second law of thermodynamics would lead to a principle that would explain phenomena in human beings and in human society that had hitherto not been amenable to explanation by any accepted "scientific law."

Wasser emphasizes in his introduction (page 5): "Adams was a man of letters who dealt with science on its own terms. Since he was not sufficiently equipped to make original contributions, his science would not interest the professional scientist. It would interest the layman who enjoys Adams. Science by its determinism gave pattern to *The Education of Henry Adams* and *Mont-Saint-Michel and Chartres,* by its content furnished ideas for his letters and essays, and by its generalizations lent a theory to his works on history. In short, all these works which make Adams the keenly interesting figure that he is owe much to his studies in science. Because Adams did meet science on its own terms and not by means of some other discipline, he can be thought of as a lay philosopher of science. Science for science's own sake is a crucial element in the *Weltanschauung* of his prose."

This paragraph sums up the peculiar interest that the thought of Henry Adams has for the active scientist and is the main theme running through Wasser's informative account of Adams, the man of letters with an abiding special interest in science.

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Handbuch der Physik. vol. 48, *Geophysics II.* S. Flügge, Ed. Springer, Berlin, ed. 8, 1957. 1045 pp. DM. 198.

Volume 47 (*Geophysics I*) of this *Handbook* is entirely devoted to physics of the solid earth [*Science* **124**, 829 (1956)]; the present volume 48 contains mainly chapters dealing with physics of the atmosphere and of the ocean, while general aeronomy, physics of the ionosphere, and terrestrial magnetism are to be included in volume 49. In the previous edition of the *Handbook,* most of the topics covered in volume 48 had not even been mentioned. To do justice to the great amount of information now included, a review covering several pages would be required.

Volume 48 begins with a chapter by A. Eliassen and E. Kleinschmidt, Jr., "Dynamic meteorology," which includes basic theory, waves in the atmosphere, large-scale motions, cyclones, and the general circulation in the atmosphere (145 pages). The following four chapters cover radiation and optics of the atmosphere: F. Möller, "Radiation in the lower atmosphere," from sun, sky, and the ground, absorption, and the radiation balance (in German, 108 pages); W. E. K. Middleton, "Vision through the atmosphere," extinction of light, visibility, colors, and pertinent instrumentation (34 pages); Z. Sekera, "Polarization of skylight," including theory, observations, and neutral points (41 pages); and J. Bricard, "Diffusion by rain drops," covering theory, rainbows, diffusion in clouds, rain, and fog (in French, 41 pages).

The late E. Regener had contributed to the first draft of the chapter, "Ozone in the atmosphere," in which H. K. Paetzold discusses the ozone spectrum, methods to measure the amount of ozone in the atmosphere, theory of its formation and destruction, and its distribution and effects, especially on the stratosphere temperature (in German, 57 pages). "Geophysical aspects of meteors," by A. C. B. Lovell, contains data on meteor heights and on winds in the upper atmosphere (28 pages). This is followed by E. F. Cox's "Sound propagation in air," including theory, recording of sound, effects of wind, and natural oscillations of the atmosphere (24 pages).

The last two chapters on the atmosphere are by F. H. Ludlam and B. J. Mason, "The physics of clouds," their forms, condensation and nuclei, droplets, formation and growth of crystals and of precipitation, and cloud seeding (62 pages), and by R. Mühleisen, "Atmospheric electricity," its measurement, ions, thunderstorms, currents, and the electric balance (in German, 67 pages).

"Oceanography," by H. U. Sverdrup, is rather condensed, in view of the extensive textbooks on the subject, and includes methods of observation, water masses and their properties, theory, currents and their effects (63 pages). H. U. Roll discusses "Surface waves of the ocean," their theory, recording and observations of waves and swell in the open ocean and near the coast (62 pages).

