ences and, of these, more than 200 were published in the period 1930–55.

The subjects covered in the six chapters include transpiration and cuticle structure, excretion and osmoregulation, gain of water, and water and body temperature. Despite the limitation suggested by the title, material on aquatic insects is also discussed. Edney's treatment of these subjects is concise and clear, and his criticisms of methods and conclusions—including some of his own—are illuminating. Transpiration, for example, has turned out to be a far more complex process than it was, until recently, believed to be. The many questions which Edney raises should stimulate new and better work in the field.

A search for factual errors in those aspects of the subject with which the reviewer is personally familiar has yielded only one sentence which might be questioned. On page 71 it is stated, "The evidence so far considered shows that in most eggs which absorb water this is restricted to a given period of development—it may be before diapause as in *Melanoplus,* or after, as in *Austroicetes.*" This statement holds for *Melanoplus bivittatus,* as Salt's work has shown, but is not true for *Melanoplus differentialis,* where water is taken up by the eggs both before and after diapause. The fact that two species of the same genus of grasshoppers behave so differently in this respect illustrates both the variety which may be encountered in closely related organisms and the risk of making generalizations even for a genus. Since there are more than 150 species of *Melanoplus* in North America, a considerable number of surprises, no doubt, still await those who investigate the water relations of their eggs.

Edney's compact and well-organized volume is a valuable addition to the series of monographs presently being published by the Cambridge University Press. All who are concerned with the important part played by water in biological processes will be interested in this book.

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Nonparametric Statistics for the Behavioral Sciences. Sidney Siegel. McGraw-Hill, New York, 1956. 312 pp. $6.50.

Prior to the publication of *Nonparametric Statistics for the Behavioral Sciences,* isolated descriptions of nonparametric statistical tests and the necessary accompanying tables were inconveniently scattered throughout a highly varied literature. Sidney Siegel has performed a great service for behavioral scientists by cataloging, in a single volume, most of the available nonparametric procedures, along with tables of critical values. As a reference work, this book is not only convenient but almost indispensable. As an elementary textbook, it combines simplicity and systematic organization with many instructive illustrations, but there is, intentionally, very little presentation of the rationale and derivation of the techniques.

The book is organized around experimental designs; this makes it possible for a research worker to locate an appropriate procedure without knowing the associated significance tests by name. Each technique is described in terms of function, method, and, when relevant information is available, power and power-efficiency. Examples of each method follow a uniform format: null hypothesis, statistical test, significance level, sampling distribution, rejection region, and decision. Instead of producing annoying redundancies, this consistent treatment serves to clarify distinctive properties of the various tests and tends to pinpoint the differential advantages of alternative procedures.

The book also contains a section on measurement, in which the author takes a firm but polemical stand on scaling requirements. He makes a puristic but somewhat overstated case for the widespread application of nonparametric statistics by dismissing interval scales as rare phenomena in the behavioral sciences and then forbidding, for ordinal data, the operations of arithmetic necessary for computing means and standard deviations. However, even though ordinal scales are not completely isomorphic with the real number system, they do reflect certain numerical characteristics, and the sum of a random sample of ordinal numbers possesses statistical properties upon which significance tests may be based. Interpretations of arithmetic operations performed upon noninterval scales are by no means trivial, as pointed out by Lord in his discussion of nominal numbers and Chebyshëv's inequality [F. M. Lord, *Am. Psychologist* **8**, 750 (1953)].

Most nonparametric tests require only ranking information, and some are applicable even to nominal classes. One strong justification that is offered for their use in the social sciences is the difficulty experienced in meeting, for behavioral data, the interval scaling requirements attributed to parametric statistics. However, this issue is complicated by the problem of dimensionality in measurement, which is not mentioned in the present volume. Some of the nonparametric techniques that require ordinal data are illustrated with the California F Scale of Authoritarianism, which is a set of heterogeneous, multidimensional attitude statements. In a multidimensional domain such as authoritarianism, even unique ordinal properties are questionable, and, unfortunately, practical solutions for dimensionality are available only for interval numbers. However, nonparametric statistics are also recommended because of their distribution-free character, ease of computation, and the generality that is obtained by not making numerous and stringent assumptions about parameters. Because of these important properties, nonparametric techniques are widely applicable, and the present volume constitutes an excellent, nontechnical handbook for their use.

