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FUNDAMENTALS OF PHYSICAL SCIENCE

By KONRAD B. KRAUSKOPF, Stanford University. New Fourth Edition. Ready in March.

An elementary text for college courses in general physical science. It offers a balanced presentation of the more important ideas in each science, and provides illustrations of the scientific method at work. New topics in this new edition include a chapter on wave motion and sound, new material on meteorology and radioastronomy and an extensive modernization of the chapters on atomic structure and nuclear energy.

COLLEGE PHYSICS

By ROBERT L. WEBER, MARSH W. WHITE, and KENNETH V. MANNING, all at The Pennsylvania State University. Third Edition. Ready in April.

A substantial revision of the successful liberal arts physics text. Although the conventional approach to the subject is retained, new emphasis is placed on modern physics in this edition, and the two chapters in the previous edition on the subject have been expanded to four chapters in the revision. Calculus is not required for this book, although it lends itself well to courses in which calculus is studied concurrently.

Advances in Geophysics. Vol. 5. Edited by H. E. Landsberg and J. Van Miegheem. 325 pp. Academic Press Inc., New York, 1958. \$10.00. Reviewed by S. F. Singer, University of Maryland.

This series features excellent review articles on geophysical topics of current interest. The present volume contains six contributions. The first one departs from the usual practice by being a historical article; it is authored by N. C. Gerson who reviews the two International Polar Years which took place 75 and 25 years before the present International Geophysical Year. The article also gives a brief but good review of the plans and some of the accomplishments of the IGY. The next paper by Prof. B. Gutenberg deals with microseisms, a phenomenon which has no connection with earthquakes ("seisms") but refers to short period fluctuations of the ground; the terms "ground-unrest" or "tremor" or "pulsatory oscillation" have also been used or suggested. The types of microseisms range from short-period (a fraction of a second), produced by nearby traffic, surf, and wind, to intermediate-period (a few seconds), produced by ocean waves and surf (which is sometimes quite distant), and long-period, rather irregular fluctuations whose origin is uncertain.

The third contribution by Prof. R. A. Hirvonen (of Helsinki and Ohio State) deals with the size and shape of the earth and discusses the principal geodetic observations on which this science is based, namely triangulation, astronomical fixes, spirit leveling, and gravity measurements. Unfortunately no account is taken as yet of the great impact of artificial satellites for astronomical fixations and for what amounts to measurements of the shape of the earth through the precession of the orbital plane.

The fourth contribution on oceanic tides by A. T. Doodson of Liverpool is of unusual interest since the author addresses himself very much to the nonspecialist and points out the misconceptions which exist even in scientific circles concerning the origin of the ocean tides. The many ramifications of the subject are very expertly reviewed, especially the various mathematical investigations on "model oceans".

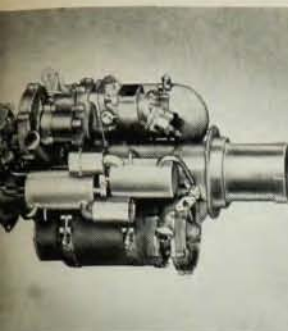
The next chapter by K. Watanabe of the University of Hawaii (formerly of the Air Force Geophysical Research Directorate) on ultraviolet absorption processes in the upper atmosphere is of great current interest. Not only does the absorption of ultraviolet lead to the formation of the ionosphere but, as Friedman has shown, the absorption of ultraviolet may itself be used as a means for studying the density of the upper atmosphere. The article is therefore a review not only of the very detailed data on absorption cross sections of atmospheric gases, but also of the upper atmospheric models proposed by various investigators, and of the results obtained on the output of ultraviolet and x rays from the sun. One indication of the good accumulation of data is the large number of references (264).

The last chapter by James E. McDonald of the

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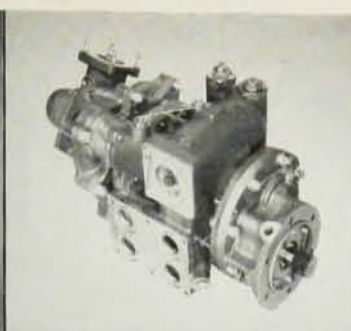
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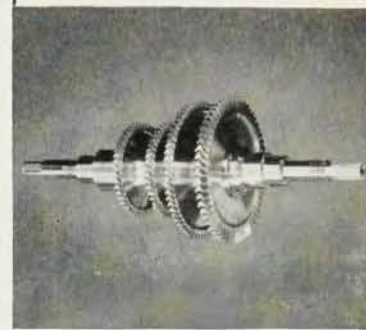
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Institute of Atmospheric Physics, University of Arizona, deals with the physics of cloud modification. This chapter again is of great current interest. The author reviews the present status of our understanding of the physical processes involved in condensation and precipitation, and then discusses developments in cloud modification techniques using artificial nucleation—the so-called "seeding" technique. The author then evaluates the modification experiments, but the conclusion is not a firm one and this reviewer is not left with a very strong feeling concerning the value of the modification experiments.

Differentialgleichungen der Physik. By Fritz Sauter. 147 pp. Walter de Gruyter & Co., Berlin, Germany, 1958. Paperbound DM 2.40. *Reviewed by C. M. Ablow, Stanford Research Institute.*

Methods of solution of the differential equations arising from the conservation laws of physics are usually presented in a disjointed manner, each type of equation yielding to its peculiar solution trick.

In this little book the methods are shown to arise naturally from the mathematical expression of physical properties described by the equation. For example, if the "spring constant" of a harmonic oscillator varies symmetrically about the equilibrium point it is the frequency of the oscillator which is affected, while if that variation is not symmetrical the equilibrium point itself is moved. These physical considerations dictate in a natural way forms for approximate solution of the equations of different nonharmonic oscillators.

The author goes surprisingly far without asking from his readers more than the elements of calculus and of manipulations with series. A few of the ordinary differential equations of mechanics are discussed. More space is given to the partial differential wave, heat, and potential equations. Several of the more useful orthogonal function systems, such as the Legendre, Laguerre, and Hermite polynomials, are introduced in a physically rational manner. Both exact methods for typical equations and approximate methods for equations of similar form are presented.

The book is written in the simplest and therefore best scientific German with few if any of those long and intricate sentences which are, by those inexpert with languages, so understandably dreaded.

Fluid Dynamics and Heat Transfer. By James G. Knudsen and Donald L. Katz. 576 pp. McGraw-Hill Book Co., Inc., New York, 1958. \$12.50. *Reviewed by Robert E. Street, University of Washington.*

There are textbooks on fluid dynamics and textbooks on heat transfer. The first usually include some material on heat transfer and the second invariably contains a chapter or two on fluid flow. From the physical point of view there is really no distinction, since the flow problem is one of the transport of momentum and the other is one of the transport of energy; any flow prob-