

PHYSICIST

Research in Field of GASEOUS ELECTRONICS

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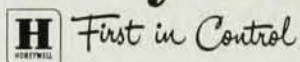
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physicists prefer to explain the fundamental relations as derivable from a few basic experiments. The present volume is neither an axiomatic presentation nor are the explanations based directly upon experimental evidence. A median is achieved; the authors give the physical basis for each phenomenon together with a complete mathematical formulation.

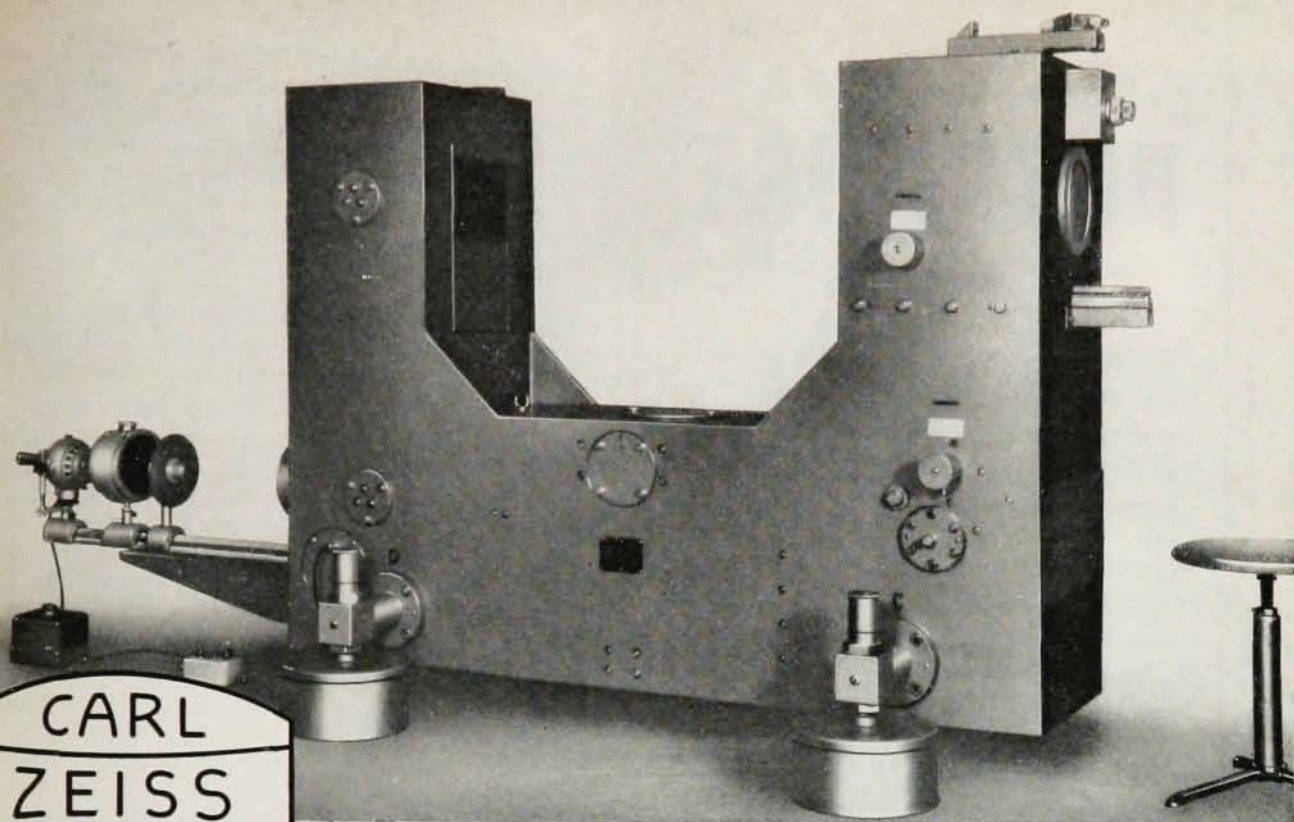
Relativity: The General Theory. By J. L. Synge. 505 pp. (North-Holland, Amsterdam) Interscience Publishers, Inc., New York, 1960. \$16.50. *Reviewed by Jacques Romain, Convair/Fort Worth, Division of General Dynamics.*

A NEW book on relativity by Professor Synge is an event indeed. Those who have read his former books (*Relativity: The Special Theory* and *The Relativistic Gas*) know that his books offer deep critical discussions of the subject.

