Book Reviews

Projective Geometry and Projective Metrics. Herbert Busemann and Paul J. Kelly. Academic Press, New York, 1953. 332 pp. Illus. $6.

It is not often that a book combining excellent material, clarity of exposition, and graceful style makes its appearance. This is such a book. That the authors are consummate masters of the subject goes without saying, but they have also shown a deep sense of esthetic value and appreciation of the beauty of geometry. They point out with some sadness—with which I am deeply sympathetic—that classical geometry has fallen upon hard times, probably because other mathematical disciplines have become more attractive and because in our search for generality and abstractness we have lost interest in the beauties of various geometric constructs.

The book is a happy combination of analytic and synthetic methods. Those of us who cut our geometric teeth on Veblen and Young might wish for a little more rigor and axiomatization, but one must recognize that the choice the authors made was deliberate since the book is not intended for a highly sophisticated audience. Starting with the geometry of the projective plane, the authors develop affine and equiaffine geometries, which necessitates the introduction of such notions as groups homeomorphisms and isomorphisms. An abstract metric is then introduced and its various specializations lead quite far afield to such geometries as those of Hilbert and of Minkowski. The book concludes with three-dimensional projective geometry where various more sophisticated notions are either mentioned or fully discussed.

One might wish that the authors had included some work of Von Staudt, or a little of the more recent work on distance geometries. But the book is rich enough, so that if any book deserves to live this one does.

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Robert Grosseteste and the Origins of Experimental Science, 1100–1700. A. C. Crombie, Oxford Univ. Press, New York, 1953. 369 pp. Illus. + plates. $7.

Important technological developments were occurring in Europe from about the 9th century on, and knowledge of ancient Greek science began to be acquired on a large scale in the 12th century. It is both a presupposition and a conclusion of Crombie's book that the consequent fusion of these two traditions produced the sorts of attitudes and inquiries that we call modern science and that it had recognizably done so by the 13th century.

Focusing initially upon the scientific work of Grosseteste, the author then proceeds to other members of the Oxford School in the 13th and 14th centuries, and to their influence upon European science, with particular attention to certain aspects of the study of color and light. Sufficient material is assembled to enable Professor Crombie to show the influence, particularly methodological, on the work of the major physicists of the 17th century.

This book is an important contribution to the history of science in the 12th, 13th, and 14th centuries. It also should be of major interest to those concerned with the origins and nature of modern scientific thought.

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The Challenge of Man's Future. Harrison Brown. Viking Press, New York, 1954. xii + 290 pp. Illus. $3.75.

Harrison Brown, the author of this volume, is a geochemist. In 1947 he received the American Association for the Advancement of Science annual award and, in 1952, the American Chemical Society award in pure chemistry.

He presents a picture of the balance of nature on this globe as it was before the advent of man, during early and more recent historical times, and after the development of modern technology. A moderately fertile wild region of 10,000 mi^2 provided enough food for about 5000 persons who lived solely by collecting wild plants and animals. By a slow and fluctuating process and then recently with a rapid spurt the total population of the globe has been modified as the centuries have passed. Through the years, there has been a close relationship between population and food production or importation in various countries. In England, for example, from 1700 to 1840, the birth rate fluctuated but the death rate gradually declined. From 1890 to 1940, however, the rise in total population in England was startling. He points to the danger of the exhaustion of fossil fuels and other resources in relation to the increase of population in industrial nations.

Even today, two-thirds of the world's population lives under conditions in which both birth rates and death rates are high and food production is insufficient even in good times to provide adequate nourishment for everyone. For two or three thousand years prior to 1850, India probably had a stable population of between 50 and 100 million persons. The tremendous rise in the population of this subcontinent has resulted from the introduction of Western ideas and ideals and an increased importation of foods. Since 1940, for example, the population of the Indian subcontinent has been increasing at a rate of about 5 million persons per year. Over 90 percent of the total man hours worked in India are now devoted to the production, handling, and transportation of food.

In conclusion, the author points to the difficulties that lie ahead for the human race. He does suggest that the possibility cannot be excluded that a balance between numbers of human beings and food and

energy may yet be found. He suggests, "Just as we have rules designed to keep us from killing one another with our automobiles, so there must be rules that keep us from killing one another with our fluctuating breeding habits and with our lack of attention to the soundness of our individual genetic stock."

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Dielectric Aerials. D. G. Kiely Methuen, London; Wiley, New York, 1953. xii + 132 pp. Illus. $2.

