the vegetation, and above the vegetation; (9) soil moisture at various depths underground; (10) evaporation from different kinds of surfaces; (11) barometric pressures.

Since such complete data are not usually available, it becomes necessary to use all the meteorological information possible and to supplement it by special records for ecological purposes. It would be a great saving in time and energy if these data could be automatically recorded on multiple-recording drums so that the values of each factor could be readily observed in simultaneous relation to others. In addition to its labor-saving value, it should also lead to clearer recognition of correlations and divergencies among the various factors that might help explain the dynamics of ecology.

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Book Reviews

Theory of Electrons. L. Rosenfeld. Amsterdam: North-Holland Pub.; New York: Interscience, 1951. 119 pp. $2.25.

This book is a revised and extended version of what must have been a most stimulating seminar for advanced graduate students of physics. It presents the foundations of the classical atomistic theory of the electric, magnetic, and optical properties of matter in a clear, careful way, in a brief 119 pages, by assuming that the reader has a considerable background in physics and mathematics, including analytical mechanics, statistical mechanics, and Maxwell's theory of the electromagnetic field. A summary of tensor notation is provided in an appendix.

The first chapter gives a brief historical review of the discoveries that led to the modern picture of the electrical constitution of atoms. The second is devoted to an unusually careful derivation of Maxwell's equations in matter by averaging over the charge and current distributions of the constituent atoms, electric quadrupole terms being retained. The third chapter deals with the dynamical properties of systems of charge, including Larmor's theorem and the gyromagnetic effects. The fourth chapter, on the magnetic properties of matter, is necessarily rather sketchy (even though the limitation to classical ideas is somewhat relaxed), but it forms a clear and attractive introduction to the field.

The last two chapters take up half of the book and form its most characteristic and valuable part. A brief discussion of the polarization of an atomic system by a constant field leads into a presentation of the elementary theory of dispersion. The remaining pages are devoted to clarification and refinement of the concepts thus introduced. Radiation damping is discussed, and its effect on the extinction coefficient of light scattered by a gas. This same contribution to the extinction coefficient is then derived from a quite different point of view, that of light scattering by a medium in which there are fluctuations in density. Ornstein and Zernike's theory of critical opalescence is presented. Finally, the book culminates in a rigorous theory of dispersion that takes account of both radiation damping and density fluctuations, and ties together the preceding material in a beautiful way.

This book is to be recommended, on both scientific and aesthetic grounds, to advanced students of physics and to those who teach them.

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Amino Acids and Proteins: Theory, Methods, Application. David M. Greenberg, Ed. Springfield, Ill.: Thomas, 1951. 950 pp. $15.00.

The editor of this monograph has had the assistance of 17 contributors who have prepared 11 of the 13 chapters. In a beautifully printed and well-illustrated, although uncomfortably heavy, volume the amino acids and proteins are described and discussed from many points of view. The first 4 chapters deal with the properties of amino acids, the analytical methods used for their determination, their preparation by synthetic methods, and their isolation from proteins. The chapters following are devoted to the classification, purification, and isolation of proteins, to determination of their molecular size, to their amphoteric properties, and to criteria for judgments regarding the purity of individual preparations. The final chapters discuss the chemical reactions of proteins, their nutritive properties, antibodies, the biochemical significance of proteins, and the metabolism of proteins and amino acids.

Emphasis is placed throughout on methods, but the contributors have interpreted their assignment in widely different ways. For example, the chapter on the synthesis of amino acids gives, by means of chemical equations, the reactions that have been used to prepare these substances, together with brief statements on the procedures and references to their origin. However, the reader can rarely tell whether the reaction described has mere historical interest today, or whether it is the procedure he would be well advised to employ if he were assigned the problem of preparing a small sample or a large stock of the substance. To assist him in his choice, there is little in-

formation on yields or purity of product, or upon the conditions essential for success.

On the other hand, Chapter V gives a good general discussion of methods for the preparation of proteins and ends with specific and detailed descriptions of procedures whereby some 20 representative proteins may be obtained, many of them in crystalline form. In a later chapter are complete directions for the use of the Tiselius apparatus in determining diffusion constants, and, in still another chapter, a full description of the use of this device to determine mobilities.

Perhaps the least satisfactory section of the book is that on the isolation of amino acids from protein hydrolysates. The methods are given only in outline, so that reference to the original literature is necessary if use is to be made of them, and, as in the chapter on synthesis, there is little to indicate which of the various methods mentioned is to be preferred.

