

The old quantum theory of the atom began with a study of the properties of the Rutherford model; the new theory begins with the study of the atom as a region of variation of potential. The book under notice illustrates the new methods by means of some simple problems and their appropriate energy diagrams. The reader is bound to be familiar with these illustrative examples, and he will find that the new problems appear in a garb which is no more unfamiliar than an old friend in a new suit. The author's method may well be adopted as the method of choice for beginning this subject, especially for those whose interest lies chiefly in experimental physics.

In expanding the subject and in introducing the wave equation, a number of special problems is considered. Some of these are common to most books of this character, such as the problem of the hydrogen atom and of electron spin. Others are less familiar and make an appeal to chemists as well as to physicists, such as the subjects of valence bonds and molecular formation. A chapter is devoted to electrons in crystals and insulators and conductors.

It is not too much to say that of all the good elementary books on the subject, this volume brings out most successfully and simply the physical aspect of the recent theory.

Short Notices

From Galileo to Cosmic Rays: a New Look at Physics.

By Prof. H. B. Lemon. Pp. xviii+450. (Chicago: University of Chicago Press; London: Cambridge University Press, 1934.) 17s. 6d. net.

THE problem of telling, in simple fashion, something of the fundamental principles of physical science—the ordinary workaday notions which serve to help us in our dealings with a macroscopic world—as well as something of yesterday's sensational developments, is an important and urgent matter, but one of supreme difficulty.

What are we to do in order to cater for, not only that exacting fellow, the intelligent layman, but also the undergraduate who is destined to go out in natural science, in the classics, maybe even with that *ægrotat* in botany which was the fate of the Rev. Lancelot Ludovic Soulsby? He has enough and to spare of expanding and of island universes; he can talk glibly of the principle of indeterminacy. Is it possible, in a short, systematic course, to provide him with the essential background, and to give him some intelligent grasp of, say, the law of the conservation of momentum, the measurement of horsepower, the kinetic theory of heat, an explanation of thunderstorms, the propagation of waves, and so to lead him to the story of the nuclear atom, and atomic transmutation?

Prof. Lemon has made a gallant attempt to achieve the almost impossible, and, in so doing, has pressed into his service most of the devices known to modern pedagogy: a liveliness of exposition that does not degenerate into cheapness; a most unorthodox use of the pictorial art; a number of very fascinating stereoscopic photographs; and an enthusiasm for his subject that never fails him.

The result is an arresting volume; in one respect, the book reminds one of the original edition of Maxwell's "Matter and Motion"—it is only the professional who can realise the immense amount of labour which must have gone to its production. It makes pleasant and easy reading; which, a *bouleversement* of an almost proverbial saying, affords some measure of the author's industry. A. F.

Board of Education. Educational Pamphlets, No. 101: *Senior School Mathematics*. Pp. 67. (London: H.M. Stationery Office, 1934.) 1s. net.

THE recent reorganisation of the elementary schools of Great Britain has naturally led to the establishment of a large number of 'senior schools' of various types. The Board of Education has therefore published this pamphlet in order to give some guidance to teachers in laying out adequate courses in mathematics adapted to the varying needs of such schools.

After an interesting introduction, there follow ten well-written chapters on the scope of the work likely to be of the greatest use to the pupils. Freed from examination preparation and purely formal study, the exploration of a suitable course becomes a very thought-provoking task. It will be evident that a senior school will need more especially a practical bias, and in mathematics, this means not only arithmetic of everyday life, but also considerable amount of actual practical work, such as mechanical drawing, simple surveying and the like. All these problems are adequately discussed from many points of view, and some excellent suggestions are made. The final two chapters are particularly helpful, for they deal with the difficult and thorny problems of the special course for girls and the treatment of the backward pupil.

Progressive teachers of mathematics will be in thorough agreement with the suggestion concerning the unity of the several branches, arithmetic, algebra and geometry, given in par. 26, but it is doubtful whether that measure of agreement will be afforded to the suggestion of par. 72. There seems no valid reason for suppressing the y in plotting a simple algebraic function; indeed, the complete equation $y = f(x)$ leads to a more intelligent grasp of the graphical representation and the relation between variables.

The whole pamphlet, nevertheless, is an inspiring contribution to a difficult problem, and teachers generally will welcome the many excellent suggestions made therein. F. G. W. B.