Book Reviews

Science and the Social Studies. 1956–57, twenty-seventh yearbook. Howard H. Cummings, Ed. National Council for the Social Studies, Washington, D.C., 1957. 271 pp. Cloth, $5; paper, $4.

It has apparently been intended that this yearbook should be read by high-school teachers of the social studies. The authors, 13 in number, contribute in varying degree to the development of two themes: (i) that advances in science and in technology have caused constantly accelerating changes in social, economic, and political conditions; and (ii) that teachers of social studies must assume greater responsibility for teaching pupils to make intelligent adjustments to these changes.

In the development of the second of these themes it is conceded that the teacher of social studies must have some understanding of science and of the ways in which scientists work. Taking a cue from James B. Conant, several of the authors propose that such an understanding be developed through the "case study" approach. Presumably to provide the teacher of social studies with ideas and with material for such case studies, as well as for the amplification of theme number one, parts I and II of the yearbook present a series of chapters having to do with the present effort to apply science and technology for the improvement of underdeveloped countries and with the International Geophysical Year, the work of the National Science Foundation, and the results of recent research in agriculture, in medicine, and in the use of radioisotopes. These chapters have been prepared by writers who appear to have ample technical knowledge in their respective fields. The chapters should prove to be useful as sources of reference material, not only for teachers of social studies but for all who are interested in progress in the applied sciences.

In part III there is an attempt to indicate ways in which teaching in the sciences or in the social studies may be organized to give greater emphasis to some of the methods used by the scientist and to the development of better understanding of the social consequences of scientific discovery. These chapters are well written but appear to present few ideas which have not already been well developed by the same authors, as well as by others, in publications which have been generally available for several years.

As might be expected where there are so many authors involved, the sections and the chapters of the yearbook vary considerably in style, and the continuity between divisions is sometimes not too apparent. However, there can be no doubt that scientists, social scientists, teachers, and the public all need to give greater attention to the need for constructive utilization of the processes and products of scientific discovery. The yearbook is, therefore, timely and may provide a needed inspiration for its readers.

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Physics and Chemistry of the Earth. vol. 2. L. H. Ahrens, Frank Press, Kalervo Rankama and S. K. Runcorn, Eds. Pergamon, New York and London, 1957. viii + 259 pp. Illus. $10.

This is the second volume of *Physics and Chemistry of the Earth.* Volume 1 was reviewed in *Science,* last May [**125**, 891 (1957)]. This volume is just as substantial as the earlier volume, though it contains fewer pages and one less chapter.

William S. von Arx of Woods Hole Oceanographic Institute describes "An experimental approach to problems in physical oceanography," using laboratory models as analogues to study marine circulation. He details the theoretical considerations and operating practices which serve as guides in the construction of three types of models: small inshore areas, marginal and mediterranean seas and some large lakes, and planetary models. Natural circulations can be duplicated in models, and some of the as-yet-unexplained features of ocean currents also appear. The planetary model develops unusual patterns of circulation in parts of the oceans that have not been explored oceanographically and invites field inspection.

L. H. Ahrens presents "A survey of the quality of some of the principal abundance data of geochemistry." Individual determinations by any method may be disappointing, and it is generally laborious to measure precision. Constituents in low concentration are most subject to error and, unfortunately, these errors profoundly affect geochemical conclusions regarding trace elements. Neutron activation and isotope dilution-mass spectrometric determinations may give us very accurately analyzed materials to use as standards for more conventional methods.

Harold C. Urey discusses "Boundary conditions for theories of the origin of the solar system." The interrelationships considered are: temperature during origin, temperature at later times, volatility, density variations among planets, chemical and physical processes producing differences in proportions of metallic and silicate phases in different planets, structure and composition of meteorites, and the occurrence of iron as the element, the oxide, and the sulfide. He emphasizes the importance of solid bodies and of the physical and chemical processes to which they were subjected. Urey urges that the possibility that the solids rather than the gases dominated the processes by which the solar system originated be more seriously considered in astronomical theories.

Francis A. Richards reviews "Some current aspects of chemical oceanography." Analysis of so complex a solution as sea water is exacting, and shipboard conditions compound the difficulties. There is great need for improved analytical techniques. The discussion of major and minor constituents, dissolved gases, biochemical relationships, and nutrients and their distribution and consumption are interesting in themselves and, above all, highlight the interdependence of the many disciplines that contribute to oceanography.

M. N. Hill, in describing and evaluating the "Recent geophysical exploration of the sea floor," leads the reader to feel that gravimetric, magnetic, refraction shooting, reflection shooting, heat-flow, and surface-wave dispersion measurements need support from each other to give more than a partial picture. For those restricted parts of the sea floor which have been explored, the four-layer structure down to the Mohorovicic discontinuity is reasonably uniform: unconsolidated sediments, consolidated sediments or volcanic rocks, basic igneous (basaltic) rocks, and deep basement (ultrabasic) rocks. Geophysical and geological study of atolls and volcanic islands lends more support to crustal subsidence than to eustatic changes for explaining the sinking with respect to sea level.