mica, and chrysoberyl, which occur in limestones at some distance from tin-bearing intrusive rocks, with the skarn deposits rather than with the vein deposits is, in my opinion, unfortunate; clearly, they are vein deposits.

Notwithstanding the omissions noted above, the book will be of great interest and usefulness, especially to exploration geologists and engineers who wish a working background in the geology, geochemistry, and mineralogy of beryllium deposits.

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## Astronomy for Laymen

**A History of Astronomy**. Antonie Pannekoek. Interscience, New York, 1961. 521 pp. Illus. $9.25.

**Astronomy**. Fred Hoyle. Doubleday, New York, 1962. 320 pp. Illus. $12.95.

**The ABC's of Astronomy**. An illustrated dictionary. Roy A. Gallant. Doubleday, New York, 1962. 125 pp. Illus. $3.95.

These three books are intended primarily for the interested and literate layman. The first two are by professional astronomers of distinction, and both present our present-day conception of the universe and its constituents as a historical development, through many stages in the attempts of civilized men to understand those features of their celestial environment that were significantly related to terrestrial life as they lived it. The third book is also by a professional—a professional interpreter of science to nonscientists, a "science writer," and a good one. This book is for would-be amateur astronomers, and it combines a dictionary of the astronomical language and a handbook for those who desire firsthand acquaintance, by naked-eye observation or the use of a small telescope, with the heavens always spread out above us. All three books are typographically attractive. Hoyle's book is sumptuously illustrated with color plates, reproductions of manuscripts and pages from famous works, very clear explanatory diagrams, and fine black-and-white pictures of celestial objects and of astronomers. Gallant's book is really a collaborative work with John Polgreen, whose drawings, diagrams, and selections of astronomical photographs are an essential part of the presentation.

Pannekoek's *History of Astronomy* was originally published in Dutch in 1951. The translator is not named (was it Pannekoek himself?). It is not an original investigation but a comprehensive survey which invites comparison with two classic surveys written in English a half century ago—Berry's *Short History of Astronomy* (1898) and Dreyer's *History of the Planetary Systems* (1905). Pannekoek gives a much more extensive treatment of pre-Greek astronomy than either Berry or Dreyer—nearly a quarter of the book passes before Hipparchus appears. Dreyer stops with Kepler, and Berry carries his history to the late 19th century (when modern astrophysics was just getting started). But Pannekoek reaches World War II and portrays well 40 years of intensive advance in many directions; he records the major changes in the views generally held at the turn of the century and leaves us with the expectation of more changes in the future. There are three sections to the book: Astronomy in the Ancient World (to the close of the Arabian period); Astronomy in Revolution (to Laplace); Astronomy Surveying the Universe (the 19th and 20th centuries, considered topically rather than chronologically). His style is clear and direct, the treatment essentially nontechnical but not superficial, and much attention is paid to the instruments of the astronomers and to the way in which observations were made. The influence of the intellectual, technological, and social background of each period upon the endeavors of the astronomers is rightly stressed. A valuable feature is the provision of more than 200 references to authoritative historical treatises and original papers.

On the jacket of Hoyle's book the publisher calls it a history of man's investigation of the universe. But the book also incorporates, in three expository chapters and in sections of all the other chapters, a very fine account of descriptive astronomy, of the telescopes, spectroscopes, and other instruments used in observation, and of the physical principles upon which astronomy is founded. The history is well and vividly narrated, but this is done more briefly and selectively than in Pannekoek's longer work. The record is brought almost to the present moment, and the most recent developments are described with a particular effectiveness, appropriate to one whose contribution to them has been considerable. Hoyle's well-known felicity of expression and skill in exposition are evident throughout the book, and these, together with the superb illustrations, make me feel that the book is well worth its price. Looking far back to high school days when I neglected lessons to devour books on astronomy, I can imagine the delight with which I would have greeted this one.

Gallant and Polgreen's dictionary and observer's handbook I find a bit disappointing. The writing is direct, simple, and clear, the illustrations excellent, and the format attractive. As dictionary definitions go, these are pretty good, with a few exceptions ("centrifugal force" is one); the art of definition is a very difficult one, and it is much easier to find fault than to contrive a better definition in as few words. Some of the diagrams and charts are very good. But to the amateur learning how (and how *not*) to get the most out of a small telescope, this book tells little of value, nor does it provide enough sky lore to make naked-eye star study very inviting. Perhaps, as a professional teacher, I have some bias against the scrappy assembly of unsystematized facts presented in a dictionary. But I have seen many such books that were not as good as this one.

