

areas acquired here and there would not be satisfactory for any purpose unless woven into a more complete system by the teacher. An interesting experiment is the inclusion of additional exercises, which are based upon descriptions extracted from the volumes of the Highways and Byways Series. They are well chosen to illustrate the different types of English scenery, and should be a useful link between æsthetic appreciation and exact observation.

#### OUR BOOK SHELF.

*Carburettors, Vaporisers, and Distributing Valves used in Internal Combustion Engines.* By E. Butler. Pp. xi + 176. (London: C. Griffin and Co., Ltd., 1909.) Price 6s. net.

MR. BUTLER has written an interesting book on a subject which hitherto has not had justice done to it; and he is to be congratulated upon his bold decision to devote a book exclusively to these matters of detail instead of compressing them into the small space that can be spared in books dealing with internal combustion engines in their complete form. It cannot, of course, replace the completer treatises, but it is an excellent adjunct to them and is evidently written by one who is thoroughly familiar with this side of the work.

The volume contains twelve short chapters, of which the first four are concerned with surface and spray carburettors for petrol and alcohol motors, carburettors capable of automatically adjusting the air and petrol supplies over a wide range of speed, and various types of vaporisers for use with the heavy oils forming the second distillate from petroleum. The remainder of the book includes descriptions of various forms of admission and exhaust valves used on all classes of internal-combustion engines, together with some discussion of methods of actuating, timing, and water-cooling them.

Mr. Butler is an inventor on these lines, and has made himself familiar with what others have done in the same field; thus there are illustrations of no fewer than fifty-two different kinds of carburettor and vaporiser. With so much study of these matters, we wonder to find that he is apparently unaware of the increasingly common practice with motor vehicles of using the heat of the exhaust gases to warm, not the mixture as a whole, but the air supply only. The warm air is then passed over the jet and all the other arrangements are as usual. At least equal economy is obtained in this way besides greater ease of fitting and a lowering of the prime cost. Even with so simplified a form of carburettor or vaporiser as this makes, it has been found that the cylinders do not require cleaning out at any more frequent intervals.

As regards the valve mechanisms, we are glad to find that the author has included a description of the Knight engine, and, further, that he has given a good deal of space to the discussion of sliding and rotary valves. We cannot but feel that the poppet type of valve is unlikely to be permanently used, and the author deserves our thanks for having taken us some steps along the road towards a better form of valve mechanism. Many motor manufacturers are working in the same direction, and there is no doubt that we shall soon be hearing of other suggested forms of valve. If the experience of extended use of the Knight engine is favourable, it will give great impetus to this development. With the largest forms of gas engine there are, of course, already many engines now running with complete success, using slide valve forms of control for either the admission or exhaust ports, or for both.

*Cotton Spinning Calculations.* By W. S. Taggart. Pp. xiv + 335. (London: Macmillan and Co., Ltd., 1909.) Price 4s. net.

THE author of this excellent and beautifully printed text-book assumes that the reader has no special equipment beyond an elementary knowledge of arithmetic, and some acquaintance with the various processes of cotton manufacture and the technical nomenclature used in connection therewith. In the introductory chapter, he gives general calculations respecting the velocity ratio in wheel trains and belt gearing; the surface velocities of rollers and the stretching of fibres resulting from "draft"; the estimation of "hanks" and "counts"; and the force actions of levers. A set of exercises closes this part. In succeeding chapters the treatment is more direct and special. The various machines through which the material passes, from the Scutcher to the Ring Spinning Frame, are considered in detail. The author has had the assistance of the leading manufacturers of textile machinery in the cotton district, and is thus able to give diagrams, drawings, and tables of wheel teeth, showing very clearly with full details the mechanisms used in all the standard types of machines. The calculations are therefore based on numbers representing the best modern practice. A special chapter is devoted to the consideration of epicyclic or differential gears and the design of cone drums. Thus, by repetition, and by the wealth of illustration provided, no reader should fail to obtain a thorough insight into the action of the most complicated of the mechanisms. This kind of quantitative work is essential if a student is to have anything more than a superficial knowledge of the subject, and it will enable him readily to calculate the wheel changes, &c., necessary in order that a machine shall be able to cope with the varying demands made upon it.

The author concludes his very interesting volume with a number of useful tables and an index. Both author and printers are to be congratulated on the production of this admirable work, which should be in the hands of everyone, at home and abroad, who is interested in the practical working of textile machinery.

*Proceedings of the Aristotelian Society.* New series, Vol. ix. Pp. 259. (London: Williams and Norgate, 1909.) Price 10s. 6d. net.

OF the nine articles contained in this volume the most important are, perhaps, Prof. Alexander's essay on "Mental Activity in Willing and Acting," and Prof. Stout's rejoinder, "Are Presentations Mental or Physical?" The point at issue in these papers is one of fundamental importance for both psychology and the theory of knowledge, since Prof. Alexander's contention, to put it quite plainly, is that all mental activity consists solely of conation and feeling, or possibly, since it is conceivable that the feeling or affective side of mental life may be reducible to experience of successful and thwarted conation, of conations alone. Hence he refuses to admit the existence of such cognitive processes as have usually been supposed to be denoted by the names sensation, imagination, perception. On his view the *object* apprehended in all these processes is physical; the *process* involved is simply conation directed towards a specific physical object. It follows, of course, that if Prof. Alexander makes out his case, "presentations" must be deleted entirely from our account of the stuff out of which mind is made, and, in the theory of knowledge, any doctrine which assumes either that "we can only know our own sensations," or that, at any rate, we begin by knowing our sensations and