

Book Reviews

Successful Commercial Chemical Development. H. M. Corley, Ed. Wiley, New York; Chapman & Hall, London, 1954. xxv + 374 pp. \$7.75.

After little more than a decade of formal existence, the Commercial Chemical Development Association has produced a book that is unique in several respects. It is a pioneering effort, the first book on the subject. It is a pooled effort, produced under the guidance of a book committee; each chapter is the work of a chapter committee with as many as 14 members. The book's purpose is

. . . to document in one volume the most enlightened, present-day knowledge of the important principles of every essential step, as well as the pitfalls to be avoided, in selecting promising new chemicals and rapidly developing them to the stage of economic importance.

Its preparation has undoubtedly entailed more discussion and debate than the authors would care to reckon.

Regardless of whatever merits or defects the book may otherwise have, it marks a milestone of progress toward removing the mysticism and hocus-pocus from the art of discovering and developing important new chemical products and toward creating a systematized or engineered approach. The chapters are written by commercially practicing market developers speaking from the experience gained in putting into practice the methodology that has been evolved bit by bit by the more thoughtful practitioners.

The first three chapters trace the evolution of organized commercial chemical development, touch on the growth of the North American chemical industry, and devote some 20-odd pages to definitions of terms. From this point on, the remaining 18 chapters develop the various aspects of commercial chemical development.

Many of the factors to be considered in detail for the selection of projects that will lead to successful new products are listed, including raw material availability, plant and processing costs, suitability for the market anticipated, competition from other chemicals or chemical processes, patentability, toxicity, handling ease, and others. Obviously, many diverse skills need to be applied if the over-all program of new-product development is to be successful.

The successful marketing of chemical products requires application of many nonchemical skills. Careful attention must be applied to pricing, packaging, labeling, shipping, and any specialized marketing techniques. Several case histories illustrate the breadth of teamwork needed for successful commercial chemical development. The evolution and recent rapid growth of the chemical industry itself is illustration enough of the effectiveness of the practices described in this book.

The ground rules of successful commercial chemical

development as presented here should prove useful guides to those whose business it is to translate laboratory findings into salable products. Further than that, the book will be helpful to the management of chemical enterprises, in showing how to establish the function, and to users of chemical products who are desirous of having new materials brought to their attention.

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Animal Cytology and Evolution. M. J. D. White. Cambridge Univ. Press, New York, ed. 2, 1954. xiv + 454 pp. Illus. \$8.50.

Of the half-dozen books of the past two decades that have gained so much praise for bringing together aspects of evolution, genetics, cytology, systematics, and paleontology, *Animal Cytology and Evolution* is one of the most highly regarded. The publication of its second edition, expanded, reorganized, and very largely rewritten, is as noteworthy an event for the cytologist as for the evolutionist.

As a lucid account and skillful summary of nuclear cycles, especially those with unusual chromosomal behavior, and as a guide to what is known of normal and abnormal chromosomes and chromosomal sets of animals, White's book is excellent and without any peer today. The completeness of coverage of the literature is remarkable, and the insight of the author with regard to his problems has given the whole work an admirable organization and structure. Whether or not personal views are congruent with White's, it is unlikely that any informed biologist will read this monograph without enjoyment, profit, and strong admiration for the author's accomplishment. Unless they are members of the majority group of evolutionists, however, biologists will no doubt expect more in the way of open-minded evaluation on the part of the author.

As *descriptive* cytology, no more could be asked of one whose goal is to discuss the bearing of animal cytology on evolutionary processes. As *interpretative* cytology, however, much more might fairly be expected in the way of balance, accuracy, and unbiased prose. White does not hesitate to ignore or give short shrift to arguments or evidence that are opposed to his own, and he is not always scrupulous in assigning credit where credit is primarily due (as, for example, when he comments on the suppression of crossing-over within and adjacent to heterozygous inversions). Nor is he unwilling to state as probable fact what is still open to serious question. Actually it remains to be shown, for example, that "the dark-staining bands in the salivary chromosomes clearly correspond to the chromomeres of ordinary mitotic [!] and meiotic chromosomes," that "there seems now no serious reason to doubt that each band does represent a single genetic

locus" and "that each chromomere is really a single gene," that genes and most centromeres are not subdivisible, and so on for many of the cardinal issues of chromosome cytology and genetics. Use of *probably*, where *possibly* or *perhaps* is more clearly in order, and other persuasive verbalisms, tend to impart an enormously favorable slant to the expression of White's views. Any who are concerned with specific conclusions or evaluations will do well to study the original papers.

