An Aspect of Cancer

Endogenous Factors Influencing Host-Tumor Balance. Proceedings of an international symposium, Chicago, Oct. 1966. ROBERT W. WISSLER, THOMAS L. DAO, and SUMNER WOOD, JR., Eds. University of Chicago Press, Chicago, 1967. xiv + 352 pp., illus. $12.50.

This conference on the cryptic question of host-tumor balance was appropriately dedicated to Charles B. Huggins, a major contributor on both the practical and the theoretical level to our understanding of host factors that modify the natural history of neoplastic disease. A happy coincidence was the announcement two days after the closing of the symposium of the Nobel award to Huggins.

The complexity of factors concerned with the balance between host and tumor was explored by some 50 scientists, each a recognized authority in his area. The specific subjects discussed included the influence of hormones on cell growth and behavior and the mechanisms by which they exert their effect, the role of immunologic factors in influencing tumor induction and growth, the clotting mechanism as a factor affecting the blood and lymphatic spread of cancer, and morphological and biochemical correlations with the natural history of cancer. The prepared papers vary in depth more because of the uneven extent of our knowledge than lack of authority or currency. Transcripts of discussions follow each group of papers.

It is obvious that the most profound knowledge we have of host factors relates to the effect of endocrine function during the interval between tumor induction and the appearance of the overt neoplasm. Basic steroid chemistry is combined with fundamental physiology in an elegant series of papers in the first part of the symposium which show constant concern over the relevance of experimental data to man. Our current understanding of steroid action is greatest in relation to human breast cancer. Although far short of providing answers to many important questions, the studies elucidating metabolic pathways and interactions between steroids and cell receptors provide much fundamental information on comparative pharmacology and immunology, with pitfalls appropriately noted. It is in this area that the symposium makes its most significant contribution.

The second part of the symposium is concerned with immunological factors as they modify the induction and development of cancers. Laboratory data and clinical data are reviewed thoroughly, and the papers appropriately emphasize the inconsistencies which continue to plague both bench scientist and clinician. The validity of in vitro models as prototypes for studying in vivo systems is effectively reviewed, and, while perhaps present data do not warrant great optimism, progress is certainly being made.

A less satisfying portion of the book relates to the role of vascular and interstitial tissue behavior on cancer. Experimental models are less informative in contributing to our understanding of cancer in man. Papers in this section are understandably more descriptive than mechanistic.

The summarization of the symposium by George Klein is unusually rewarding. Klein wisely chose to concentrate on the important questions raised by the formal presentations rather than limit his summary to a condensation of presented data. The organizers of the symposium are to be congratulated on both the quality of papers presented and the promptness with which the proceedings were published. This volume is enthusiastically recommended to workers in the field as a successful attempt to synthesize the basic science and the clinical aspects of a very elusive aspect of the study of cancer.

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Effects of Pressure

Chemical Reactions at High Pressures. K. E. WEALE. Spon, London, 1967 (distributed in the U.S. by Barnes and Noble, New York). xvi + 349 pp., illus. $12.50.

The great increase in high-pressure research is a notable contemporary development. Pressure, like temperature, is an effective tool in illuminating the structure of molecules as related both to equilibria and to reaction rates. Increasing the pressure and lowering the temperature both favor a more orderly arrangement of matter and so might be expected to have parallel effects. In fact, however, although most reaction rates are speeded up by raising the temperature, they may be either slowed down or speeded up by raising the pressure, depending on whether or not the activated complex is more or less voluminous than the reactants.

This book reports and interprets the effect of pressure on a wide variety of phenomena, with appropriate concern for the theoretical interpretation. The effect of pressure on equilibria, reaction rates, phase transitions, dielectric constants, and viscosity typify the scope of the book. The literature coverage, although not complete, is extensive enough to be useful. Reaction-rate theory tells us that if the logarithm of the rate of reaction is plotted against pressure the slope is the volume change, ΔV^*, in going from reactants to activated complex. Accordingly a mechanism which implies a volume of activation different from the observed one can be excluded from further consideration. The book illustrates the usefulness of such considerations in a wide variety of cases.

By reading this book one will get a good overview of many fields involving high pressure as well as a useful bibliography which can be used to extend the inquiry. The book is to be recommended for such a survey.

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Arctic Dwellers

Alaskan Eskimos. WENDELL H. OSWALT. Chandler, San Francisco, 1967 (distributed by Science Research Associates, Chicago). xviii + 297 pp., illus. Cloth, $7.25; paper, $4. Chandler Publications in Anthropology and Sociology.

The Eskimo of Alaska have finally been accorded considerable scholarly tribute, after having been overshadowed for several decades by the earlier descriptions of the Arctic dwellers of Greenland and Canada. This well-conceived book is a synthesis of recent data from several investigators, collated with selected historical sources.

The aboriginal Eskimo of Alaska apparently had access to both a greater range and more abundance of food resources than did their eastern counterparts, and were consequently able to sustain a larger population with a relatively higher standard of living. However, Alaska is geographically complex, and patterns of Eskimo occupancy are far from uniform. Within four biotic provinces live the 21 tribes described, each of which is classified according to one of six major subsistence patterns. Variations in tool types necessary to exploit the different ecological regions

might be expected; cultural diversity also extended into many facets of social and ceremonial life.

