planning to include the laser in his cancer armamentarium.

The reader's optimism should, however, be tempered somewhat by a review of the bibliography. One quarter of the 99 references are to publications by the author, nearly all dealing with clinical experimentation. A review of many of the other references suggests that much is left to be learned before this innovation in biomedical research should be made available to every clinician who can afford to buy it.

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For Statisticians and Students

The **CRC Handbook of Tables for Probability and Statistics** (Chemical Rubber Company, Cleveland, Ohio, 1966), edited by William H. Beyer, appears in a "Professional Edition" (518 pp., illus. $15) and a "Student Edition" (378 pp., illus. $5).

The professional edition consists of 13 sections, the first section giving background material on probability and statistics, and the remaining sections containing 77 tables and charts under such headings as the normal distribution; chi-square, t, and F distributions; discrete distributions; order statistics; range; correlation coefficient; nonparametric statistics; quality control; and miscellany. The first section, which comprises more than one-fifth of the book, summarizes some of the basic concepts in probability and statistics and includes topics such as the general linear model, plans for design of experiments, and analysis-of-variance tables. Preceding almost every table is a brief introduction which defines and discusses the function being tabulated. This edition includes almost every table that a practicing statistician is likely to need in his daily work.

The student edition, which appears in a smaller page size, omits five of the tables and most of the background material included in the professional edition. Unfortunately, there is nothing on the title page of the student edition to distinguish it from the professional edition, and both have been given the same Library of Congress card number. Only in the publisher's advertisements does one find the labels "professional" and "student" editions.

Although this handbook contains a highly useful collection of tables, it has a number of shortcomings. In the preface it is stated that the tables "were collected from many sources, to which due credit is given." I noted, however, a number of omissions and one error in the acknowledgments. No credit, for example, is given to W. J. Dixon's article in *Biometrics* (1953) as the source of the table of critical values for testing outliers.

In checking some of the tables in this handbook against other published tables, I found a number of nontrivial errors. These will be listed in the errata section of the journal *Mathematics of Computation*. Three of the errors in the t table could have been avoided if the latest edition of *Statistical Tables for Biological, Agricultural and Medical Research* by Fisher and Yates had been consulted instead of the first (1938) edition. In the student edition the first few lines of the "general linear model" appear at the bottom of page 20, but the rest of this 21-page section was omitted. The introduction to the table of binomial coefficients tells how to obtain values missing from the table, but there is no remedy for the omission of a whole page from this table. The table gives $({}_nC_m)$ for $n \leq 50$, with m covered only for $m \leq 11$, whereas the source table covers $m \leq 25$ and is thus complete.

In the table of critical values of Spearman's rank correlation coefficient, r_s, there is an unexpected lack of monotonicity in the column headed $\gamma = .01$. I found that this is due to the fact that most of the table is based on approximations, but no statement to this effect is given.

One thing lacking in the book is a bibliography of related tables to assist the reader who sometimes needs more extensive tables than those given here. The index is adequate except for being set in unusually small type.

These two books will be useful if the prospective user gets hold of the right edition and is aware of its shortcomings.

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Crystallography: Exploring Polytypism

Polymorphism and Polytypism in Crystals (Wiley, New York, 1966. 361 pp., illus. $12.75), by Ajit Ram Verma and P. Krishna, is the first book in Wiley's Monographs in Crystallography series, edited by Martin J. Buerger.

Polymorphism is the crystallization of the same chemical substance in more than one structure. Polytypism is a special case of polymorphism involving "the ability of a substance to crystallize into a number of different modifications, in all of which two dimensions of the unit cell are the same while the third is a variable integral multiple of a common unit." One would judge from the title of Verma and Krishna's book that an equally thorough treatment is afforded both subjects. However, polymorphism is treated "more to facilitate a fuller understanding of polytypism" and is discussed in two chapters (phase and structural aspects), whereas the more specialized topic occupies over 80 percent of the text. The authors discuss polytypism from its beginnings as a crystallographic curiosity in 1915 to its current recognition as a widespread phenomenon bearing on the fundamentals of crystal growth. The coverage includes a description of polytypic structures (especially SiC and CdI_2), polytype structure determination, dislocations and spiral growth, theories of polytypism, and recent observations. In weighing collected experimental data against the various postulated mechanisms, the authors dwell at length upon Frank's nonthermodynamic, screw-dislocation theory and Jagodzinski's thermodynamic, layer-transposition mechanism. Neither of these best-available theories, however, is completely satisfactory, and the dilemma of polytypism persists: what is the ordering mechanism in materials such as SiC (47 modifications; unit cells up to 594 layers, $\sim$ 1500 Å) and CdI_2 (64 structures)?

