

BOOK REVIEWS

The common sense of science by J. Bronowski. Published by Heineman, London, 1978, Pp. 159, Price £ 1.50.

This is a reprint of the book first published in 1951 by a distinguished scientist, broadcaster and a great intellectual. It is remarkable that it maintains its freshness and appeal even now.

The book essentially deals with the evolution of scientific thought in the West, particularly in England and Europe. The author makes a brilliant analysis, and considers some deep questions often asked about science as has evolved and as to where we are heading. And I believe, he succeeded in exploding some common misconceptions about science. For example, it has been a well-known modern prejudice that art and science are mutually incompatible. He finds eloquent retort in Greek scientists and philosophers and in the example par excellence of Leonardo Da Vinci of the Renaissance Period. Thus the thesis of his chapter I is concerned with science and sensibility and the underlying connection between arts, culture and science. Chapters 2 to 4 analyse the scientific revolution in the 17th century and the development of Newton's mechanistic model, its enormous success from terrestrial to celestial phenomena and leading to the concept of machine like order in the physical world.

In Chapter 5, the author discusses the central problem of the nineteenth century scientific methods culminating in the concept that all laws must be framed in casual form so much so that the idea and effect has a powerful hold on our minds. It seemed to unify both the physical and biological sciences. This became the guiding common sense principle.

The revolution of the twentieth century science has, however, radically altered our common sense view of the world. Thus Einstein discarded the Newtonian assumption of absolute space and absolute time common to all observers. There is no universal 'now' and the state of motion of observers plays a very important role. The space and time get intricately mixed up and cannot be distinguished from matters and their motion. The birth of quantum physics led to complete abandonment of the common sense view of the world at the microscopic level, wherein there is inherent uncertainty in the description of nature. At this level we can have only a statistical or probabilistic view of the microscopic world. Even in the life science, determinism had to give way to probability of things happening as exemplified by Mendel's law of the random coupling among the genes.

One is thus naturally led to the idea of chance in Chapter 6, which is discussed at length from various angles—trend and fluctuations, effect and chance, etc., and the

unifying principle becomes the probability of occurrences of certain phenomena under some specific conditions.

In chapters 7 to 9 the author turns to deeper philosophical questions and humanism. We are faced with the question whether science plays the role of destroyer or creator. Are science and society out of step with each other? The author ends with an optimistic note. He feels that 'science will create values and discover virtues when it looks into man'. Let us hope that his feelings are justified by future course of human society.

In short, this is an extremely stimulating book and it will satisfy readers having passionate thirst for knowing the evolution of scientific thinking. My only regret is that the author has not made any reference to Eastern thoughts as done by other scientists on such subject, e.g., Schrödinger and recently F. Capra.

K. P. SINHA

Problems of Linear Electron (Polaron) Transport Theory in Semiconductors by M. I. Klinger, translated by J. B. Sykes. Volume 87 in the *International Series in National Philosophy* edited by D. Ter Haar, First Edition, 1979. Published by Pergamon Press, Pp. xv + 931. Price \$ 125.

Right from the beginnings of the electron theory of electrical conduction in matter, theory of electrical conductivity has rivetted the attention of many able physicists. Apparently the last word is not yet uttered. The book under review deals with an account of the recent theories of electron transport in semiconductors. This book is a translation of the Russian version published in 1973 and deals mainly with electron (polaron) transport theory in three-dimensional solids under the single particle approximation and excludes discussion of many electron correlation effects. The approach is wholly theoretical and does not deal with high frequency effects. The first part has a very useful account of the general dynamical theory of linear transport according to Kubo formalism. The second part is an account of the theory of polaron transport in crystalline semiconductors. The third part is devoted to the topic of electron transport in disordered systems. The book makes rather heavy reading and the references concentrate very much on the Russian literature on the topic. Considerable familiarity with quantum mechanics, statistical physics, and electro-dynamics of continuous media along with knowledge of introductory solid state theory is essential for an intelligent reading of this book.

The book makes very little contact with experimental results and one is likely to get lost in elaborate formulae spread over nearly 900 pages of text. By and large, the first portion of the book is easier to assimilate than the latter two. It is also a bit difficult to find the direction in which this subject is moving. However, it is a useful

addition to the existing literature because it brings them together in one place. The book has been reproduced from type script and there are only a few figures. There is a list of additional references, some of them up to 1978. There is also a fairly short index.

G. SURYAN

The Observer's Book of Rocks and Minerals by Richard and Francis Atkinson. Published by Frederick Warne (Publishers) Ltd., 40, Bedford Square, London, WC1B 3HE, 1979, Pp. 184, Price £ 1.50.

Nothing is as important in the natural world as our own earth and the rocks beneath our feet. *The Observer's Book of Rocks and Minerals* is written by the well-known authors in a clear, readable style and contain many colourful photographs and instructive illustrations to identify minerals and rocks by simple field tests. The two main parts of the book are the "Description of Rocks" and the "Description of Minerals" with brief sections on the formation of rocks and on the origin of mineral deposits.

Thumb through this book before you go on hikes, trips and vacation. Read and become familiar with the pictures of minerals and rocks. This may enable you to identify some common rocks and minerals at sight. Visit collecting places, examine specimens and try simple field tests. You will find how useful this *Observer's Book of Rocks and Minerals* is going to be.

G. V. ANANTHA IYER

'A' Level Physics, Volume 1, Mechanics and Heat by M. Chapple. Published by Macdonald and Evans, Estover Road, Plymouth PL6 7PZ, UK, Second Edition 1979, Pp xiv + 318, Price £ 1.75, ISBN number : 0 7121 0154 3.

This is a good book, obviously written by an experienced teacher and suitable for the PUC or First Year B.Sc. students of our universities. In a way, it is similar to our school and college text books, which give a brief account of the basic principles, follow it up with a few worked examples and give a number of exercises for the students to solve. About 115 carefully drawn figures illustrate the principles and the exercises. Four pages of mathematical tables and a comprehensive index add to the utility of the book.

The book is divided into two parts, the first part dealing with mechanics and properties of matter and the second part dealing with heat. Part one covers units and measurements, statics and hydrostatics, Newton's laws of motion, simple harmonic motion, gravity, elasticity, viscosity and surface tension, these being the sequence in which the topics are discussed. Part two covers the measurement of temperature, heat energy

and its transformations, properties of ideal gases, vapours and vapour pressures and the various methods of heat transfer.

Each of the 12 chapters has about a dozen worked examples and about 30 problems and exercises. Hints for the answers are given at the end of the book. The traditional topics are refreshingly interspaced with the ideas of the current status of the subjects. The exercises are also a blend of the traditional problems with the questions based on current day practical experience. The reviewer found Appendix 1, entitled 'Examination Techniques' to be a sound piece of advice to every student serious about an examination. His task of correcting the answer papers of generations of students would have been a lot more pleasant if the student had access to this type of common-sense advice.

In summary, the book is heartily recommended. The only disappointing feature is that the price of £ 1.75 would take the book beyond the reach of most Indian students.

E. S. R. GOPAL