The evidence presented reinforces the current anthropological view that there is no single "Eskimo culture" spread across the vast North American continent. Rather, there are numerous "cultures" of Eskimo peoples which share some traits because of geographical or historical similarities or both and which simultaneously diverge to reflect individual local traditions.

The book merits scholarly attention and should also attract a wide audience among public administrators, teachers, and others working in Alaska generally.

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Rocks from Earth's Interior

Ultramafic and Related Rocks. P. J. WYLLIE, Ed. Wiley, New York, 1967. xviii + 464 pp., illus. $22.50.

The aim of petrology is to study the "beginning," development, alteration, intergradation, and reconstruction of rocks. According to modern views based upon experimental and theoretical thermodynamic data, geophysical measurements, and geological observation and interpretation, the ultrabasic (=ultramafic) rocks should yield new information on the nature of the deep crust of the earth. These rocks have therefore recently come into the glare of geological publicity.

The ultramafics are chemically characterized by relatively low contents of O, Si, Al, alkalis, and high Fe, Mg, Ca. Mineralogically this is reflected by absence of quartz and (most) feldspars, and by high concentrations of olivine, pyroxene, and sometimes garnet and hornblende, which are relatively heavy minerals (close-packed silicate lattices). In all respects the ultramafics form the antipole of the granitic rocks, which are high in quartz and feldspars, are specifically light, and reside in shallow depths (because they are forced upward by the gravitational field). The ultramafics abide at much deeper levels (indeed, they may, at least in part, derive from the earth's mantle) and only occasionally appear in the upper parts of the crust. As meteors are obvious messengers from outer space, the ultramafics are, on this theory, messengers from inner space, that is, from the interior of the earth. How and why these heavy rocks manage to migrate against the gravity gradient is a moot question. Are they carried upward by floating continents emerging from the depths? Or do they come from dispersed molecules and atoms slowly migrating through preexisting rock masses perhaps attached to some "carriers" (Mg-metasomatism)?

The account of ultramafic rocks presented in this book is divided into 43 chapters written by 37 authors. The many expert authors have produced variety, but also have introduced problems by overlap and gaps in the coverage. The editor has smoothed the discontinuities in several ways, particularly by writing a special introduction for each chapter which attempts to coordinate and relate the chapter to other chapters and to furnish cross references.

The large number of known natural occurrences are classified and divided into categories, and the fundamental problems are discussed. Among the diversified and complicated questions treated are the intricate relations of the layered intrusions, the minor intrusions, and the zoned complexes. Much room is given to the Alpine-type ultramafic associations. The problems are multiplied by including kimberlites and carbonatites. There is a very useful compilation of the worldwide distribution of kimberlite, until recently the only primary terrestrial source of diamonds. No satisfactory hypothesis for the origin of kimberlite can be offered; some kimberlites may have developed from fluidization systems which followed the explosion of deep, gas-charged magma.

The mafic and ultramafic small nodules, constantly found in kimberlite but also in basalt and other basic igneous rock, promise to reveal the chemical and mineralogical composition of the earth's mantle, and have been intensively studied. They are variously interpreted as representative of the primary basaltic magma formed as bottom cumulates in temporary reservoirs or formed marginally during upward flow. But eclogites, except in the form of nodules, are not treated.

There are special chapters on the geochemistry and on the petrogenesis of the ultramafic rocks. Experiments in the system CaO-MgO-SiO_2-CO_2-H_2O pertinent to the relations between kimberlite and carbonatite are explained and discussed.

A review of 12 pages on petrogenesis, on the significance of the geochemical results, and on the relations of ultramafic rocks to the upper mantle completes the text. There are about 1000 references, an author index, and a subject index.

The book is stimulating, full of facts, and extremely useful. In this short review a list of the 37 authors and the titles of the 43 chapters would have taken one fourth of the space available. I can therefore just summarily compliment each author on his logical and authoritative presentation, reliability, and clear and easy style of writing. The book is very readable, and is a must to every geologist who studies and wants to understand how defined geoprocesses may give birth to these fascinating rock products.

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Instrumental Optics

Interferometry. W. H. STEEL. Cambridge University Press, New York, 1967. x + 271 pp., illus. $11.50.

The wavelength of light is about half a micron, or one 20-millionth of an inch. It is the ideal tool for measuring small thicknesses, surface finish, or movements down almost to atomic dimensions, and the technique ordinarily used is interferometry. W. H. Steel of the National Standards Laboratory in Sydney, Australia, has now written an authoritative, concise, contemporary survey of this important field. To do so, he has had to draw heavily on coherence theory and Fourier transform relationships. Indeed, chapters 2 through 4, only 43 pages, manage to cover most of the fundamentals of modern instrumental optics, and the reader must read and understand them well, for the concepts and terminology developed there are used without further explanation in the rest of the book.

Chapter 5, on two-beam interferometers, is similarly basic, for in it the author defines significant concepts not previously sharply distinguished, even by experts: tilt, shift, shear, delay, and lead. Shear may be lateral, rotational, or radial. Using this rich and compact conceptual framework, Steel can then economically unify things which are as seemingly diverse as spectroscopy, radio astronomy, holograms, and the familiar optical interferometers. This of course means that the tricks used in each are seen to be applicable to the others.

The generality of the treatment will lead the careful reader to a deep under-