In the paper by Hagerman and Villee entitled "A Mechanism of Action for Estrogenic Steroid Hormones," the authors outline their well known work on the stimulation of pyridine nucleotide transhydrogenase by estrogens. Although the mechanism of the stimulation is unknown, Hagerman and Villee suggest that activation of transhydrogenase in the uterus is sufficient to account for the increase in metabolic activity of the uterus following estrogen administration. Unfortunately, there is no critical comparison of their results with those of Talalay, which differ in certain important respects from the Hagerman–Villee interpretation.

Following this paper, there are some interesting remarks by Mueller on the role of protein synthesis in estrogen action. He reports that pretreatment of animals with puromycin, an inhibitor of protein synthesis, prevents any response to estrogen administration and, therefore, suggests that stimulation of protein synthesis is the primary event in estrogen action. Whether this viewpoint is in conflict with that of Hagerman and Villee is not clear at the moment. However, the approach seems both interesting and fruitful.

The chapter entitled "Structure and Chemical Reactivity in the Steroids" by Turner reviews certain recent developments in steroid chemistry which he feels are not sufficiently known to investigators interested in biochemical or clinical subjects; such as the control by stereoelectronic or kinetic factors of the course of a given transformation. He also reviews some of the recent work of Barton indicating that minor structural alterations at sites on the steroid nucleus apparently remote from a given site of reaction can be transmitted through the fused ring system of the nucleus and can thus influence the course of the reaction. For the moment this discussion does not appear to be strictly relevent to the problem of the biological action of the steroids, but, of course, this judgment is subject to revision at any moment. Almost the same thing could be said of the discussion by Ringold concerning the effects of chemical modifications of the steroid molecule on biological activity of the hormones. Since many factors probably go into the biological activity of a given steroid, it is difficult to say which chemical alterations affect its local activity and which, for example, change its localization and distribution.

In his concluding remarks, Stetten calls attention to this difficulty in the interpretation of structure–function relations.

Perhaps because more fundamental problems of biological regulation are not yet solved, the actions of steroids, a special class of regulators, cannot be considered in a completely satisfactory way. Despite this, this book seems quite worthwhile as indicating the approaches that are being taken.

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Gmelins Handbuch der Anorganischen Chemie. Achte Völlig Neu Bearbeitete Auflage. Chrom. Teil A-Lieferung 1. Geschichtliches. Vorkommer. Technologie. Element bis Physikalische Eigenschaften. System-Nummer 52. Herausgegeben vom Gmelin-Institut. Begonnen von R. J. MEYER. Fortgeführt von E. ERICH PIETSCH. Stellvertretender Hauptredakteur, Alfons Kotowski. Verlag Chemie, G.m.b.H., Pappelallee 3, Weinheim/Bergstr., Germany. 1962. xx + 418 pp. 18 × 25.5 cm. Price, DM. 316.–.

Anyone who has attempted to make a complete literature survey on even a small chemical topic knows what a difficult, time-consuming and frustrating experience it can be, and can well imagine the enormity of the task which confronts the editorial staff of Gmelins Handbuch in their attempt to make a complete survey of the literature of inorganic chemistry. It is no wonder that the volumes in this series are expensive, and that, even though this book bears a 1962 imprint, the literature references in it are complete only through 1949. It is true that some references of later date (even up to 1961) are included, but they are a small minority, and for the most part are in the lists of general references with which each main section begins. The few specific references of recent date do not seem to follow a pattern—one gets the impression that the editors included those which they found during their search for earlier references. Even though the list of recent publications is incomplete, it will be of considerable value.

This volume is not a revision or a supplement to an earlier volume on chromium, for the previous edition of Gmelin did not include a description of that element. The work described here, therefore, includes the very earliest references to chromium. It covers the history and occurrence of chromium, the technology and toxicity of the element and its inorganic compounds, and the physical properties of the metal. The section on occurrence fills nearly one-half the book and that on physical properties, almost one-third. Very little mention is made of the solution chemistry of chromium compounds except that which is involved in metallurgical processes or in the chemistry of such technically important materials as pigments, leather tanning agents, and plating baths. The more "academic" chemistry of chromium compounds will, of course, be discussed in Part B.

An interesting and convenient (but hardly necessary) innovation in the recent volumes of Gmelin is the inclusion of marginal headings and a table of contents in English.

This volume represents a valuable addition to the literature of inorganic chemistry, and joins the rest of the Gmelin series as an essential part of every chemical library.

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An Introduction to the Biochemistry of the Cancer Cell. By HARRIS BUSCH, College of Medicine, Baylor University, Houston, Texas. Academic Press Inc., 111 Fifth Avenue, New York 3, N. Y. 1962. xiv + 424 pp. 15.5 × 23.5 cm. Price, $13.50.

