a sound background for understanding the physical basis on which antennas work. Indeed, one may go further and say that the student who masters the material in the text will be very well equipped to tackle any problem involving electromagnetic waves. When two authors such as Dr. Schelkunoff and Dr. Friis set out to expound in detail their wide and expert knowledge of a subject in which both have contributed so much original work, we might reasonably expect the result to be a notable book. In this case we are not disappointed.

The book deals hardly at all with engineering details but aims to give the reader an understanding of fundamental principles. It starts with the basic concepts of radiation and waves and includes a discussion of Maxwell's equations and energy flow in the electromagnetic field. It goes on to discuss how energy is extracted from or fed into a medium by means of an antenna and deals with the fundamental electrical quantities such as input impedance, etc. A more detailed discussion of linear antennas is then given, together with antenna systems, including the broadside and rhombic antennas. Aperture antennas such as horns, slots, lenses, and reflectors are next considered and here full use is made of the impedance concept for free space.

Advanced mathematical theory has been omitted and is dealt with by one of the authors in a companion volume. Sufficient theoretical treatment is given, however, for the understanding of the principles involved in the operation of antennas and arrays.

As a textbook for students in electrical engineering *Antennas* can be thoroughly recommended. It contains instructive exercises at the end of each chapter. Physics students could also study it with profit as a first-class illustration of the application of electromagnetic theory to real problems. Some of the text, however, will only be fully appreciated by the advanced research worker, and it will be long before a student has fully exhausted its resources. As a reference text it is excellent, and it is well indexed. The authors are clearly very well read in the literature of the subject and have included an extensive bibliography covering mainly American and British work. The book is well produced and is freely illustrated with instructive diagrams. The authors are to be congratulated on producing a work that will long take a prominent part in the literature of the subject.

Advanced Antenna Theory. Sergei A. Schelkunoff. New York: Wiley; London: Chapman & Hall, 1952. 216 pp. $6.50.

It must be admitted at once that the advanced mathematical theory of antennas is difficult. It is the nature of the problem that makes it so. Luckily, one can go a long way in understanding the principles of operation of antennas without a detailed mathematical treatment of the electrical field and current distribution. This is well illustrated in the work reviewed above. However, it is a challenge to mathematical research workers to apply their techniques to a problem which clearly, in principle, can be solved. A great deal has recently been done in advancing the theoretical treatment of the dipole antenna, and the author has himself contributed appreciably.

The book opens with an exposition of the mathematical apparatus necessary for tackling this difficult problem. Three main lines of attack are then described. First, there is that of the author himself, based on a treatment of the biconical antenna to which accurate mathematical methods can be applied. From this, by approximation can be deduced the properties of thin antennas of different shapes, and in particular of the cylindrical antenna. Next comes the rigorous treatment of the resonant properties of a spheroid, the only form for which a fully precise mathematical treatment has been given. Finally, the alternative approximate approach through the integral equation of Hallén is discussed and the recent developments of this by King and Middleton and other workers.

This is not a book for the casual reader—but for those who either have, or are prepared to learn, the mathematical technique it is full of interest and instruction. It forms an excellent complement to the book reviewed above, the two together giving a complete account of theory and practice. It is well produced and written in the clear and characteristic style that has come to be associated with this author.

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Tables of Percentage Composition of Organic Compounds. H. Gysel. Basel: Verlag Birkhäuser, 1951. 637 pp. Sw. fr. 125.

Complete and accurate tables of the percentage composition of organic carbon compounds have been needed for some time now—since the standard work of M. M. Richter, published in 1912, no longer satisfies our requirements. This book alleviates this need, and Dr. Gysel and his collaborators deserve our thanks for this laborious and tedious undertaking.

The percentage compositions are computed to two decimal places, and the atomic weights adopted by the Commission on Atomic Weights of the International Union of Pure and Applied Chemistry at its meeting in New York City in September 1951 are used in the calculations. The book is divided into four parts which contain percentage tables for carbon and hydrogen up to $C_{60}H_{122}$; for carbon, hydrogen, and oxygen up to $C_{52}H_{106}O_6$; for carbon, hydrogen, and nitrogen up to $C_{50}H_{60}N_6$; and finally for carbon, hydrogen, oxygen, and nitrogen up to $C_{50}H_{102}O_4N_6$. Additional tables give multiples of weights of the elements and groups that are of interest to the organic chemist. The use of the tables is clearly explained in the introduction, which is written in English, French, and German.

Organic chemists and analysts who have spent valuable time in calculating percentage atomic compositions will find this book of great value.

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