

Macmillan and Gavin Dalzell's construction of a practical rear-driver, the appearance of the original Dunlop pneumatic tyre with outer cover cemented to the rim, while free-pedals are merely referred to as incidental accompaniments of automatic brakes. Dr. Bourlet's history of the introduction of pneumatic tyres reads like a burlesque :—

"... The first pneumatic tyres were very timid attempts, and at the best only suitable for racing tracks. . . . The single tube tyres, Clincher, Boothroyd, and others then became popular, and were a little more trustworthy. . . . It was not until Michelin put on the market his detachable tyre that pneumatic tyres entered the domain of practical cycling mechanics. . . . Six months later the Dunlop Company exhibited a detachable tyre. . . ."

Again, in the purely descriptive portions of the book many important developments of the last three or four years are entirely unnoticed ; to wit, Lloyd's cross-roller gear, the Fleuss and Trench tubeless tyres, jointless hollow rims, short-pitch roller chains, the Bowden brake transmitting mechanism ; in fact, the book is at the date of its publication several years behind the times, as far as the bicycle in England is concerned.

The discussion of the various points of construction are very interesting and instructive ; but the conclusions drawn by the author are in many cases diametrically opposed to opinions widely held on this side of the Channel. The author has proved that, for ease of steering, the frame of a good bicycle should be as short as possible ; the frame with extended wheel-base "était donc détestable ; il manquait d'ailleurs de rigidité." The frame of the Pedersen bicycle, weighing less than 20 lbs. complete, receives most praise ; but the author would improve it by substituting pin-joints for the rigid lugs. Mr. Mushing's analysis in the Centaur Company's catalogue of the weight of a bicycle equipped as a heavy roadster and as a road racer (total weights 36 lbs. and 25 lbs. respectively, weight of frame and front forks in each case 7 lbs. 15 oz.) might modify the author's opinion on this point.

In chains, a retrograde movement was effected when, in 1895, English makers returned to the detestable block chains, "un peu modifiées, il est vrai, mais toujours aussi mauvaises." Now, whatever be the merits of the 1899 roller chains, the old inch-pitch roller chains were much worse than the block chains which superseded them. Has the author compared, say, a Hans Renold block chain with the roller chains made prior to 1895 ? The type of roller chain held up for admiration is that with each sleeve split at the middle, a half-sleeve being made as a solid internal projection from each inner side-plate. This construction is thoroughly bad, and no chain made in this way is durable, as some chain-makers have found to their cost.

A great number of two-speed gears are described, none of which have been sold to any extent in England, while the few two-speed gears known here are not referred to. This chapter is therefore of interest mainly to the mechanician and the designer.

As a practical guide to the cyclist in choosing a new machine, the book will be of most service in France, but of little or no value here.

A. S.

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OUR BOOK SHELF.

The Spirit of Organic Chemistry. By Arthur Lachman, B.S., Ph.D. With an Introduction by Paul C. Freer, M.D., Ph.D. Pp. ix + 229. (New York : The Macmillan Company. London : Macmillan and Co., Ltd., 1899.)

THE title of the book, if it conveys a definite idea, scarcely explains the contents. The preface, however, sets forth the various objects which the book is intended to accomplish. Its main purpose, we are told, is to supplement the text-book and to introduce the student to the current literature of the subject, from which it is to be inferred that he will be equipped with a sufficient knowledge of present problems to follow contemporary research.

The volume consists in reality of a series of essays on subjects which have at one time or another engaged the attention of chemists. It is divided into chapters, the heading of each furnishing the text for a discourse on some prominent theory or classical investigation. "The constitution of acetoacetic ether" leads up to an account of *tautomerism*. The constitution of the sugars, of maleic and fumaric acids, of the oximes and of the diazobenzene compounds, involve a series of dissertations on stereochemical problems ; whilst the chapters on uric acid and the constitution of rosaniline record the development of certain branches of synthetic chemistry. An essay on the constitution of benzene, and a brief history of "Perkin's reaction," complete the series. The subjects are not by any means exhaustively treated ; but they are presented in an easily readable form, and controversial matters are handled in a judicial spirit.

Whether these few essays will enable the student to follow current literature is another question. A great amount of organic research is now busy with the constitution of the terpenes, the camphors, the alkaloids, the artificial and natural colouring matters, and many other subjects of which no word is said. Moreover, several of the subjects discussed have passed into history. Still, there will doubtless be many to whom the volume should prove interesting and profitable reading.

The introductory chapter does not add substantially to the value of the book. Its rather high-sounding phrases convey little real information, and the historical references are too brief to be intelligible to any one ignorant of the history of the science.

J. B. C.

Elementary Physics and Chemistry. First Stage. By Prof. R. A. Gregory and A. T. Simmons, B.Sc. Pp. viii + 150. (London : Macmillan and Co., 1899.)

THE importance of experimental science teaching in elementary schools is being more and more recognised by the Education Department every year. This tendency is seen in the course of elementary physics and chemistry for the upper standards, which was introduced into the Elementary Education Code for 1898. To meet the want thus created is the purpose of the present book, covering the first of the three parts into which the syllabus is divided. The plan of the book is admirable, and though the division of each lesson into "what to do," "reading lesson," and things "to be remembered," involves a certain amount of repetition, there will be compensation to young students in the resulting clearness. Matters are so arranged that the lessons are suitable for classes in which each pupil can perform the experiments for himself, or for those in which they can be made by the teacher alone. In their anxiety to secure a logical sequence of thoughts, the authors have included a few experiments, the results of which we think might have been taken for granted ; but, apart from this, the book seems well adapted for beginners in science. The clear and simple language, combined with a large number of excellent illustrations, can surely leave no doubt in the mind of the duller pupil as to the ideas which are intended to be conveyed.