On this, their first southward migration, these birds were doing the opposite to homing: they were deserting their birthplace for a destination that could have been known to none of them and over territory on which not a single landmark could have raised familiar memories or been previously observed.

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SCIENTIFIC BOOKS

ELECTRICITY AND RADIO

Basic Electricity. By WILBUR L. BEAUCHAMP and JOHN C. MAYFIELD. viii + 312 pp. Illustrated. Chicago: Scott, Foresman and Company. 1943. $1.60.

Fundamentals of Electricity. By WILLIAM H. JOHNSON and LOUIS V. NEWKIRK. x + 212 pp. Illustrated. New York: The Macmillan Company. 1943. $2.00.

Fundamentals of Electricity. By CHARLES E. DULL and MICHAEL N. IDELSON. xx + 456 pp. Illustrated. New York: Henry Holt and Company. 1943. $2.00.

Fundamentals of Electricity. By MORTON MOTT-SMITH. 64 pp. Illustrated. Pittsburgh: Westinghouse Electric and Manufacturing Company and Science Service, Inc. 1943.

Electricity and Its Application to Civilian and Military Life. By CHARLES A. RINDE. xii + 466 pp. Illustrated. New York: Harcourt, Brace and Company. 1943. $2.50.

Prepare Yourself. By LAWRENCE F. TULEEN, GEORGE S. PORTER and ARTHUR HOUSTON. vi + 298 pp. Illustrated. Chicago: Scott, Foresman and Company. 1943. $.96.

Shop Job Sheets in Radio. By ROBERT NEIL AUBLE. Book I—*Fundamentals,* vi + 134 pp. Book II—*Service Problems,* x + 128 pp. Illustrated. New York: The Macmillan Company. 1944. $1.50 each.

Practical Radio and Electronics Course. By M. N. BEITMAN. (3 volumes) 368 pp. Illustrated. Chicago: Supreme Publications. 1943. $3.95.

AT the beginning of the present war, it was obvious that the armed forces would make wide application of the amazing developments of the past two decades in the field of electronics. It was also obvious very early in the conflict that there was a great lack of individuals trained to operate the new highly specialized and rather complicated equipment. This lack was partly caused by the failure of most educational institutions to afford proper emphasis to electronic devices and instruments in their laboratory courses. While courses in applied electronics had been introduced in many schools, the general attitude was that the work was not too important and consequently did not enjoy the wholehearted support of many of the educators.

Fortunately, once the new electronic equipment has been designed, engineered and built, its operation is relatively simple and can be entrusted to relatively unskilled personnel. The armed forces were then faced with the necessity of giving a training program to a large group from whom this operating personnel could be selected. For such training programs, most of the available texts were utterly unsuitable in that either the treatment followed the conventional lines of logical presentation common to most college-grade text-books or the treatment in the usual high-school text was too elementary. To fulfil the need, a number of texts were prepared all according to a definite specification as to the subject-matter, method of treatment, etc. The above listed texts were some of the books written for this purpose.

As would be expected from the fact that these books were designed to definite specifications, the treatment is similar in arrangement, scope, etc. In all these books, the subject of magnetism and electricity is treated before the subject of mechanics, with the result that the conventional treatment based on mechanics is not possible. Another result of this is that the scope of the numerical problems which can be assigned is definitely limited, particularly in not making it possible to stress the energy relations which exist in electrical circuits. Here again, since the books are designed to "train rather than educate," the loss is not too serious. In all the books, considerable emphasis is placed on the subject of electro-chemistry, as applied to primary and storage cells. The main difference between the various books lies in the selection of examples, photographs and diagrams, and in this respect all of the books are very good.

"Basic Electricity," by Beauchamp and Mayfield, and "Fundamentals of Electricity," by Johnson and Newkirk, are very similar in many respects and are definitely elementary in their treatment. The first of these books actually describes many experiments with detailed instructions on the making of the apparatus for the experiments. "Fundamentals of Electricity," by Dull and Idelson, is just slightly more advanced and more emphasis is placed on numerical problems and formulae. "Fundamentals of Electricity," by Morton Mott-Smith, was prepared by the Westinghouse engineers and looks rather more like a collection of reprints from popular magazine articles than a text-book. It is, however, especially good in containing a large number of excellent sketches and photographs. "Electricity and Its Ap-

plication to Civilian and Military Life," by Rinde, while written to the same specifications, is perhaps the most advanced text of this group, and it also contains many excellent diagrams and photographs. As indicated by its title, the main emphasis in this book is on electricity and its treatment of mechanics is very brief indeed although probably adequate for the purpose.

