ography at the end of the book, and my spot-checks of the index rate it high; but the reader will sometimes wish there were a larger number of specific references in the text on individual topics.

Many physicists, ignorant of better methods, apply large-sample formulas to counts of eight. Yet small-sample theory is well developed; the only excuse for ignoring it is the difficulty of finding it and of penetrating the jargon that surrounds it. For that task in particular, I think this compact book will prove very helpful.

William Fuller Brown, Jr.
Sun Oil Company

Ferromagnetic Domains. By K. H. Stewart. 176 pp. Cambridge University Press, New York, 1954. $4.75.

There are few, if any, fields of physics which are so uniquely connected with the work of one man as ferromagnetism is connected with that of Pierre Weiss. His two hypotheses, the molecular field and the domain structure, both proposed nearly half a century ago, not only proved to be extremely fruitful but, enlarged and reinterpreted in terms of modern physics, still constitute the backbone of the present theory of ferromagnetism. This is particularly true of the domain theory which is the subject of this Cambridge Monograph on Physics. The early development of the theory was so rapid and successful that in comparison recent years brought relatively few striking new results or improvements. It is significant that only about half of the experimental data and quantitative diagrams in the book are based on material published within the last 25 years. This "comprehensive" character of the book has the great advantage that it gives a fairly uniform coverage and is an excellent introduction to the whole field. It has the drawback that newer results do not occupy as much space as some readers may wish. This is not to say that important ones have been omitted but rather that the treatment tends to be qualitative and not many experimental data are given. On the other hand, the recent beautiful work of Neél and his school and the very elegant experiments performed at the Bell Telephone Laboratories are treated in detail. The reviewer found no reference to the very interesting work of Hughes on the influence of domains in neutron transmission.

The first chapter is a general introduction to the subject and it is followed by chapters on magnetic anisotropy and on magnetostriction. The field of domains proper is discussed in three subsequent chapters on domain arrangement, on domain walls, and on hindrances to domain wall movements. The closing two short chapters are on time effects and on magnetic and thermal energy changes. The book has 70 figures, 7 plates of various power patterns but no subject index. On the whole it is a very commendable introduction into the field of magnetic domains with adequate references (over 160) for further study.

R. Smoluchowski
Carnegie Institute of Technology

Procedures in Experimental Metallurgy. By A. U. Seybolt and J. E. Burke. 340 pp. John Wiley and Sons. Inc., New York, 1953. $7.00.

This book is written for the experimenter who is new to the study of metals or for the young research metallurgist who is unfamiliar with the many important laboratory techniques which are now used in the preparation of metal and alloy specimens for study. It is assumed that the investigator is familiar with general physical and chemical principles.

The preparation of metal samples, up to the point of obtaining data on the properties of the metal, is the main theme of the book. The authors have included the various steps of specimen preparation, such as the selection of the base metals, the principle of alloying, melting, casting, fabrication, heat treatment to desired structures, and special techniques for the preparation of single crystals and of samples by the method of powder metallurgy.

As most of the operations in the preparation of samples involve high temperatures, the procedures for obtaining high temperatures, their measurement and control, the various vacuum and controlled atmosphere systems, the commonly available refractories and the preparation of crucibles are covered fairly extensively in the first six chapters of the book. The remaining chapters are devoted to the procedures for the preparation of the samples of metals or alloys.

Emphasis throughout the entire presentation has been placed properly upon the constructional features of equipment and the basic principles involved in its use; the text is copiously illustrated with excellent assembly drawings. The reader is not burdened with an excess of relatively unimportant minute details.

The scope of the book is narrower than the title suggests. The authors have omitted investigational techniques, such as microscopic examinations, x-ray diffraction methods, thermal analysis, mechanical testing, etc., as they believe satisfactory publications on these subjects are available.

G. W. Geil
National Bureau of Standards

Roger Bacon in Life and Legend. By E. Westacott. 140 pp. Philosophical Library, New York, 1953. $3.75.

This is easily the worst written book that I have ever read. As an example of the author's style, here is a complete paragraph chosen more or less at random (it appears on page 94):

"On 4 July 1928 A. G. Little, a Fellow of the British Academy, put forward the view that the writings of Bacon had been studied continuously since his death, and that they are still being studied."

The whole book is composed of a succession of short paragraphs of this kind. It appears that the author had collected notes for a biography of Bacon, listing and briefly summarizing all the published literature he could find on the subject. To make this material into a book, he threw it together, divided it into ten-page chapters, added a few introductory and concluding sentences, and

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.

V. Twersky
Electronic Defense Laboratory

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