Book Reviews

The Life and Death of Cells. Joseph G. Hoffman. Hanover House, Garden City, N.Y., 1957. 301 pp. $4.50.

Here is a biophysicist's fresh approach to the problem of the life and death of cells. Among the topics considered are, what is life?, living tissue cells, automation in cells, organization and flux in cells, effect of environment on cells, cell division, variations and mistakes (in cell division), cancer cells, submicroscopic fibers, growth and death as stochastic processes, physical forces, and the importance of death. In many cases the problems are discussed with vivid imagery, particularly with respect to cellular movement and underlying molecular movements; for example, "There is literally a simmering and throbbing of the cytoplasm. It appears to be a boiling vortex of matter, even though it is known to be mostly water." Or again, in connection with the effects of ionizing radiations: "There is, however, one physical agent which strikes through the defences of a cell and can blast it like a bolt of lightning." Staid statements are often given zest by calculations and extrapolations; for instance, "A tissue cell may have a voltage across its walls of 50 millivolts . . . a rate of change of voltage of 50,000 volts per centimeter . . . across the wall."

Among the interesting discussions are those on the relationship between mistakes in heredity and the number of cell generations intervening between zygote and adult. The mistakes which occur only infrequently are considered to be one of the causes of cancer. There is also an intriguing chapter on physical forces, reactivity, enzyme specificity, macroscopic force fields, van der Waals forces, and Coulombic forces as possibilities for the explanation of some cellular phenomena. The last chapter, on death, includes an interesting discussion of the template hypothesis of duplication of biological units. The treatment of cells in tissue culture and the problems of cancer appealed to me as being especially original and informative.

A few unfortunate slips are found—for example, the failure to follow convention in capitalizing only generic names, not specific names, of animals and microbes. Also, a statement like: "When a plant or tree makes ten thousand seeds, it must assume that there will be more than barren rocks to greet the seeds," may raise eyebrows, as will the acceptance of the evidence that grain from ancient Egyptian tombs will sprout on being planted. A person who wants authority for various interesting statements regrets the lack of citations to the literature, but the book is apparently intended for the general reader, not the specialist. However, all in all, its merits far outweigh its minor deficiencies, and *Life and Death of Cells* should provide interesting reading matter for the large number of individuals who are intrigued by the ways of cells.

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Algebraic Geometry and Topology. A symposium in honor of S. Lefschetz. R. H. Fox, D. C. Spencer, A. W. Tucker, Eds. Princeton University Press, Princeton, N.J., 1957. 408 pp. $7.50.

Algebraic Geometry and Topology is a volume dedicated to S. Lefschetz on his 70th birthday (3 September 1954) by his students and friends. Lefschetz's main contributions to pure mathematics lie in the fields of algebraic geometry and algebraic topology, which thus become the subject of this book. One would like to add that, in the past 15 years, Lefschetz has been mainly interested in the theory of ordinary differential equations and has exerted a considerable influence in its development, although the subject is not touched on here.

The book starts with articles by W. V. D. Hodge and N. E. Steenrod which summarize, in a vivid fashion, the essential contributions of Lefschetz to algebraic geometry and topology. The remainder of the book contains 12 papers on algebraic geometry (in its broad sense) and 11 papers on topology. All of these are original papers on current developments in the two fields. There is also a bibliography of 98 items, covering Lefschetz's mathematical publications, which includes several books and sets of lecture notes.

Both Hodge and Steenrod admit the benefit they have derived from studying Lefschetz's work. Hodge acknowledges his indebtedness for the stimulus to his ideas on harmonic integrals, and Steenrod, for a treatment of some cohomology operations, known as reduced powers, which he introduced. These are certainly the best possible tributes to a great mathematician, the more so since these contributions of Hodge's and Steenrod's are among the most important in modern mathematics.

The contributed papers cover a wide range. It may be of interest to observe that many of them have contact with some phase of Lefschetz's work.

This book will be an indispensable piece of mathematical literature. It appears at a time when both algebraic geometry and topology are in the process of a vigorous development. Algebraic geometry has extended itself, on the one hand, to complex manifolds and differential geometry and, on the other hand, to abstract algebraic geometry and number theory. In recent years, algebraic topology has been closely interwoven with algebra, particularly with the so-called homological algebra. The basic problem in mathematics, as in many other fields of science, is the relation between the discrete and the continuous. A topological space is a continuous object, but the algebraic structures associated with it, the homology groups, the cohomology ring, and so forth, are generally discrete. An algebraic variety in the complex field has a topological structure, but an abstract variety in a finite field is basically discrete. We see, in the recent development of algebraic geometry and topology, this interplay of the discrete and the continuous on a high level. It must be for this reason that the field, like the work of Lefschetz himself, occupies such a central position in pure mathematics.

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Chemical Applications of Spectroscopy. vol. IX of *Technique of Organic Chemistry*. W. West, Ed. Interscience, New York, 1956. 787 pp. Illus. $15.

The past decade has witnessed remarkable increases in both the importance and diversity of applications of spectroscopy for the practicing organic chemist. Perhaps the most striking development has been the creation and almost explo-

sive growth of the virtually new fields of radio and microwave spectroscopy. The great usefulness of some of the newer techniques and the ready availability of excellent commercial instruments has encouraged or induced many organic chemists to become part-time spectroscopists as well. More often than not, however, their background and formal preparation in spectroscopy have been limited. For this reason, a book which provides the nonspecialized worker with a broad yet reasonably detailed survey would meet a distinct need. This *Chemical Applications of Spectroscopy* attempts to do.