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## A Compelling Amalgam

**About Biology**. Karl von Frisch. Translated from the German by Elsa B. Lowenstein. Oliver and Boyd, Edinburgh, 1962. 287 pp. Illus. 25s.

The title page of this translation of *Du und das Leben,* a popular introduction to animal biology, lists the publication date of the original as 1959, but the copyright date is given as 1949. The earlier date more accurately reflects the contents, for the achievements of the last decade with its flowering of molecular biology and biophysics are not represented here. Hence it would be proper to point out that the book does not serve to introduce to the reader the major bandwagons of modern biology, but to suggest this as a criticism would be very short-sighted. The book is a most gracious and compelling amalgam of comparative anatomy, com-

parative physiology, and natural history. As such it represents an approach and a synthesis of continuing validity and interest. This is presented with great lucidity and narrative skill, and the reader is drawn along by the peculiarly felicitous analogies of which von Frisch is such a master.

Unfortunately the author has not been well served by his translator and publisher. There are a number of typographical errors. The translation is over-literal in places and retains the word order of the original at the expense of style and readability, and occasionally at the expense of sense. Units of measure have been half anglicized by translating them from the metric system to inches. One can readily recognize some of these conversions (1250 red blood cells form a row 2/5 inches long), but other remain mysterious (100-200 stomata in an area of 1/2000 sq. in.). These are trivial matters, but they impede the enjoyment of the book, particularly by the nonbiologist to whom it is addressed. This is a pity, for a modest amount of editorial work would have remedied the difficulties.

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# Notes

## Biological Sciences

In format and content, part 2, *Biology, Genetics, Agriculture, Medicine, and Zoology*, of the **Penguin Science Survey, 1961** (edited by S. A. Barnett and Anne McLaren. Penguin Books, Baltimore, Md., 1961. 251 pp. Paper, $1.45), appears to be a lineal descendant of the now defunct New Biology Series, though the putative paternity is nowhere given. It is roughly the size of two semiannual volumes of New Biology, and its articles are pitched at the same level—that is, at approximately the level of the *Scientific American.*

This first issue includes discussions of the following topics: world health (B. B. Waddy), food production (N. W. Pirie), locust control (Gunn), myxomatosis (H. V. Thompson), the octopus brain (M. J. Wells), viruses (F. K. Sanders), proteins (G. H. Haggis), antigens (N. A. Mitchison), the morphogenesis of pattern (J. M. Smith), cockroaches (J. W. H. Lawson), and three superior book reviews by S. A. Barnett. J. B. S. Haldane contributes some fascinating reminiscences of his father. Those who take an interest in the son's psychological development will note with interest this sentence: "Although [J. S.] Haldane's philosophy, which approximated to the Adviata philosophy of India, forbade him to be a pessimist, he was not as happy as he might have been had he been a Marxist. . . ."

Donald Michie's discussion of machines-that-learn, with an account of a simple one made out of matchboxes, should be of interest to teachers of high school and college students who are eager for special problems. The article on smoking and lung cancer, by E. Maurice Backett, is admirably clear. W. M. S. Russell's discussion on "the use of animals for experiment" includes a wealth of detail new to me, at least; anyone confronted with antivivisectionist activities should consult this paper written by a man who was, for five years, engaged in the study of humane laboratory techniques.

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## New Books

### General

**Bird.** Lois Darling and Louis Darling. Houghton Mifflin, Boston, 1962. 281 pp. Illus. $5.

**The Cavendish Laboratory.** Nursery of genius. Egon Larsen. Watts, New York, 1962. 95 pp. Illus. $3.95.

**Ministries of Education: Their Functions and Organization.** Kathryn G. Heath. U.S. Department of Health, Education, and Welfare, Washington, D.C., 1962 (order from Superintendent of Documents, GPO, Washington, D.C.). 701 pp. Illus. Paper, $2.50.

**Oeuvres de P. L. Tchebychef.** vols. 1 and 2. A. Markoff and N. Sonin. Chelsea, New York, 1962. vol. 1, 720 pp.; vol. 2, 757 pp. Illus. $27.50.

