on classical relativity theory. The reviewer considers the book of extreme importance because of its content and originality.

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Food Science: A Symposium on Quality and Preservation of Foods. E. C. Bate-Smith and T. N. Morris, Eds. New York: Cambridge Univ. Press, 1952. 319 pp. Illus. $8.00.

This volume is the outcome of an extended summer course in food science given under the Board of Extra-Mural Studies of Cambridge University in cooperation with the Low Temperature Research Station during 1948. A brief introduction by Franklin Kidd defines food science as the vast field which, beginning with photosynthesis, includes all processes involved in production, composition, storage, and preservation of foods and their utilization, and having fundamental significance for the welfare of mankind.

The editors have skillfully utilized the contributions of 26 British cooperating scientists in this compact and highly informative volume. Seven chapters of varying length supply condensed factual and statistical material of much interest and value. Of these, the first, by N. C. Wright, chief scientific adviser of the Ministry of Foods, presents briefly a concise and valuable summarization of the economics, supply, and distribution of foods in the United Kingdom during the period from 1934 to 1944, and the nutritional status of the population as of 1948.

The second chapter gives an extended survey of the composition, variation, nutritional values, and factors affecting internal changes in the principal foods. Meats, fish, eggs, fresh fruits, and vegetables, and the great group of cereals and milled products are each considered in detail. The book deals primarily with British foods, but its interest is not lessened for the American reader, although certain varieties of fish are unused here, or because some of the procedures described differ in detail from corresponding processes in this country. Chapter 3 discusses competently the basic constituents of foods under the headings proteins, mucopolysaccharides and mucoproteins, carbohydrates, and fats. This valuable chapter is followed by another dealing with "Some Aspects of Quality in Foods," in which the physical and chemical basis of quality, and the significance of the fine structure of biological tissues, both plant and animal, in nature are carefully treated. Chapter 5 deals briefly with "The Microorganisms"—the molds, yeasts, and bacteria—chiefly concerned with the processes of spoilage in foods. The treatment is largely from the physiological standpoint, and the data on the effects of environmental factors on growth are well but possibly too briefly presented. The subject of "Principles of the Control of Microbial Spoilage" especially would seem to warrant more expanded treatment than is given in this section, although the matter is skillfully presented. Chapter 6 devotes 40 pages to an intimate discussion of "Chemical Mechanisms of Spoilage" and covers a wide range of reactions. Rancidity in edible fats and fat-containing foods is treated very fully, its effects on odor, flavor, and appearance being discussed with some detail. The Maillard, or browning, reaction on dehydrated foods is also given careful attention.

The final chapter devotes over 60 pages to the principles of food preservation. Herein are treated the traditional methods of canning, preserving by concentration, refrigeration, and use of chemical preservatives. Much attention is given to refrigeration and quick-freezing and also to dehydration by modern methods; the subject of sugar preserves is likewise given detailed treatment. The recent developments in sterilization by radiation have come since the course was given and therefore are not discussed in detail. This does not impair the value of the chapter as a whole, although the process may have much future interest. An appendix describing "Organization of Research and Information Services in the United Kingdom" completes the volume.

The book is excellently printed, has many illustrations and graphs, and extensive bibliographies at the end of each section. Altogether, it is a book that all food chemists and technologists would find most useful and it should be a valued accession to every library that aims to carry on its shelves the most useful and authoritative volumes dealing with the great subject of food supply and food technology.

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Geometry and the Imagination. D. Hilbert and S. Cohn-Vossen; trans. by P. Nemenyi. New York: Chelsea Pub., 1952. 357 pp. $5.00.

David Hilbert (1862–1943) was a very great mathematician whose research extended into almost every field of mathematics. Furthermore, he was a great teacher and expositor, with a genius for presenting basic ideas uncluttered by details. His insight penetrated far beyond the obvious and brought to light relations previously unobserved. With a self-confidence supported by his pre-eminent position as a mathematician, he did not hesitate to devote attention to mathematics of the most elementary sort, such as arithmetic and plane geometry, and he was able to endow these humble topics with a dignity and depth unsuspected by more superficial observers.

"Intuitive Geometry" would have been a more accurate translation of Hilbert's *Anschauliche Geometrie*. The book, based upon lectures given by Hilbert in Göttingen in 1921, was first published by Springer in Berlin in 1932, and has become a mathematical classic. This translation by Nemenyi is precise and in excellent English. The Chelsea Publishing Company acknowledges indebtedness only to the attorney general of the United States.