The last comprehensive treatment of the biochemistry of cancer is the monograph by Greenstein published in 1953. The tremendous advances in biochemistry and the upsurge in the volume and scope of cancer research during the past decade make a book on the biochemistry of cancer not only timely but necessary. For these very reasons, however, prospective authors have shied away from the formidable task of updating Greenstein, an undertaking probably now beyond the capability of a single author. Busch wisely has not attempted this, but instead has written a relatively small volume of 424 pages in which he has chosen for review only those areas of major interest. To this reviewer, the selection of material has been excellent and admirably fulfills the author's aim of introducing his readers to those areas of biochemical research that offer particular promise and interest to most workers in the field.

The choice of topics clearly reveals the many changes that are occurring in the direction of the thoughts and ideas of researchers in the biochemistry of cancer. In the second edition of Greenstein's "Biochemistry of Cancer," nucleic acids were hardly mentioned. Today, with the general acceptance of the concept of cancer as a mutation, the problems of DNA and RNA structure and their role in protein synthesis are in the forefront of the cancer problem. In keeping with contemporary trends, over half of this book is devoted to these and related topics. In Part I, "The Genotype of Neoplastic Cells," the author first develops the currently accepted view of the neoplastic transformation as an alteration in the hereditary apparatus, and follows with a general description of the significance of DNA as the master substance in the transmission of genetic formation. In subsequent chapters the chemical structure, synthesis, breakdown and the various transformations of DNA and RNA are broadly covered, and the immediate relevance of these processes to the chemical treatment of cancer is delineated in a brief chapter on the inhibition of nucleic acid synthesis as an approach to cancer therapy. The final chapter of this section covers possible mechanisms of chemical and viral carcinogenesis. It is here that the excitement of imminent discovery makes itself felt, through the conception that some common transformations of DNA may underly the action of the three known classes of carcinogens, namely, viruses, radiation and chemicals.

The second section, termed "Some Aspects of the Phenotype of Cancer Cells" covers the more traditional ground of the cancer biochemist. Here he covers those familiar problems with which biochemists have been grappling unsuccessfully for many years. The first chapter describes the long-standing, peculiar observation that the activity of the enzyme catalase is depressed in the liver of tumor-bearing animals, and describes the possible role in this phenomenon of a mysterious entity known as "toxohormone," which is presumed to be produced by cancer cells. In subsequent chapters there are discussed the elaboration of abnormal proteins by neoplastic plasma cells; the formation of mucoproteins and their occurrence in abnormal quantities in the blood of cancer patients; and a brief discussion on neoplastic cell antigens and related immunologic problems. The remainder of this section is devoted to one of the traditionally controversial areas of cancer biochemistry, namely the significance of the high glycolysis of tumor cells, and related problems of carbohydrate metabolism.

Throughout the book, the author's own studies are given prominence. One of these which is particularly interesting is the discovery of a nuclear protein, RP2-L, claimed to be unique to cancer tissues.

Despite its small size this volume contains a wealth of interesting information, logically and lucidly presented with the aid of numerous charts, graphs and illustrations. An up-to-date bibliography at the end of each chapter enhances its value for reference purposes.

The book will be of particular value as a reference work to biochemists actively engaged in cancer research, and it would

be an excellent source of information to graduate students in the medical sciences. It should prove useful also to practicing chemists or biochemists interested in learning the contemporary status of the biochemistry of cancer.

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Introduction to Molecular Spectroscopy. By GORDON M. BARROW, Professor of Chemistry Case Institute of Technology. McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, N. Y. 1962. xiii + 318 pp. 17 × 24 cm. Price, $10.75.

As the author indicates in the preface, this book has been written principally to bridge the gap between the very cursory treatment of spectroscopy generally given in undergraduate textbooks and the detailed treatments written for the specialist and research worker. It could also be helpful to the non-specialist who makes use of applied spectroscopy and who wishes to acquire some theoretical background of the subject.

After an introduction to the theoretical treatment of molecular systems, the author considers the vibrational energies of diatomic molecules and the rotational energies of linear molecules from both the classical and quantum-mechanical points of view. A chapter on the absorption and emission of radiation is followed by treatments of rotational and vibrational spectra of polyatomic molecules. In succeeding chapters the concepts of molecular symmetry and group theory are introduced, and the calculation of vibrational frequencies and normal coördinates is discussed. The book concludes with chapters on electronic spectra of diatomic and polyatomic molecules. In a book that otherwise ranges over the whole field of molecular spectroscopy it is curious to find the Raman effect dismissed in a three line paragraph on page 2 and a short parenthetic mathematical statement on p. 198 in a section dealing with infrared active fundamentals.

