

Book Reviews

Solid analytic geometry. Adrian Albert. New York: McGraw-Hill, 1949. Pp. ix + 162. \$3.00.

The first five chapters of this textbook present the usual material on lines, planes, spheres, and the other quadric surfaces, concluding with an invariantive classification of quadrics. The concepts and terminology of vector algebra are introduced immediately and are used effectively throughout. The sixth chapter is devoted to the theory of matrices, which in the seventh chapter is applied to rotations in space and to the principal axis transformation. The last two chapters are considered by the author to be supplementary to a basic course. Chapter 8 is on spherical coordinates and gnomonic charts, useful material which is frequently neglected. Chapter 9 is an introduction to analytic projective geometry in the plane and in space, carried far enough to include a proof by means of matrices of the invariance of the cross ratio.

The treatment throughout is designed to tie analytic geometry to the modern theory of vectors and matrices, and the methods employed are for the most part those which can be generalized directly to the Euclidean geometry of n dimensions. The book contains much excellent material illustrating the applications of the theory of vectors and matrices to solid Euclidean geometry and many short and elegant proofs are developed in this technique. The only criticism which occurs to the reviewer is that the viewpoint is predominantly algebraic rather than geometric, and that there is a minimum of emphasis on developing the student's space intuitions.

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Lehrbuch der Embryologie. Walter Brandt. Basle, Switzerland: S. Karger, 1949. Pp. xii + 648. (Illustrated.) 56 Swiss francs.

This is a textbook of human embryology for medical students. In general, it follows the standard pattern: a rather extensive chapter on general embryology is followed by chapters on organogenesis. The text is written clearly and concisely, and the important chapters on human placentation, fetal circulation, and hormonal control of the sexual cycles, in which fields much recent work has been done, are up to date. The illustrations, partly in color, are adequate for the most part but do not do justice to the chapters on the nervous system and the sense organs. For instance, illustrations of the histogenesis of the central nervous system and of the structural differentiation of the eye and ear and their auxiliary structures are entirely missing. Moreover, illustrations of such important processes as fertilization and gametogenesis (which latter is represented by a poor diagram) would have been desirable.

An innovation of the book is the inclusion of a considerable amount of experimental embryological material. This reviewer is wholeheartedly in favor of a more analytical and dynamic approach to embryology than is offered by most texts. It is, therefore, regrettable that these parts do not live up to expectation. The promise of the author, in the foreword, to incorporate the newest results in developmental physiology is not kept in the text which, apart from very few exceptions, considers the literature only up to 1934. As a result, the presentation of the subject and the viewpoints are outdated and inadequate in many respects. For instance, our conceptions of embryonic induction and of axis determination in limb primordia have undergone considerable changes in the last fifteen years. The old ghosts of mosaic- and regulation-eggs are revived, and the descriptions of gastrulation in Amphibia and in higher forms, and of the fundamental processes of the segregation of organ primordia from the germ layers, are incorrect. In the part on organogenesis, the experimental data on the determination of an organ are presented in advance of the description of its embryonic development; the didactic wisdom of this procedure is questionable. A serious shortcoming of the book is the lack of a bibliography, in spite of numerous bibliographic references in the text. It is of great importance that the attention of the premedical and medical students be directed to sources.

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Die Optik in der Feinmesstechnik. (Optics in precision measurements practice.) Kurt Rantsch. Munich, Germany: Carl Hanser, 1949. Pp. 317. (Illustrated.) Cardboard: 27 DM; clothbound: 30 DM.

Here is a valuable contribution to that division of optical engineering which deals with the use of optical instruments for precision measurements. The first third of the book treats in a very thorough manner those principles of geometrical and physical optics which are necessary to provide a background for the intelligent use of precision optical measuring equipment. The paraxial imaging properties of lenses and mirrors are developed systematically. Considerable attention is devoted to apertures and pupils, and to the transmission of flux through a system. The short section on physical optics covers pertinent topics such as interference and diffraction, resolving power, and light losses by reflection. Possibly some readers would have welcomed a brief mention of polarized light, and of optical interference films for antireflection and beam-dividing purposes. There is a convenient eight-page collection of all mathematical formulas at the end of the book for quick reference.

