

THE CLASSIFICATION OF ROCKS.

An Introduction to the Study of Rocks. By L. Fletcher. (British Museum (Natural History) Mineral Department, 1895.)

HAVING received from the facile pen of Mr. Fletcher a guide to the Mineral Gallery of the British Museum, and an introduction to the Collections of Minerals and Meteorites which it contains (works of a very high order from their simple lucidity as well as their thoroughness and accuracy) the student has looked forward to a companion work on the Rock Collection, from the same writer. This work has now made its appearance, and is no whit behind its fellows in outward aspect, being printed in clean, clear type, on good white paper, cheap, not too bulky, and attractive in its general appearance.

A large part of the work is taken up with an essay on classification, which will certainly tend to impress the student with the care that must be used in seizing on essential characters, the numerous pitfalls to be avoided, and the necessity of employing every instrument of research available in the study of rocks. After some preliminary paragraphs on the varied points of interest which rocks present; on the chief characters presented by the two constituents of rocks, minerals and amorphous matter; and on their ordinary modes of origin; the author observes that rock-masses vary so much from point to point, that "similarity, not identity" of characters can alone be aimed at in a classification. He strives to recognise the existence of "*petrical individuals*," but, owing to variation in different parts, to alteration, inclusion, and denudation, fails to reach the ideal, and is compelled to state that "*petrical individuals have rarely, if ever, existed*." We can hardly realise, however, that the inclusion of fossils or pieces of foreign rocks, which seem to trouble the orderly mind of the author, can have any real bearing on nomenclature; a boy is no less a boy if he happens to have swallowed a button. The outcome of this discussion is that "a rock-name is only required by the mineralogist for the purpose of indicating the *kind* of rock, not the particular rock-mass itself."

An admirable account is then given of "*lithical characters*" observed in hand specimens, both in relation to their individual constituents and to their aggregation or structure, and of the "*petrical characters*," which are only to be observed on a large scale in the field. A very useful term is here introduced—"merocrystalline," which is to be correlative with holocrystalline; all petrologists will be grateful for this substitute for semi-crystalline and the other unsatisfactory terms that they have been compelled to employ under protest. Taking the characters here specified, the author employs them to construct a tentative classification of a set of typical rocks, by linking into one group those which have several of these important characters in common. The first scheme attained by this method is in part natural, in that it brings together those "rocks which are composite in kind of material, holocrystalline, and without directional lithical characters," such as granite, syenite, diorite, dolerite, and euphotide. But it is also in part artificial, as, for instance, when it brings together gneiss, shale, and slate because they possess directional characters, and coal, clay, and phonolite because they are

compact though composite. Mr. Fletcher points out that "directionality has been useful, however, in enabling us to bring together the rocks belonging to the several kinds"; but that things thus wedded are to be so quickly divorced is, we take it, his method of enforcing the necessity for most careful selection of essential characters in classification. The primary essential, when hit upon, turns out to be mode of origin.

From this point things go more smoothly, and the rocks fall into a grouping which is, for the most part, natural; want of complete knowledge on such subjects as the origin of the crystalline schists still, however, leaves us in difficulties in classifying these rocks, and we are compelled to place in an artificial group many which differ widely in their methods of origin.

In developing the natural grouping finally adopted, the history of the granite and basalt controversies is succinctly told, and a set of useful definitions and descriptions of the chief types of rocks is given. The work closes with a brief syllabus of these types, which have, through the devious course of trial and error, at last found rest in natural and fairly well-defined groups.

OUR BOOK SHELF.

Facts about Processes, Pigments and Vehicles; a Manual for Art Students. By A. P. Laurie, M.A., B.Sc. (London: Macmillan and Co., 1895.)

IN the majority of cases when a student of painting has seriously entered upon his work in a school of art, he has no wish, he makes no attempt to investigate the chemical and physical properties of the materials he employs. He is content to copy the practice of his teachers and fellow-learners; facility in working and immediate effectiveness are all he demands. He may even go so far as to resent the intrusion of science into the domain of art. To ask a painter to study exhaustively the chemistry of the materials and processes of painting would be unreasonable, for a whole-hearted devotion to the prime business of his life must be his first concern. Nor can an adequate grasp of the difficult and varied problems offered by pigments and vehicles and painting-grounds be acquired by listening to a few lectures, witnessing a few experiments, and reading a few chapters in a manual. The author of the little book before us makes a very modest demand upon the time and patience of the student of painting. Here are no symbols and formulæ to repel the uninitiated, no tables of constants, no complex theories of reaction and change. Mr. Laurie's readers are first furnished with a set of easy experiments which have been devised to show in an obvious way the nature and treatment of the chief pigments and vehicles. Then, in part ii., some notes on methods of painting in tempera, fresco, water, and oil are given, while the volume concludes with a glossary of pigments and a list of the chemicals and apparatus needed for carrying out the experimental work described in the earlier chapters of the book. There is one section of the volume which seems somewhat incongruous—a description of "drawing for process" and an endeavour to estimate the artistic value of the leading methods of photographic reproduction. Mr. Laurie will doubtless effect some improvements in a second edition—a little more attention to literary style is desirable. The late Mr. Gambier Parry of Highnam Court would have been surprised to find himself described as French. There are, indeed, very few slips or errors in this little volume—very few statements and explanations with which the writer of this notice does not agree.

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