"Prepare Yourself," by Tuleen, Porter and Houston, is a little different from the others in that it is an elaborate laboratory manual. The various standard physics experiments, beginning with mechanics, heat, sound, light, magnetism and electricity are treated in a rather unconventional manner. The student is guided through a series of simple experiments, many with common household devices, and, by means of questions and suggestions in the text, he is asked to ascertain the physical facts. Space in the book is provided for filling in the answers. Consequently, when the student has gone through this book and performed most of the experiments, he might not have a knowledge of formal physics, but he will know as many facts and will probably have a better idea of what is really aimed at in laboratory work than many students who have gone through the more formal training. The level of this book is about that of the last year of high school or possibly junior college grade. Emphasis on the idea that experiments are made to find the facts is stressed throughout the book. This factor is all too frequently neglected, particularly in some high-school physics laboratories.

The last two books, which are in a different class from those mentioned, are: "Shop Job Sheets in Radio," books 1 and 2, by Auble, and "Practical Radio and Electronics Course," Volumes 1, 2 and 3, by Beitman. The first of these is again a laboratory manual of experiments in elementary electricity with emphasis on radio and, in the second, specific experiments on radio sets. The second book, "Practical Radio and Electronics Course," is a little more elaborate and is more of a text. The three volumes of this cover fundamentals of "Radio and Electronics"; "Receivers, Transmitters and Test Equipment," and "Applied Electronics and Radio Servicing." A large number of photographs of commercial equipment and service men's kinks are found in these books. The treatment, however, is primarily such as would be useful for a trade school in that no effort is made to present logical treatment considered essential to the student of any science. There are, however, many useful kinks described in these books so that even a professional physicist would no doubt find many ideas of use to him.

It is possible that after the war the books above described will go out of print and be no longer available. Nevertheless, there is a definite place for books of this character which should be useful for the individual who wishes to go on in electricity a little beyond the conventional high-school treatment but who would not care for some reason or other to study the more conventional treatment covered in the college-grade text-books. Authors of college-grade text-books would do well to look over these various books and use some of the ideas and illustrations to liven up their own texts, which often become rather dull reading because of the author's insistence on rigorous logical treatment. All too frequently when so-called practical ideas or applications are discussed, the treatment is in the nature of an apology.

While none of these books by itself would be suitable for a formal course in physics either in the elementary schools or advanced schools, they would all be very suitable to use as supplementary texts. The treatment, which is slightly more advanced than usual high-school treatment, would make it possible for the more intelligent high-school student to advance a little beyond conventional high-school treatment. Also, the books should assist the students of college grade in showing more practical illustrations than are usually given in a conventional college-grade text. In every case, the various authors are to be congratulated on having produced these books under what must have been considerable pressure to complete them in the shortest possible time. The style of writing in all of them is easy to read and follow. With the exception of the book by Morton Mott-Smith, the pages and type are well arranged for easy reading.

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BOOKS RECEIVED

BAILEY, ALTON E. *Industrial Oil and Fat Products.* Illustrated. Pp. x + 735. Interscience Publishers. $10.00. 1945.

GEORGIEV, ALEXANDER M. *The Electrolytic Capacitor.* Illustrated. Pp. xii + 191. Murray Hill Books, Inc. $3.00. 1945.

HERZBERG, GERHARD. *Infrared and Raman Spectra.* Illustrated. Pp. xiii + 632. D. Van Nostrand Company, Inc. $4.50. 1945.

KEENAN, JOSEPH H. and JOSEPH KAYE. *Thermodynamic Properties of Air.* Pp. iii + 73. John Wiley & Sons, Inc. $2.25. 1945.

SIMONDS, HERBERT R., M. H. BIGELOW and JOSEPH V. SHERMAN. *The New Plastics.* Illustrated. Pp. xii + 320. D. Van Nostrand Company, Inc. $4.50. 1945.

SMITH, JAMES G. and ACHESON J. DUNCAN. *Sampling Statistics and Applications.* Illustrated. Pp. xii + 498. McGraw-Hill Book Company. $4.00. 1945.

WILSON, CHARLES M. *New Crops for the New World.* Illustrated. Pp. viii + 294. The Macmillan Company. $3.50. 1945.

YOUNG, C. B. F. *Chemistry for Electroplaters.* Illustrated. Pp. vi + 205. Chemical Publishing Co., Inc. $4.00. 1945.