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-