Since stress is given to what is regarded as cytogenetic interpretations, it should be commented that *cytogenetic* has here a different connotation than usual. White generally and necessarily deals with cytology that is accompanied by an *ad hoc* and consistent genetic interpretation rather than cytology that is tested or corroborated by direct genetic data or experiment. As is so often the case in the writings of our modern evolutionists, natural selection as a cause is deduced from effect, and the resulting arguments and conclusions are, of course, unconvincing.

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Life on Other Worlds. Harold Spencer Jones. English Universities Press, London, rev. ed. 2, 1954. xi + 259 pp. Plates. \$3. (U.S. distrib., Macmillan, New York.)

In this little book, Harold Spencer Jones summarizes in a lucid way the knowledge pertinent to this fascinating question. The first chapter presents a summary of our present ideas on the structure of the universe. Then comes a discussion of conditions necessary for life. This is largely concerned with the unique chemistry of the carbon compounds. The author next describes the available methods of investigation, including the theory of escape of atmospheres, spectrographic analysis of planetary atmospheres, and means of determining planetary temperatures. After a discussion of the probable evolution of the atmospheres of Earth, he considers worlds without atmospheres and then, at the other extreme, the giant planets. Separate chapters are devoted to Venus and to Mars. Finally, theories of the origin of the solar system are considered. A concluding chapter points out the implications of the evidence developed.

This book is obviously written for the intelligent amateur and for scientists other than astronomers who wish an authentic summary of the information bearing on this topic. Quite naturally, therefore, the professional astronomer will find little with which he is not already familiar. However, the clarity of style and the skill with which concepts are completely and concisely developed make this book one that can be read with profit by anyone engaged in teaching an introductory course in astronomy, and it can provide valuable collateral reading for students in such courses. Inevitably, a book last revised in 1951 is out of date in certain details, but the nature of the treatment is such that this in no way vitiates the general theme.

In general, this book succeeds admirably in its purpose of presenting a summary of the solid scientific information bearing on the ever tantalizing question of whether life exists on worlds other than this.

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Quantum Mechanics. P. Mandl. Academic Press, New York; Butterworths, London, 1954. viii + 233 pp. Illus. \$5.80.

The field of quantum mechanics is already blessed with a number of excellent textbooks. Nevertheless, F. Mandl's book is a welcome addition to this list. Apart from elementary "first courses" on wave mechanics and from specialized treatises on specific applications of quantum theory, most previous textbooks fall in two classes. The first group contains very readable books concentrating on the underlying physical principles and the practical use of quantum mechanics, such as the American textbooks by Bohm and by Schiff. The second group concentrates on the rigorous mathematical foundations of quantum mechanics, for example, the classic works by Dirac and by von Neumann. These works, although important original contributions, are by no means easy reading for the theoretical student and experimental physicist. Mandl's book is also designed to bring out the unifying mathematical scheme underlying quantum mechanics. It deals with the more formal aspects of the theory but without undue stress on rigor and without assuming any elaborate mathematical training on the part of the reader. Only the nonrelativistic theory is treated throughout.

In the first five chapters the mathematical formalism of quantum mechanics is developed in detail, with particular attention to its physical interpretation rather than to practical applications. After a chapter on mathematical techniques, the concepts of wave mechanics in general and eigenfunctions in particular are introduced. A thorough and clear treatment of matrix mechanics and of the general operator formalism follows. Especially welcome is a discussion of the measurability of operators and related questions of observation.

The remaining four chapters deal with specific applications, but from a point of view somewhat different from that of most previous books on a comparable level. The main aim of these sections is to illustrate the use of the general theory, rather than to obtain theoretical results in various branches of physics. Included are treatments of angular momentum operators and their application to systems of many particles, of the perturbation method, and of collision theory. The book ends with a discussion of group-theoretic methods. This discussion is noteworthy for its simplicity, not usually found in treatments of group theory. The book's usefulness is enhanced by a collection of exercises, together with hints for their solution.

Quantum Mechanics probably should not be considered as a textbook for the more standard courses