In the opening paper it is noted that Australia is the world's driest continent (it has the lowest runoff per unit area). However, water does not yet limit Australia's growth. In a section entitled The National Outlook, the present and future water needs for hydroelectric power, irrigation, and municipal and industrial uses are considered.

The second series of papers, entitled Basic Data, describe records and measurements of precipitation, evaporation, surface water, and underground water in Australia. This section also includes three papers on analysis and processing of hydrological data.

Eleven papers in the general category of "water balance" range from predicting flood flows to discussion of problems of irrigated areas. Socioeconomic problems of water resource use and management are discussed in four papers, and a final four deal with water investigations and research. These papers stress a need for increased efforts in data collection, research, and long-range planning—points that are mentioned many times in separate papers throughout the volume.

This compilation should be of value to those involved with water resource use, administration, research, or planning in Australia. Because it is directed specifically at Australian conditions and problems, which of course was its purpose, the total interested readership may be limited. Those seeking information on new technology will likely be disappointed.

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Techniques and Interpretations

Spectroscopic Properties of Rare Earths. Brian G. Wybourne. Interscience (Wiley), New York, 1965. x + 236 pp. Illus. $10.50.

Rare earths, in the spectroscopist's mind, are associated with large quantities of information and thick volumes containing numbers. It is, therefore, a pleasant surprise to see a new book entitled *Spectroscopic Properties of Rare Earths* which, despite its title, is quite small in size. The book contains, however, invaluable information. The second chapter is a very clear and useful presentation of Racah techniques, which are so easily displayed that they can be used immediately, even by spectroscopists who are not so familiar with the difficult chapters of the theory of complex spectra. In fact, the author, in chapters 3, 4, and 5, applies these techniques, very systematically, to three major problems in atomic spectroscopy: intensities, Zeeman-effect, and interaction with the nucleus.

In addition to a general treatment of each problem, which includes the evaluation of the matrix elements of all the involved operators in the L-S, J_1-j, and J_1-l coupling schemes, the author gives several particular examples that are of utmost importance and interest.

A distinguished feature of the book is the extensive list of references (487) which brings all the subjects discussed up to date. The author was scrupulous in giving credit to the various scientists. He has, however, incorporated quite a few of his own ideas into the text. One example is the application of J_1-j coupling calculations to the $f^N s$ type configuration, as in §5-5 for Pm II, thereby disproving the commonly stated argument that "since s-electrons are penetrating electrons, the contribution of the f^N core to the hyperfine structure may be ignored."

Considerable space is given to discussion of the spectra of the rare earths in crystals. One of the interesting effects in these spectra is the nephelauxetic effect, which could not be checked by the time the book was written. Since its publication, however, new data have been found in Pr^{3+} free ion, which include all the energy levels of the $4f^2$ configuration (except $^1S_0$). The analysis was done by Sugar, who also calculated the parameters of this configuration. He showed that, indeed, the free-ion parameters are larger than those obtained from crystal spectra.

The book is, unfortunately, not free from misprints. I would like to point out the misprint on page 102 where $g = 1.05116$ should read $g = 1.50116$.

On the whole, with its general treatment of the spectroscopic properties of the rare earths as well as the fine and revealing specific examples it contains, the book should be very useful for the experimental spectroscopists who are interested in the theoretical interpretation of their results.

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Biological Research

Instrumental Methods of Experimental Biology. David W. Newman, Ed. Macmillan, New York, 1964. xiv + 560 pp. Illus. $15.

The editor states in the preface that this book is suitable for use as a single textbook for courses on methods, techniques, and instrumentation. The dust jacket indicates that it is "a presentation of the fundamental theory and techniques for biological instrumentation." Although the book presents some useful material, it is not sufficiently organized or balanced for use as a textbook. The 15 chapters, contributed by 17 authors, are varied in length, style, level, detail, and adequacy of references. The introduction identifies physical methods with instrumental methods and thereby includes chromatographic separation methods with instrumental methods. In previous publications these methods have generally been included under physical methods, and those methods in which physical principles are utilized to "refine the senses, measure and/or control" have been included in instrumental methods.

The first five chapters present paper, thin-layer, column, and gas chromatography and zone electrophoresis with a minimum of theory. Practical procedures are emphasized, some commercial equipment is described, and detailed procedures are outlined for specific separations. The instrumentation involved is neither explained nor evaluated; conspicuous omissions include column and gas chromatographic methods for amino acids, gel filtration, and immunodiffusion technques.

Freeze-drying techniques are described in practical terms, with some advice on the use of commercial equipment. I was pleased to note that "lyophilization" was described as an unnecessary word.

In the well-illustrated chapter on ultracentrifugation the fundamentals are presented in a lucid text which precedes a detailed mathematical presentation of theory (in fine print). Practical illustrations and extensive references make these 87 pages by Rodes Trautman particularly valuable. The short chapter on weighing sets forth some useful points on the tolerances of the standard classes of weights but provides no treatment of the submicrogram methods. The chapter on *p*H gives only the elementary buffer equa-