It is stated on page 5 that the new nomenclature for the amino acids, in particular the small capital letter prefixes for configurational relationship of these substances, is to be used throughout the book. Nevertheless, beginning on page 6 and almost consistently thereafter, *large* capital letter prefixes are used. To be sure, a small capital letter prefix is to be found here and there, and on page 70 both small *and* large capitals occur. This is apt to prove confusing to students, who may well wonder which is correct.

The book is thus somewhat disappointing in spite of the excellence of many chapters and the great amount of accurate and useful information about proteins and amino acids. There is much that is newly presented in textbook form. A number of tables offer information that would be difficult to find elsewhere. The student who reads it will indeed have acquired a fairly broad view of the subject, but he may frequently have to check back to the original literature to be sure of details.

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Reviewed in Brief

The Growth of Physical Science. 2nd ed. Sir James Jeans. New York: Cambridge Univ. Press, 1951. 364 pp. $3.75.

The second edition of the posthumous work of the late Sir James Jeans, first published in 1947, has been brought up to date by correcting a number of misprints in dates and names as well as by including findings that had been overlooked by the author, who did not live to see his book in print. This edition, prepared by P. J. Grant, of the Cavendish Laboratory, can be highly recommended to teachers of physics and scientists in the neighboring fields who want to get an insight into the development of the physical sciences.

A brief outline of the physical sciences in antiquity is followed with a more detailed account of Greek mathematics, physics, philosophy, and astronomy. The sciences in Alexandria are discussed, followed by a short description of science in Islam and in Europe during the Dark Ages. This then leads to the most important chapters: science during the Renaissance and the period from 1600 to 1700, called by Jeans "the century of genius." The two centuries after Newton are treated briefly, and the book closes with a chapter on modern physics covering the theory of relativity, the electrical structure of matter, quantum theory, and some modern astronomy, as well as experimental development in various fields of physics, including nuclear physics.

The easy style and clarity of description will make this a welcome edition for both students and teachers.

Methods in Medical Research, Vol. 2. Julius H. Comroe, Jr., Ed. Chicago: Year Book Pub., 1950. 361 pp. $6.50.

This is the second in a series of volumes devoted to methods and techniques. The contents are grouped into three sections: "Methods of Study of Bacterial Viruses," "Pulmonary Function Tests," and "Assay of Hormone Secretions." Sixty contributors and reviewers are responsible for the material presented. The methods are clearly outlined and will be of unquestioned value to workers in the fields covered. The book is lithoprinted.

Methods in Medical Research, Vol. 3. Ralph W. Gerard, Ed. Chicago: Year Book Pub., 1950. 312 pp. $7.00.

In the third volume, the same careful selection of material and clarity of presentation are maintained. The volume is divided into four self-contained sections with the following titles: "Genetics of Microorganisms," "Assay of Neurohumors," "Selected Psychomotor Measurement Methods," and "Methods for Study of Peptide Structure." Fifty-two contributors and reviewers prepared the material. The book can be highly recommended.

Scientific Book Register

Vorlesungen über Differential- und Integralrechnung: Differentialrechnung auf dem Gebiete mehrerer Variablen, Vol. II. A. Ostrowski. Basel: Verlag Birkhäuser, 1951. 480 pp. Sw. fr. 67, bound.

Substances Naturelles de Synthèse: Préparations et Méthodes de Laboratoire, Vol. I. Leon Velluz, Ed. Paris: Masson et Cie, 1951. 141 pp. 1,200 fr.

Annual Review of Plant Physiology, Vol. 2. Daniel I. Arnon, Ed.; Leonard Machlis, Assoc. Ed. Stanford, Calif.: Annual Reviews, 1951. 361 pp. $6.00.

The Birds of Greenland, Part II. Finn Salomonsen; illus. by Gitz-Johansen. Copenhagen: Einar Munksgaard, 1951. Pp. 159–348, with 18 plates. $9.00.

Physik und Chemie des Zellkernes. Protoplasma-Monographien, Band 20. Petr F. Milovidov. Berlin: Naturwissenschaftlicher Verlag, 1949. 529 pp.

Scientific and Learned Societies of Great Britain. 57th ed. London: Allen & Unwin; New York: Macmillan, 1951. 227 pp. $5.25.