the reduction of the field equations to the familiar lumped circuit constants is derived. The remainder of the book is devoted to the problem of the propagation and guidance of electromagnetic waves, including the plane wave analysis in inhomogeneous media, wave guides, resonant cavities, and antennas.

In this textbook, Ramo and Whinnery have succeeded in combining the essential theoretical analysis with the practical viewpoint of engineering applications, so that the reader is led to a clear understanding of the present state of the electromagnetic art. The clarity of exposition and general readability of the text combine with a unity of concept and of presentation to make this an outstanding intermediate level textbook in electromagnetic theory.

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International Review of Cytology, Vol. II. G. H. Bourne and J. F. Danielli, Eds. Academic Press, New York, 1953. 245 pp. Illus. + plates. $11.

Cytology may be looked upon as the common meeting ground of cell morphology, cell physiology, biochemistry, embryology, and genetics—broadly speaking, cell biology. Interpreted in this way, the 14 papers included in the second volume of this annual review can properly belong in such a collection in spite of the wide variety of topics: cytochemistry, electron microscopy, active transport phenomena, growth and differentiation, nucleocytoplasmic relations, integration of enzyme activities, and the physiology of gustatory and olfactory epithelia. Of the 17 contributors eight are American, four English, two Belgian, one Dutch, one Irish, and one German, thus emphasizing the English-American contributions much as the first volume did. The marshaling together of such an assortment of papers is in keeping with the editors' avowed purpose of keeping the "scope as wide as possible" in the "publication of critical discussions of data published elsewhere, and of new theoretical work."

Inevitably the treatment in such a composite group is spotty and uneven. Some of the papers are little more than compendia; others are carefully organized and give critical evaluations and integrations of knowledge in their special areas. No particular orderly sequence of topics is apparent; for example, papers concerned primarily with histochemistry are scattered throughout the volume, interspersed with those dealing with bacteria, electron microscopy, and thermodynamics.

The most extensive review (76 pp. and 356 references), by Hewson Swift, describes and evaluates techniques of chemical analysis at the cellular level, dealing with quantitative aspects of nuclear nucleoproteins. The nature of the Feulgen nucleal reaction is discussed by M. A. Lessler, who concludes that it is the most reliable and specific test for DNA and that quantitative measurements can be made if the sources of error are properly controlled. J. Chayen's paper on ascorbic acid and its cellular localization compares the many methods and postulates the function of vitamin C in cell metabolism. W. L. Doyle's cautious evaluation of methods of microscopic histochemistry for the demonstration of alkaline phosphatase is the shortest paper in the collection (12 pp.; 51 references). Alkaline phosphatases of the nucleus are discussed by Chèvremont and Firket. A penetrating and critical analysis by David Glick of the quantitative approaches currently in use in histo- and cytochemistry overlaps and duplicates to some extent the other papers on histochemistry.

The physiological reviews include Ion Secretion in Plants by Sutcliffe, Multienzyme Sequences in Soluble Extracts, a masterly treatment by Henry Mahler of recent studies on the complex oxidative reactions within the cell, and Conway's treatment of the theory of the redox pump from the thermodynamic standpoint.

The remaining papers cover a wide range of subjects: tissue-culture studies by Gaillard, electron microscopy of tissue sections by Dalton, special cytology of gustatory and olfactory epithelia by Baradi and Bourne, bacterial cytology by Mudd and DeLamater, and grafting and regeneration experiments with *Acetabularia* by Hämmerling.

Included in the volume is a report of a conference of tissue-culture workers held at Cooperstown, N. Y., in 1950. Author and subject indexes are appended. Few typographical arrors are evident and the figures and plates are beautifully reproduced.

The volume should be extremely useful to cell biologists and indispensable to others who, although unable to search out and read all the original papers, require information on current developments in these special areas.

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Causality in Natural Science. Victor F. Lenzen. C. C. Thomas, Springfield, Ill., 1954. 121 pp. $3.

This small volume is a gratifying, unusually sane and complete account of the causality problem in modern science. Written by a philosopher of singular competence in the field of physics, its judgment can always be trusted to be mature in the eyes of scientists as well as philosophers. There is no attempt to present and defend a thesis: different views are impartially offered and discussed. Among the virtues of the book is emphasis upon modern phases of physical science, where causality is reputed to have become of doubtful status or even to have failed. To the reader who has previously been indoctrinated by popular and one-sided accounts, the last chapter, entitled "Causality and quanta," will be particularly helpful and illuminating.

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