work; of it he wrote, "Insight such as this falls to one's lot but once in a lifetime." It and the *Three Essays on the Theory of Sexuality* were the only two books that he revised as new editions were published. Chapter VII on "The psychology of the dream processes" is the basis for his metapsychology, knowledge of which is essential to any understanding of the theoretical aspects of his work.

This volume is not an easy one to read. It is based on the eighth (1930) edition, the last published in Freud's lifetime. It is in effect, however, a variorum edition; it lists the alterations introduced since the first issue, and consequently contains numerous explanatory notes. In an effort to convey more precisely the exact meaning of the original text, the translations of some of the dreams are awkward, but this is necessary if one is to understand the import of the interpretations that follow. Despite this stiffness and the interruptions in reading caused by the numerous annotations, the serious student will find this a rewarding book. A cursory comparison of Chapter VII in this volume with that in Brill's translation, which appeared in 1931, reveals how much more Strachey has made available to us. Together with the wealth of material in the recently published correspondence with Wilhelm Fliess, this volume gives us an understanding of Freud's first neurophysiological theory of the working of the mind and its subsequent replacement with a psychological system that followed the same general pattern.

There is an excellent general index, an index of the dreams referred to in the text, a bibliography of all works mentioned in the text, and another of important works on dreams (not referred to by Freud) published before 1900.

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Harmonic Analysis and the Theory of Probability. Salomon Bochner. University of California Press, Berkeley, 1955. viii + 176 pp. $4.50.

Except for expressions of thanks and credit, the entire preface of this book reads as follows: "This is a tract on some topics in Fourier analysis of finitely and infinitely many variables and on some topics in the theory of probability and the connection between the two is a very intimate one on the whole." To explain a little more fully, some topics in Fourier analysis are treated that have no special reference to the theory of probability—generalized theta relations and zeta functions are especially noteworthy examples. But almost all the topics in the theory of probability are applications of Fourier analysis. The connection between the two fields is the familiar one arising out of the Fourier transformation of distributions of real-valued and vector-valued random variables.

Many of the topics presented are original with Bochner and either appear here for the first time or are taken from his journal publications; and the treatment of all of them is marked by his originality. Indeed, the tract can fairly be described as a review and extension of a certain part of the author's work in Fourier analysis.

The tract is addressed to professional mathematicians and is, accordingly, too technical to be accessible to other scientists, with few exceptions. It is well, but compactly, written. The workmanship demonstrates and communicates great power and knowledge, so the tract abundantly repays the intensive study required to read it with understanding.

There are many typographic errors and a few errors that are a little more substantial. Their cumulative effect is some impediment.

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Neurochemistry. The chemical dynamics of brain and nerve. K. A. C. Elliott, Irvine H. Page, and J. H. Quastel, Eds. Thomas, Springfield, Ill., 1955. xii + 900 pp. Illus. $19.50.

In the past, brain was often considered as a morphological and functional unit by physiologists and pathologists. The integration of biochemical research, however, with research on brain structure and function is a recent development, which, for its very obvious advantages, cannot be welcomed enough. Several books and meetings during the last few years are stimulating proof that neurochemistry has come of age as an independent field of research. One of the very good and most ambitious of these books is *Neurochemistry, the Chemical Dynamics of Brain and Nerve.* Reviews in a fast-developing field are not an easy task, but this book fulfills its task admirably. Such a book is doubly important, since the information in this field is scattered in biochemical, physiological, pharmacological, neurological, histological, and psychiatric journals, to mention a few.

The two shortcomings of this book are fully realized by the editors. Because the publication took 4 years, and despite the fact that many chapters are revised, many recent advances are left out. The other shortcoming, probably a necessary fault of most such books, is, to quote the editors, that "a book of this kind can never be fully comprehensive." I and probably a great many other people in the field would welcome a second volume of the book in which subjects would be discussed that, for reasons of keeping down the cost or size, were treated very concisely or omitted. For example, the *in vivo* metabolism of the brain, hallucinogens, the new tranquilizers, serotonin and so forth, are not discussed at all; chapters on lipids, the blood brain barrier, the metabolism of proteins and amino acids, and phosphorus metabolism are rather sketchy.

The 32 chapters of the book cannot all be mentioned here. The central importance of carbohydrate metabolism is well treated in several chapters. K. A. C. Elliott writes on tissue respiration, H. Weil-Malherbe on oxidation mechanisms, R. A. Peters on pyruvate metabolism, and E. Racker on glycolysis. The acetylcholine and cholinesterase systems are reviewed by J. H. Quastel, D. Nachmansohn, A. S. V. Burgen, and F. C. MacIntosh in their respective chapters, in which there is very little duplication of the different approaches to the problem. Glutamic acid and glutamine are clearly reviewed by H. Waelsch, and, in a short article, nucleic acids and proteins are discussed by H. Hyden.

The chemical constituents of brain and the biochemistry of demyelination are discussed by R. J. Rossiter. S. S. Kety discusses blood flow, W. M. Sperry the biochemistry of early development, and J. H. Holmes and D. B. Tower intracranial fluids. Other chapters deal with noradrenaline, steroid hormones, electrolytes, neurotropic drugs, convulsive conditions, and nutritional disorders. Mention should be made of the very interesting reviews of J. H. Quastel on narcosis and of L. S. Penrose on inborn errors of metabolism.

Books of this scope have dual function. They not only review the work that has been done in the field but also, by pointing out the work that has not yet been done, stimulate further research. *Neurochemistry* fulfills this dual role remarkably well.

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Instruments for Measurement and Control. Werner G. Holzbock. Reinhold, New York; Chapman & Hall, London, 1955. 371 pp. Illus. $10.

