are devoted to the problem of modulation and detection of light; papers by Series and by Bloom and Bell investigate the increasingly important topic of superposition of coherent quantum states for this purpose; Pershan and Bloembergen present the results of their work on KDP as a modulator, and Forrester writes about the photoelectric effect as a mixer and detector.

Communication systems operating at optical frequencies present all the old problems but with a new twist, for one can no longer ignore the quantum nature of the phenomena. Thus, three papers represent the beginnings of a quantum theory of communication. We will undoubtedly hear more of this work in succeeding conferences. Three survey papers should be mentioned: one by Low on optical spectra of paramagnetic solids, one by Pershan and Bloembergen on cross relaxation in masers, and one by Snitzer on optical dielectric waveguides. Each forms a good summary of an important topic. Several new quantum devices are considered in the papers by Mergerian and Markhan on the possibility of maser action using F centers; by Burstein, Langenberger, and Taylor on tunneling in superconductors; by Basov, Krokhin, and Prokharov on semiconductor masers; and by Lax on the not-so-new cyclotron resonance maser. This book is a necessity for anyone working in the general field of quantum electronics.

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## Research Résumé

**Hormones in Blood**. C. H. Gray and A. L. Bacharach, Eds. Academic Press, New York, 1961. xviii + 655 pp. Illus. $20.

This volume covers practically all known hormones, both steroid and nonsteroid, including insulin, thyroid-stimulating hormone and the iodine-containing hormones, the neurohypophyseal hormones, melanotropins, adrenocorticotropin, growth hormone, lactogenic hormone, the pituitary gonadotropins and human chorionic gonadotropin, the estrogens and androgens, progesterone, the corticosteroids, and the catecholamines. It was intended to be an up-to-date, informative, and critical survey of the various established techniques for the determination of hormonal content in the blood. It contains a most thorough account of these hormones, their chemical compositions, their physical and chemical properties, and their biosynthesis and of the methods for their determination in blood and plasma, as well as what is known about the levels in which they are present in the body in both normal and pathological states. Each chapter is written by an active investigator in the particular field, and in fulfilling all their intentions, the editors and their contributors succeeded admirably. The information I find most useful is the compilation, arranged in tabular form, of hormonal concentration in plasma as well as in endocrine organs. The discussions on the various chemical and biological assay procedures available for each hormone are exhaustive, and the volume is a valuable reference for biochemists and physiologists, as well as for anyone interested in any aspects of clinical investigation.

There are two points of discussion which I feel are raised by this volume. First, I found myself wondering, as I read through the book, if its title were not perhaps misleading. If we discuss growth hormone in the blood, for example, we must first establish that the hormone obtained from the blood is chemically identical with the hormone obtained from the pituitary gland. Nonsteroid hormones have not yet been isolated from the blood, and, in fact, there have been some indications that the circulating hormones and the hormones isolated from glandular extracts may not be the same. In dealing with these hormones, the distinction between the hormonal activity, which is detected in the blood and plasma, and the hormone molecule itself must be kept clear. Even with the steroid hormones, where the extracted hormone may be identical with the hormone in the plasma, the circulating hormones are not present in a free state but occur in plasma as conjugates or are bound to a component in the plasma protein; an example is the component called *transcortin*, which is known to combine specifically with cortisol in the human plasma. It would be possible, I feel, for a reader to receive the erroneous impression that the hormones described and discussed in the book are isolated from the blood rather than from the endocrine glands, as they in reality are.

A second question is that of chemical and physical assay versus biological assay. Although there are a number of investigators who hold the view that eventually physicochemical assay methods will replace the biological techniques in endocrine research, it is my opinion that it is still necessary to use biological procedures side by side with the physicochemical, however sensitive and specific the latter techniques may be, in order always to be sure that the hormone molecule retains its activity. Even immunoassay, which has raised great hopes in connection with the determination of protein and peptide hormones, has certain limitations; one should not be too optimistic about the possibility of their exclusive use, without verification by some bioassay data.

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## On Abridging Classics

**On Growth and Form.** Sir D'Arcy Wentworth Thompson. Abridged by John Tyler Bonner. Cambridge University Press, New York, 1961. xiv + 364 pp. Illus. $5.95.

This shortened book—"for wider readership including those who cannot find time . . ." and with its out-of-date passages removed—is little more than a third the size of the second edition and about half that of the first. Most of the material on rate of growth, phyllotaxis, geodesics, absorption, the shape of eggs and hollow structures, and tabular numerical data was removed, and the rest was condensed by elimination. Much of the mathematical analysis is gone. Pictorial figures are retained in preference to analytical figures. The reduction was by omission, and D'Arcy Thompson's long-stride style and superb writing is unchanged in what is saved, with the exception of some chapter introductions, an occasional transition, and the editor's preface. Bonner states that he sometimes tried to keep the text modern, sometimes simply to keep the interest of the reader.

Much has been retained in this volume, yet it is a pale substitute. The loss of mathematics and data detracts from the development of Thompson's ideas. The notes to newer information that have been added do not follow the broad experience of Thompson. Bonner follows the Hutchison-Medawar type