The following four chapters give an excellent account of all kinds of tides: J. Bartels, "Tidal forces," theory and extensive numerical data on important Fourier terms produced by sun and moon (in German, 31 pages); R. Tomaschek, "Tides of the solid earth," theory (including effects of the earth's structure), recording and results, effects of meteorological phenomena, of oceans, and of local geology (71 pages); A. Defant, "Tidal waves and tides in water," their theory, standing and internal waves, special harmonics of ocean tides, separation from effects of body tides, tidal friction (in German, 82 pages); W. Kertz, "Atmospheric tides," their theory under various assumptions, observations, and free vibrations of the atmosphere (see also the chapter by Cox) (in German, 53 pages).

Finally, S. Sakuma and T. Nagata, in "Physical volcanology," summarize information on volcanic earthquakes, magnetic phenomena near volcanoes, data on volcanic energy, and on magma (30 pages). This is followed by one subject index in German-English and one in English-German (33 pages).

Most of the sections and the printing and illustrations are excellent. Several chapters offer the first modern comprehensive presentation of their subjects. For many purposes, combined use of all three volumes is desirable; for example, volume 48 does not contain data, except incidentally, on composition, diffusion, temperature, pressure, or density in the atmosphere; these will probably be included in volume 49. The space devoted to the major topics is rather uneven—for example, 255 pages of volume 48 for the various types of tides but only 31 pages of volume 47 for gravity and isostasy. Some such differences are justified by the fact that, for various fields of geophysics, extensive up-to-date textbooks exist, but none for others. The two published volumes are worth the rather large expense to anyone who needs, fairly frequently, data concerning geophysical instruments, observations, or theories.

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Chemical Engineering Practice. vol. 3, *Solid Systems.* Herbert W. Cremer, Ed. Academic Press, New York; Butterworths, London, 1957. vi + 534 pages. $17.50 per volume ($13.30 per volume on orders for complete set).

Volumes 1 and 2 of *Chemical Engineering Practice* (there will be 12 volumes in all) were favorably reviewed in the 29 March issue of *Science* [*Science* **125**, 605 (1957)]. Volume 3 continues the comprehensive treatment of the chemical engineering complex and is devoted to a discussion of solids preparation. Again, it is my pleasure to report on the excellent treatment given the subject matter.

The volume is divided into five sections, each with several chapters devoted to different aspects of solids preparation. These sections are "Size reduction," "Screening, grading and classifying," "Mixing of solids," "Storage and handling of solids," and "Cleaning gaseous media." With the exception of the first section, of which three of the five chapters are contributed by Harold Heywood, the book is almost wholly a compilation of theory and practice by members of the staff of Simon-Carves, Ltd. The editors have done well in organiz-

ing a rather heterogeneous amount of material.

Although much of the volume is devoted to British methods, the principles developed are sufficiently general to be of universal applicability. The volume fills a need among both chemical and mining engineers.

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The People of Puerto Rico. A study in social anthropology. Julian H. Steward, Robert A. Manners, Eric R. Wolf, Elena P. Seda, Sidney W. Mintz, and Raymond L. Scheele. A Social Science Research Center Study, College of Social Sciences, University of Puerto Rico. University of Illinois Press, Urbana, 1956. 540 pp. Illus. $10.

The People of Puerto Rico is an important book, not only for all those who are interested in Puerto Rico, the islands of the Caribbean, and Latin-American cultures, but also for all social anthropologists and sociologists who are interested in the analysis of complex contemporary cultures and societies. It provides useful and important empirical data on the society and the culture of Puerto Rico. But even more important is its theoretical contribution with respect to the use of the "community study" method for an understanding of national (in this case insular) cultures. Several decades ago, social anthropologists turned from the study of homogenous primitive cultures to communities within the context of great civilizations and nations. Such studies have been undertaken of communities within many modern nations—in Ireland, France, Mexico, Brazil, China, and the United States, to mention but a few. These studies have contributed much to the understanding of the national cultures of the nations concerned. Yet, studies of individual communities, many of them small rural communities, provide a picture of only one small segment of a complex modern society. Often such community studies have not shown the relationship of the single community to the nation; they have tended to treat the community as if it were an exotic and isolated tribe. The present book by Julian Steward and his associates offers a conceptual scheme for integrating studies of individual communities into a national (insular) frame of reference, and the authors have applied that scheme admirably for Puerto Rico.

