tion, structure proof, synthesis, resolution, methods of racemization, infrared spectra of the individual amino acids are treated in 21 different chapters of volume 3. Similarly, 11 chapters are concerned with the preparation of amino acids not known to be bound in proteins of mammalian tissue. The latter include aliphatic straight-chain monoaminomonocarboxylic, aminopolycarboxylic, diaminomonocarboxylic, diaminodicarboxylic, imino, α-alkyl amino, (β)-branched amino, α-amino-ω-hydroxy, sulfur-containing amino, ring-substituted α-amino, and N-alkylated amino acids. These chapters provide an exhaustive and authoritative survey of the several aspects of the amino acids mentioned.

In this review I have attempted to indicate briefly something of the subject matter and the thoroughness of its presentation. The more extensive and exhaustive the coverage of an important subject, the more likely is a short review to appear superficial and even trivial. However this may be in the present instance, it seems clear that these volumes will occupy an important place as a reference source for many specialists and for biochemists and biologists in general. The authors state in the preface that they "have been entranced by the spectacle of the many and diverse phenomena" associated with the behavior, properties, and biological duties performed by the α-amino acids. Biochemists and many others will benefit immeasurably because the authors were not only entranced but were highly discerning, skillful, and thorough in recording their extensive observations.

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The Physico-chemical Constants of Binary Systems in Concentrated Solutions. vol. 3, *Systems with Metallic Compounds.* xiii + 1322 pp. $36. vol. 4, *Systems with Inorganic + Compounds* (excepting metallic derivations). xi + 1332 pp. $39. Jean Timmermans. Interscience, New York, 1960.

With the appearance of volumes 3 and 4, this tabulation of the physical constants of concentrated solutions of two substances is complete. Volumes 1 and 2, which cover systems of two organic compounds, were reviewed in *Science* [**131**, 97 (1960)]. Volume 3 covers systems of two inorganic compounds, and volume 4 contains data on systems of one organic plus one inorganic compound, the references to the literature, and a 230-page formula index for the whole set.

The survey is noncritical and appears to cover the literature up to 1956. The bibliography is easy to use once the system of interest has been located in the tables. Finding a system is no easy task, however, for the only index provided is a formula index, and it is hopelessly inadequate. For example, under C_2H_6O appears the entry "ethyl alcohol" followed simply by about 200 page numbers that give no clue as to the nature of the second component. Under such circumstances the reader is practically forced to a page-by-page search through one or more of the thousand-odd page volumes to find specific data, if indeed they are present at all. Although the over-all organization ameliorates this situation somewhat, by no means do the volumes comprise a handy reference work.

While there is no doubt that this set will prove useful to specialists concerned with the properties of binary systems, poor indexing and the failure to evaluate discordant sets of data greatly diminish the value of the work for general reference purposes.

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Radiation Protection and Recovery. Alexander Hollaender, Ed. Pergamon, New York, 1960. v + 392 pp. Illus. $12.50.

Many efforts have been made to develop effective chemical and physiological-biological means to counteract the damaging effects of ionizing radiations. Often the situation appeared confused, the possibilities limited, practical applications doubtful. However, persistent work in the field has changed this picture. Today the multiplicity of approaches appears, in retrospect, more uniform than anticipated, and in the proper arrangement of the scientific facts an impressive inventory of the present state of the art can be presented. This is exactly what Hollaender does. The book's 12 chapters cover the protection of macromolecules and different biological systems, the experimental treatment of acute whole-body radiation injury in mammals, recovery phenomena, and photo-reactivation. The stimulation given to biology and medicine—for example, Lorenz's classical bone marrow experiment and its implications to tissue transplantation techniques, to immunological problems and related phenomena—becomes obvious.

Historical remarks, cleverly inserted, vivify the presentation; their value might have been increased by more detailed consultation of the reports of the Atomic Energy Commission and other governmental agencies—for example the protective action of cysteine on the synthesis of desoxyribonucleic acid in the intestinal mucosa of x-irradiated rats was reported in 1952, long before rediscovery of the effect in 1958. But perhaps it is such facts that make reading the book so interesting. The volume stimulates and it challenges. The pioneer in the field starts to revise old and to look for new ideas and interpretations; the newcomer accepts gratefully the tremendous background information presented by the different contributions and so well selected by the editor.

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Handbook of Microbiology. Morris B. Jacobs and Maurice J. Gerstein. Van Nostrand, Princeton, N.J., 1960. x + 322 pp. Illus. $8.50.

