

products of the mechanical working of the laws of political economy. Nothing was more alien to the nature of Hopkins than a fanatical desire to realize in human society, regardless of its cost in human suffering, a dogmatic scheme.

Let us now turn to his autobiography. If the fabric of truth is a construction of the human intellect, then a man of science is more of an artist than a kind of super-technician. He is consequently to be weighed by the same values as artists. Of these Rodin said: "The love of nature and sincerity are the two great passions of an artist". Hopkins's autobiography testifies to the presence of both of these passions. His sincerity was that of an extrovert, in the sense of C. G. Jung's typology. There is nothing in it of the self-seeking exhibitionism of the introvert with a morbidly shrunken ego. He views himself from without, and describes, not confesses in a theatrical manner, his life, not in order to get sympathy or admiration from his fellow-men, but to give them facts of his life, the knowledge of which may be useful in their struggle for a better, a more human life. He ends his short and brilliant autobiography with the words "Fortunatus sum", and with the attitude of a true extrovert he thinks of fortune as something outside him, apparently not realizing that "character is fate". To be able to say "Fortunatus sum" is the extrovert way of expressing the thought: I have a perfect character. The psychologist may find material in his study of the question how far a man of science is born or is made. Whatever the proportion of inherited or environmental determinants in the formation of a personality may be, Hopkins realized that most of them are outside our personal control. He described his own qualities (some of which he regarded as shortcomings, others as excellences), with a modesty verging on humility, as things given to him and not as achievements attained by him. He regarded himself as an unschooled amateur, having not realized that this feeling is the consequence of "a genius being him, who knows more than he learnt".

A. B. L. BEZNAK

QUANTUM THEORY OF FIELDS

Quantum Theory of Fields

By Prof. Gregor Wentzel. Translated from the German by Charlotte Houtermans and J. M. Jauch. Pp. ix+224. (New York and London: Interscience Publishers, Inc., 1949.) 36s.

To say that this is the best book on the quantum theory of fields is no praise, since to my knowledge it is the only book on this subject. But it is a very good and most useful book. The original was written in German and appeared in 1942. This is a translation with some minor changes. A few remarks have been added, concerning meson theory and nuclear forces, also footnotes referring to modern work in this field, and finally an appendix on the symmetrization of the energy momentum tensor according to Belinfante.

Thus Wentzel's book presents the state of knowledge of this subject as it was some six years ago. But in the last two years, important progress has been made connected both with the Lorentz-invariance of the quantization scheme and with the treatment of infinities. This spectacular development is due to the work of Weiss, Tomanaga, Dirac, Heitler, Schwinger, Dyson, Feynman, and many others.

Obviously this recent progress is not included in the book. Yet, this is not a drawback. We seem to be too near to this new development to evaluate properly its role in theoretical physics. Great simplification may occur, and perhaps even entirely new ideas may be introduced in the future.

Wentzel's book deals skilfully with the basic methods and excellently achieves the author's purpose: "to provide the reader with such basic information as will enable him to follow independently the original literature now appearing in the periodicals". Indeed, it is an excellent introduction to more modern work. What is especially attractive about the book is the presentation of a uniform and powerful method which can be applied successfully so long as interaction problems do not appear. Thus, one basic theme is introduced and systematically broadened; starting with the scalar meson field, the book then proceeds to the vector meson field, and the same scheme is further generalized and adapted to the electromagnetic field and the electron field. The last chapter is a fascinating one on particles with higher spin and on the connexion between spin and statistic. Because of its logical structure, the book seems to become easier as one goes further ahead.

Of course, there are some faults, too. It could scarcely be otherwise, since this is a pioneer work,—the first attempt at synthesis in book form. The first chapter, and especially the treatment of Lorentz invariance, seems to me the weakest part of this book. But this is not important compared to its many virtues; it is an excellent guide for graduate students and teachers alike in this new and difficult subject. Let us hope that the author will produce a new edition which will modernize the book and appear when the time is ripe for it. This is not yet.

L. INFELD

THE WAYS OF FISHES

The Life Story of the Fish

His Morals and Manners. By Brian Curtis. Pp. xii+284+6 plates. (New York: Harcourt, Brace and Co., 1949.) 3.75 dollars.

The Ways of Fishes

By Dr. Leonard P. Schultz, with Edith M. Stern. Pp. xii+264. (New York: D. Van Nostrand Co., Inc.; London: Macmillan and Co., Ltd., 1948.) 30s. net.

Sport Fishing in Canada

By Francis C. Whitehouse. Pp. xvi+188 (49 plates). (Vancouver, B.C.: The Author, 1109 Burnaby Street, 1948.) 3 dollars.

FISHERMEN, both amateur and professional, in salt water and in fresh, have long been puzzled by many things concerning the fish that they catch. "Do fish sleep? What colours can they distinguish? Do they suffer pain? How do they find the way?" are but a few of the questions to which they are always seeking and seldom finding reliable answers. Nevertheless, by observation and simple experiment based mainly on trial and error, such amateur naturalists have made many interesting and valuable contributions to our knowledge of fish life. Perhaps their most important discoveries have been where to find the fish and how to catch them—both prerequisites to finding out most other things about them.

Men of science, too, have long been studying fish both in the field and in the laboratory, and by