

grants being subject to the roads being kept in repair to the satisfaction of the county justices. A further improvement took place when these roads were taken over by the County Councils.

The bicycle has, however, been the main agent in recent road improvement. To use these machines with any comfort a road must be in thoroughly good order, level, and free from loose stones and mud. The voice of the bicyclist is heard everywhere calling out when roads are in bad order, and local legislators are driven both by their own experience and that of their constituents to bring about a better condition of the main roads and highways. An institution known as the Roads Improvement Association has been formed, and, besides bringing pressure to bear on the local authorities, has issued a great quantity of literature for the guidance of local surveyors and roadmen as to the management of the roads; upwards of 13,000 pamphlets containing practical information on the management of roads have been distributed by this society.

Fortunately road reformers are able to show, by conclusive evidence, that roads kept in thoroughly good order cost less in annual maintenance than when they are left to get rutty and uneven and covered with mud or loose stones.

Mr. Aitken's book is a good practical treatise on the making and maintenance of roads. It is divided into fifteen chapters, which deal respectively with the history of road-making; traction; the construction of new roads; bridges, culverts and retaining walls; road material; quarrying; stone-breaking and haulage; road-rolling and scarifying; paved roads, including wood, asphalt, brick, and tar macadam; footways, &c.

The book deals principally with main roads and those subject to heavy traffic, which, as a rule, are now under the care of the county surveyors, who are skilled experts, and very little attention has been given to the requirements of the ordinary highways, where improvement is most required. The space devoted to quarrying, which occupies no less than sixty-seven pages, or about one-sixth of the whole book, could well have been spared, as it is rarely in these days that a surveyor has to quarry his own road material, and the space would have been better devoted to showing how ordinary highways may be maintained in good order and kept level and clean, and material placed on them when required without inconvenience to the traffic in situations where steam road-rolling is impracticable.

OUR BOOK SHELF.

Knowledge, Belief and Certitude. By F. Storrs Turner. Pp. viii + 484. (London: Swan Sonnenschein and Co., Ltd., 1900.) Price 7s. 6d. net.

MR. STORRS TURNER distinguishes knowledge from consciousness as interpretation from datum. He alleges as base of the former three certitudes, as to self, other selves and real things. He finds the sciences to involve the same pre-conditions and to take a permissibly abstract point of view—that of a fictitious independent spectator. But he holds that, therefore, the sciences are not adequate to concrete reality, while the pretension of science in general to present the whole is vain. In psychology the standpoint of the ideal spectator is

inadmissible, and philosophy has failed because of the same abstraction. But among concrete ends we find our conviction as to some certain knowledge satisfied. Real knowledge belongs to the teleological sphere.

His conclusion to the failure of the speculative and the success of the purposive reason surprised Mr. Turner with the force of a revelation. The first chapters of his inquiry, which "remain substantially as they were originally written," were committed to paper years ago when "a dense fog" covered his mind. A trace of this is to be found in the attempt to maintain concurrently that the certitude of other selves is an inference of reason (p. 74), that it is plainly one with the certitude of self (p. 89), and that neither is able to come into existence apart from the other (p. 95). Mr. Turner can say within a page that "by real things we mean permanent things" (p. 80), and that "what we have is the certitude that there are a multitude of real things, some of them permanent, most of them changing" (p. 81). It will perhaps be unnecessary to say that his verbal criticism on such writers as Mr. F. H. Bradley depends for its validity on a hit or miss principle. It is a little grotesque to have estimates of Hegelian metaphysics and post-Hegelian logic from the standpoint of "reflective common-sense, aware of its limitations." Mr. Turner thinks that continuity implies indivisibility, and his verdicts on much in philosophy and science rest on similar misunderstandings.

"Knowledge, Belief and Certitude" is, however, by no means a worthless book. There is a certain dialectical ability in much of it, and a tenacity as to main principles which will appeal to the clear-headed reader who can discount the fallacious element. It is, however, as an honest attempt to think the problem of knowledge right through, and to present a record of the process as well as the results of his investigation, that it chiefly commends itself. How and why Mr. Turner came to his estimate of various views and systems, rather than that estimate itself, is the thing worth studying.

H. W. B.

Notions de Minéralogie. Par A. F. Renard et F. Stöber. 11^{me} Fascicule; Classification et Description des Espèces Minérales. Pp. 191 to 374. (Gand: Ad Hoste, 1900.)

THE first fascicule of this text-book, containing the general principles of mineralogy, has already been noticed. The second fascicule (pp. 191-374) is devoted to the detailed description of mineral species. A large number of species are mentioned and, consequently, the majority are only briefly treated; in its main features the book necessarily resembles other mineralogical text-books.

It seems that, by a wise provision, all candidates in natural science at the University of Gand devote one hour weekly to the study of mineralogy, and it is for these students that the book is primarily intended. From this point of view we think that, as in most text-books, more species are mentioned than is necessary; such rare minerals, for example, as chalcocite and nitrobarite should scarcely come within the range of the elementary student, but the brief descriptions of the commoner minerals leave nothing to be desired.

There are several useful features in the book which deserve special mention. In the case of most of the minerals of commercial importance, such as mica, apatite, cassiterite, galena and sulphur, a statement is given of the annual world's yield and its approximate value.

Another important feature is a summary of the minerals of Belgium with their localities, with which the volume concludes. Such local information is extremely useful, and this is the first authentic list of Belgian minerals and localities which has been given. The list has evidently been compiled with care; special attention is