"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.

GILBERT H. HARMAN
Department of Philosophy,
Princeton University,
Princeton, New Jersey

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.

MARIE LOUISE LINDBERG
U.S. Geological Survey,
Washington, D.C.

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.

DONALD M. HUNTEN
Kitt Peak National Observatory,
Tucson, Arizona

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.

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NEW BOOKS

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Classics in Education. Wade Baskin, Ed. Philosophical Library, New York, 1966. 740 pp. $12. Fifty-eight contributions ranging from Aristotle to Alfred North Whitehead.

Compton's Dictionary of the Natural Sciences. vols. 1 and 2. Charles A. Ford, Ed. Compton, Chicago, 1966. vol. 1, 436 pp.; vol. 2, 459 pp. Illus. $24.95 set (secondary level).

A Conflicting View of the Universe. John J. Durie. Harlo Press, Detroit, 1966. 45 pp. $3.

Dictionary of Geography. Sir Dudley Stamp, Ed. Wiley, New York, 1966. 508 pp. $10.

Dictionary of Semiconductor Physics and Electronics: English-German, German-English. Werner Bindmann. VEB Verlag Technik, Berlin; Pergamon, New York, 1965. 615 pp. $25.

Diplomats, Scientists, and Politicians: The United States and the Nuclear Test Ban Negotiations. Harold Karan Jacobson and Eric Stein. Univ. of Michigan Press, Ann Arbor, 1966. 548 pp. $8.50.

The Drugs You Take. S. Bradshaw. Hutchinson, London, 1966. 224 pp. 30s.

Experiments in Visual Science: For Home and School. James R. Gregg. Ronald, New York, 1966. 166 pp. Illus. $5.

Exploring Pacific Coast Tide Pools. Vinson Brown. Naturegraph Publishers, Healdsburg, Calif., 1966. 56 pp. Illus. Paper, $1.95.

A Field Key to the Savanna Trees of Nigeria. Brian Hopkins and D. P. Stanfield. Ibadan Univ. Press, Ibadan, Nigeria, 1966. 47 pp. Paper, 5s. 6d.

German Chemical Abbreviations. Compiled and edited by Gabriele E. M. Wohlauer and H. D. Gholston. Special Libraries Assoc., New York, 1966. 67 pp. Paper, $6.50. Contains about 2500 abbreviations, with German and English meanings, listed alphabetically in a three-column format.

The Globe of Martin Bylica of Olkusz: Celestial Maps in the East and in the West. Zofia Ameisenowa. Translated by Andrzej Potocki. Wydawnictwo Polskiej Akademii Nauk, Warsaw, 1959. 108 pp. Illus. Paper.

Guide to the Underwater. Bill Slosky and Art Walker. Sterling, New York, 1966. 192 pp. Illus. $10.

Harper's University: The Beginnings. A history of the University of Chicago. Richard J. Storr. Univ. of Chicago Press, Chicago, 1966. 427 pp. Illus. $8.95.

Hebrew Amulets: Their Decipherment and Interpretation. T. Schrire. Routledge and Kegan Paul, London; Humanities Press, New York, 1966. 192 pp. Illus. $8.50.

IAEA Research Contracts. Sixth annual report. Internatl. Atomic Energy Agency, Vienna, 1966 (order from Natl. Agency for Internatl. Publications, New York). 141 pp. Illus. Paper, $1. Technical Reports Series, No. 53. Thirty-seven papers.

The Images of Space. Harold Leland Goodwin. Holt, Rinehart, and Winston, New York, 1965. 189 pp. $2.95.

The Impact of Highway Investment on Development. George W. Wilson, Barbara

R. Bergmann, Leon V. Hirsch, and Martin S. Klein. Brookings Institution, Washington, D.C., 1966. 238 pp. Illus. $6.

Incident at Exeter: The Story of Unidentified Flying Objects over America Today. John G. Fuller. Putnam, New York, 1966. 251 pp. $5.95.

Indian Legends from the Northern Rockies. Ella E. Clark. Univ. of Oklahoma Press, Norman, 1966. 376 pp. Illus. $6.95.

Indian Scientific and Technical Publications, 1960–1965. Compiled by S. B. Deshaprabhu and others. Council of Scientific and Industrial Research, New Delhi, 1966. 296 pp. $6.

The Invention of the Aeroplane (1799–1909). Charles H. Gibbs-Smith. Taplinger, New York, 1966. 384 pp. Illus. $14.95.

IQ: A Mensa Analysis and History. Victor Serebriakoff. Hutchinson, London, 1966. 192 pp. Illus. 30s.

The Man-Made Object. Gyorgy Kepes, Ed. Braziller, New York, 1966. 236 pp. Illus. $12.50. Vision and Value Series. Seventeen papers by Gillo Dorfles, Herbert Read, Joan M. Erikson, Kazuhiko Egawa, Michael J. Blee, Marshall McLuhan, Christopher Alexander, Leonardo Ricci, Marcel Breuer, Theodore M. Brown, Jean Hélion, Henry S. Stone, Jr., Frederick S. Wight, Dore Ashton, and Françoise Choay.

McGraw-Hill Basic Bibliography of Science and Technology. Compiled by the Editors of the McGraw-Hill Encyclopedia of Science and Technology. McGraw-Hill, New York, 1966. 748 pp. $19.50. A compilation of recent titles and annotations on more than 7000 subjects.