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Advances in Cancer Research. vol. 4. Jesse P. Greenstein and Alexander Haddow, Eds. Academic Press, New York, 1956. 416 pp. Illus. $10.

The fourth volume of *Advances in Cancer Research* continues to maintain the high scholarship, completeness, and critical evaluation of the preceding reviews. Three of the eight papers deal with chemotherapy. The first chapter, by Sidney Farber and his associates, on "Advances in chemotherapy of cancer in man," is a remarkably up-to-date analysis which, with Stock's review in volume 2, forms a rather complete summary of the whole of this active area of current research on cancer. Galton's presentation, on "The use of myleran and similar agents in chronic leukemias," not only meets the requirements of the title but contains a discussion of clinical assessment, by a mature investigator, that is worthy of consideration by the younger clinicians now entering this field. Goldin, in a review entitled "The employment of methods of inhibition analysis in the normal and tumor-bearing mammalian organism," effectively demonstrates the valuable additional data that can be derived from carefully designed dose-response laboratory studies in which the drug, the host, and the tumor are considered as an interrelated system.

The very selective review on "Some recent work on tumor immunity," by Gorer, is a reflection of the revival of interest in this approach to cancer. The author is very helpful in orienting the reader to the relevant aspects of modern immunology, but this specialty has acquired a language of its own which will be a source of ever-increasing despair to the general biologist.

Grobstein's consideration of "Inductive tissue interaction in development" is an engrossing account of the recent

work on differentiation. The author is to be congratulated on limiting his mention of cancer to some two dozen lines and then proceeding to his topic without straining analogies.

Haven and Bloor attempt to present much of the available information on "Lipids in cancer"—a rich diet in which more evaluative predigestion would have been useful. The most intriguing work reported is that on the beneficial effects of including tumor tissue (now further localized to the phospholipid portion of such tissue) in the diet of rats that bear tumors.

Under the title "The relation between carcinogenic activity and the physical and chemical properties of angular benzacridines," Lacassagne and his group make available, in English, their complex theoretical analysis of the *K* region in the molecular structure of carcinogens. The search for biochemorphologic features at the electron level is undoubtedly worth while but, alas, beyond my capacities to review.

Mühlbock, in the last paper, on "The hormonal genesis of mammary cancer," presents this old topic in a somewhat different and informative fashion. Of particular interest is the attempted and reasonable reconciliation of the hormonal aspects of mammary tumors in mice and in the human female.

The editors, Jesse P. Greenstein and Alexander Haddow, and the publisher are to be congratulated for their valuable contributions to the cancer literature. The value of the reviews would be increased by including the titles of the references. If these were numbered and referred to by number in the text, most of the additional space would be compensated for, and the distraction of having too many parenthetical names and dates in the text would be obviated.

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Separation and Purification. vol. III, pt. 1, of *Technique of Organic Chemistry.* Arnold Weissberger, Ed. Interscience, New York, ed. 2, 1956. 873 pp. Illus. $17.50.

The former volume III in this admirable series possessed no title and treated of a diverse group of topics. In the present revision, the volume has been divided into two parts: part I, *Separation and Purification,* reviewed here, and part II, *Laboratory Engineering,* to be reviewed later. Into the latter portion have gone those topics that are concerned primarily with reactants and the reaction itself: "Selection of materials for the construction of equipment" (new); "Heating and cooling" (revised); "Grinding, screening, and classifying" (new); "Mixing" (little changed); and "Operations with gases" (new). It may be added parenthetically that it is the "laboratory" aspects of the subject which are stressed, rather than the "engineering" approach.

