

and it is not certain that they really add to understanding.

The printing and illustration are excellent and, for a change, the wealth of worked and unworked examples include many which are not to be found in Routh, Lamb, or Whittaker.

The emphasis is on physical understanding and, to this end, mathematical technicalities are kept to a minimum. One can only applaud this approach, but surely it need not involve making loose or incorrect mathematical statements. An otherwise good chapter on nonlinear oscillations is marred by "... this series converges, i.e. the amplitude of each higher harmonic is smaller than that of the preceding term". In these days of departmentalized education there is a real risk that a student will never have such errors corrected for him. Again it is good to expose a student to a discussion of fundamentals, such as the equivalence of Newtonian and Hamiltonian laws. But then it should be done carefully without brushing under the carpet the problem of how one would define mass without Newton's second law.

The reviewer was irritated by references in the text to Sir Arthur Eddington, Baron Fourier, Lord Rayleigh, Rev. Wallis, etc. Why not also Herr Einstein and Mr. Tait? Indeed the titles of aristocracy seem to have dazzled the author to the point of rendering two lords indistinguishable from each other—there is an index reference to Lord Rayleigh on page 517 where the intention is clearly Lord Kelvin! This is a good book and will probably run to a second edition. Perhaps the opportunity will be taken to drop all this.

More on the two cultures

SCIENCE AND HUMAN VALUES (2nd ed.).
By J. Bronowski, 119 pp., Harper and Row, New York, 1965. \$3.00.

by *R. B. Lindsay*

The relation between science and the humanities, or arts, has become a much discussed topic in our time. C. P. Snow's celebrated lecture *The Two Cultures* (1959) is usually mentioned

in this connection. It is interesting to observe, however, that in 1953 the author of the book under review gave a series of three lectures on the theme of science and human values at the Massachusetts Institute of Technology. These lectures were published in book form in 1958. A second and revised edition of this book now appears. The revisions consist mainly of the addition of some ten pages of notes to certain portions of the original text that have given rise to discussion, as well as the inclusion of a forty-page dialogue entitled "the Abacus and the Rose", stimulated to a considerable extent by Snow's lecture and the ensuing discussion.

The original edition of this book attracted considerable attention, and it is probable that interest will be revived by its second appearance. It is clear that the author has a highly motivated and sincere passion for emphasizing the human values inherent in science and the folly of the view that the so-called humanities have a monopoly of such values. The book has an emotional and almost lyrical quality that will appeal to many readers.

It is appropriate that this review should deal primarily with the new dialogue "the Abacus and the Rose". This employs the technique made famous by Galileo three and a half centuries ago, involving a colloquy among three participants representing differing points of view. In Bronowski's version the three are, respectively, a secretary to the Ministry of Education, a teacher in a provincial university (representing the literary humanities), and a biological scientist of some distinction. The last two argue the now pretty well understood dispute between science and the humanities, using the first participant as a sort of foil or moderator. The arguments hit the point pretty well and are often amusing. The author tries hard (or gives the impression of trying hard) to keep the balance fairly even, though he cannot resist the temptation of having his scientist bring in numerous literary allusions, based presumably on the principle that it is more normal for a scientist to be acquainted with literature than for a literary man to be acquainted with science. The reader will not

be surprised to find who wins the battle in the end.

The author's specific scientific references are in general sound, but occasionally he slips into definitely misleading statements—as when he seems to claim that physicists cannot define the construct "mass." What he evidently had in mind is that every satisfactory definition of a physical construct must possess both an epistemic (operational) aspect and a constitutive (theoretical) aspect.

The book will continue to make an important impact on a problem which demands continual discussion.

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R. Bruce Lindsay is dean of the graduate school at Brown University.

Hilbert applications

LINEAR OPERATIONS IN HILBERT SPACE. By Werner Schmiedler. Transl. from German by J. Strum. Revised and edited by A. Shenitzer and D. Solitar, 122 pp. Academic, New York, 1965. Cloth \$6.00, paper \$2.95.

by *Dagmar Renate Henney*

This little booklet was first printed in German in 1954, and has subsequently been translated and published by Academic Press. The volume represents an introduction to the theory of Hilbert Spaces and its various applications, of which atomic theory is probably the most important. The author restricts himself to linear problems since this topic is relatively self-contained and reasonably complete.

The book is intended primarily for students of mathematics and applied sciences. No special mathematical knowledge is required except for some of the exercises and applications. The purely mathematical part deals with Hilbert Space, linear operators, and spectral theory. Various applications of the theory are suggested in the exercises. This emphasis has not been stressed greatly in some of the other available texts in functional analysis and hence there exists a real need for this little book.

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The reviewer is a member of the department of mathematics at The George Washington University.