

the same remarkably inclusive—and uncritical—plan has been followed.

The most interesting of the additions is an account of the wonderful Rolls-Royce engine used for the British Schneider Trophy seaplanes and its manner of test. The author describes how this engine of but 34 litres cubical capacity, giving in its original form 825 h.p., was so skilfully modified as to yield no less than 2,300 h.p.—an increase from 25 h.p. per litre to no less than 68—with an increase of speed of as much as 1,000 r.p.m. beyond that of the parent engine.

As illustration of the immense ingenuity of modern testing methods, the author mentions the discovery of hair cracks in connecting rods by the painting of the rod after magnetisation with fine iron filings carried in paraffin; and the revealing of cracks in aluminium pistons by oil marks on a dusting of powdered chalk. It must be confessed that the text is on occasion obscure. One example will suffice: the author wishes to say that the capacity of an exhaust silencer must be twenty times the cylinder-swept volume; what he does say is that the capacity of the silencer in cubic feet must be eighty per cent of the cylinder capacity in litres. Despite these occasional lapses the book will prove of real value to those engaged in the testing of this prime mover.

*Suns and Worlds: an Introduction to Astronomy.*

By W. H. Steavenson. (The How-and-Why Series.) Pp. 104+4 plates. (London: A. and C. Black, Ltd., 1933.) 2s. 6d. net.

As was to be expected of one who is himself above all a diligent observer, Dr. Steavenson has written a book in which the actual appearance of the heavens is given considerable prominence. The last few years have seen a number of books on popular astronomy, but the present volume has a great deal to recommend it, partly on account of this circumstance. One of the difficulties which beset the writer of popular expositions is the choice of a mental standard for his public; the author must make up his mind whether he is addressing an intelligent schoolboy, a casually interested adult, or an enthusiastic and painstaking reader. Dr. Steavenson starts off by explaining the seasons and the phases of the moon; but he goes right on to give an account of galactic rotation. The mathematics is suppressed, but the general line of the argument is sometimes given. Judging by the phases of the moon, which we usually see expounded in fairly elementary school-books, Dr. Steavenson has chosen for his public the intelligent schoolboy: and judging by the rotating galaxy—but why not the schoolboy too? There is a lot to be said for astrophysics as an academic exercise for the young, and it is a pity that it is not a school subject. Astrophysical work involves a peculiar mixture of mathematical and general reasoning, and would provide an excellent mental gymnastic. But this is a digression; Dr. Steavenson is out to interest more than to instruct, and in this we can have no doubt but that he has succeeded.

*The Methods of Cellulose Chemistry: including Methods for the Investigation of the Compound Celluloses.* By Dr. Charles Dorée. Pp. x+499. (London: Chapman and Hall, Ltd., 1933.) 21s. net.

THE title of this book and the name of the author provide an indication of an excellence which is not belied by its contents. Dr. Dorée has, in fact, succeeded admirably in his stated object of providing a collection of the best available methods for the experimental investigation of cellulose and of its associates and derivatives. He has achieved this by drawing lavishly, but with discretion, on the literature of chemistry, physics, botany and biochemistry, and on the technical side, from journals dealing with textiles, paper, dyeing and colloids, and he has supplemented this information by his own original work and tests of the methods concerned. Theoretical discussion of experimental data is, perhaps wisely, avoided.

The methods are classified in three sections dealing with normal cellulose, its synthetic derivatives and compound celluloses. The latest developments in determinations such as of viscosity, of degradation products of celluloses and of  $\alpha$ -cellulose are treated fully, and will make special appeal to the worker in industry, who in the past has usually had to build up a composite method of his own from the numerous published alternatives. The section on woods neglects some important work carried out in Australia which will probably result in fundamental modification of the methods of wood analysis. J. G.

*Analytic and Vector Mechanics.* By Prof. Hiram W. Edwards. (International Series in Physics.) Pp. x+428. (New York: McGraw-Hill Book Co., Inc.; London: McGraw-Hill Publishing Co., Ltd., 1933.) 24s. net.

THIS useful work is well adapted for students entering upon a university honours course. The notation and fundamental principles of vector analysis are fully explained, and vector methods are freely though not so forbiddingly employed as to repel a generation which still finds it easier to think in terms of Cartesian methods than to apply a vector calculus *ab initio*.

After chapters which deal with velocity and vectors, the author develops the subject by way of the traditional topics handled clearly and skilfully. Harmonic motion, the dynamics of translation and rotation, elementary statics (including attraction and potentials), central forces, particle motion in fluids with resistance, and damped harmonic motion—these headings give a conspectus of the principal topics leading to chapters on vector fields, precessional motion, Lagrange's equations and Hamilton's principle. Physical applications are kept well in the foreground, and, while the treatment of such fundamental physical problems as the definition of mass might very well be extended, junior honours students in physics will find the book reasonably well suited to their needs. A. F.