidal de la Blache and Jean Brunhes, for whom history in its broadest sense is inseparable from geography. He thus takes some care to distinguish between policies promoting economic growth and those directed toward land management. He also distinguishes between sectoral planning (based on sectors of an economy or society) and spatial planning, which considers man and his natural environment in their geographical and historical associations.

Labasse classifies the nations of the world into "open-space" and "closed-space" nations. The United States and the Soviet Union are open-space nations, and France, England, and the Netherlands are examples of closed-space nations. Labasse describes with some admiration the tremendous power of the American economy, and he describes accurately some of the important characteristics of our society: its deployment in space, its economic liberalism, the mobility of people, the multiplicity of political jurisdictions, our dependence on the automobile. He notes that planning and management progress empirically in the United States and puts his finger on the confusing proliferation of special-purpose regions for planning and basic-data collection. He notes that in spite of the number of works discussing water development and the renovation of city centers, the effectiveness of American application of spatial planning is limited, for the nation as a whole distrusts planning and attaches absolute value to "natural economic laws." We keep this attachment, he says, even though we have long since found that these "laws" do not work for the agricultural sector. We have not yet admitted that there are reasons for disassociating behavior in spatial management from economic behavior. The real estate speculator still has almost complete freedom. In other words, a number of important policies and social characteristics of the United States do not favor granting man as an inhabitant a status equal to that of man as a producer. Labasse considers it a safe bet that advanced techniques of spatial planning are not likely to be prevalent in the United States until we cease to be an open-space country.

Labasse casts his eye over other parts of the world with equal perception and acuteness. There are interesting sections on most of the technically advanced countries where planning programs have been attempted. There is an informative analysis of planning and techniques of development in the Soviet Union, where man the inhabitant appears even more subordinated to man the producer than in the United States. One wishes that Labasse had been able also to study the Chinese People's Republic, which seems the ultimate in emphasizing man the producer.

Quite naturally Labasse's review of national accomplishments in "creative geography" covers western European nations most fully. There is an informative section on the history of regional planning in Great Britain, considered the pioneer country in land planning, having started in the early 1930's. The Netherlands, in Labasse's view, has the most advanced land-use and regional-planning program in the world. Its program has included not only some daring land reclamation, but also carefully designed regional development to relieve pressure on the great urban centers, and meticulous land-use controls to provide a balanced environment. Labasse describes the Dutch program as "a victory of man over himself."

Some of the author's most critical glances are reserved for his own country. He is particularly disturbed about the primacy of Paris, whose metropolitan area may reach a population of 16 million within 35 years if the present rates of growth continue. Even now enterprises having their headquarters in Paris pay about 40 percent of all French salaries. Fifty-six percent of the French electrical industry and 63 percent of the automobile workers in France are in the Paris area. Labasse believes that this dominance is not a healthy thing for France and has left the provincial areas socially and economically in an unfavorable position. An important share of the responsibility for this situation can be assigned to the heavy emphasis placed on sectoral planning since 1947.

Instead of megalopolitan development, with its "extreme dilution of the habitat," Labasse favors, for France or any other country, the "bending of the national point of view toward regional needs." The appropriate unit is an "organic" region of perhaps 50,000 square kilometers, containing 5 million inhabitants supported by a "solid urban core." Effort would be directed toward making the urban core a cultural and administrative center as well as the nerve center for production and communication in the region. Full recognition would be given to man the inhabitant. Indeed, man the inhabitant would be recognized as a descendant and bearer of traditions, to which the average European is more sensitive than we of the New World realize. Spatial planning, Labasse says, takes the long view; that is, "the city of the year 2000 is more urgent than the city of 1970."

It is significant that the most recent description of the Fifth French Plan (1966–1970) announces that "a development plan must aim at balanced expansion between the nation's different regions" and that actions will be taken under the Plan toward that end ("The Twenty Years of Planning in France: The Fifth Plan, 1966–1970," Service de Presse et d'Information, Ambassade de France, New York, April 1967, p. 10). France thus appears to be paying attention to *l'organisation de l'espace* and to the development of a rational public policy for recognizing man as an inhabitant. But, then, France is a closed-space country. Will the United States as an open-space country be able to do as much? And when?

EDWARD A. ACKERMAN
Carnegie Institution of Washington, Washington, D.C