Boundary Layers is a monumental achievement. It deserves a place on the desk of every student and worker in the field of fluid mechanics.

The Theory of Laminar Boundary Layers in Compressible Fluids. By K. Stewartson. 191 pp. Clarendon Press, Oxford, 1964. Paper $10.10.
Reviewed by L. Talbot, University of California, Berkeley.

Although a book ought to be reviewed on its own merits, it is difficult to resist the urge to consider the present volume in the light of *Laminar Boundary Layers* (see above review). The reason is that Stewartson's monograph contains almost precisely the kind of material on compressible boundary layers which would be required to round out the treatment of boundary layers given in the Rosenhead volume. Since both books have come from the same press, and within so short a period of time, it is inevitable that one should wonder if they could not somehow have been combined. The unity and economy of treatment which might thus have been achieved is so apparent that it hardly needs saying. What is really surprising, however, is that nowhere in Stewartson's monograph is the Rosenhead volume mentioned.

The first two chapters of Stewartson's monograph are concerned with fluid properties and the basic equations of flow. Real-gas effects are mentioned briefly, but throughout the remainder of the book only ideal-gas flows are considered in detail. The same is true for rarefaction effects.

The third and fourth chapters deal with boundary-layer flows without and with pressure gradients, respectively. Both exact and approximate solutions of the boundary-layer equations are discussed. The exposition is clear and concise, and the coverage quite comprehensive. Chapter 5 is concerned with three-dimensional layers, and the sixth chapter covers some unsteady problems. In the latter, particular attention is given to the shock-tube boundary layer and Rayleigh problems. Hydrodynamic instability theory is not discussed. The final chapter contains discussions of a number of interesting interaction problems involving shock waves and boundary layers; the reviewer found this chapter to be the most stimulating in the book.

There is ample evidence that Professor Stewartson has done some considerable thinking about the subject matter of which he writes. In many instances he brings a fresh viewpoint, both to the latest problems and to topics which by now are regarded as almost classical. His own original contributions to laminar boundary-layer theory are large in number, and he has the tendency to emphasize these more than other work on the same topic. This is not intended as a criticism but rather as an indication of the personal nature of the book, in which the views of Professor Stewartson are clearly in evidence.

There are in the book nearly 300 cited references. They are given by source, titles being omitted, and they are numbered consecutively at the end of each chapter rather than being collected together.

The omission of several topics, such as instability theory and some consideration of compressible Oseen flows is regrettable, but as always, some selection of topics is inevitable. All in all, this volume probably represents the most complete account of compressible laminar boundary layers at present available within the covers of a single book. In this case, the covers are paper, which make it a rather expensive item by comparative standards.

The Role of Science in Civilization. By Robert Bruce Lindsay. 318 pp. Harper & Row, New York, 1963. $6.50.
Reviewed by Phyllis A. Richmond, University of Rochester.

This is a thought-provoking, well-written book. The view of the scientist as a passive observer of nature is replaced by that of the scientist as a creator who "chooses the kind of experience he desires to create". Lindsay avowedly aims in part to defend science from those critics among the humanists who see it as grossly materialistic and destructive of those values in life considered most significant. On the whole he is successful, and in the process he shows that the use of creative imagination in some areas of science is as vivid as in the arts. His appreciation of nonmaterial aspects of science is refreshing.

There is no denying the breadth of Lindsay's viewpoint. Thomas Browne's *Religio Medici* comes to mind as a comparable work. A good attempt is made to answer the school of thought represented by philosophers like Karl Jaspers, who write of science as a limited and incomplete vision of the totality of experience. This is not entirely successful because Lindsay tends to see more science in the social sciences and humanities than probably exists or should exist in these fields.

The book discusses what science is and then explores its relationship to the humanities, to philosophy, to history, to communication, to technology, to the state, and to human behavior. The description of science is primarily from the vantage point of physics and chemistry. A few biological and geological examples are included, but medical ones are absent. This is, perhaps, unfortunate, because it is possible to discern several distinct scientific methods when all the sciences are taken into account.

The section on the logical structure of a scientific theory is rather unusual. It is limited to deductive reasoning without reference to inductive reasoning; that is, it is Euclidean, not Baconian, and in essence ignores the 17th-century revolution in scientific thought. "Primitive, intuitive, undefined notions" are axioms rather than hunches. Observations or experiments are undertaken to *verify* a collection of deductions. There is no suggestion that conclusions can be derived from a collection of observations and verified by accurate prediction, though prediction is discussed as part of theory elsewhere in the book. When one considers that Newton wrote the *Principia* in classic deductive form, though he used the inductive method to arrive at much of its content, Lindsay's section is doubly interesting. It suggests that in some areas of scientific endeavor there has been a return to the rigorous argument of the classic era. This needs to be investigated. Have we come full circle in some areas of physical science? Does the *method* of the theo-

retical physicist have more in common with Archimedes and Aristarchus than with Robert Boyle?—a most thought-provoking proposition. Is physical science—in its more ethereal regions—becoming an art? This would bring it into line with the biological, geological, and medical sciences, which have never entirely lost all of their "art" characteristics.