The main feature of this book is its completely geometrical point of view. The reader is given direct insight into four-dimensional Riemannian space-time and shown how to use simple space-time diagrams instead of the usual Newtonian description. Such an approach seems ideally suited to handle general relativity in a profound and creative way, especially in view of the present attempts towards a unified theory.

The book begins with a mathematical exposition of essential tensor formulas, and a full study of the main mathematical tool brought into use by the author, the "world-function", which is essentially the square of the geodesic separation of two events, and which permits developments in power series within the frame of tensor calculus. After a fundamental chapter on chronometry in Riemannian space-time, the material continuum and its energy tensor are introduced. The second half of the book deals with properties of Einstein fields and fields with spherical symmetry, integral conservation laws, the equations of motion, some special universes, gravitational waves, electromagnetics, and geometrical optics. Since the author goes back to first (geometrical) principles and rebuilds every topic in his own way, the book is not a general survey of the field. It is rather an up-to-date selection of outstanding topics worked out with the new method. Although the geometrical treatment never obscures the physical meaning, the physical exposition of the argument that leads to the well-known equations of general relativity is not included. The reader would do well to review the main features of general relativity before undertaking a study of this book. Then he will be prepared to learn that several things he thinks he understands do not make any sense at all.

The style of thinking and the spirited writing of the book are typified by the following quotation from the preface: "If I break my neck by falling off a cliff, my death is not to be blamed on the force of gravity (what does not exist is necessarily guiltless), but on the fact that I did not maintain the first curvature of my world-line, exchanging its security for a dangerous geodesic."



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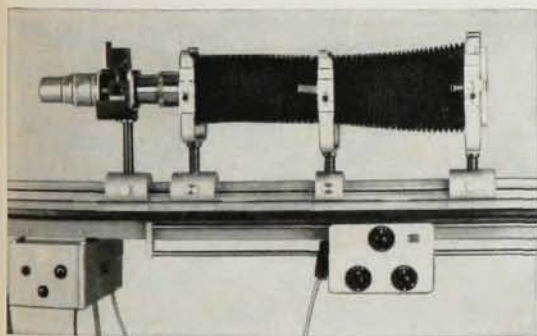
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Appendices include a full index of notations and numerical values of physical quantities expressed in seconds, in a unit system (used throughout the book) in which the velocity of light and the gravitational constant are made unity. Although it is a matter of taste, I think that there is some loss in the fruitfulness of dimensional analysis. The extensive bibliography is worth special mention: There are over a thousand titles, including references to reviews.

Let us hope that Professor Synge will continue his outstanding work in a third book which could be entitled "Relativity: The So-Called Unified Theories."

Fourier Transforms. By Richard R. Goldberg. No. 52 of Tracts in Mathematics and Mathematical Physics, edited by P. Hall and F. Smithies. 76 pp. Cambridge U. Press, New York, 1961. \$3.75. *Reviewed by J. Gillis, The Weizmann Institute of Science.*

FOURIER transforms now play a leading role in such diverse fields as probability, x-ray crystallography, and the higher quantum mechanics. However, this little book is an elegant reminder that the physical applications make use of only the simplest formal properties of the integrals. The really deep properties are still without physical application and it is these which Prof. Goldberg expounds. In fact, one cannot help feeling that at least part of the trouble in x-ray crystallography may possibly stem from the failure of crystallographers to dig more deeply into the properties of Fourier transforms. Much more may be applicable if one only knew how.

The material is derived largely from the fundamental researches of Wiener, Bochner, and some others. But the beauty and lucidity of the exposition are clearly the author's own, though with signs of Bochner inspiration. The first three chapters expound the classical Wiener theory, which relates the closure of the translations of a function with the nonvanishing of its Fourier transform. This is generalized in Chapter 4, while Chapter 5 is devoted to Bochner's theorem. There is an appendix on Fourier transforms in topological groups. The book is well written and beautifully produced, and is a worthy addition to the "Cambridge Tracts" Series.

Principles of Meteoritics. By E. L. Krinov. Transl. from Russian by Irene Vidziunas. Transl. edited by Harrison Brown. 535 pp. Pergamon Press Ltd., Oxford, 1960. 70s. *Reviewed by Edward Anders, Enrico Fermi Institute for Nuclear Studies, University of Chicago.*

NOT counting earlier editions by the same authors, only four books on meteorites have appeared during the last half-century: O. C. Farrington's *Meteorites* (1915, 233 pp., now out of print); H. H. Nininger's *Out of the Sky* (1952, 335 pp.); F. Heide's *Kleine Meteoritenkunde* (1957, 142 pp.); and E. L. Krinov's work which has just been translated from the 1955 Russian original. Of these, Krinov's book is the most com-