Dielectric aerials, also called "polyrod antennas," may be thought of as wave guides from which energy "leaks" out the sides and the resulting interference sets up a radiation pattern, usually with end-fire directivity. The dielectric antenna may have the form of a rod, a tube, or a horn. It has been used mainly where a compact array is desired or metal is not wanted.

The author states that "no complete theory of the mechanism of the radiation of dielectric rods exists at present" and even less work has been reported on tubes and horns. After a chapter on wave propagation along dielectric rods, three methods are presented that have been used as a theoretical basis for the observed behavior of polyrod antennas. The first utilizes the Huyghens principle and elementary ray theory; the second considers the rod to be a type of lens; the third, and favored, method is based upon a set of fictitious electric and magnetic surface currents following Schelkunoff. After developing the three methods and comparing results for pattern calculations, the author deals briefly with band width, losses, and practical applications.

The analysis of tubular structures and horns is more complicated mathematically and less practical experience has been reported. There is a good summary of the material available.

Minor differences of notation and terminology (such as the Continental usage of delta for the Laplacian) should cause no difficulty. Perspective drawings of field configurations would have been helpful at several points. The mks system of units is used. The bibliography contains 29 items.

This book conforms to the usual high standards of the "Monographs on Physical Subjects" and should be a welcome and useful addition to the literature on antennas and radiation.

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Solubilities of Inorganic and Organic Compounds: A Compilation of Solubility Data from the Periodical Literature. Supplement to ed. 3. Atherton Seidell and William F. Linke. Van Nostrand, New York, 1952. 1254 pp. $12.50.

This supplementary volume to the third edition of *Solubilities* contains literature data published in the years 1939–49, inclusive. Ownership of the book and responsibility for publication have been assumed by the American Chemical Society.

This issue contains four parts. The inorganic section, compiled by Seidell, is arranged in alphabetical order according to the elements, and contains 567 pages.

The organic part, compiled by Linke, is made up of 252 pages. The compounds are arranged according to increasing number of carbon atoms in the molecular formula. Although in a compilation of this kind some errors are bound to occur, it should be emphasized that the naming of a number of carbon compounds does not comply with the adopted rules. Thus, amines such as dimethylamine and ethylamine are expressed in two words, as are compounds such as hexachlorobenzene, trinitroresorcinol, and many others. β-Hydroxypropionic acid is incorrectly designated on page 608 as "β-Oxy Propionic Acid." 2-Bromopropionic acid is listed as "Bromo Propionic Acid," which is ambiguous. On page 609, 1-propanesulfonamide is incorrectly listed as "Propane-1 Sulfamide," and on page 654 "p-Nitro Hydroquinone" should read *o*-nitrohydroquinone. On page 603, the structural formula for propargyl alcohol contains a double bond instead of a triple bond, and on page 701, acetophenone is misspelled.

The third part contains a valuable 180-page compilation by Dr. Francis, of Socony-Vacuum Oil Co., of ternary aqueous and nonaqueous systems and also five pages of quaternary aqueous and nonaqueous systems.

The fourth part is a review, based on 142 references, by Dr. Bates, of the National Bureau of Standards, entitled "Recent contributions to the theory of electrolyte solubility."

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New Books

The Western End of Lake Erie and its Ecology. Thomas H. Langlois. J. W. Edwards, Ann Arbor, Mich., 1954. xx + 479 pp. Illus. $10.

Electronics. A textbook for students in science and engineering. Thomas Benjamin Brown. Wiley, New York; Chapman & Hall, London, 1954. xi + 545 pp. Illus. $7.50.

The Collected Papers of Stephen P. Timoshenko (In German, French, and English). McGraw-Hill, New York–London, 1953. xxv + 642 pp. Illus. $15.

The Biochemistry of Genetics. J. B. S. Haldane. Macmillan, New York, 1954. 144 pp. $2.75.

Cohort Fertility. Native white women in the U.S. Pascal K. Whelpton. Princeton Univ. Press, Princeton, N.J., 1954. xxv + 492 pp. Illus. $6.

Characteristics and Applications of Resistance Strain Gages. Proc. of NBS Symposium held Nov. 8–9, 1951. National Bur. of Standards, Washington, D.C., 1954 (Order from Supt. of Documents, GPO, Washington 25, D.C.). iv + 140 pp. Illus. $1.50.

Sea-Birds. An introduction to the natural history of the sea-birds of the North Atlantic. James Fisher and R. M. Lockley. Houghton, Mifflin, Boston, 1954. xvi + 320 pp. Illus. + plates. $6.