In organizing the material the author has taken pains to present difficult topics to newcomers in an orderly fashion, and many of the diagrams are particularly to be commended for their clarity, which is aided by the use of a two-tone black and gray technique of reproduction.

Unfortunately, a closer study of the text reveals an inordinate number of typographical errors and editorial slips that largely defeat the purpose for which the book is intended. Though perhaps individually trivial and, for the most part, easily recognized by the expert, these errors and omissions can cause serious difficulty and frustration to the neophyte. There are far too many to list them in their entirety in this review. Some forty-five were noted in a single reading of the text and as representative examples the following may be cited. In equation 45 on page 39 the coefficients of four out of five functions are incorrect; in equation 3 on page 62 the second square bracket is misplaced; on page 187 there are errors in three of the list of twelve matrix product equations; on pages 221 and 224 confusion is introduced by failure in several places to distinguish correctly between x, y, z, R and $\dot{x}$, $\dot{y}$, $\dot{z}$, R. Careless mistakes are also present in some of the diagrams; particularly bad is the mistake in Fig. 10-3 on page 236 where the absorption band system of carbon monoxide has been reversed in transposition from Herzberg's monograph and does not conform with the accompanying lettering. In Fig. 7-4 on page 140 the transitions corresponding to the P branch of the spectrum are incorrectly represented, and in the center section of Fig. 10-16 on page 256 the diagram suggests that the u wave function is unsymmetric with respect to the left hand square well.

The references to further reading, given at the end of each chapter will usually be helpful to the newcomer in the field, but it is surprising at the end of Chapter 8 to see Bellamy's excellent but irrelevant book "The Infrared Spectra of Complex Molecules" cited as a reference to further reading on molecular symmetry and group theory, while no mention is made here of the monograph of Wilson, Decius and Cross.

To sum up this is a well planned book but one that cannot be recommended unless accompanied by an extensive list of textual corrections.

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Molecular Structure and the Properties of Liquid Crystals. By G. W. GRAY, Department of Chemistry, The University of Hull, England. Academic Press Inc., (London), Ltd., Wing 1, 7th Floor, Berkeley Square House, Berkeley Square, London, W. 1, England. 1962. vii + 314 pp. 16 × 23.5 cm. Price, 63 s.

Although there have been several recent review articles on liquid crystals, this volume represents the first book in English on the subject and the only book in any language published in the past twenty years. It is sufficiently complete and critical that it would provide an excellent background for anybody wishing to embark upon either theoretical or experimental work in the field. The book is adequately indexed, and the individual sections and chapters are self-sufficient enough to make it possible for the interested reader to acquaint himself with isolated topics, be they organic chemistry, experimental identification techniques, physical properties or theory.

An interesting introductory chapter contains both the pertinent history and philology. This is followed by a chapter which develops in detail both the theoretical and operational distinctions between the three types of liquid crystals, or mesophases. The smetic and nematic mesophases are classified, respectively, as two-dimensional and one-dimensional crystals. The cholesteric mesophase represents a sufficiently different state of matter, particularly in the light-scattering characteristics, as to deserve a special designation. Experimental identification of these three different states of matter, particularly by observation of melting and freezing phenomena, is discussed in detail. This section is supplemented with sketches, diagrams and photographs in sufficient number to be extremely useful for the experimentalist.

The several theories of molecular arrangement and order in these mesophases are given critical consideration. This includes reasonably good reviews of X-ray diffraction, spectroscopic, proton resonance, refractive index, dielectric, thermodynamic and surface tension experiments, with some interpretation in terms of theory and models. A separate chapter is devoted to the behavior of liquid crystal mixtures. The book concludes with three chapters on the effect of chemical constitution on mesomorphic behavior, on the systematic trends in transition temperatures for homologous series of liquid crystals and on the effects of substituents and of steric factors on mesomorphic thermal stabilities.

The book is mechanically well produced. In spite of "anistropy" appearing on the first page of the text, the incidence of error seems to be small. Drawings, photographs and diagrams have been effectively used for illustration of molecular arrangement; the non-specialist in organic chemistry will particularly appreciate the liberal usage of diagrams of the chemical compounds. There are numerous citations to the literature, although only a sparse representation of work reported since 1958.

Gray makes the observation that approximately one out of every 200 organic substances could be expected to exhibit mesomorphic behavior. At the modest price involved, these are sufficiently good odds that every organic chemist concerned with the characterization of compounds by their melting behavior will need to have this useful volume available for reference in his library. The book can also be recommended to the physical chemist interested in intermolecular forces and configurations.

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