tenance problems, to which the present book devotes a chapter.

Queuing theory was born over half a century ago, when Erlang analyzed telephone-traffic problems. Fluctuations in service demands, as varying numbers of customers began to dial numbers, posed problems in the utilization of facilities. To handle peak loads with zero or negligible waiting time would require uneconomically large facilities. Inadequate capacity leads to intolerable delays and customer dissatisfaction. This combination of a fluctuating demand for service coupled with penalties if too much or too little servicing capacity is provided is characteristic of queuing problems.

It is only in the last decade or so that the ubiquity of problems of this sort has been recognized and that "nontelephonic" studies have been made. The stacking of airplanes over an airport and the building of frequently idle runways are the penalty brackets of fluctuating air traffic. Similar problems arise with respect to toll booths on highways, bridges, and tunnels; docking facilities in ports; scheduling of public transportation; maintenance of inventories (here the penalty brackets are lost orders and excessive inventory costs); choice of the proper number of clerks and checkout aisles in a supermarket, of telephone clerks in a telephone-order retail business, of the number of spaces in a parking lot; or determination of the size of the maintenance crew needed to keep a number of machines in operation when breakdown occurs randomly.

One suspects that there must be many similar cases which are somewhat disguised, such as that of a manufacturing establishment with a variable demand for a particular technical service. The decision here is whether to contract for the services or acquire the necessary capability to perform them. Another case might be that in which one must decide whether to establish an enterprise when competing enterprises already exist. This could be profitable if customer queues have engendered dissatisfaction but could be disastrous if adequate service is available. Here, of course, the availability of other techniques of competition complicates the problem. When adequate service pre-exists, however, this factor might only shift the impact of the disaster to a different victim or otherwise distribute the losses.

This book will appeal to specialists in operations research and to others concerned with the technicalities of queuing problems in whatever context they occur. It partly fills a gap in the textbook literature which will be even better filled when the later monographs of the series appear. The mathematical level is not difficult, though mathematical maturity is assumed. As one would expect, some knowledge of probability theory is taken for granted. Indeed, I felt on a number of occasions that if the author had made a little more allowance for the "rustiness" of the mathematics of many scientists, ease of reading would be greatly increased for nonspecialists in operations research and the book would also appeal to many of the more able undergraduates. As it stands, probably only graduate students and the ablest undergraduates will be able to get through it.

The book's 11 chapters discuss arrival and service time distributions, single and multiple exponential channels, simulation of nonexponential distributions, transients, infinite queues, queue discipline and priorities, and problems of inventory control and of maintenance of equipment. Tables and graphs of relevant functions are provided. Calculations are made showing how to evaluate the balance between service cost and customers lost and between mean wait and service cost; customer impatience is discussed. Optimization of the number of service channels, effects of priorities on delays, and a number of inventory and maintenance "strategies" are also considered.

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The Chemistry of the Steroids. W. Klyne. Methuen, London; Wiley, New York, 1957. 216 pp. Illus. $3.50.

Chemistry of the Steroids. Charles W. Shoppee. Academic Press, New York; Butterworths, London, 1958. vii + 314 pp. $9.

These two monographs with the minor difference in title are written with a widely different end in view. The small monograph by Klyne is intended primarily for the nonchemical reader, and the major emphasis is given to the steroid hormones. It attempts to lay a foundation for the subject and to indicate the major properties and reactions of the naturally occurring steroids and their relatives. To me, the treatment appeared too specialized for biologists and perhaps better suited to a chemist interested in an introduction to this field of natural products. A series of references to reviews and texts appears at the end of the book.

Shoppee's monograph "sets out to present as concisely as possible the present state of knowledge." The more important references up to the end of 1955 and a few in 1956 are cited; this listing appears to be relatively complete. The highly compressed style will discourage the casual reader, but there is a wealth of well-presented and well-organized information. The inclusion of a great deal of subject matter that must be regarded as historical at this time seemed of questionable value to me, but this surely is a minor criticism of so great a task.

Both monographs are useful additions to the chemical literature and will find their place among the reference works in this very active field of investigation.

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Historia Natural del Maíz. Separata de la Revista de la Academia Colombiana de Ciencias Exactas, Fisicas y Naturales, vol. X, No. 39. Daniel Mesa Bernal. The Academy, Bogotá, Colombia, 1957. 106 pp.

The expressed purpose of this publication is to present for readers of Spanish a panorama of the history and importance of maize in early times and a résumé of the theories about its center of origin. Two chapters outline the problem, give brief statements about the historical sources, and summarize the importance of maize as the key to pre-Columbian civilization in America.

In the discussion of the theory of Asiatic origin, the Oriental members of the Maydeae are unfortunately placed on an equal footing with those of America. The statement that, of these Old World genera, *Coix* is most closely related to maize cannot be accepted without more clarification. There seems to be something wrong with the statement about the depth at which fossil pollen of *Euchlaena* was found in Mexico.

Four areas—Mexico and Guatemala, Colombia and Venezuela, the Andean plateau, and the La Plata region—are discussed as possible centers of the origin of maize agriculture. The chapter on Colombia and Venezuela is particularly appreciated because of its full treatment of an area which has received too little attention in the past.

Both sides of each controversial point are given objectively, and there is seldom a hint as to which side the author prefers. This results in an array of ideas, some much sounder than others, which, without supporting evidence, seem to be of equal value. In fact, there is nothing to indicate that the author has made any study of the subject except from the literature. We may wish also that he had made himself a little more clear in discussing such things as degree of variation, number of varieties, and primitive characteristics.

A plate and 35 text figures break the monotony of the large, double-column, closely printed pages. A few typographical errors have been noted: misspelled names (Cutler, Weberbauer), a chapter incorrectly numbered (8 or 9), and a figure inverted (page 36).