All the interesting features of this book cannot be presented in a short review. The chapter on Science and Philosophy has a brief but delightful imaginary dialogue between a scientist and a philosopher. The 20th-century lag of philosophical interpretation behind scientific concepts is dealt with most skillfully. One is reminded of the adage that it takes twenty years to get a new idea into a textbook and another twenty to get it out again when obsolete.

As a trained historian, the reviewer finds the discussion of scientific objectivity in historical writing disappointing. History has to deal with documentary sources after a process of natural selection by time. It is well known that there are many gaps, particularly in intellectual history, and no amount of "scientific" investigation will return that which is known to have been destroyed. The matter of acquiring a *feel* for a period of time, such as the Restoration England of Newton's prime, is not so difficult to acquire as Lindsay suggests, and understanding a science in its own frame of reference may often be achieved better by those who are trained not to read modern meanings into ancient words.

The chapter on Science and Communication, which is the longest in the book, will be of greater interest to scientists than to nonscientists. That on Science and Technology is a neat little history of technology. Science and the State concerns the applications of science as they come under political control, as well as recent developments in governmental support of science in the United States. Science and Human Behavior touches upon a field still in its infancy.

This is an interesting and timely book. It should be required reading for all scientists, for those who would understand the deeper purposes of modern science, and for students of intellectual history.

Selected Problems in Physics with Answers. By M. P. Shaskol'skaya and I. A. El'tsin. Transl. from Russian by W. J. F. Reynolds. English Transl. Edited by F. Castle. 246 pp. (Pergamon, Oxford) Macmillan, New York, 1963. Paper, $3.75.
Reviewed by T. Teichmann, General Atomic Division, General Dynamics Corp., San Diego.

Elementary courses in physics (high-school and first-year college) are so often treated merely as the foundation for more sophisticated and complex things that the problems in such courses tend to be rather artificial. This need not be, for there are many phenomena in life, and for that matter in science, which are described fairly completely by the concepts of elementary physics, and whose study is both interesting and entertaining, and some times even educating!

The problems in this book are largely of this character. They have been chosen to cover the ground of what seems to be a Russian school-leaving exam in physics, though they include a number of topics which would only be covered by a beginning college course or by some judicious independent reading. They are not designed to be tricky or complicated, but they do call for the ability to see the concepts underlying the form. Almost all branches of physics are covered (except, obviously, quantum mechanics) and more than two thirds of the book consists of answers, often given in several ways. Both the format and the style are very readable. Since the cost is relatively modest, this book can be unhesitatingly recommended to both the neophyte and the expert.

Handbook of High Vacuum Engineering. By H. A. Steinherz. 358 pp. Reinhold, New York, 1963. $11.75.
Reviewed by Björn Bergsnov-Hansen, Stanford Research Institute, Menlo Park, California.

In the relatively new field of vacuum technology, pertinent information is widely distributed over the literature. A concise handbook would therefore be extremely welcome. Looking at the table of contents of Steinherz's book raises *big expectations;* however, examination of the text leaves one somewhat disappointed. In some chapters a wealth of information is given in the form of abstracts of papers published in the field. However, the book would have gained considerably if the author had attempted to evaluate the material and place the facts in focus. As it is, in large sections of the book the significant information is hidden in short and partly incomplete descriptions of experiments. Furthermore, detailed description of commercially available equipment is almost exclusively limited to that manufactured by the author's company.

The book would have benefited from more careful editing. The text contains imprecise expressions and concepts; in particular, some of the mathematical expressions and equations are confusing. For example, the letter d is used as both a differential symbol and diameter within the same paragraph; the letter l denotes both length and liter within the same equation; total differentials are given finite values.

In spite of these objections, the book may be considered a worthwhile addition to the bookshelf. Several useful tables and especially the extensive literature references (almost four hundred) make it a useful source of information.

Strange Particles. By Robert Kemp Adair and Earle Cabell Fowler. Vol. 15 of Tracts on Physics and Astronomy, edited by R. E. Marshak. 151 pp. Interscience, New York, 1963. $4.75.
Reviewed by Herman Feshbach, Massachusetts Institute of Technology.

It is unfair to this excellent volume and to its most able authors to start this review with a complaint on the current use of the word "strange". To be sure the properties of the K particles, and of the hyperons Λ, Σ, and Ξ were strange when they were first discovered, but there seems to be no reason to perpetuate this memory of our initial ignorance which after all is always present when a whole new range of phenomena comes into view.