Into part I have gone those topics that are concerned with the isolation, separation, purification, and identification of mixtures of products and of other compounds. Most of the sections of part I have been revised, and expanded also, so that, while the former single volume contained only 671 pages, the two parts now total 1284 pages. It seems significant that each chapter has been expanded, if only by four pages, so that the reader may well ask why the authors invariably add newer material to the older rather than allowing natural selection to replace the outmoded by the modern.

The chapter headings of part I are as follows: "Diffusion methods," including "Thermal diffusion of organic liquids" (new), "Barrier separations" (new), "Dialysis and electrodialysis" (little changed), and "Zone electrophoresis" (new); "Laboratory extraction and countercurrent distribution" (revised), including a section on "Liquid-liquid extraction for increased quantities" (new); "Crystallization and recrystallization" (revised); "Centrifuging" (revised); "Filtration" (revised); and "Solvent removal, evaporation and drying" (revised).

The major revisions in the present volume, when compared with the corresponding portion of the previous edition, reflect rather accurately the areas of greatest recent activity. This is particularly apparent in the first chapter, which contains three completely new sections, not found in the earlier edition. The techniques of thermal diffusion, barrier separations (molecular sieves), and zone (paper) electrophoresis have become prominent only in very recent years, and a majority of the references in these three sections are to the literature since 1950, the date of the previous edition of this work.

In the chapters that have been revised from the first edition, the more active areas also have been greatly enlarged. Thus, R. S. Tipson's "Crystallization and recrystallization" now contains an excellent 15-page treatment of molecular compounds and inclusion complexes, while D. and L. C. Craigs' "Laboratory extraction and countercurrent distribution" devotes 20 pages to their highly successful automatic countercurrent distribution apparatus and 12 pages (with seven tables) to the selection of suitable solvent systems. A similar welcome expansion has been accorded the section on freeze-drying in the late Geoffrey Broughton's "Solvent removal . . ." chapter.

There are, of course, omissions. I would have welcomed a discussion of the commercially available zeolite molecular sieves in the "Barrier separation" section, a treatment of three-phase countercurrent distribution in the extraction chapter, and an application of freeze-drying techniques to nonaqueous systems. For those who are unfamiliar with the "Technique of organic chemistry" series, it may be worth while to note that additional separation and isolation techniques are treated in other volumes; for example, "Distillation" (vol. IV), "Adsorption and chromatography" (vol. V), "The ultracentrifuge" (vol. I, part I), and "Electrophoresis" (vol. I, part II).

However, the observations which are applicable to the series in general may, with conviction, be applied to the present volume. It is well written, it is profusely illustrated, and it is thorough in its treatment, maintaining a nice balance of theoretical and practical aspects. It must indeed rank as a standard reference work.

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High Energy Accelerators. vol. 1 of *CERN Symposium on High Energy Accelerators and Pion Physics, Proceedings.* Geneva, 11–23 June 1956. European Organization for Nuclear Research, Geneva, 1956. 567 pp. Illus. F. 40.

This book is the first volume of a two-volume report on the European Organization for Nuclear Research (CERN) Symposium. It covers the material presented in the first week of the symposium.

After an introduction by J. B. Adams of CERN, the first section concerns new ideas for high-energy accelerators. In this section are papers concerning fixed-frequency alternating-gradient accelerators, fixed-frequency cyclotrons, and ideas about colliding beam accelerators. Here, also, are some Russian ideas about completely new possible methods for acceleration of particles, with the aid of plasmas, and so forth.

The second section is about problems connected with the transition energy in alternating-gradient accelerators. Here again, the Russian workers have a novel idea for circumventing this problem.

The third session has to do with the problems of getting particles out of machines. In this section there are papers concerning some of the existing synchrotrons and synchrocyclotrons as well as proposals for new machines. The following seven sections cover, in turn, linear accelerators and injection problems, non-