

Physicists

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(2) Semiconductor Materials Specialist to head group working on crystal growth, perfection and doping problems of III-V compounds and maser (laser) crystals. Prerequisite: PhD with good theoretical background in crystallography and experience in crystal growth and structural research.

(3) Solid State Physicist to lead a group conducting basic investigations of quantum effects in solids (tunnelling phenomena, hot carriers, microplasmas, etc.), and to ultimately indicate new device principles for transfer to our Solid State Development Department. Prerequisite: PhD in Solid State or Physics, special knowledge in the theory of electrical properties of metals and semiconductors.

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of such a system can be described by statistical concepts only. The same remarks apply when the random structure is "frozen in". Under certain circumstances, ordered structures associated with crystallinity can be formed. Real polymer chains are characterized by the existence of potentials hindering free rotation, and finally, the migration of a segment of a polymer chain can be considered as governed by secondary forces acting upon it by neighboring atoms or alternatively by details of the local structure.

The morphology of and molecular mobility in a polymer under given circumstances are governed by the long flexible-chain property of the molecule and to a greater or less extent by either or both of the other properties. In the case of certain phenomena, the flexible long-chain property plays a relatively minor role, and the property is very similar to that observed in crystals, glasses, and liquids of low molecular weight. High-polymer physics thus arises naturally from the physics of materials of low molecular weight.

During the past few years, there has been a great commercial development of high-polymeric materials; their industrial value arises principally through their physical and primarily mechanical properties. There has thus appeared the need for an introductory book dealing with the physical properties of polymeric systems as related to molecular structure. Professor Bueche's book is written with this purpose in mind. The physical phenomena are discussed fully in terms of molecular theory as outlined above; this is presented in some detail and is based to a great extent upon the author's own extensive contributions. At the same time, the reader is made aware of the gaps which exist between the predictions of the theory and the results of experiment. Alternative theoretical treatments and interpretations of the data are discussed. This book, together with the reference material, could serve as a useful introduction for the research worker, while the book by itself should be of great value to a student who wishes simply to obtain an understanding of the field.

Theory of Probability (3rd ed.). By Harold Jeffreys. 447 pp. Oxford Univ. Press, New York, 1961. \$13.45. Reviewed by R. Bruce Lindsay, Brown University.

PRIMITIVE and intuitive notions, admittedly necessary for the construction of physical theories and the understanding of physical phenomena, have ever been a source of philosophical difficulty. The notion of probability is a good illustration. It is agreed on all sides that we cannot dispense with it in physics or indeed in science as a whole. Yet the endeavor to provide definitions of it which could serve as a reasonable basis for its use has led to endless argument on the part of many well-known mathematicians, physicists, and philosophers. Sir Harold Jeffreys first presented his point of view in detail in 1939, in the first edition of the book, the third edition of which is being reviewed here. He is a very distinguished geophysicist

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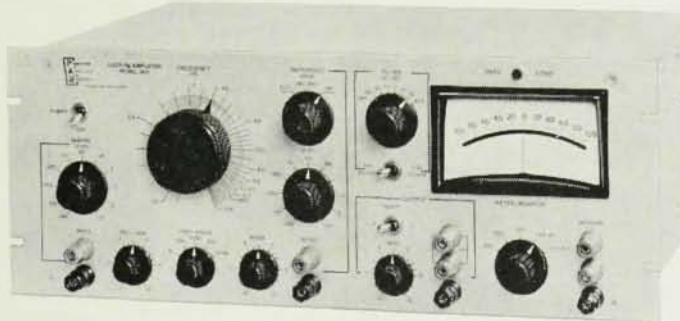
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and applied mathematician, who has, however, devoted considerable attention to scientific methodology and states his views in this field with considerable confidence and spirit.

Jeffreys wrote his book in the first place to "provide a method of drawing inferences from observational data that will be self-consistent and can also be used in practice". He was rather impatient with the notion that the so-called common-sense view of probability is inadequate for practical scientific applications and cannot be given a consistent mathematical treatment. He still is! Consequently, the basic development in the third edition remains the same as that in the first. Certain new proofs have been added and others are presented in greater detail. There has been a certain amount of rearrangement of material to strengthen the logical argument.

Professor Jeffreys is principally interested in the use of probability as a measure of the probable validity of physical laws in serving as descriptions of experience and as a means for providing the best estimates of parameters occurring in these laws. His work will continue to contain more value and interest for experimental physicists. It is unlikely that theoretical physicists will be helped by his program. He inveighs against frequency theories of probability at some length, and though he admits that the results of statistical mechanics are for the most part good, he considers the foundations to be wrong. Jeffreys has no use, for example, for the Gibbs ensemble concept. Nevertheless, the latter has had great influence on the applications of statistical mechanics. Of course, it is subject to criticism, but its critics might be advised to read once more the preface of Gibbs' famous little book, *Elementary Principles in Statistical Mechanics*, to recall precisely what he set out to do.

The careful reader of Jeffreys' book will probably conclude that it is not merely the problem of the most effective and valid definition of probability which is involved, but also the more fundamental question of the nature of a scientific theory. The bold use of the imagination in dreaming up new physical constructs and postulates has carried modern physical theorizing far beyond the stage which it seems likely that Jeffreys, with his continued emphasis on "inductive inference", will be willing to accept.

The style of the author is clear, elegant, and incisive, even when dogmatic, and his book continues to be a pleasure to read.

The Fourier Integral and Its Applications. By Athanasios Papoulis. 318 pp. McGraw-Hill Book Co., Inc., New York, 1962. \$10.75. Reviewed by A. A. Maradudin, Westinghouse Research Laboratories.

THE applications referred to in the title of this book are all to be found in electrical engineering. Consequently, some physicists may be put off from reading it. This would be a pity, I think, because I found Professor Papoulis' book to be a very good in-