"solid normative base" is not very convincing. Most people would agree that the purpose of governments and social institutions ought to be the promotion of human aims and powers; but few will feel confident that this claim is justified simply by citing man's position in nature. Gotshalk defends himself against the charge that such justification commits the "naturalistic fallacy"; but it is also a fallacy to treat as obvious an inference that many people would reject. Since Gotshalk's inference is much less secure than his conclusion, the analogy between the value of physics for engineering and the value of philosophy for government is not completely convincing. On the other hand, just as discoveries by physicists can transform physical engineering, so too a political philosophy such as Marxism can change the nature of government and politics. Furthermore, in the Soviet Union a knowledge of Marxist philosophy is indispensable if one wants a career in government (or for that matter if one wants a career of any sort). We can wonder, however, whether or not such knowledge of philosophy affects in any substantial way the day-to-day process of government. The ways in which a knowledge of philosophy is, or even can be, of any real help in government, even in a Marxist government, are surely not obvious.

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Crystal Formation

D. P. Grigor'ev's **Ontogeny of Minerals** (Translated from the Russian edition, 1961, by Israel Program for Scientific Translation, Y. Brenner, Ed. Davey, New York, 1965. 256 pp. Illus. $11.50) is a book devoted to the description of general processes affecting the history of minerals from nucleation through growth to alteration and disintegration. There are 228 Russian references and 98 non-Russian references, yet the vast amount of physical and chemical data which have evolved in recent years regarding crystal synthesis are outside the scope of this book. Described are the general features by which nonobserved processes may be recognized in mineral specimens by identifying the results of the processes, such as pseudomorphs, zoned crystals, and inclusions (195 illustrations). Nucleation of crystallites occurs in space (as in magma), upon crystals of an earlier generation, upon crystals of different minerals, or upon rock fragments. Once nucleated, crystals may grow in layers, spirals, zones, or skeletons. Aggregates of the same mineral species may initially grow from randomly oriented seeds, but later growth may preferentially orient the crystals in parallels, columnar, spherulitic, or reniform aggregates. Differences in rates of growth in different directions affect the evolution of crystal forms. Deposition of new material in the re-entrant angle of twinned crystals leads to preferential growth of twinned crystals over nontwinned crystals of the same mineral species. Differences in the rates of growth of different mineral species result in the inclusion of one mineral in another, as fluorite or hematite in quartz crystals.

After crystals are formed they may be subjected to plastic deformation, twin translation, twin gliding, block formation, brittle deformation, rupture, shearing, and reorientation. Chemical changes in minerals may lead to the formation of pseudomorphs. The supply and removal of mineral substances and the volume relations during replacement and recrystallization are considered.

This book is intended as a series of lectures for advanced students who wish to familiarize themselves with the past environment to which various minerals have been subjected. It is a descriptive text, with abundant illustrations. It is not a reference book for physical or chemical data or phase relationships regarding the synthesis and growth of minerals.

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Atmospheric Optics

The first volume of *Physique de l'Atmosphère*, by Etienne Vassy, appeared in 1956. The third volume, **Phénomènes d'Absorption et de Diffusion dans l'Atmosphère** (Gauthier-Villars, Paris, 1966. 295 pp. Illus. F. 45), is now available; it appears that still more volumes are intended. The treatment is at an undergraduate level and is mostly descriptive, although some elementary derivations are included.

Multiple scattering is hardly mentioned, although results of radiative-transfer theory are occasionally quoted, as in the chapter on polarization of sky light. Most of the book is concerned with optical radiation, but there is a brief treatment of microwave and radio absorption and propagation in the troposphere and ionosphere, including scatter propagation.

For the level at which it was aimed, this is a reasonably satisfactory treatment, though old-fashioned or even out-of-date in many places. But I cannot conceive of a university on this continent teaching such a specialized course to undergraduates, and the material is far too elementary for graduate students. No references to research papers are given, and only about a dozen to monographs and review articles. There is no index.

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New Books

General

Alaska: A Challenge in Conservation. Richard A. Cooley. Univ. of Wisconsin Press, Madison, 1966. 186 pp. Illus. $5.50.

The Alien Animals: The Story of Imported Wildlife. George Laycock. Published for the American Museum of Natural History. Natural History Press, Garden City, N.Y., 1966. 240 pp. Illus. $4.95.

Archaeology: An Introduction. Clement W. Meighan. Chandler, San Francisco, 1966. 213 pp. Illus. Paper, $4.50; cloth, $7.50. Chandler Publications in Anthropology and Sociology, Leonard Broom, Ed.

Astronomischer Jahresbericht. vol. 64, *Die Literatur des Jahres 1964.* W. Lohmann, F. Henn, and U. Güntzel-Lingner. Gruyter, Berlin, 1966. 747 pp. Paper.

Astronomy and Cosmology in the Achievement of Nicolaus Copernicus. Jerome R. Ravetz. Wydawnictwo Polskiej Akademii Nauk, Warsaw, 1965. 95 pp. Illus. Paper.

Biomedical Aspects of Space Flight. James P. Henry. Holt, Rinehart and Winston, New York, 1966. 184 pp. Illus. $2.95.

The Birth of Mathematics in the Age of Plato. François Lasserre. World, Cleveland, 1966. 191 pp. Illus. Paper, $1.65.

British Bivalve Seashells. A handbook for identification. Norman Tebble. British Museum (Natural History), London, 1966. 218 pp. Illus. Paper, 14s.

Teilhard de Chardin: The Man and His Theories. Abbé Paul Grenet. Translated from the French edition (Paris, 1961) by R. A. Rudorff. Eriksson, New York, 1966. 176 pp. Illus. $5. A Profile in Science.

The Chemistry of Life. Steven Rose. Penguin Books, Baltimore, 1966. 266 pp. Illus. Paper, $1.75.

(Continued on page 780)