Concretely, this team from Columbia University undertook studies of four Puerto Rican communities as well as another study—for which they used social anthropological techniques—of the prominent upper-class families who resided in the city of San Juan. Each of these communities was selected to represent an important variant of Puerto Rican culture—or, in other words, a "subculture." Thus, a community that produces tobacco and mixed crops, located in the central mountain region, was studied by Robert Manners; a community that produces coffee, located in the western highlands, was studied by Eric Wolf; a community of workers on a large government-owned sugar plantation was studied by Elena Padilla Seda; and a community of workers on a large corporation-owned sugar plantation was studied by Sidney Mintz. Raymond Scheele carried out the study of the urban, upper-class subculture. These individual studies were closely coordinated; they cover much of the same ground and deal with a comparatively large number of island-wide problems. They are brought into relationship with one another and with Puerto Rican insular institutions by a careful perusal of the historical background and by an excellent comparative analysis of the regularities and variants that appear in the various Puerto Rican subcultures that are covered by the study. Thus, each community is seen not as an isolated and local manifestation of a complex society but in relationship to the whole culture.

This study is a model, so to speak, of group research in social anthropology. There will be social scientists who will argue with some of the theoretical concepts, but all will recognize that this book by Steward and his associates is a major step forward in the adaptation of the methods and theories of social anthropology to national cultures. It may well become a modern classic in social anthropology, comparable in importance, in its time, to Robert Redfield's *The Folk Culture of Yucatan.*

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Marine Algae of the Northeastern Coast of North America. William Randolph Taylor. University of Michigan Press, Ann Arbor, rev. ed., 1957. viii + 509 pp. Illus. $12.50.

For the past 20 years William Randolph Taylor's *Marine Algae of the Northeast Coast of North America* has been a standard treatise on marine algae. The revised edition follows the same format as the first, both with respect to keys and descriptions of orders, families, genera, and species. For each species the description is followed by notes on distribution within the range covered by the book, and by bibliographic references. The new edition contains descriptions of three genera and 14 species not known for the area at the time of the first edition. In addition, information concerning the range of many species is amplified, especially that for arctic species found in the northern portion of the area covered by the book.

Critical studies on type specimens by the author and by other phycologists has necessitated change in certain specific names appearing in the first edition. More modern views concerning relationships of certain families have been followed, and this has resulted in transfers from one order to another.

The revised edition, similar to the first, is not a compilation but is based in large part on study of living and herbarium specimens. Records from the area, given by other phycologists, have been scrutinized with care, and wherever possible herbarium specimens authenticating these records have been studied. The result is a book of the same scholarly quality as the first edition.

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Vergleichende Physiologie. vol. III, *Ernährung, Wasserhaushalt und Mineralhaushalt der Tiere.* W. von Buddenbrock. Birkhäuser, Basel, Switzerland, 1956. 677 pp. Illus. DM. 66.

This is the third in a series of volumes of W. von Buddenbrock's *Vergleichende Physiologie.* The first volume dealt with sense physiology, the second, with nerve physiology and hormones. The first 424 pages of this volume deal with nutrition, feeding, and digestion; the next 127 pages, with water balance (osmoregulation); and the final 67 pages, with mineral economy. Each of the first two sections opens with an extended discussion of the general physiology of the subject. Then follows an account of the function in each principal group of animals, from protozoans through vertebrates. The work is designed for zoologists, and the general physiological discussions do not include many physicochemical details of cell physiology.

Vitamins are treated briefly in the general section, scarcely at all for specific animal groups. Feeding mechanisms and the morphology of digestive systems are well presented, with useful diagrams. Many tables summarize the distribution of digestive enzymes in different animals. Characterization of proteases is by *p*H optima rather than by specific substrates; lipases and esterases are not clearly distinguished. Controversial matters, such as the importance of dissolved organic foods and the relative roles of extracellular and intracellular digestion in pelecypods, are critically examined.