This is a descriptive book for plant technicians and practicing engineers. Written by a development engineer of the Askania Regulator Company, it attempts "to acquaint the reader with the types of instruments available for the measure-

ment and control of process variables; to provide a reference book for those who are searching for an instrument that fills their specific needs; to give the man who develops new instruments an opportunity to compare some of the approaches used by his colleagues in the solution of problems common to the instrument industry." The title of this book might better have included the word *industrial*. The book is well illustrated by schematics as well as by cutaway drawings of many instruments, which adds greatly to ready understanding.

The outline of contents is conventional—chapters on instruments for temperature (60 pp.), humidity and moisture, pressure (14 pp.), flow, liquid level, density, viscosity, speed, and analysis (30 pp.) cover the measurement section. Five chapters (127 pp.) relate to the control area—automatic controller action; electric controllers; self-operated, pneumatic, and hydraulic controllers; time function controllers; and final control elements.

The organization is somewhat confusing, showing lack of a coherent classification of the various functions of instrument systems. For instance, recording devices are useful for recording any signal that results from any type of measurement, but nowhere in this book are recorders treated as recorders per se; rather, they are referred to in passing in several connections, first in the temperature chapter under the heading "Millivoltmeters as recorders." Little attention has been paid to the careful use of terms. Definitions are sometimes only implied or are given in terms of operations. The treatment does not include any discussion of performance and limiting accuracy of the instruments.

The short chapter on controller action is simplified but straightforward. Although this is in no sense a textbook, anyone with a modicum of technical background can follow the descriptive treatment of control in these chapters.

Unfortunately the book contains no references. A short glossary covers only some of the terms used specifically in the control chapters.

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Frontiers of Astronomy. Fred Hoyle. Harper, New York, 1955. xvi + 360 pp. Illus. $5.

Fred Hoyle's interests range over the entire field of astronomy. In this book he discusses what is literally at the frontiers of the science. The coverage of astronomy is extensive. Although it is in no sense a textbook, the sequence of topics is almost that of a traditional textbook, with the first chapter on the earth, and the last on the universe as a whole.

The book is not mere reportage. In every chapter Hoyle's own ideas and often his own researches are presented in a very readable way. His enthusiastic personality comes right out of the printed pages.

The level is popular. There are no equations or mathematical proofs; in spite of this not many matters are left out because they are too technical. The book could be read with interest by those with no background in astronomy, but it is my impression that it will be enjoyed most by those with some prior acquaintance with astronomy or physics. Anyone whose knoweldge of astronomy is defined by the content of a typical introductory textbook will be fascinated by the recent progress in observation and theory presented here.

Hoyle has set out to prove the thesis that the characteristics of the universe as we find it are not due to chance but to law. He feels that no aspect of the universe—for example, the densities and masses of the planets—need be attributed to arbitrary starting conditions. All follow from equilibrium conditions that would obtain regardless of the starting conditions. If all the theories he presents can be substantiated, this very attractive view will be established.

In many cases, however, observation is not yet at the stage where the choice of theory is clear-cut. Although Hoyle has taken pains to point out alternatives, his preference for the theories that bear out the thesis is difficult to suppress. The reader might obtain a false impression of the weight of the arguments on the other side or, conversely, wonder whether all the conflicting observations have been given. But this comment is a bit beside the point; the book will be read precisely for Hoyle's ideas, and we must look to those who disagree with him to present their side of the story themselves.

The question of emotional preference for a theory is faced squarely in the epilogue, following remarks about the steady-state theory of the universe and the continuous creation of hydrogen that it implies. Hoyle says, "It is not a point in support of this theory that it contains conclusions for which we might happen to have an emotional preference." He agrees to the correctness of the remarks in this connection expressed by Herbert Dingle in his presidential address (1953) to the Royal Astronomical Society. But, Hoyle says, "it is not an emotional preference to attempt to establish a theory that would place us in a position to obtain a complete understanding of the Universe." This is true as long as the proponent of the theory stands ready to abandon it if observation goes against it and does not support it by incomplete observations or with too many assumptions. I feel that Hoyle has improved in this respect over some of his earlier expressions, and that he has indicated correctly at what points his present views must be provisional.

As an exposition of the areas of astronomy where current interest is high, *Frontiers of Astronomy* is to be recommended heartily. A more readable account would be hard to come by. It will be assigned as collateral reading in my course in astronomy.

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Proceedings of the International Conference of Theoretical Physics, Kyoto and Tokyo, September 1953. Science Council of Japan, Ueno Park, Tokyo, 1954. xxviii + 942 pp. Illus. $10.

This volume contains a record of the lectures and discussions of the main sessions and some of the informal meetings of the International Conference of Theoretical Physics, Kyoto and Tokyo, September 1953. The conference was attended by 55 physicists from 13 countries and approximately 600 Japanese physicists.

The texts of both the lectures and discussions are based on tape recordings taken during the actual sessions. The contents are divided into five sections: field theory and elementary particles; nuclear physics; statistical mechanics; molecules and solids; and liquid helium and superconductivity. There is a name index.

The Convolution Transform. I. I. Hirschman and D. V. Widder. Princeton University Press, Princeton, N.J., 1955. x + 268 pp. $5.50.

The title of this book brings to mind general researches on groups, function-spaces, Laurent Schwartz distributions, and, of course, it includes after suitable changes of variables, the Laplace transform, to which one of the authors has already devoted a well-known and much prized treatise. However, it is said that the author of an equally prized book on the good city of Boston—a city for which I have a special affection—once collaborated on a further volume dealing with the United States, and that his friends were relieved to find that this further and somewhat shorter volume limited itself to those parts of the United States that could be reached in an hour or so from Boston on foot.