the whole human element of the thing. However, this element cannot be spirited away so easily. Frank shows how it turns up time and again to embarass and put on the spot scientists who have no opinion or who may be in the grip of some childhood philosophy. For instance, is relativity theory antimaterialistic? This may be an important question depending upon the prevalent climate of opinion.

Actually, as Frank concludes, the history of science has itself been less tough-minded than the attitude described above: "If we wish to speak in a brief and rather perfunctory way, we may distinguish between two main purposes of a theory: use for the construction of devices (technological purposes), and use for direct guidance of human conduct. The actual acceptance of theories has always been a compromise between the technological and the sociological value of the theory." We have here liberal education in the true sense from the pen of a great teacher and humanist.

Thermodynamics and Statistical Mechanics. By A. H. Wilson. 495 pp. Cambridge U. Press, New York, 1957. $9.50. *Reviewed by M. Kac, Cornell University.*

This book is intended for students of theoretical physics since the author feels that most textbooks in this field have been written primarily for chemists. However, a number of topics (chemical reactions, solutions) usually associated with physical chemistry are treated in detail. The emphasis is supposed to be on the principles but the number of applications is so large and many of them are treated so sketchily that this worthy aim is somewhat obscured.

The first four chapters are devoted to classical (phenomenological) thermodynamics and a valuable innovation has been introduced by including the Caratheodory axiomatic approach (Chapter 4). This is one of the best parts of the book and it tends to emphasize the often overlooked fact that thermodynamics is logically quite a subtle subject.

The remaining nine chapters are devoted to statistical mechanics and these follow more or less standard lines.

The more delicate portions (notably the theory of condensation) are dealt with briefly, too briefly for the reviewer's taste. Still the style is lucid and the book contains an impressive amount of information without being ponderous and verbose.

It should be useful as a textbook and a reference book and the part on phenomenological thermodynamics is truly excellent.

Physical Properties of Crystals: Their Representation by Tensors and Matrices. By J. F. Nye. 322 pp. Oxford U. Press, New York, 1957. $8.00. *Reviewed by R. B. Lindsay, Brown University.*

The literature on crystal physics is very extensive both from the standpoint of the elucidation of structure by means of x-rays and electron microscopy and that of the prediction of properties from the statistical mechanics of the solid state. The author of the present text has set himself a rather limited task and within the framework of his purpose has produced what will undoubtedly be a useful book. He examines in detail those properties of crystals which can be expressed in tensor notation and the thermodynamic relations connecting them. This means that he regards a crystal effectively as an anisotropic continuum having certain symmetry properties and pays no regard to its atomic structure.

The book consists of four parts of which the first is an exposition of tensor analysis; this, though brief, is elegant, clear, and thorough. It is followed by a much longer group of chapters on equilibrium properties of crystals including magnetic, electric, elastic, and piezoelectric behavior. This part is concluded by a chapter on thermodynamic relations, presupposing a working knowledge of thermodynamics, but serving admirably to tie together the various properties with the assistance of numerous ingenious schematic diagrams. The third part discusses transport properties including thermoelectricity but not superconductivity. There is an adequate account of Onsager's principle in irreversible thermodynamics. Part Four is a brief presentation of crystal optics. There are eight appendices including a rather substantial one reviewing the fundamentals of crystallography. A useful feature is the inclusion of numerous exercises through which the reader can test his understanding of the text. The book is suitable as a text in most universities for senior undergraduate majors in physics or first-year graduate students, but it should also be helpful for all who are engaged in research involving any phase of crystal physics.

The Science of Engineering Materials. Edited by J. E. Goldman. 528 pp. John Wiley & Sons, Inc., New York, 1957. $12.00. *Reviewed by Cyril Stanley Smith, Institute for the Study of Metals.*

"The present book is an outgrowth of a series of conferences and symposia, formal and informal, that culminated in the Carnegie Conference on the Impact of Solid States Science on Engineering Education which was held in Pittsburgh at Carnegie Institute of Technology in June 1954."

The conference and this book are manifest proof of the desire of the present generation of solid-state physicists—largely under the inspired leadership of Frederick Seitz—to interpret theoretical achievement in terms understandable by the average engineer.

The book contains 18 chapters, each written by an outstanding research man in the style which has come to be regarded as appropriate for the engineer. There is little really new in the book, but teachers of engineering who have kept abreast of their subject will be grateful for a handy reference and an outstandingly good presentation of all aspects of solid-state physics of concern to them.

There are chapters on cements, plastics, and glass—all non- or pseudo-crystalline and hence beyond the