There are six self-contained chapters in the book, each devoted to a separate type of geometry. The first chapter mainly concerns the conic sections and quadric surfaces, and until the concluding paragraph coordinates are not used. The purpose is to make the reader

see and feel the proofs, without too much regard for the rules of the game as the Greeks insisted upon playing it. Thus, when Hilbert wishes to construct a sphere tangent to a plane, he merely pushes the sphere up until it touches the plane. In this way he produces a figure from which the reader can see at a glance that a plane section of a right circular cylinder is an ellipse. Further results obtained by this approach are far from trivial.

The second chapter is on lattices and should interest crystallographers. Hilbert gives some exceedingly simple proofs of special cases of theorems from Minkowski's *Geometrie der Zahlen* and a great deal of material that is not to be found in that classic. The regular polyhedra are taken in stride.

Synthetic projective geometry is treated next, with emphasis on configurations. The author can scarcely avoid the use of the word "axiom" in this branch of geometry, but geometrical intuition is placed ahead of formalism. He is thus content to prove Desargues' theorem in the plane by first proving it in space and then projecting the figure onto the plane.

The longest chapter in the book is appropriately given over to differential geometry. That this subject can be developed without coordinates is inconceivable, and in fact we find the author frequently resorting to the it-can-be-proved technique. But for one who has studied the subject in the conventional manner and wishes to clarify his concepts, the exposition is unsurpassed.

Chapter V, entitled "Kinematics," is short. It is devoted to the construction of plane curves by means of linkages and other mechanical devices. The last chapter, on topology, is still a clear introduction to that subject, but a book written 30 years ago cannot be a summary of topology as it is today.

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An Introduction to Physical Anthropology. 2nd ed. M. F. Ashley Montagu. Springfield, Ill.: Thomas, 1951. 555 pp. $8.75.

If a second edition has grown in only six years to nearly twice the size of the first, it goes without saying that it has been thoroughly revised and, besides, must reflect the growth of the science represented. This new edition has matured far beyond its first version, but as an "introduction" it still suffers from one-sidedness—dealing with topics not expected from its title and ignoring others that should form an integral part.

The opening chapter, although accompanied by 11 excellent portraits of men eminent in the history of anthropology, does not provide an account of the historical development of our understanding of man. It defines physical anthropology as "the comparative science of man as a physical organism in relation to his total environment, social as well as physical." The word "social" may be supposed to excuse the later inclusion of a polemic chapter on "the relation between body, mind, and culture," which is clearly out of place. The chapters on primates and their evolution have been greatly improved, particularly through the generous addition of a great many and very good illustrations, but the most important anatomical reasons for man's position among the primates are not made evident. The fourth chapter on the origin and evolution of man provides a fair account of our present incomplete knowledge of this great problem. This vast field of knowledge is growing too rapidly, however, to enable any one man to give a generally acceptable account of it. The pedigree of primates given here in Fig. 105 should have been clearly labeled as "author's interpretation" of phylogenetic relationships, and some justification for these rather partisan views should appear in the text. Besides it should, if at all possible, be explained why this pedigree differs so radically from the one appearing in Fig. 40.

The chapters on "ethnic" differentiation in man are quite readable, partly because some sections were written without regard for documentation and by skipping over problems far from settled. If this volume was designed as an introduction for the layman or first-year student, it should have been considered inadvisable to air controversial matters, for experts will find in these chapters many facile claims in place of a statement of problems they hope to solve in the future. The author's allergy to the legitimate term "race" forms a handicap in these accounts, and his indiscriminate substitution of the terms *division, group, subgroup, type,* and *population* gives the unjustified impression that our species is not subject to race formation, as is the case with all other species.

The final chapter on the effects of heredity and environment upon man is much too short to be called comprehensive, yet it is well written and should induce the lay reader to turn to the selected literature listed in this section, as in all others. The long appendix on anthropological methods has been much elaborated in this new edition but still reveals limitations in at least the metric techniques of the author's science.

Although this *Introduction* is advertised as covering the entire field of physical anthropology, it makes practically no attempt to deal with human age changes, without which the story of the evolution and differentiation of mankind remains incomplete. The book can be recommended chiefly on account of its fluent style, its 161 splendidly reproduced illustrations, and its sectional bibliographies which, although reasonably up to date in regard to English literature, ignore practically all else. This volume represents only a partial and quite personal introduction to the vast science of man, the most interesting part of all biology.

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