SCIENTIFIC BOOKS

MODERN PHYSICS

Die Bedeutung der Modernen Physik für die Theorie der Erkenntnis. Drei mit dem Richard Avenarius-Preis ausgezeichnete Arbeiten von Dr. Grete Hermann, Dr. E. May, Dr. Th. Vogel. viii + 210 pages. S. Hirzel, Leipzig. 1937.

The Philosophy of Relativity. By A. P. USHENKO. 208 pages. George Allen and Unwin, Ltd., London, 1937. $3.00.

THESE two works illustrate the lively interest which philosophers are exhibiting in the philosophical implications of the quantum theory and theory of relativity. The German work consists of three excellent essays which received prizes in a recent competition conducted by the Academy of Sciences of Saxony. The tenor of the first two essays is conservative; both authors argue that fundamental presuppositions, such as the principle of causality and the concept of substance, which have been inherited from historical theories of knowledge, are basic for the new physical theories. Dr. Hermann distinguishes between causality and predictability, and thereby preserves the principle of causality for quantum mechanics. Her thesis is valuable in that it calls attention to the fact that measurement, in quantum theory as well as classical physics, involves a coupling between the value of a physical quantity of an object and the value of some indicating quantity of a measuring instrument. Dr. Hermann also presents an illuminating analysis of the Lorentz transformation. The conclusion of her monograph is that space and time and causality are preserved in the newer theories; it is their relativistic application which is new in the theories of relativity and quantum mechanics.

Dr. Hermann's essay is essentially an analysis of fundamental concepts and principles of physics. In the longer work of Dr. May the more detailed epistemological presuppositions are studied. He argues correctly that the fundamental concepts of the theory of knowledge are presupposed by the new as well as by classical physics. Of especial importance is his demonstration that the quantum mechanical disturbance of the object in observation is reducible to the empirical fact that a measuring instrument interacts with the object, and has nothing whatsoever to do with the philosophical problem of the perception of an external world. Dr. May adopts Dr. Hermann's distinction between causality and predictability and thus obtains a basis for the assertion that the realm of physical processes is strictly determined, even though exact prediction is not possible. The reviewer disagrees with this dualism between physical reality and its theoretical representation, and also with the thesis that space is known to intuition as necessarily Euclidean and time as absolute. But a discussion of these philosophical matters, to which the physical theories are indifferent, is hardly a suitable topic for a limited review.

The third essay by Dr. Vogel reveals an influence of logical positivism which restricts philosophy to a clarification of the meaning of language and of the calculus which constitutes mathematical physics. Dr. Vogel, however, retains his sense of reality and insists that natural science is more than a language. He emphasizes the function of principles of correlation between symbols and experience. This paper contains an excellent analysis of causality.

In contrast to the philosophical conservatism of Hermann and May and the positivism of Vogel, Professor Ushenko argues that new metaphysical doctrines are implied by the theory of relativity. He states that classical physics was based upon the concept of substance, whereas in the theory of relativity the concept of event is basic. He develops a metaphysics of events with much brilliant analysis. Events, which are agents of the physical world, are described by dispositional characteristics, *i.e.*, by characteristics which are not manifested unless an observer is present; but an event must have an essence which is distinct from its dispositional properties, in order to exist in its own right. This essence is a fusion of space and time. Space-time is a structure of events which transcends experience, but is the condition of correlations of acts of experience.

The reviewer believes that both classical and relativistic physics may be interpreted in terms of a metaphysics of substance or events. Indeed, we have seen that Dr. May asserts the necessity of the concept of substance in the new physics. Professor Ushenko asserts that size, shape and mass are the three properties which condition the sameness of substance, and since these properties are relative they can not determine unambiguously the identity of a physical substance. But the electric charge of a body and space-time interval are invariants which may provide for the self-identity of substance. Furthermore, it might be argued that constancy, and not invariance, should be adopted as the criterion of substance. While electricity may be interpreted in relativistic theory as substance, a substantial entity of classical physics may be interpreted as a series of events. Indeed, Mach interpreted the things of classical physics as complexes of elements of sensation. The reviewer believes in opposition to the theory of the present book that the essence of an event may be expressed as the law of correlation of its perspectives.

