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.

Denis M. Shaw reports on "The geochemistry of gallium, indium, thallium." The history, chemistry, and cosmic abundance are discussed, then the geochemistry of each is separately reviewed. Outstanding problems needing investigation are summarized: geochemical affinities and cosmic distribution as deduced from meteorites; occurrence in sulfides; precise analyses aimed toward investigating the perplexing tin-indium association; and greater analytical sensitivity for restudy of distribution of indium in silicates. The association of thallium and manganese in sediments needs confirmation.

P. J. Melchior reviews "Latitude variation." He makes very clear the importance and difficulty of the observational procedures and the enormous patience and care of the International Latitude Service. The maximum diameter of the curve described by the instantaneous pole observed since 1900 is about 0.7 second, corresponding to a displacement of 21 meters on the earth's surface. The variations of latitude determined by astronomical observations contribute to problems involving elastic deformations of the earth, secular displacement of the mean pole, and some of the dynamical properties of a liquid core.

Volume 2 has subject index and name index, and each chapter has many references. The careful study of this book pays large dividends in broadened horizons.

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Natürliche und Künstliche Erbänderungen. Probleme der mutationsforschung. Hans Marquardt. Rohwolt, Hamburg, Germany, 1957. 177 pp. Illus. Paper.

Radiation genetics is, at the moment, in a strange situation. There is, on one hand, a great general interest in the effects of atomic radiations on our hereditary substance, and there exist, on the other hand, no manuals or textbooks to inform the public, or members of the medical profession, biologists, radiobiologists, and physicists, of the present stage of mutation research. To bridge the gap, H. Marquardt, professor of forest-botany at the University of Freiburg (Breisgau, Germany), presents in this little booklet (No. 43 of Rohwolt's *Deutsche Enzyklopädie*), in five chapters, a well-rounded picture of the existing situation, tying the principal experimental facts of mutation research into a unit with the logical conclusions and consequences. There is a short survey of the historical development, followed by chapters that deal, respectively, with the cytological foundations, the genetic foundations, the mutation process, and the importance of modern mutation research for our technical age.

The book is written in a clear, pleasant, and musical diction—Marquardt holds, besides his Ph.D. in biology, a doctor's degree in music—and reads like a thrilling report on an expedition in unknown territories. It is surprising how much—by proper arrangement of the facts—can be said in such a small volume. The book will definitely fill a present need and will be welcomed in wide circles; only the language barrier will limit its use.

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Climatology. Treated mainly in relation to distribution in time and space. W. G. Kendrew. Oxford University Press, New York, ed. 2, 1957. xv + 400 pp. Illus. + plates. $6.75.

Although this is a revision of the first edition, published in 1949, it is essentially a moderately altered edition of *Climate,* published in 1930, which contained most of the material of the present edition. Numerous small changes have been made, and a few new paragraphs have been added, together with an inadequate bibliography, mostly of British publications.

This volume was written "for the general reader" and affords brief statements about numerous aspects of climate, with, however, few explanations of the causes for the local differences. Part 1 (10 chapters) concerns insolation and temperature; part 2 (7 chapters) deals with atmospheric pressure and winds; part 3 (11 chapters) deals with atmospheric vapor and its condensation and also with sunshine and visibility. Mountain climates are discussed in part 4 (5 chapters), and the "weather of the westerlies" is covered in part 5 (5 chapters). The final part (3 chapters) is called "Some climatic types."

In addition to illustrations of the conventional aspects of climate there are brief discussions of smog, fronts, periodicities, hail, tornadoes, and hurricanes. The presentation is formal or "heavy." The examples are largely from the British Isles or from British colonies or ex-colonies. This volume is not suitable as a text, nor is it one of the better popular treatments of the subject.

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The Pigeon. Wendell Mitchell Levi. Levi Publishing Company, Sumter, S.C., 1957. xxvii + 667 pp. Illus. $20.

Biologists, psychologists, and others who study the pigeon have made good use of the first edition of this book, and the second edition carries them further into W. M. Levi's debt. An enormous amount of information is brought together from the most diverse sources. Much of it, particularly the discussions of breeding, housing, care, and diseases, is of great practical value to those studying the pigeon in laboratory or loft. The beautifully illustrated sections on the history and varieties of pigeons are of more general interest. The sections on anatomy, physiology, genetics, and behavior could not, in the nature of the book, be complete, but they are useful accounts for the nonspecialist. The section on commercial squab production, though of no immediate scientific interest, is written with special authority. There are delightful miscellanies scattered through the text. Among the 1127 illustrations the reader will find pictures of Old English dovecotes, Egyptian-style multiple lofts, bells attached to the feet of pigeons in Bali, and a set of 15 perfectly tuned pipes once sewn to the tail feathers of a pigeon in Peking.

So ambitious an undertaking is bound to have an occasional blemish (the index is not fully adequate, for example), but the book is, nevertheless, a landmark in the literature on the pigeon. Beyond that, it is an achievement of a dedicated layman (Levi, though he served in a Pigeon Section of the Signal Corps in World War I and has been an officer in many organizations concerned with pigeons, is a lawyer) which might put many a professional scientist to shame.

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Die Periphere Innervation. Emil Villiger. Schwabe, Basel, Switzerland, ed. 11, 1957. 210 pp. Illus. $5.

This book on the peripheral nervous system is the companion volume to Emil Villiger's well-known text on the anatomy of the brain and spinal cord. After ten years it now reappears in its eleventh edition, attesting to its perennial popularity. Since Professor Villiger's death, both volumes have been taken over and revised by his successor, Eugen Ludwig, presently professor emeritus of anatomy at the University of Basel.

Die Periphere Innervation begins with a completely new chapter on the general characteristics of peripheral nerves, including data on their ultrastructure as