value that are probably to be found only in these pages, we may mention the statement (p. 235) that the pitch-stones of Meissen are melted up, in increasing quantities, for producing bottle-glass, but that difficulties arise from the very ready formation of bubbles in the mass. This at once reminds us of the experiments of Berger, by which obsidians were converted into pumice before the blow-pipe, and of Judd's far-reaching deductions in connection with the lavas of Krakatoa.

An appendix gives, in somewhat unnecessary detail, an account of the road-metal used on the Government roads of Saxony in 1896. The conclusion, however (p. 351), is worth quoting: "Thus, from the group of sandstones, limestones, dolomites, mica-schists, phyllites, slates, loams and clays, which together form 40 per cent. of the surface of Saxony, no material at all was selected for the construction of the roads, while only 1·94 per cent. of the total road-length was made of sands and gravels, which none the less cover great areas." This surprising fact may be commended to our county surveyors, especially in the limestone districts of Ireland. It is true that in France, with a magnificent system of steam-rolling and workmen's caravans, a good road can be made of lime-stone, if frequently examined and renewed; but the failure in such regions as the Côte d'Or plateaux, where the difficulties of our own Cotteswolds are encountered, shows how much lies in the choice of materials at the outset. Perhaps the eye for minerals, and the natural aptitude for their extraction, which have made Saxon miners the pioneers of Europe, have found expression also in the accurate choice of road-metal.

While Dr. Herrmann's work does not presume to rank as a general text-book, it should be added to our scientific and technical libraries, if only as a record of progress in a State where science is rightly regarded as the inspiring muse of industry. GRENVILLE A. J. COLE.

OUR BOOK SHELF.

Die Mathematik an den Deutschen technischen Hochschulen. Dr. Erwin Papperitz. (Leipzig: Veit, 1899.)
Ueber den Plan eines physikalisch-technischen Instituts an der Universität Göttingen. Felix Klein. (1895.)
Die Anforderungen der Ingenieure und die Ausbildung der mathematischen Lehramtskandidaten. Felix Klein. (1896.)

THESE pamphlets are interesting as showing that the revolutionary ideas brought forward by Prof. Perry on the teaching of mathematics have already begun to agitate the German academic mind; and that his ideas concerning the proper method of presenting the principles of the subject, having regard to the requirements of the student, will receive powerful support in Germany.

The cleavage now going on in mathematical thought was very evident in the recent Physical and Mathematical Congresses, held simultaneously in Paris. The followers of Maxwell and Kelvin found the interest they required in the Physical Congress; the Mathematical Congress was almost entirely engrossed in the development of the analytical ideas of Weirstrass. A lover of music nowadays must become a Wagnerian, or run the risk of hearing no music at all; so, too, the mathematician, who is not absorbed in developments of the convergency of series, must turn to the physical section for the interest he requires.

The Cambridge student of old-fashioned mathematical physics, of the school which the foreigner considered worth imitation, is now driven elsewhere, into the National Science Tripos; and so we find the serious shrinkage in the Mathematical Tripos now in rapid progress. G.

A Glossary of Botanic Terms with their Derivation and Accent. By Benjamin Daydon Jackson. Pp. xi + 327. (London: Duckworth and Co., 1900.)

MR. DAYDON JACKSON has laid those who have to consult botanical literature under a great obligation by the publication of this excellent and compendious glossary. Such a work was badly needed, and no one possesses greater qualifications for the undertaking of it than Mr. Jackson himself, who has done such good work in other departments of an analogous character.

The definitions are usually good and concise, and the errors, so far as we have been able to discover them, are surprisingly few. We cannot help, however, expressing our regret that in the definition of the words "axial" and "axile" the author did not emphasise the difference between them which has been insisted on by some of the best writers. *Axial* should be reserved for structures appertaining to the morphological axis (as distinct from its appendages), *axile* merely denoting position without reference to the morphological nature of the structure concerned. But it would be unfair to tax Mr. Jackson with a confusion only too apparent in literature in which the two terms are frequently used synonymously.

It is often of interest to know by whom a term was introduced, as it is thus possible to ascertain exactly the meaning it was originally intended to convey, and it is to be hoped that Mr. Jackson may see his way to give this information in a future edition. Some of the more recently introduced terms are already dealt with in this way in the volume before us, and we cannot but think that an extension in the direction indicated would still further improve what is already an exceedingly valuable work of reference.

Antropometria. By Dr. R. Livi. Pp. 237. (Milan: Hoepli, 1900.)

THE "Antropometria" of Dr. Livi treats of the subject under three main headings. In Part i. measurements are enumerated and described and their modifying factors reviewed. Instruction is then given in the treatment of data, with especial reference to the statistical method. Part ii. will be found to contain generalisations based on the foregoing sources of evidence, and expressed in the form of laws regulating the rate of growth in various parts of the body; some useful notes on the relation of stature and weight are appended to this part. Part iii. is devoted to an exposition of the principles and method of anthropometric identification, and a stenographic system of recording observations, similar to that used by Dr. Garson in this country, is suggested. Finally, a long table of indices will be found at the end of the volume. Like Dr. Livi's other work, the present contribution to anthropometric literature is thorough and clear; the manual will be extremely useful to students and teachers of physical anthropology.

Elementary Questions in Electricity and Magnetism. Compiled by Magnus Maclean, D.Sc., and E. W. Marchant, D.Sc. Pp. viii + 59. (London: Longmans, Green and Co.)

IT is sometimes a convenience to teachers and students to possess a collection of questions apart from those often given in text-books. There are 311 questions in this volume, arranged under 24 different headings, referring to various sections of frictional electricity, magnetism and current electricity. In addition, the book contains 14 tables of electrical constants, and answers to the numerical questions. The student who works through the exercises in the book will establish his knowledge of electrical principles upon a sound footing.