**The Perennial Philosophy.** Aldous Huxley. World, Cleveland, Ohio (reprint, © 1944), 1962. 319 pp. Paper, $1.55.

**Physics for the Modern World.** E. N. daC. Andrade. Barnes and Noble, New York, 1962. 110 pp. Illus. $2.

**River Basin Survey Papers.** Frank H. H. Roberts, Ed. No. 25, *Archeology of the John H. Kerr Reservoir Basin, Roanoke River Virginia-North Carolina.* Carl F. Miller. Smithsonian Institution, Washington, D.C., 1962. 463 pp. Illus. $4.

**To the Ends of the Earth.** The explorations of Roald Amundsen. J. Gordon Vaeth. Harper and Row, New York, 1962. 231 pp. Illus. $3.50.

### Mathematics, Physical Sciences, and Engineering

**Advances in Computers.** vol. 3. Franz L. Alt and Morris Rubinoff, Eds. Academic Press, New York, 1962. 314 pp. Illus. $12.

**Astronomy of the 20th Century.** Otto Struve and Velta Zebergs. Macmillan, New York, 1962. 544 pp. Illus. $12.50.

**Chemistry of Carbon Compounds.** vol. 5, Miscellaneous and General Index. E. H. Rodd, Ed. Elsevier, New York, 1962. 930 pp. Illus. $29.

**Chlorine.** Its manufacture, properties, and uses. J. S. Sconce. Reinhold, New York, 1962. 911 pp. Illus. $25.

**Continental Drift.** S. K. Runcorn, Ed. Academic Press, New York, 1962. 350 pp. Illus. $12.

**Dictionary of General Physics.** Compiled and arranged by W. E. Clason. Elsevier, New York, 1962. Unpaged. $22.50.

**Electrical Instruments and Measurements.** W. Alexander. Cleaver-Hume, London, ed. 2, 1962. 350 pp. Illus. 25s.

**The Electronics of Laboratory and Process Instruments.** V. S. Griffiths and W. H. Lee. Interscience (Wiley), New York, 1962. 384 pp. Illus. $9.50.

**Eléments de Calcul des Probabilités.** Théorique et appliqué. J. Bass. Masson, Paris, 1962. 219 pp. Illus. NF. 34.

**Fish as Food.** vol. 2, *Nutrition, Sanitation, and Utilization.* Academic Press, New York. 1962. 794 pp. $25.

**Gas Chromatography Abstracts, 1961.** C. E. H. Knapman and C. G. Scott, Eds. Butterworth, Washington, D.C., 1962. 229 pp. $8.50.

**Lectures on the Many-Body Problem.** E. R. Caianiello, Ed. Academic Press, New York, 1962. 356 pp. Illus. $10.50.

**Logiques Construites par une Méthode de Déduction Naturelle.** J. Dopp. Nauwelaerts, Louvain, Belgium; Gauthier-Villars, Paris, 1962. 191 pp. Illus. BFr. 220.

**Materials Science and Technology for Advanced Applications.** Donald R. Mash, Ed. Prentice-Hall, Englewood Cliffs, N.J., 1962. 777 pp. Illus. $12.

**Metallurgy of Semiconductor Materials.** Metallurgical Society Conferences, vol. 15. John B. Schroeder, Ed. Interscience (Wiley), New York, 1962. 423 pp. Illus. $15.

**Nuclear Spectroscopy.** Course 15, International School of Physics "Enrico Fermi." G. Racah, Ed. Academic Press, New York, 1962. 267 pp. Illus. $9.

**Programmed Manual for Students of Fundamental Physics.** Jay Orear. Wiley, New York, 1962. 16 chapters. Illus. $4.95.

**Recent Developments in Information and Decision Processes.** Robert E. Machol and Paul Gray, Ed. Macmillan, New York, 1962. 207 pp. Illus. $8.

**Space Radio Communication.** A symposium held in Paris, September 1961. G. M. Brown. Elsevier, New York, 1962. 642 pp. Illus. $25.

**Synthetic Methods of Organic Chemistry.** vol. 16. W. Theilheimer. Karger, Basel, Switzerland; Wiley, New York, 1962. 524 pp. $48.

**Theoretical Petrology.** Tom. F. W. Barth. Wiley, New York, ed. 2, 1962. 427 pp. Illus. $12.75.