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-

prehensive, and comes closest to being a textbook on the subject.

As stated by Harrison Brown in the preface ". . . this work gives a view of meteorites primarily from a Russian perspective. It is admittedly nearly as deficient in reference to English literature on the subject as our own works are deficient in reference to Russian literature."

These gaps are particularly obvious in two fields that have been of chief interest to Western workers; rare element abundances and age determinations. The names of Fireman, Geiss, Reed, Turkevich, and Zähringer are missing from the author index, although these workers have been publishing papers on meteorites since 1955. Perhaps this should not be regarded as too serious a flaw, since these papers are already well known to Western readers. Moreover, a rapidly moving field such as this one can probably be covered better by review articles than by a book.

One also misses an up-to-date discussion of the Widmanstätten pattern, although much descriptive information on this topic is found in the book. None of the pertinent phase diagrams are given, and the names of Vogel, Owen, and Uhlig are missing from the author index. These omissions are in some measure offset by the detailed treatment of certain topics in which Soviet workers have been especially active. These include measurements of physical properties of meteorites, and Krinov's own work on the surface features of meteorites. Another valuable feature of the book is Appendix II: "Meteorites of Rare Type". Here one finds complete listings of stony irons, achondrites, brecciated meteorites, carbonaceous chondrites, and observed falls of iron meteorites. The translation is adequate, though not entirely free from errors. "Viscosity" is translated as "tensile strength" (p. 25), and "spherical" or "spherulitic" as "globuliferous" (p. 401).

Unfortunately, the physical makeup of the book is incredibly poor. The text is not set in type, but is directly reproduced by photo-lithography from a typescript. Sometimes portions of the text at the right-hand margin are mutilated (e.g., p. 320). The figures are very poorly reproduced, often to the point of illegibility (e.g., Fig. 114 and Plate I). Except for the paper and the binding, one must go below the 35-cent paperback level to find books of comparably poor quality. The publishers claim in a brief note, well hidden in the back of the book, that the compromise in quality was necessary in order to make "the information contained in this publication speedily available". Letterpress setting "would have delayed its appearance by one year or more, and the price would have had to be increased further". It is difficult to accept these claims without challenge. True, this book is likely to become very useful to workers in the field, but in view of the previous availability of a Russian edition, no particular haste in publication was called for. Also, many hardcover books are nowadays produced in a month or less, and a paperback version of *Lady Chatterley's Lover,* in as little as 5 days. In spite of the dissimilarity in subject mat-

ter, it should have been possible to produce a decent version of Krinov's book in much less than a year. The present version is a disgrace to the Western publishing trade, and an affront to the author as well.

Elements of the Theory of Markov Processes and Their Applications. By A. T. Bharucha-Reid. 468 pp. McGraw-Hill Book Co., Inc., New York, 1960. $11.50. *Reviewed by Philip M. Morse, Massachusetts Institute of Technology.*

NEW developments in classical theory, as if in response to quantum theory, are to a great extent concerned with the effects of random events. The scattering of sound and of electromagnetic waves from the inhomogeneities caused by turbulence, the details of Brownian motion and of thermal noise, and the build-up of cosmic-ray showers are examples of stochastic processes. And here the interconnections with other scientific disciplines are particularly fertile. The astrophysics of galaxies parallels the theory of plasmas. The theory of cosmic-ray cascades is very close to that of the rise of disease epidemics. And the mathematical techniques used in the statistical theory of radioactive decay are the same as those used in the study of the growth and decline of animal populations, the fluctuations of automobile traffic, and the flow of goods inventories. It is time that a book on the basic theory and its various applications was published in this country.

The simplest stochastic processes, roughly analogous to the linear processes in field theory, are the Markov processes, where the statistical behavior of the system in each successive period of time is determined by the state of the system at the beginning of the period. Many of the processes just mentioned can be adequately represented by a Markov process, or can be related to one, as a first approximation.

The book under review presents a logical and readable account of the basic theory of Markov processes and discusses the application of the theory to these and other aspects of physics, chemistry, biology, and operations research.

The chapters on basic theory discuss the simple Markov process, with denumerable system-states and discrete time periods. They then go on to the cases of continuous time and the further extension to continuous space variables, and conclude with diffusion and Fokker-Planck equations. The part on applications touches on biology, and gives an introduction to the genetic theories of R. A. Fisher and of Sewell Wright, and a short treatment of stochastic theories of ecology and epidemiology. The discussion of the applications in physics is more detailed. It includes a chapter on cascade processes and another on the statistics of particle counters and of nuclear fission. The chapter on astrophysics concentrates chiefly on galactic fluctuations. The latter part of the book deals with the statistics of chemical kinetics, and applications in operations research, dealing mainly with queuing. Appendices on