

sent it off to be printed. A large proportion of the paragraphs begin "In the preface Mr. Jones informs us" or "Dr. Bridges suggests that" or "It has been pointed out that". The result is a hodge-podge of undigested information, more of a bibliography than a biography.

But with all his clumsiness, the author has not completely succeeded in making his story dull. The character of Roger Bacon, the mystery which surrounds everything he did and thought, the blood-curdling legends which grew up around his name, still shine through and distract the reader's attention from the book's inadequacy. It is impossible to write about Bacon and not to leave the reader with a sense of heightened imagination and of unsatisfied curiosity. Bacon was the man who, more than any other, pushed the intellectual vitality of the Middle Ages beyond the narrow limits of scholastic theology toward the wider exploration of natural science. In his life and writings there is the freshness of the birth of a new age, and the tragedy of a great man crushed by the forces of history.

Luckily the author quotes verbatim from Bacon himself and from the modern biographers. The quotations are the best parts of the book. Here for example is Bacon's opinion of the work of his contemporary Thomas Aquinas: "These writings have four sins; the first is infinite puerile vanity; the second is ineffable fatuity; the third superfluity of volume; the fourth is that a part of philosophy of magnificent utility and immense beauty and without which facts of common knowledge cannot be understood—concerning which I write to your glory—has been omitted—." Another quotation, from the biographer Émile Charles, comments on the popular view of Bacon as a magician in league with the devil: "The wonder of the public, bordering on horror, is the homage paid by the ignorant to a science which they do not understand." These words have a more acute meaning, perhaps, to the physicists of 1954 than to the philosopher who wrote them in 1861.

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Fields and Waves in Modern Radio (Second Edition). By Simon Ramo and John R. Whinnery. 576 pp. John Wiley and Sons, Inc., New York, 1953. \$8.75.

The initial chapter reviews the basic features of oscillating circuits and waves with emphasis on the impedance concept. This is followed by a detailed treatment of static fields and their boundary value problems. Maxwell's equations are then introduced and fitted into linear circuit theory. The wave equation is derived, skin effect and circuit impedance elements are treated, and the propagation and reflection of plane waves are considered with emphasis on transmission line analogues. Then the basic concepts and terminology of guided waves are introduced by analyzing simple waves propagating between parallel planes and along parallel lines. The remainder of the book treats wave guides and transmission lines, resonant cavities, microwave networks, and radiation.

As a second edition, the text differs essentially from the first in regard to organization and new material. The new material includes: additional problems, and simple examples of static fields; more material on propagation—disc loaded, and helical guides; a section on small perturbations in cavities; a new chapter on microwave networks; and new sections on horns, slot antennas, receiving antennas, and antenna arrays.

This excellent text is designed for senior and first-year graduate courses on electromagnetic fields and waves. The book takes maximum advantage of the students' familiarity with circuit concepts, and as such is particularly suited for those following the usual engineering curriculum leading up to the field concepts and Maxwell's equations. There is much originality of presentation and excellent pedagogy displayed by the authors—particularly in the first half of the volume, and in connection with boundary value problems.

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Count Rumford

Mr. Larsen has written a highly readable book about Count Rumford (*An American in Europe: The Life of Benjamin Thompson, Count Rumford*; by Egon Larsen; 224 pp.; Philosophical Library, Inc., New York, 1953; \$4.75). Here is the history of that remarkable man—his triumphs in England, Bavaria and France; his inventions in mechanical engineering, heat transfer, domestic economy, and public administration; his scientific insight; and his gift for making friends and enemies in high places. Count Rumford's story is that of an adventurer of genius, and as such it is entertaining reading.

Physicists will find many special rewards in this book. It is a pleasure to read of Rumford's constantly questioning approach to all manner of things—carriages, stoves, clothing, explosives, social organization, or coffee. Many of his experiments are described, and some of these are documented further with excerpts from Rumford's essays. Rumford's account of his experiments on the production of heat by mechanical work, for example, is given complete with his data. Rumford knew, encouraged and irritated many of his contemporary pioneers in physics, so we learn, for example, of Sir Humphrey Davy, Michael Faraday, Thomas Young, Laplace and Ampere. Since the Royal Institution was first suggested by Rumford, much of the early history of that distinguished organization is here as well.

Biological Effects of Radiation

Biological Effects of External X and Gamma Radiation, Part I, is a welcome and useful collection of papers which were written under the auspices of the Manhattan Project during and after World War II. The list of thirty-one contributors includes many well-known names in radiobiology. The outstanding feature of the book is its detailed compilation of useful data