BOOK REVIEWS

Leontief, W., Koo, J. C. M., Nasar, S., and Sohn, I. *The future of Nonfuel Minerals in the US and World Economy*. Lexington, Massachusetts (Lexington Books: D. C. Heath & Co.) and Aldershot (Gower Publishing Co. Ltd.), 1981. xxviii + 454 pp., 112 figs., 126 tables. Price £32·50.

Some years ago the United States National Commission on Supplies and Shortages considered institutional adjustments that would improve the government's ability to detect and anticipate problems of supply of materials. It was impressed, not so much with the lack of data, but with the lack of adequate analysis of the existing data. This volume endeavours to deal with this deficiency by methods of systems analysis; its authors all belong to the Institute for Economic Analysis of New York University.

Twenty-six industrially important elements are considered. In a recent review (*Mineral. Mag.* **48**, 305) I have complained about the practice by writers on this kind of subject, especially economists, of describing these elements as *minerals*. They include: (1) Iron and alloying elements Fe, Ni, Mn, Cr, W, Mo, V, Si; (2) Nonferrous elements Al, Cu, Pb, Zn, Ti, Hg, Sn, Mg; (3) Precious metals Au, Ag, Pt; and (4) Elements used in the fertilizer and chemical industries P, K, Na (here put down as soda ash), Cl, F, B, S. Mineralogists reading this list will realize that only four of these elements occur naturally in the native state and, in that condition, can properly be regarded as minerals; two are, in fact, gases. All the elements are, of course, obtained from minerals, but this is nowhere recognized. The book, in short, is not for mineralogists but for mineral economists.

The chapter on the place of minerals in the United States and world economy gives a brief but useful summary of world and more local models involving mineral resources, from Peccei's Club of Rome report to Mallenbaum and to the as yet unpublished United States Bureau of Mines/Geological Survey project Minerals Availability System. The methodology of the present study places much reliance on input–output analysis and the assumptions made, too lengthy for discussion here, command a whole chapter. Models are then generated from which alternative predictions to the year 2000 are derived. These are well presented, commodity (element) by commodity, giving for the United States the base-year (1972) supply pattern, the projected demand pattern, and the projected supply; these are then placed in a world context. It will be noted that the base year upon which the modelling depends was in fact a peak year for mineral production; the recession of more recent years has halted and reversed the exponential growth so apparent from the First World War to the early 1970s. It is hard to be sure that account is taken of more recent history, in spite of the subtitle of the book. For example, is it realistic to believe that United States demand for iron will rise from 87.7 million metric tons in 1972 to 140.8–196 MMT in 2000? The usefulness of the very numerous figures and of the data so ably summarized in the book and its eight lengthy appendices turns to no small extent on the answer to this question.

KINGSLEY DUNHAM

Chernov, A. A., and Müller-Krumbhaar, H. (eds.). *Modern Theory of Crystal Growth I* (*Crystals: Growth, Properties and Applications*, Volume 9). Berlin, Heidelberg, and New York (Springer-Verlag), 1983. vii + 146 pp., 42 figs. Price DM 88.00 ($36.40).

Although crystal growth technology is sufficiently advanced to enable us to produce good-quality specimens for research and industrial applications, it seems that we do not fully understand *how* crystals grow. In the latest volume of the Springer-Verlag series on *Crystals*, the editors suggest that current growth theories are deficient in three main areas: realistic microscopic 'building brick' models; descriptions of melting and freezing; interface structures and transport processes. Accepting that such problems do exist, they have attempted to provide an extended review of existing mathematical models, simulation techniques and their capabilities. Part I of the series comprises five invited articles by authors from as many countries.

The book gets off to an unfortunate start with some stilted phraseology in the preface, but most of the text and figures are clear and well presented. The first two contributions by A. Bonissent and P. Bak follow an atomistic approach and deal with equilibrium properties of solid–liquid and solid–expitaxial layer systems respectively. W. Haubenreisser and H. Pfeiffer examine the growth of two component systems via kinetic theories based on lattice models. In contrast, V. V. Voronokov adopts a macroscopic approach to describe the kinetic properties of clean crystal surfaces in terms of growth elements. Finally, J. van der Eerden provides models for the motion of surface steps under the influence of coupled surface and volume diffusion. The subject mixture may seem slightly