pletely new approach to the diagnosis and investigation of many disorders and diseases. . . ." It is his hope that "the book will be found useful by all who are interested in human development." The editor's way of doing this was to gather up 55 previously published papers (by 112 contributors) and to bind these papers, without editorial comment, into an expensive, hard-cover book. The papers themselves vary a good deal in content, literary quality, and usefulness to the student; but a critical review should be concerned not with the quality of the papers themselves but with their usefulness in the context of this book.

It must be said that a patient reader will find here a comprehensive view of this rapidly developing area of human biology. But the editor gives him no help, and the reader might save himself the price of the book by examining back issues of *Lancet* from which 30 of the 55 papers are reprinted. It is difficult to see why some of the papers were included, or what motivated their exact arrangement in the volume. That is, the development of the theme is neither precisely historical nor precisely categorical. If it were historical, Barr's papers, dealing with sex chromatin, should have been placed ahead of those in which the chromosomes were examined. Instead, they appear as papers 13 to 16. If, on the other hand, the arrangement were categorical, one would expect papers 20, 39, 44, and 47 to appear together, since they all deal with patients having XXX chromosome complements. Other papers that deal with a single topic are also scattered through the book, sacrificing, needlessly, the opportunity to provide an arrangement that allows studying the various conditions together, to one that represents the order in which the papers were originally published.

Two of the papers, not including those of Barr which discuss the nuclear chromatin bodies, contain no mention of chromosomal studies at all. Why were they included? Some of the papers are preliminary reports, and quite a few have addenda. This is suggestive of the rapidity with which change occurs in this field, and this, in turn, suggests that some of the papers represent the fluid state of thought at the time they were originally published, rather than a mature judgment made possible only by the passage of time and the accumulation of fact. What this book needs is a paragraph or two accompanying each paper, which gives the reason for including the paper, places it in the context of the development of the field, emphasizes which paths proved to be productive and which did not, brings out the impact of chromosomal aberrations on human biology, and provides the bewildered reader with guidance. If this had been done, the book would probably have been smaller and less expensive, and certainly much more illuminating.

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## Cowherd to Ornithologist

**Alexander Wilson, Naturalist and Pioneer.** Robert Cantwell. Lippincott, Philadelphia, Pa., 1961. 319 pp. Illus. $15.

Robert Cantwell's attractive book holds an enlightening account of the conditions of Scottish life, and of the beliefs held by the society, into which Alexander Wilson was born. I confess I was a little eager to arrive at the parts actually concerned with Wilson, but the preliminary matter about corrupt conditions in Paisley assist the reader to a better understanding of Wilson's life.

The young boy, Alexander, motherless at 10 years, was thrust out to be a cowherd when his father promptly remarried. Young Wilson spent three years roaming the fields and watching the cattle, completely without further opportunity to go to school.

We next see him back in Paisley as a weaver's apprentice, bound at service for another three years, during which he became fascinated with the Scottish poets and embittered by the frightful labor conditions. Wilson was fond of pranks and rhymes, and amused the other boys by reciting poetry to the rhythm of his loom, or he wrote satirical rhymes and take-offs about the townspeople in authority, whom he did not like. His poetry improved but became more bold as he grew older, until the famous piece, *The Shark or Lang Mills Detected,* put him in prison for libelous conduct.

The author skillfully portrays his understanding of this strange talented personality, starved for education and sympathetic friends.

Out of jail, and, for a final gesture, required to burn his poem on the steps of the Tolbooth, Wilson thought only of going to America. He became a peddler and saved every sixpence toward this end. A successful poem which he wrote, "Watty and Meg," was so good it was credited to Robert Burns, the idol of Scotland. This blow to Wilson's pride no doubt helped him to "make it" to America.

The account of Wilson's American experience is remarkably full but not without error in some areas, where Cantwell becomes a little too sure, for lack of correct information, and fails to give credit to his sources. For example, the statement regarding "the occasional scarlet ibis" sent to Wilson by Stephen Elliot seems very doubtful since this species is not yet accepted on the Georgia List of Birds.

There is also a little misinterpretation in the author's account of John Abbot. If Stephen Elliot is one of Cantwell's sources, it seems that his name and the titles of the publications or manuscripts used should be given.

*Alexander Wilson, Naturalist and Pioneer* is a mine of information, and although it is a beautiful book, it is oversized to the point of inconvenience. Any serious student of Wilson will most certainly want to own this book, preferably in a smaller format, and he will be eager for the source material. A more complete bibliography would make the book much more useful and footnotes through the text would be a boon to scholars.

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## Optical Masers

**Advances in Quantum Electronics.** J. R. Singer, Ed. Columbia University Press, New York, 1961. xvii + 641 pp. Illus. $15.

Once again the Office of Naval Research is to be commended for sponsoring a conference on quantum electronics (the second conference) and for supporting publication of the papers presented. The new and exciting development that took place in the months before this meeting was the optical maser, and many papers are devoted to experimental and theoretical description of this device. In his opening paper, Charles Townes suggests several new fundamental experiments made possible by the optical maser. Several papers

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