those on germanium, silicon and bismuth tellurides only one reference each later than 1962. The article on the lead compounds is brought up to date by an appendix; the articles on the antimonides are otherwise the only ones which are up to date as written. It would appear that the main part of the book has undergone a gestation period rather longer than that for an elephant.

Each article is roughly similar in layout; an introduction is followed by a section on methods of preparation, purification, crystal growth and doping. General properties, which include crystal structure, density, and thermal and elastic properties, are next discussed. The band structure is described and the resulting transport and optical properties are listed. The properties of alloys may then be given, and finally some comments on applications of the materials to devices. Mechanical properties, which are presumably of interest to device engineers, are completely ignored except for a very brief mention in the article by Putley, which is also the only one to give consideration to the making of contacts. Nowhere is there any serious attempt to explain the theory of semiconducting materials.

It is generally considered unfair to criticize a book for not being what its author never intended it to be. In this case, however, it is extremely difficult to determine the purpose of this book. Its lack of theory renders it useless as a text-book for students. If it is intended as a guide to the device engineer in selecting suitable materials for his devices, then a summary of the properties of all the materials in tabular form would be an invaluable aid, particularly for comparison purposes. To be really helpful to him, the sections on applications could also undergo a considerable expansion. There is such a lack of detail with regard to techniques that only someone who is already experienced with semiconductor materials would find it of use, perhaps when switching his attention to, to him, a new material. The collection of so much information into one volume is to be welcomed, but a division by properties and applications rather than by materials would be more appropriate.

The book is pleasingly produced and is very well indexed.

DAVID DEW-HUGHES

MECHANISMS OF MIND

The Nature of Psychology

By Kenneth J. W. Craik. Edited by Stephen L. Sherwood. Pp. xx+184. (London: Cambridge University Press, 1966.) 30s. net; 6 dollars.

KENNETH CRAIK, had he lived, would by now have been recognized as one of the most original and versatile psychologists of his generation. This selection from his unpublished writings, introduced by a brief biography from Sir Frederic Bartlett, should be welcome to all who knew him and highly instructive to those who did not. Born in 1914, a classical scholar at the Edinburgh Academy, and a student of philosophy under Prof. Kemp Smith, Craik was eventually attracted to psychology by the lectures of the late Prof. Drever. After graduating in that subject, he moved to the Cambridge laboratory to embark on a series of experimental researches on the problems of sensation. Besides attending the recognized classes on psychology, we are told, he went off to the Cambridge Technical School to take a course in engineering, and then under Lord Adrian's guidance steeped himself in the anatomy and physiology of the brain.

In 1940 he obtained the degree of Ph.D., and a year later a Fellowship at St. John's College with a thesis on "The Experimental Study of Visual Adaptation". The bibliography of his published work runs to eighty numbers—an output of almost eight papers every year. During the Second World War, so Prof. Bartlett relates, "he became a key man in the scientific service of his country".

He was chairman of the Target Tracking Panel of the Ministry of Supply, and an active member of the Panel on Servo-mechanisms, of the Military Personnel Research Committee, and of the Vision Committee for the Flying Personnel Research. For security reasons, it has unfortunately been impossible to publish any of his official reports. In 1945, on the eve of V.E. Day, while cycling along King's Parade, he was knocked off his bicycle and killed by a passing car. In describing what happened the editor and his collaborators observe that they "have come upon about ten recorded presentiments of the circumstances of his lethal accident".

Of his numerous manuscripts, the earliest that survives is apparently an essay on "Immortality", written when he was only 17. Prof. Bartlett quotes a couple of short extracts, but it seems a pity it was not included in the present volume. The selection begins with "the epilogue from the Ph.D. thesis", and then proceeds to a couple of draft chapters and several isolated notes for a book on "The Mechanism of Human Action". The next two sections include reports of "experimental work" (for example, observations on a prolonged monocular scotoma, the effect of boldly fixating the noonday Sun for two minutes) and suggestions for the "quantification of sensation". Of the four papers that make up the third section—on "Aspects of Psychology"—the most noteworthy is a lecture on "Psychology for Medical Students"; this brings out with a shrewd impartiality both the weaknesses and the strong points of all the different schools, and stresses the need for an eclectic text-book of psychology specifically for the student of medicine. What he has in mind, he tells us, is a book which would omit all that is unnecessary for the practising physician and concentrate solely on topics of direct utility.

Here, as elsewhere, Craik fully recognizes the value of introspective techniques; but in almost all these papers his aim is avowedly to think first of the human mind as functioning through the mediation of brain-mechanisms. And throughout these selected excerpts, which, it must be remembered, were written more than 20 years ago, and in the ingenious "brain-models" which he describes, he reveals a remarkable anticipation of the later contributions made by cybernetics and information theory. The "standpoint of the electronic engineer" is equally prominent in his only book (on *The Nature of Explanation*) and in the last of his papers, the two published posthumously on the "Theory of the Human Operator in Control Systems".

The collection ends with a section headed "Philosophy", consisting of a dozen short papers dealing with the purely mechanistic approach. Of these perhaps the most illuminating is his reply to the criticisms urged by W. H. Barnes in reviewing his book in this journal ("Is the Mind a Calculating Machine?" *Nature*, 153, 603; 1944). Here he reverts once again to the subject of his youthful essay, and explains that his intention was "to pursue the physiological and mechanistic approach" as the most fruitful and profitable line available at the moment, and to "convey its relevance to the body-mind problem, to the explanation of thought and behaviour, and to the immortality of the soul". This fascinating set of papers, thirty-five in all, reveals the many-sided interests of Craik himself and the brilliant promise of his early work—a promise which unfortunately was never to be fulfilled.

CYRIL BURT

Dictionary of Nuclear Physics and Nuclear Chemistry German - English/American; English/American - German. Second revised and enlarged edition. Edited by H. Rau. Pp. 351. (London: Sir Isaac Pitman and Sons, Ltd., 1964.) 55s.

This dictionary, though considerably enlarged from its first edition (*Dictionary of Nuclear Physics*, published