The book is intended for philosophers. In order to assist their understanding of relativity the author presents simplified mathematical expositions of the special and general theories. The analysis of physical concepts, however, is not as penetrating as that of Dr. Hermann's essay.

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SOCIETIES AND MEETINGS

THE NORTH CAROLINA ACADEMY OF SCIENCE

THE thirty-sixth annual meeting of the North Carolina Academy of Science was held at Catawba College, Salisbury, N. C., on May 7 and 8. This was the first time that this institution has been host to the academy. About two hundred and fifty members and visitors attended the meeting. Forty-four papers and four exhibits made up the program. The proceedings will be published in the *Journal of the Elisha Mitchell Scientific Society*.

The General Section met on the first day with P. M. Ginnings, president of the academy, presiding. The reading of papers, mostly of general interest, commenced at 9:30 A.M. and continued until 4.30 P.M., when the annual business meeting was held. The principal matters taken up were the reports of the various committees and the election of officers.

Resolutions were read honoring the late Dr. David H. Howard, Jr., department of chemistry, Davidson College. The academy elected to life membership Professor C. W. Edwards, department of physics, Duke University, and Dr. A. S. Wheeler, recently retired acting chairman, department of chemistry, the University of North Carolina. The executive committee reported the election of 38 new members since the last meeting and the reinstatement of 7 former members.

In the high-school science essay contest, sponsored by the academy, first prize was awarded to Miss Lucy Nelms, Nashville High School, Nashville, N. C., for her essay entitled "Thumbs Down on Erosion." This contest will be continued in 1938 in the fields of physics and chemistry.

Dr. John N. Couch, department of botany, the University of North Carolina, was awarded the Phipps and Bird medal for the most noteworthy paper, entitled "A Fungus that Catches Nematodes."

The American Association for the Advancement of Science research grant for 1936 was awarded to Mr. D. S. Correll, department of botany, Duke University, for the continuation of his studies of the orchids of the southeastern states. The grant for 1937 was awarded to Dr. L. G. Willis, North Carolina State Experiment Station, for the continuation of his studies on the oxidation-reduction equilibrium in soils.

A complimentary barbecue supper was served on the college lawn to the members of the academy and visitors. This was followed by a one-act comedy by the local dramatic club.

The evening meeting was presided over by the vice-president, C. F. Korstian. Howard R. Omwake, president of Catawba College, welcomed the academy. This was followed by an address, entitled "The Interdependence of the Sciences," by the retiring president, P. M. Ginnings, Greensboro College.

At the conclusion of the evening meeting, President and Mrs. Omwake entertained the officers and members of the academy at an informal reception in their home.

The forenoon of the second day was set aside for the presentation of the more technical papers, and the academy therefore met in sections as follows: General Section (botany, zoology, forestry, geology), Mathematics Section and Physics Section. The Chemistry Section did not meet at this time.

The following officers were elected for 1937:

GENERAL SECTION

President, W. E. Speas, Wake Forest College.
Vice-President, M. L. Braun, Catawba College.
Secretary-Treasurer, H. L. Blomquist, Duke University.
Executive Committee, the above officers and W. L. Porter, Davidson College; H. R. Totten, the University of North Carolina; R. F. Poole, North Carolina State College.
Representative to the American Association for the Advancement of Science, Bert Cunningham, Duke University.

CHEMISTRY SECTION

Chairman, W. C. Vosburgh, Duke University.
Vice-Chairman, Neville Isbell, Wake Forest College.
Secretary-Treasurer, E. C. Markham, the University of North Carolina.
Councilors, D. G. Hill, Duke University; R. W. Bost, the University of North Carolina.
Executive Committee, the officers and C. S. Black, Wake Forest College; W. A. Reid, North Carolina State College; Edward Mack, the University of North Carolina; W. E. Jordan, North Carolina State College.

MATHEMATICS SECTION

Chairman, J. J. Gergen, Duke University.
Secretary, Archibald Henderson, the University of North Carolina.

PHYSICS SECTION

Chairman, J. B. Derieux, North Carolina State College.
Secretary, F. W. Lancaster, North Carolina State College.

The thirty-seventh meeting of the North Carolina Academy of Science will be held in 1938 at North Carolina State College, Raleigh, N. C.

H. L. BLOMQUIST,
Secretary