The bibliography of 85 titles includes some interesting items which have been overlooked in earlier works of this sort but fails to include some works discussed in the text. Some of the citations are incomplete.

The author's purpose has been satisfactorily accomplished, and Spanish-speaking people should find the book an interesting introduction to both ancient and current thought about this fascinating subject. Students of the history of maize will find the book indispensable for the addition which it makes to our knowledge of the old literature.

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Science in Schools. Proceedings of a conference under the auspices of the British Association for the Advancement of Science. Held on April 17 and 18, 1958, at the Royal Geographical Society. W. H. Perkins, Ed. Butterworths, London, 1958. 150 pp. 15s.

The decorative design on the cover of this attractive little book provides a good indication of the content. It reads:

"Learning before luxury? Should schools receive a better share of the scientists who are graduating today? Science as an also-ran in girls' grammar schools? 'Just one period a week of nature study' for primary school science? How are we spending now . . . how much . . . how quickly should we expand?

"These and other topical questions on science education were discussed by certain leading industrialists, scientists and educationalists of our day at the April 1958 British Association Meeting. The papers now appear in eminently readable book-form. They will be of interest to all who believe that the development of science and technology cannot take place without a much bolder programme of rapid educational advance than any which has yet been promulgated."

The problems discussed by the speakers—Sir Ben Lockspeiser, Sir Solly Zuckerman, Sir Eric James, H. F. Boulind, M. G. Bennett, Dame Kathleen Lonsdale, Sir Raymond Priestly, and others—were, of course, the problems of British schools. But the discussion applies almost equally well to American schools, for problems concerning the education of future scientists and engineers and the education in science of students who will follow other career lines are much the same on both sides of the Atlantic.

Science in Schools offers a brief, thoughtful, well-integrated, and beautifully written discussion of those problems and of how, at least in part, they might be met.

DAEL WOLFLE
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Coral Island, Portrait of an Atoll. Marston Bates and Donald P. Abbott. Scribner's, New York, 1958. 254 pp. Illus. $4.95.

Coral Island is an interesting and factual account of the inhabitants, natural history, and surface structure of Ifaluk Atoll, a half-square-mile of land in the Caroline Islands of the tropical Western Pacific. A team of investigators under the auspices of the Pacific Science Board and the Office of Naval Research spent from June to November studying the plants, animals, supply of fresh water, cultivated foods and reefs of the area in relation to the economy and daily life of the Ifalukians. The authors give a detailed description of the people and their economy, based on the things they use from land and sea. A slight surplus of essential resources was found, except for fish, which were somewhat overexploited in the lagoon.

The research team lived as self-supporting and generous guests of the Ifalukians, some of whom became close friends of the scientists. The whole atmosphere was one of cooperation on a basis of social equality. This book is filled with intimate details of the personality of the Ifalukians and of their way of life, which, with respect to housing and to clothing (or lack of it), is ideally suited to climatic and personal needs. For them, however, flies, mosquitoes, and infections present especially difficult problems.

This book makes fascinating reading for anyone interested in people and natural history.

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Safety Techniques for Radioactive Tracers. J. C. Boursnell. Cambridge University Press, New York, 1958. 68 pp. $1.75.

The "poisonous" character of radioactive substances is well proven today. The normal human being has a natural radium content of about 10^{-10} g of radium-226 in his body, and the maximum permissible amount of this element for the entire body is 10^{-7} g. The maximum permissible concentrations of radium in air and in water are 8×10^{-12} μc/ml air and 4×10^{-8} μc/ml water, respectively. Still lower permissible concentrations for the entire body are given for the heavier elements.

Thus it becomes evident that radioisotopes have to be handled with special care and with strict observation of certain safety techniques. This little booklet gives a compendious survey of the basic techniques, in the first six chapters. In a seventh chapter the facts are summarized under the headings "Do not" and "Do." A bibliography of selected references, from which some of the data presented have been taken, is a welcome guide for the reader interested in details. The booklet will be of value to the student and to those engaged in practical isotope work.

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Nicolaus Steno and His Indice. (Acta Historica Scientiarum Naturalium et Medicinalium, Edit. Bibliotheca Universitatis Hauniensis, vol. 15). Gustav Scherz, Ed. Munksgaard, Copenhagen, Denmark, 1958. 314 pp. Illus. Kr. 32.

Nicolaus Steno or, in the Danish vernacular, Niels Stensen (1638–1686), has gradually come to be recognized as one of the outstanding figures in the history of natural science. Despite the great tribute paid to Steno in Thomas Henry Huxley's address to the British Association in 1881, he had been so far forgotten that little more could be said of him in the standard histories of science and of medicine than that he discovered the parotid duct and turned theologian. Yet here is one who had discovered the Graafian follicle before de Graaf, Peyer's patches in the intestine before Peyer, and the tetralogy of Fallot before Fallot; was an exceptional comparative anatomist and zoologist; and, above all, was the father of modern geology, paleontology, and crystallography. The high position of Steno has become abundantly clear with the publication of his works, letters, and manuscripts. In 1910, Vilhelm Maar edited Steno's *Opera philosophica*; Knud Larsen and Gustav Scherz brought out, in 1941–1947, his *Opera Theologica*; then came the two massive folio volumes of his *Epistolae,* in 1952, edited by Gustav Scherz, who, in 1956, published a full-scale study, *Vom Wege Niels Stensens.*

The present work consists of a series of essays—five in English, two in German, one in French—which present an appreciation of Steno's life, scientific achievements, and influence. Added to these are Steno's *Index,* or catalog of his natural-history collection, and several hitherto unpublished documents. The volume is an important one, especially for the general reader who wishes to acquaint himself with this universal mind, which played an exceptional role in the development of modern science.

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