The remaining two-thirds of the book takes up optical instruments. It is replete with good photographs of an

astonishing variety of products of the firms of Ernst Leitz and Carl Zeiss. The author, who is a member of the Zeiss organization, explains that this limitation to German manufacturers was necessary under present conditions in order not to delay publication. It is to be hoped that his intention to add instruments of other origin in future editions will materialize. The pictorial representation of the subject matter has been carried out so carefully and completely that it should serve to compensate the language difficulties which some may have, the book being, of course, in German. Measuring microscopes, collimators, contour projectors, comparators, gage block interferometers, and apparently all such instruments as would be expected in a text of this kind have found their place. One wonders if industry really makes full use of the potentialities of all this equipment. Finally there is a noteworthy section on surface profile determinations, with comparative photographic documentation of results using the profile microscope, the quenched total reflection microscope, and the interference microscope.

The book will serve the student as a reference or even as a text, and it will provide the instrument maker or process engineer with a guide to the solution of many problems in precision measurements.

A. F. TURNER

Bausch & Lomb Optical Company

Trace elements in food. G. W. Monier-Williams. New York: John Wiley, 1949. Pp. viii + 511. \$6.00.

The title *Trace elements* has a variety of connotations for different groups. The nutritionist has in mind primarily iron, iodine, copper, manganese, cobalt and zinc. Agriculturists add boron to this group and dentists add fluorine. The toxicologist, while not unmindful of a possible excess of some of the elements named, centers his main interest on the remaining ones. But the health officer and the food chemist must deal with the gamut of elements, since all are encountered in foods, in more or less quantity, sometime or other.

Monier-Williams' *Trace elements in foods* is written primarily from the standpoint of the food chemist. There are 28 chapters, each dealing with a single element except for the last few chapters, which cover several closely related elements. The book is primarily an abstract of the papers to which it refers—about 1,600 in all. In the case of each element half of the discussion deals with the source and amounts in foods, nature or condition of occurrence, function if any, nutritional requirement, availability, assimilability, tolerance, toxicity, retention, excretion etc. The other half of the discussion is devoted to methods of analysis. Its thoroughness in this field should make it a useful book for every food chemist.

The author discusses briefly the philosophy of regula-

tory measures. He states: "Agreement [between what is clearly toxic and what is undoubtedly harmless] is not likely to be reached without far more complete knowledge of human physiology than we possess at present. Meanwhile, any preference must be on the side of the consumer." But he weakens that statement by another. "It can be urged that where exhaustive animal experiments have shown no sign of injury of any kind, there is no reason to fear any adverse effect on man and no justification for imposing limits and prohibitions which may harass traders and impede progress without conferring any apparent benefit on the consumer." The different reactions of different species and the various susceptibilities of individuals, particularly invalids, within a species justify greater caution than this implies. The "harassing of traders and impeding of progress" have often been overemphasized. One can cite the former wide use of sodium benzoate in ketchup. Now it is outlawed by the federal definition and standard that industry itself largely formulated. Preservatives in milk, a most perishable food, were outlawed when knowledge was very limited as to what could be accomplished by a combination of pasteurization and refrigeration, and facilities for applying them were even more limited. This prohibition was a challenge to the dairy industry. Today the distribution of milk is on a very high level indeed. Abolition of the use of the violently reactive chemicals now being used in the flour and bread industries might be expected to have an equally salutary effect.

At least part of the medical profession was confident that lithium chloride could be used as a seasoning agent to supplant sodium chloride for patients requiring a low sodium intake. Not a single voice was raised against it until a few deaths were reported. Lithium at one time was regarded as an important ingredient of certain so-called health waters. Incidentally, Monier-Williams' discussion of lithium is very brief. The episode mentioned occurred too recently for him to have included it.

Some other omissions are less easily excused. The author states that a tree may be fed manganese through a hole bored in the trunk. He fails to point out the more and more common practice of feeding plants through their leaves. Important commercial applications of the technique are spraying pineapples with iron and citrus trees with manganese, copper, and zinc.

Through an error, the author states that normally $1\frac{1}{2}$ to $1\frac{3}{4}$ lb of tin is used to coat a base box of steel in making tinplate. In this country 3 percent of hot-dipped plate contains $1\frac{1}{2}$ lb and 97 percent contains only 1.25 lb. The ability of the canning industry thus to spread the limited supply of tin during the war is what made it possible to keep up the supplies of food to both civilians and the military forces.

E. F. KOHMAN

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