ment in their solutions. Many of the results are used later in the text.

As a textbook for a graduate student and as an introduction to a powerful tool in the analysis and synthesis of optical systems for a research worker, this book is very highly recommended. The misprints are few and easily spotted. The method of analysis is clear and carefully presented. The illustrations are well chosen and placed appropriately in the body of the text. The list of references at the end of each chapter is complete enough to allow for further exploration into any area covered by the text.

References

1. Grant R. Fowles, *Introduction to Modern Optics*, Holt, Rinehart & Winston, New York (1968), pp. 108-9. No argument is presented at all.
2. Max Born and Emil Wolf, *Principles of Optics*, Pergamon Press, New York (1959), pp. 378-9. Monochromaticity is discarded.

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An inclusive treatment of physical optics

OPTICAL INTERFEROMETRY. By M. Francon. 307 pp. Academic Press, New York, 1966. $13.50

by STANLEY S. BALLARD

Here at last is an inclusive, detailed, authoritative book on interferometry. Research workers and serious students in this burgeoning field of physical optics should greet this new book most enthusiastically. It is appropriate that the author, M. Françon is from the Institut d'Optique of Paris, where so much of the pioneer work in physical optics has been done during recent decades. He is one of the leaders in these activities, and is well known both in France and internationally through his other writings and his many lecture series. He is noted for the vigor and clarity with which he presents complicated topics and for the excellence of the diagrams and illustrations that he employs.

The experimentalist may find chapter 1 rather heavy going, as it examines the subject of coherence in depth and with appropriate mathematical aids. The following chapters are somewhat less awesome; they give useful information on various types of interference devices, categorized by the method of producing interference: by wavefront division, by amplitude division, by utilizing two beams, by multiple-beam devices, by polarization techniques and by lasers. The subjects of interference and partial coherence and of intensity interferometry are discussed in chapters 8 and 9, respectively.

Chapter 12, on the interferometric measurement of the optical transfer function, will be of interest and value to persons who may wish to construct devices to perform this practical measurement. Next are chapters on thin films, interferometric spectroscopy and interference in the measurement of length. The final chapter mentions several diverse applications of interference in wind-tunnel aerodynamics, in controlling the homogeneity, flatness and parallelism of glass plates and polishing defects and in measuring the thickness of thin films; interference microscopes and optical holography are the last two topics.

Throughout the book the modern approach of coherence theory is employed. There is little on the actual design of interferometers or the practical problems that arise during their use, although both the experimental and the theoretical aspects of each topic are treated.

There is a seven-page bibliography and a short subject index. The book is copiously illustrated with simple, clear, informative line drawings. There are no halftones, and I regret that at least one picture of interference fringes is not included, especially as Françon is known to have such an excellent collection.

It can be confidently expected that this book will take its place among the very important volumes devoted to a selected field of modern optics.

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The reviewer is professor of physics and chairman of the Department of Physics and Astronomy at the University of Florida.

INTERFERENCE FRINGES produced by heated gas inside an automobile dome lamp. The laser hologram that produced the image was exposed first with the lamp unlighted and then, after a four-minute delay, with the lamp lighted.

Nuclear statistics

RANDOM MATRICES AND THE STATISTICAL THEORY OF ENERGY LEVELS. M. L. Mehta, ed. 259 pp. Academic Press, N. Y., 1967. $12.00

by EUGEN MERZBACHER

As a complicated system composed of more than a few constituents, which interact according to imperfectly known laws, the nucleus has often been treated by statistical methods. In a highly excited heavy nucleus, the number of states per unit energy interval is very great, and the wave functions of these states are complex and exhibit few simple regularities.

Statistical methods have been in use in nuclear physics since the 1930's when the first estimates of mean level spacings were made, usually on the basis of an independent-particle model for a large number of fermions. The state of the theory of nuclear level densities were reviewed by T. Ericson (*Advances in Physics* 9, 425, 1960).

Improvements in resolution of nuclear reaction cross-section measurements in the past few years have made it possible to determine details of the statistical distribution of nuclear states beyond the average level spacing. Neutron spectroscopy, in particular, has yielded information about the frequency distribution of nuclear level spacings and level widths and has motivated a new approach toward the statistical treatment of energy levels and wave functions (widths), following the initiative of Eugene Wigner. The starting point of all such investigations has been a declaration of partial ignorance of the