There are a number of typographic and other errors and contradictions. The more important ones include: page 25, b.c.c.'s and f.c.c.'s are interchanged in the discussion on Fe (compare page 11); pages 81 and 93 are contradictory with respect to the natural occurrence of SiC (it *is* a mineral); pages 81 and 92 differ as to who first obtained SiC; entry 42 in Table 3, page 108, should be 123R;

page 121, a two-layer orthorhombic mica (lepidolite) *has* been reported (Christie, 1961); and use of the notation $hk \cdot \ell$ is inconsistent, as is the manner of designating referenced authors.

These faults, however, do not measurably detract from the value of the book. The authors have assembled a profusion of experimental and theoretical data, formerly strewn throughout the literature, into a well-organized, readable volume, and this liberally referenced first text on polytypism is a timely, welcome addition to the crystallographic literature.

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Analogues for Tumor Cells

G. F. Gause's **Microbial Models of Cancer Cells** (Saunders, Philadelphia, 1966. 109 pp., illus. $4.50) is the first of a series of monographs edited by A. Neuberger and E. L. Tatum to be published under the collective title of Frontiers of Biology. The aim of the series is "to present coherent and up-to-date views of the fundamental concepts which dominate modern biology." The editors hope to accomplish this objective by using authors who have made significant contributions to advances in various areas of biology.

This monograph has as its purpose the stimulation of interest in microbial biochemical systems as models of cancer cells. The author says that neoplastic disease is "basically a 'somatic mutation'" and that "'cancer DNA' is basically the 'evil genius' of the cancer cell." He believes that the most significant change in cancer cells which finds its mutational counterpart in bacteria is that of impaired respiration (anaerobic respiration). This is brought about in both microorganisms and tumor cells by deficiencies in cellular regulatory mechanisms caused by disturbances in the genetic DNA. With this concept as a basis, various respiratory-deficient mutants of yeast, fungi, bacteria, and protozoa are discussed, and similarities between the biochemical and enzymatic causes of these deficiencies and those of most tumor cells are compared. There are some comparisons of other bacterial mutant abnormalities with similar ones in tumor cells, but these are treated superficially. These include differences in cell wall amino acid composition, changes in cell wall surface properties, DNA-base composition distortions, and similarities in the action of different specific protein, DNA, and RNA inhibitors.

Finally the author discusses a "new" approach to the possibility of obtaining antimetabolites of tumor cells. This is founded on the hypotheses (i) that it is possible to produce mutations in microorganisms which give biochemical alterations similar to, but not identical with, corresponding biochemical alterations of tumor cells, and (ii) that these metabolites for some systems show antimetabolite properties when tested in similar biochemical systems of another species. In view of these concepts, Gause believes that components of some mutated microbial biochemical systems may occasionally act as antimetabolites for similar biochemical systems of cancer cells.

This is not a new approach to this problem, and it has been attempted for many years without much success. The difficulty has been that the organism with cancer is composed of normal cells as well as tumor cells, and effective analogues have always been almost as toxic for the normal as for tumor cells. The monograph is a fair review of the phenomenon of impaired respiration in biological systems and related biochemical changes; and it gives evidence that microbial mutants can be advantageous in the study of this phenomenon in tumor cells. Outside of this, however, it fails to make a case for the value of microbial models of cancer cells.

There is a definite need for monographs of this type, and the book is well written and easy to read. However, the treatment of the subject of this monograph falls far short of the editors' aims and ambitions for the series. One hopes that future publications in the series will develop their particular "Frontiers" in more breadth.

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Contributions to an Amorphous Field

The sociology of science, once an esoteric if not an eccentric hobby, is now an important and rapidly expanding field. As yet there are no accepted disciplinary boundaries and no journal; and although there is a variety of persons interested in the subject, they do not yet constitute an organized group identified with the field. Thus in **Science and Society** (Rand McNally, Chicago, 1965. 625 pp., illus. $8.95) Norman Kaplan, a sociologist, has done a great service, not only by gathering and reprinting this collection of recent articles, but by giving some organization to a rather amorphous field.

The book contains 39 selections, of which all but seven have appeared since 1960, on various aspects of the interrelations between science and society. The articles are arranged in six sections, each with an introductory essay by Kaplan. The first section contains three articles on the problems and concepts of the study of science in society and three giving historical background to present problems of scientific organization. The second section focuses on the behavior and attitudes of scientists and on the changing position of science in the world today.

The next section concerns the problems of laboratory organization and administration, and is followed by several analyses of the national science establishments of the United States, Russia, and western Europe. The succeeding section deals with the relatively new field of science policy; that is, the problem of planning for the development of science as a part of national policy. The last and largest section, Prologue to the Future, contains 10 articles dealing with foreseeable problems, such as those posed by the necessity for international cooperation and the effects of big science on the internal characteristics and direction of science itself.

The selections represent a fair cross-section of our current knowledge of the interrelationship between science and society. The varied background of the authors is a reflection of the complexity of the subject, for although a majority were trained as physical or natural scientists, almost every field of the social sciences is represented as well. A good bibliography and a thorough index add to the utility of this excellent volume.

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