

**Molecules in Motion**

By Prof. T. G. Cowling. (Hutchinson's University Library, No. 44.) Pp. 183. (London: Hutchinson's University Library, 1950.) 7s. 6d. net.

**T**HIS is a mathematical treatment shorn of all difficult mathematics, in which the associated experimental physics is largely taken for granted and so mentioned very briefly, leaving a skeleton which makes a reasonably connected essay. The opening chapters explain in an elementary way the historical development of the kinetic theory, and the general properties common to all gases. Mean free path phenomena of diffusion, thermal conductivity, and viscosity are discussed clearly, and the later chapters on the application of statistics, Maxwell's distribution, and the atmosphere contain some very useful ideas. The last chapter on electricity in gases is far too brief for such a topic, but leads up to an account of a degenerate electron-gas and so can be considered relevant.

In the section on viscosity, the accommodation coefficient and Sutherland's formula are considered. The reader to whom this is directed is no dilettante. Surely he deserves a more carefully considered definition than: "Viscosity is the stiffness which makes it difficult to pour or stir treacle"—which might apply to writer's cramp, but for the illumination of the next sentence, "It is most apparent in treacly liquids . . .". A number of experimental statements might have been made more explicit.

As a purely academic essay, the book must be judged successful within the limits that the author has set himself; as a popular account, one feels that it would appeal more strongly to the interested layman if it had been more rigorously worded; while the reader already possessing a substantial background of experimental physics may find it a helpful introduction to the more comprehensive treatises on the kinetic theory.

G. R. NOAKES

**Ultrasonics**

By Benson Carlin. Pp. xi+270. (New York and London: McGraw-Hill Book Co., Inc., 1949.) 30s.

**T**HERE are now a number of books dealing with ultrasonic applications in general, but the present one is more restricted. The author, when at the United States firm of Sperry Products, was occupied in flaw-detection, and this is the main concern of the book, though there is also a chapter on ultrasonic agitation. On these themes hangs rather infelicitously an account of ultrasonic waves and some of their general properties, in which the author's attitude to the reader seems to be the unhistoric one; for the author presupposes a knowledge of radar, which is used as an analogy for discussing ultrasonic testing. The emphasis is, in fact, on circuits rather than on physical principles, which seem to follow rather than precede the circuits on which they are based. Thus, we have to wait for sixteen pages before we are told what frequency and wave-length are. Diffraction, so important in flaw detection, is dismissed in six lines, while resolving-power is not mentioned.

Although the text will disappoint a physicist, an electronic engineer—especially one versed in radar technology—will revel in the display of circuits, and the able discussion of their relative merits. There is also much practical information about piezo-electric and magnetostrictive sources, their mounting, testing and relative suitability to the applications under discussion, which is not readily to be found, certainly not grouped in handy form, elsewhere. This and the

final chapter on the author's experience in the ultrasonic testing of materials are the most valuable portions of the text.

The reader in Great Britain accustomed to staid scientific treatises must not be surprised, in view of the country of origin of this book, to find a rather breezy phraseology, although, even so, I was rather perturbed to read (on p. 255) in a final summing-up of ultrasonic testing: "Most of the bugs inherent in it have been ironed out".

E. G. RICHARDSON

**On the Systems formed by Points regularly distributed on a Plane or in Space**

By A. Bravais. Translated by Amos J. Shaler. (Crystallographic Society of America, Memoir No. 1.) Pp. viii+113. (Irvington-on-Hudson, N.Y.: Crystallographic Society of America, c/o Phillips Laboratories, Inc., 1949.) 3.90 dollars.

**I**T is appropriate that the hundredth anniversary of the presentation of Bravais's historic memoir on crystal lattices should be celebrated by the first English translation. Although this work is an essential part of the foundation of the science of crystallography, it is probably true to say that scarcely any of those working in this field to-day have read this memoir. Here is the complete and fundamental derivation of the five two- and the fourteen three-dimensional crystal (Bravais) lattices, and also of the corresponding reciprocal lattices.

The translator is to be congratulated on making this historic memoir so widely available to present-day crystallographers. The reading of books such as this will help the realization of the debt which we owe to those who worked on the theoretical and practical problems of crystals in the days before the discovery of X-ray diffraction.

N. F. M. H.

**Forage Crops**

By Prof. Gilbert H. Ahlgren. (McGraw-Hill Publications in the Agricultural Sciences.) Pp. x+418. (New York and London: McGraw-Hill Book Co., Inc., 1949.) 42s. 6d.

**T**HE author, who is professor of farm crops in Rutgers University, New Jersey, has designed this book as a companion volume to H. K. Wilson's "Grain Crops", recently published in the same series; hence he restricts his attention to such crops as are "harvested by man and later fed to livestock". In forty-one short chapters he attempts to embody "the facts and fundamentals associated with the production of hay and silage crops".

Following three introductory chapters, twenty-one chapters are devoted to individual treatment of the more important legumes and grasses in order to introduce the student to the characteristics and adaptations associated with each. The author describes this as "detailed species study", but the treatment is far too elementary and superficial to give the student much idea of the plants. The remainder of the book is devoted to topics "common to all the forage crops", for example, hay mixtures, soil and cultural treatments, seedbeds, hay and silage, plant improvement, diseases and pests, etc.; again the treatment is scarcely adequate.

In his preface the author states that he "has drawn freely from hundreds of scientific and popular bulletins covering this important field" and expresses his hopes that the book will not only meet "an important need for a modern textbook in forage crops" but "also prove valuable as a reference book for workers in the field of agronomy". It is very