Compiled from contemporary literature and arranged in 38 alphabetically organized, so-called "tables," this book provides data for professional work in microbiology. Although it attempts a broad coverage of bacteriology, there is little on viruses, and protozoology per se is omitted. The 150-page, first table, which describes 160 species of bacteria, leaves out several important species—for example, *Salmonella paratyphi* and *Haemophilus ducreyi*—and includes a few of slight importance—for example, *Spirillum volutans* and *Pseudomonas ovalis.* Synonyms should have been included, and space could have been saved by a different arrangement: more than 30 lines are used for the fermentation reactions of *Acetobacter aceti.*

The classes, orders, suborders, families, and genera of bacteria, rickettsia, and viruses according to *Bergey's Manual* (1957) are listed, but I see no need for including Krassilnikov's classification (1949). Table 6 allots 21

pages to 260 antibiotics. Mitomycin gets 64 lines, bacitracin a third as much, and there are 10 lines for tetracycline. Table 15 gives the phenol coefficients against *Salmonella typhosa* and *Staphylococcus aureus* for nearly 400 substances. There are brief descriptions of 130 culture mediums and of 76 microbiological reagents and tests, and 12 pages are devoted to 105 stains. There are also temperature conversion tables, tables of most probable numbers, and a listing of *Shigellae* and *Salmonellae* serotypes. Four tabulations outline bacterial, viral, and rickettsial diseases. Nine small tables deal with such subjects as the differentiation of *Neisseria* species. Toxins, antitoxins, and antisera and toxoids and vaccines are characterized in Tables 20a, b, and c. The last table diagrammatically illustrates four methods for preparing "test dilutions," a rather elementary note on which to end. The lack of a general index makes the book less useful. The volume contains surprisingly few errors for a first edition and is a useful book, but it is hardly a "handbook," in the old German sense.

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Physics and Archeology. M. J. Aitken. Interscience, New York, 1961. x + 181 pp. Illus. $6.

Archeologists are unusually fortunate in being able to capitalize on the researches of scholars in other disciplines, and this book ably summarizes some of the ways in which the techniques of physics can be applied to the solution of archeological problems. The author deals primarily with two fundamental facets of research: the finding of archeological remains and the dating of such finds. A final chapter is concerned with the physical and chemical analysis of specimens.

The finding of sites utilizes aerial photography (mentioned briefly) and instruments that recognize variations in remanent magnetism and in electrical resistivity of soils. These instruments (including the proton magnetometer) are particularly useful for finding individual features within a site, such as filled ditches or graves, buried floors, and ancient pottery kilns. Although such scientific detection methods have been proved effective in many cases, they are still in their exploratory phases, and only a minority of archeologists have actually made use of them. This is partly because many archeologists have not yet acquired the instruments or learned how to use them and partly because problems in application sometimes defeat the techniques. As the author points out, buried horseshoes or natural pockets of moisture in the ground can register as strongly as the sought-for archeological features. However, these techniques will no doubt be more widely used in the future because they can certainly reduce the amount of expensive hit-or-miss digging now necessary in archeological sampling.

One chapter is devoted to the now well-established method of radiocarbon dating, and another to the somewhat less satisfactory techniques of magnetic dating; several other techniques for dating are mentioned briefly. The discussions are admirably organized, lucid, and informative; the author has successfully presented the facts without requiring the reader to have a specialist's knowledge to understand them.

One interesting example, in the final chapter (on analysis), is the use of chemical dating in analyzing Roman coins of the first two centuries A.D. These coins show a steadily decreasing zinc content, apparently due to loss of zinc when old coins were melted down and reused to make new ones. This example typifies the search for dating techniques—any measurable regularity through time is of potential value to archeology, for time is the archeologist's stock in trade.

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Scientific and Technical Societies of the United States and Canada. NAS–NRC Publ. 900. Compiled by John H. Gribbin *et al.* National Academy of Sciences–National Research Council, Washington, D.C., ed. 7, 1961. 512 pp. $9.

An alphabetically arranged list covering 1836 professional and selected amateur societies in scientific and technical fields: Part 1 lists 1597 in the United States; part 2, 239 in Canada. Information provided about each society is concerned with its officers, history, purpose, membership, professional activities, and the like. Periodicals published by the societies as well as the names of their medals, prizes, awards, and lectures and trusts are indexed.

Living Fishes of the World. Earl S. Herald. Doubleday, New York, 1961. 304 pp. Illus. $12.50.

This handsome volume reflects the broad background of a professional ichthyologist who has become intimately acquainted with many of the species about which he writes through his experience as director of Steinhart Aquarium and through field work in areas richly endowed with fish. To those who have not yet joined the growing ranks of skin divers, particularly along tropical shores, the kaleidoscopic natural colors in the 145 magnificent color plates may seem incredible. The beauty of the plates is greatly enhanced by artistic choice of backgrounds and by numerous interesting poses, closeups, and habitat shots.

After a brief introduction, Herald's discussion of fishes, which follows along systematic lines (essentially Regan's classification), ranges from the primitive jawless hagfishes and lampreys through the sharks and their allies to the so-called bony fishes (which include the majority of living species, approximately 15,000 to 20,000 kinds). He stresses groups less often treated in popular aquarium books. Characteristics, habits, range, and life history information are covered, and they yield such interesting facts as the use of "sonar" by African elephant fishes, the practice of intestinal respiration by Asiatic loaches, the maturing as functional females of certain sea basses that later reverse their sex to become functional males, and the "cleaning" of ectoparasites from large fishes, chiefly by small wrasses (illustrated in plates 27 and 98). Plates 80 and 83 show the striking sex dichromatism that occurs in the male and female of the same species of parrotfish (page 204).

Professional ichthyologists (for whom the volume was not written) may be mildly upset by the use of the terms "ventral" and "tail" fins, especially since many other technical terms are used. Some misstatements are inevitable in a work of this scope, and misspellings have crept in, but such minor discrepancies can be easily corrected in a re-