

the exposition himself, for his introduction shows that he has a good acquaintance both with the capacities of children and with the way in which these studies may be utilised to serve the ends of mental development. Neither Miss Howard nor Dr. Herbertson seem to have got much beyond the primitive idea that children possess empty knowledge boxes into which geographical and historical information can be shot at will.

The other sections are on a higher level. Mr. Baker's account of mathematics is quite good, and will be helpful to teachers in any type of school; but his treatment suffers from compression, for it is impossible to cover in the space allotted the whole field of study from the infant stage to the commencement of trigonometry. Natural science fares well in the hands of Dr. Percy Nunn and Miss von Wyss, and any teacher of science, especially in secondary schools or technical institutions, will profit from studying with care their exposition of method. In their selection of sciences for the "intermediate" and "final" stages we are inclined to think the writers take too narrow a view; botany, chemistry, and physics have their place, but many would prefer, especially in view of the increasing claims of hygiene, to see more recognition given to physiology in the year or two preceding the scholar's departure from school. Languages have been placed in the hands of Dr. Rouse (aided by his colleague, Mr. W. H. S. Jones) for Latin and Greek, and Mr. Mansfield Poole for French and German. Both belong to the ranks of avowed "reformers." Many schoolmasters will rub their eyes with blank amazement on reading the specimen lessons in Greek dialogue as conducted in the Perse Grammar School, but Dr. Rouse's system is merely the application of the same general principles which Mr. Poole expounds for a modern language.

On closing the book one is encouraged to recognise the progress that English teachers are making in the serious study of professional work. Ten years have elapsed since Mr. Barnett edited the pioneer volume of this description, and the comparison is favourable to the craftsman schoolmaster of the present day.

#### MAINTENANCE OF ROADS.

*Road-making and Maintenance. A Practical Treatise for Engineers, Surveyors, and Others.* By Thomas Aitken. Second edition. Pp. xviii+527; illustrated. (London: Charles Griffin and Co., Ltd.) Price 21s. net.

THE first edition of this book was published in 1901, and the fact that a second edition of a technical book of this character should be called for within so short a period testifies to its value, and also to the greater attention that has been given to the maintenance of roads within the last few years.

After the advent of railways, and the abolition of turnpikes, road-making became a very neglected science; the advent of bicycles and the inconvenience felt by a very large section of the public caused pressure to be brought on highway authorities, and a gradual improvement set in. The subsequent intro-

duction of motor-cars brought road maintenance very much to the front, and, taken generally, the main roads of this country are now kept in very fair condition. This, however, has involved a very large expenditure. It was stated at a recent discussion on motor vehicles at the Institution of Civil Engineers by the surveyor of the county of Middlesex that the cost of main roads in his county had increased from 49,000*l.* in 1889 to 90,391*l.* in 1905. In the two years 1904-6 improvements on the roads had amounted to 86,536*l.* The cost of the main roads of England and Wales has increased from 2,120,332*l.* in 1901 to 2,478,481*l.* in 1905.

The book now under notice has been revised and brought up to date, and much new matter has been added. The question of damage done to the roads by motor-cars, and the nuisance arising from dust caused by the speed at which these vehicles are driven, has been fully treated in a new chapter. A description of the various remedies that have been tried for dealing with the dust problem is given. The conclusion at which the author has arrived is that no real solution for dealing with this nuisance has yet been found, but he has no doubt that the system of "tar macadam" or "building up the road stone coating with a matrix of tar, chips and dust as a binding medium is the best possible method of solving the dust problem in a satisfactory and permanent manner."

The advantages of tar macadam are increased durability over ordinary macadam, imperviousness to moisture, capability of being kept clean, and the surface is not liable to be disintegrated by frost. Owing to its greater durability and to the fact that the surface of the road can be renewed by a thin coating of fine tar macadam, from time to time, without disturbing the subsurface or foundations, the cost over a series of years, when everything is taken into consideration, is not more than that of a steam-rolled ordinary macadam road. The author of this book, however, expresses the opinion that its first cost prohibits its adoption on an extensive scale on rural main roads.

The book is divided into eighteen chapters, dealing in an exhaustive and practical manner with the following subjects:—Historical sketch of road-making; resistance to traction on roads; laying out new roads and the improvement of those already made; retaining walls, culverts, bridges, &c.; materials used for repairs; quarrying road stone; breaking and haulage; rolling and scarifying; prevention of dust; footways; wood pavement; asphalt; brick pavement; tar macadam; testing the surface of roads and use of the viagraph; subways.

#### OUR BOOK SHELF.

*A History of Chemistry.* By Hugo Bauer. Translated by R. V. Stanford. Pp. vii+232. (London: Edward Arnold, 1907.) Price 3s. 6d. net.

THE philosophy of chemistry can only be properly studied by the historical method. Present-day chemical philosophy, like present-day religion, is a product of evolution, and to understand it thoroughly it is necessary to be able to trace the successive stages