The editor, W. West, has contributed an introductory survey of molecular spectra and a chapter on fluorescence and phosphorescence. Microwave and radio-frequency spectroscopy is the subject of a chapter by Walter Gordy. A. B. F. Duncan has contributed a chapter on the theory of infrared and Raman spectra and a section that deals with the theory of electronic spectra. A very comprehensive chapter on the application of infrared and Raman spectrometry to the elucidation of molecular structure has been contributed by R. Norman Jones and Camille Sandorfy.

Although issue may be taken with the balance among the subjects covered and with the approaches adopted by some of the authors, there can be no doubt that this book contains a sufficient range of information to be of some value to practically every organic chemist who uses spectroscopy as a tool. Among the book's limitations, one of the more prominent is the unevenness of the chapters. The background required of the reader varies quite widely. In some instances, the reader is given guidance, perspective, and a critical review of current methods and applications. In other portions of the book, the reader is left adrift in a straightforward but heavily mathematical exposition which would seem better suited to a more specialized text. Despite these and related faults, which tend to diminish the book's usefulness to the readers for whom it was expressly intended, it should prove helpful and informative.

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The Importance of Overweight. Hilde Bruch. Norton, New York, 1957. 438 pp. $5.95.

Hilde Bruch's new book, *The Importance of Overweight,* is an original and vigorous contribution to the understanding of this subject. As can be expected from her training and experience as a psychiatrist, the parts of her book which deal with analysis of the psychological aspects of obesity are immeasurably superior to her chapters on the physiological side. Bruch was one of the first psychiatrists to recognize that obesity is not simply the result of willful abandonment of self-control but that overeating corresponds to some profound physiological or psychological disturbances. She speaks of the psychological and emotional aspects of the obesity problem with the voice of a compassionate physician and a research-minded scientist rather than in the dogmatic and intolerant tone that is too often associated with the subject.

However, the subject of obesity has so many facets—physiological and nutritional as well as psychological—that it is unlikely that one person could ever write on all of it with steady excellence.

The chapter on "The cultural frame," which deals with past attitudes of various civilizations toward obesity, is particularly entertaining and well illustrates how the same condition has been considered, at times, an enviable attraction and, at other times, a hideous disfigurement. On the other hand, the development in the next chapter of "What is overweight?" is rather cursory. Bruch's concept of a "preferred weight," "to which people seem to cling in such a stubborn way," is unconvincing. Under uniform conditions of exposure to food and physical activity, and in the absence of acute disease or psychological trauma, the weight of people does indeed vary slowly, but any sudden change in mode of life can have rapid effects on weight and may never be followed by a return to the previous level.

The chapter on "The case for heredity" places in their respective interrelationship the genetic and environmental factors; that on "Physical growth in obesity" calls attention to some of the many problems involved in gaging the effect of a relative hyperphagia on growth.

The chapter on "Basic facts on basal metabolism," although it represents a recognition on the author's part of the many difficulties that are encountered in interpreting respiratory measurements in obese individuals, is superficial and contributes little to clarification of this problem.

The chapter on "Metabolic and regulatory disturbances" attempts to deal with some of the recent concepts developed, in particular, by T. B. Van Itallie and me. Unfortunately, the distinction between the two terms *metabolic disturbances* and *regulatory disturbances* does not appear to have been clearly understood by the author, and her chapter may not be very helpful to students of the physiological aspects of obesity. By contrast, the series of chapters which deal with the psychological aspects of obesity is excellent and illustrates well the fact that obesity admits of a multiple etiology, with regard to psychological as well as to physiological factors. As a clinical problem obesity can only be dealt with when it is realized that the many causes of this condition may have very little in common except their ultimate effect. It follows that each case of obesity must be dealt with according to the characteristics of the individual patient. Ready-made general solutions are likely to do more harm than good.

One may regret that Bruch, who was among the first to emphasize the importance of physical inactivity in the etiology of obesity in children, has not devoted more space to this aspect in her book. A chapter specifically devoted to a discussion of psychological causes and possible remedies for the lack of willingness to exercise that is evidenced by so many obese children would have been particularly helpful.

The book is well printed and edited. It has a good bibliography and a useful index. It is the first book which seriously attempts to deal with the underlying causes of obesity since that of Rony appeared in 1940. It has its place in the library of any worker who is concerned with this important health problem.

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Synthetic Polypeptides. Preparation, structure, and properties. C. H. Bamford, A. Elliott, and W. E. Hanby. Academic Press, New York, 1956. 445 pp. Illus. $10.

There has been phenomenal progress in the study of large, synthetic polypeptide molecules in recent years, and probably no group of workers has contributed more than those associated with the research laboratory of Courtaulds, Ltd., in England. The authors of this monograph are leading representatives of that group, and this survey of the field presented by them is naturally an important contribution. Their objective, stated in the first chapter, is "to present detailed evidence about synthetic polypeptides which has a bearing on some aspects of the structure and behavior of the protein molecule." After this introduction, they devote two chapters to the methods of synthesis of polypeptides and to the mechanisms involved in syntheses, starting from N-carboxy-α-amino acid anhydrides.

The following chapter IV deals with chain configuration in polypeptides, including the α helix and other helices, the pleated sheets, and other configurations. Chapters V and VI deal in great detail with the infrared spectroscopy of the