McGraw-Hill Modern Men of Science. Editors of McGraw-Hill Encyclopedia of Science and Technology. McGraw-Hill, New York, 1966. 628 pp. Illus. $19.50. Contains biographical data and descriptions of over 400 contemporary scientists.

Les Mechaniques de Galilee: Mathematicien and Ingenieur du duc de Florence. P. Martin Mersenne. Bernard Rochot, Ed. Presses Universitaires de France, Paris, 1966. 93 pp. Illus. Paper.

Memoirs of the California Academy of Sciences. vol. 6, *Studies of Opisthobranchiate Mollusks of the Pacific Coast of North America*. Frank Mace MacFarland. California Acad. of Sciences, San Francisco, 1966. 564 pp. Plates.

Men, Machines, and Modern Times. Elting E. Morison. M.I.T. Press, Cambridge, Mass., 1966. 245 pp. $5.95.

Meteorological Satellites. William K. Widger, Jr. Holt, Rinehart, and Winston, New York, 1966. 280 pp. Illus. $2.95.

Module, Proportion, Symmetry, Rhythm. Gyorgy Kepes, Ed. Braziller, New York, 1966. 237 pp. Illus. $12.50. Vision and Value Series. Essays by Philip Morrison, C. H. Waddington, Arthur L. Loeb, Stanislaw Ulam, Lawrence B. Anderson, Ezra D. Ehrenkrantz, Richard P. Lohse, Anthony Hill, Ernö Lendvai, John Cage, François Molnar, and Rudolf Arnheim.

The Nature of Matter and Energy. Gerald I. Lebau. The Author, Elizabeth, N.J., 1965. 377 pp. Illus.

Optical Page Reading Devices. Robert A. Wilson. Reinhold, New York, 1966. 207 pp. Illus. $10.

Optical Scanning for the Business Man. Ralph Dyer, James E. Hoelter, James A.

Newton, and others. Hobbs, Dorman, New York, 1966. 204 pp. Illus. $14.50.

Nicole Oresme: De proportionibus proportionum and Ad pauca respicientes. Edward Grant, Ed. Univ. of Wisconsin Press, Madison, 1966. 488 pp. Illus. $10.75.

Penguin Science Survey. pt. B. Anthony Allison. Penguin Books, Baltimore, 1966. 205 pp. Illus. Paper, $1.95. Twelve papers.

Periodicals for Latin American Economic Development, Trade and Finance: An Annotated Bibliography. Martin H. Sable. Latin American Center, Univ. of California, Los Angeles, 1966. 78 pp. Paper.

Photography on Expeditions: Recommended Techniques for Difficult Surroundings. D. H. O. John. Focal Press, New York, 1966. 176 pp. Illus. $12.50. The Focal Library.

Planets. Carl Sagan, Jonathan Norton Leonard, and the Editors of *Life*. Time Inc., New York, 1966. 200 pp. Illus. $3.95.

Principles of Scientific and Technical Writing. Jackson E. Morris. McGraw-Hill, New York, 1966. 277 pp. Illus. $6.95.

Raising Laboratory Animals. A handbook for biological and behavioral research. James Silvan. Published for the American Museum of Natural History. Natural History Press, Garden City, N.Y., 1966. 239 pp. Illus. $4.95.

Science and Man. Lord Russell Brain. Elsevier, New York, 1966. 109 pp. Illus. $3.75.

The Shape of Medieval History: Studies in Modes of Perception. William J. Brandt. Yale Univ. Press, New Haven, Conn., 1966. 197 pp. $5.75.

Sign, Image, Symbol. Gyorgy Kepes, Ed. Braziller, New York, 1966. 288 pp. Illus. $12.50. Vision and Value Series. Twenty-one papers.

The Sources of Instinctive Life: A Theory of Mental Functioning. R. Palmeri. Philosophical Library, New York, 1966. 72 pp. Illus. $3.

Statistical Abstract of Latin America, 1963. Compiled and edited by Donald S. Castro, Berl Golomb, and Christopher Breyer. Center of Latin American Studies, Univ. of California, Los Angeles, 1966. 144 pp. Paper, $3.

Strategic Defenses. Stanley L. Englebardt. Crowell, New York, 1966. 184 pp. Ilus. $4.95.

A Syntax-Oriented Translator. Peter Zilahy Ingerman. Academic Press, New York, 1966. 141 pp. Illus. $5.95.

Thermal, Oxidative, and Light Stabilization of Polypropylene. A literature survey. Science Surveys, Mountainside, N.J., 1966. 148 pp. Illus. Paper. Survey covers the literature between 1954 and 1966.

The Ways of Paradox and Other Essays. W. V. Quine. Random House, New York, 1966. 268 pp. $6.95. Contains twenty-one papers written between 1934 and 1964.

Meyer Weisgal at Seventy: An Anthology. Edward Victor, Ed. Weidenfeld and Nicolson, New York, 1966. 228 pp. Illus. Thirty-four papers.

Wonders of the Modern World. Joseph Gies. Crowell, New York, 1966. 255 pp. Illus. $5.95.

Working with Atoms. O. R. Frisch. Basic Books, New York, 1966. 96 pp. Illus. $3.50. Science and Discovery Series.