which were almost entirely absent in the other dictionary now appear.

In the first edition of a complex endeavor such as this it is easy to find definitions which one can criticize as unclear, incomplete, or meaningless but the majority are well done and some are quite excellent. It was the hope of the editor that the book would help to establish a common language in this field. On the whole it does succeed in this purpose, and should help those familiar as well as those not so familiar with guided missiles and space flight to achieve this end. A minor but attractive feature of the book is the inclusion of several good photographs of rockets and models of space vehicles.

**Elements of Materials Science:** An Introductory Text for Engineering Students. By Lawrence H. Van Vlack. 528 pp. Addison-Wesley Publishing Company, Inc., Reading, Mass., 1959. $8.50. *Reviewed by Peter L. Balise, University of Washington.*

THE teaching of engineering materials is undergoing a revolution, changing from a largely empirical consideration of materials' gross properties to a more scientific study of materials structure. This is part of the larger revolution, in which much knowledge that formerly was in the province of physics is now common engineering practice. Although the process of discoveries in pure science eventually being applied in engineering has been going on since the beginnings of science, it is most notable recently because of its accelerating rate.

Much yet remains to be understood about the relations between a material's structure and its behavior, but knowledge has advanced far enough to permit the engineer to predict approximately the properties of a material on the basis of its composition. Courses in engineering schools at present range from the traditional empirical approach to a rigorous study of solid-state physics. For those who take a position near the middle but definitely on the scientific side, Van Vlack's introductory text is perhaps the most suitable one now available.

The first half of the book is concerned with the internal structure of materials, proceeding from atomic forces and arrangements to crystals, phases, microstructures, and macrostructures. Although the emphasis is on clear and visual representations, there do not appear to be excessive simplifications at the expense of accuracy. Examples are given usually in terms of engineering applications which should hold the engineering student's interest, while the physics student might want a more thorough theoretical analysis.

The second half of the book is devoted to the behavior of materials in service under various types of stresses and conditions, including thermal reactions, corrosion, electromagnetic fields, and radiation. Standard subjects such as creep and fatigue are discussed, but there is much additional description of new applications such as magnetic drilling and irradiation of

plastics. Although specific materials are mentioned throughout the text, the traditional chapters on single materials are not to be found.

The illustrations are excellent, and there are many problems and an annotated bibliography with each chapter. The book is not intended for the physicist, and further study would be required by the engineer specializing in materials. Most engineering materials courses would need revision to use the book, but it is highly recommended for this purpose.

**The Logic of Scientific Discovery.** By Karl R. Popper. Translated by author from 1934 German ed. 480 pp. Basic Books, Inc., New York, 1959. $7.50. *Reviewed by George Weiss, Institute for Fluid Dynamics and Applied Mathematics, University of Maryland.*

MOST practicing physicists are likely to equate the usefulness of their research with the power to predict, however localized this may be. Yet few, I think, would be willing to give more than a guarded reply to the question of "why" their theories or experiments are able to predict further physical phenomena. This diffidence regarding the implications of scientific research has not always been the case; few physicists from Newton to Einstein doubted that an external world would impose an ultimate form on scientific theories, and that the mysteriously efficacious principle of induction could be explained by a deeper understanding of the physical world. One of the more interesting assertions made by Karl Popper in *The Logic of Scientific Discovery* is that we should not expect an ultimate form for physical theory, and, by implication, that the technologic and esthetic rewards of research are sufficient justification for its pursuit.

This book contains two points which are of interest because they run counter to the more usual concepts of epistemology. At the very beginning Popper rejects entirely arguments based on the principle of induction (not the mathematical principle, of course), claiming that it is not provable in any form. Popper's second somewhat novel point is that the value of a theory of the external world should be related to its falsifiability rather than its verifiability. That is to say, a theory which can more easily be refuted says more about the real world. These points are indeed quite plausible, but just as in Popper's justification for the pursuit of scientific research, we may say that such questions are likely never to be resolved in any ultimate way but they can profitably be discussed for purely esthetic reasons.

The present edition of the work consists of a translation of the 1934 edition together with many appendices containing additional material, changes of opinion, and detailed discussions of points in the text. Not the least interesting of these appendices is a letter written by Einstein clarifying the main points raised in the famous Einstein-Podolsky-Rosen paper. Popper does not dismiss these authors' objections to quantum theory