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NOTICES OF BOOKS AND PAPERS.

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LEHRBUCH DER PETROGRAPHIE VON DR. FERDINAND ZIRKEL  
—ZWEITE GANZLICH NEU VERFASSTE AUFLAGE—ERSTER  
BAND—WILHELM ENGILMAN, LEIPZIG, 1893.

The appearance of the first volume of the new edition of Prof. Zirkel's Text-Book of Petrography will be most heartily welcomed by all students of this science. The first edition of the work appeared in 1866, Prof. Zirkel being one of the earliest workers in modern petrography, and since that time principally owing to the introduction of the microscope into petrographical work, the science has grown so enormously and its literature has become so exten-

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sive that from a single volume in the first edition the work has grown to three ponderous volumes of which the first, just published comprises no less than 845 pages. The work has been entirely rewritten, as it was found that owing to the great strides which have been made in petrographical science little or nothing in the original edition could now be reproduced.

The work has been eagerly expected for some years past but various causes have contributed to delay its appearance, among others the fact that the author's time has been largely devoted to editing successive editions of Nauman's Mineralogy, so extensively used as a text-book in Germany. The second and third volumes however are also finished and are promised within the present year, thus completing the work.

The work aims at being a complete compendium of the whole science of petrography, incorporating the results of all the literature of the science up to date, with a critical treatment of certain subjects. It is thus essentially one of those monumental summaries of a science, which are so useful to investigators and to advanced students, and which are given to the world principally by the German Universities.

The present volume deals first with general Petrography, under thirteen headings, as follows: General Characters of Rocks; Methods of Petrographical Investigation; Form and Structure of Rock Constituents; Mineralogical Composition of Rocks; Structure of Rocks; Secretions, Concretions, Inclusions, etc.; Joints, etc.; Mode of Occurrence of Rocks; Transitional Forms; Magnetic and Thermal Relations; Origin of Rocks; Alteration of Rocks; Classification of Rocks.

This is followed by a description of the general characters of the Massive Igneous rocks which closes the present volume.

It will thus be observed that the work is not confined to Petrography in the narrower sense in which the word is usually employed but treats in a general way of the arrangement of the various rocks in the architecture of the earth's crust, a department of science usually known as Structural Geology, as well. No cuts or illustrations are given, and although these are not especially required in the treatment of that portion of the subject dealt with in the first volume, it is feared that their absence in the subsequent portions of the work, dealing with microscopic petrography, will make itself felt. It is often a matter of regret to the reader that Prof. Zirke, when presenting the results of the work of others and their opinions on debated points, has not more frequently given his own opinions, which in many of these cases at least would carry great weight, but in such an exhaustive treatise

where so many points come up for discussion this perhaps would not always be possible.

It is beyond the scope of the present notice even to mention the many excellencies of the book. The present volume will be found especially useful as presenting a *resumé* of our present knowledge of various parts of the science in which rapid advances are now being made, as for instance the question of the chemical relations of the eruptive rocks, now so widely investigated and discussed—the artificial reproduction of rocks, etc. It may be noted however that even in the time which has elapsed since the writing of the earlier parts of this volume some of the incorporated material has already become somewhat antiquated.

It is a matter of much satisfaction and one which will afford much relief to geologists in general to find that in his classification of the eruptive rocks Prof. Zirkel agrees in the main with Prof. Rosenbusch, whose scheme is now in general use. It thus seems that at least in its principal features the petrographical classification has been generally agreed upon. Many modifications will undoubtedly be found to be necessary with the advance of the science, but we now have at least a good working classification.

Prof. Zirkel rejects Rosenbusch's division of Dyke Rocks, to which many objections have been raised by others as well, and although refusing to admit that the geological occurrence of an igneous rock is a proper basis for classification, he substitutes for this its structure, which in the great majority of cases depends on its geological occurrence, and this substitution does not therefore materially affect the form of the classification.

The separation of the "old" from the "new" volcanic rocks is still retained and justified on the ground that although their differences may be due merely to alteration, nevertheless since the distinction can be made in most cases the double nomenclature should be retained, it being quite as convenient to use the terms Rhyolite and Quartz-Porphry as the terms Tertiary Rhyolite, Carboniferous Rhyolite, &c.

This argument has especial weight in the case of the German rocks, but since any classification universally adopted must be one which will be suitable and convenient for all countries, it remains to be seen whether this dual nomenclature for the eruptive rocks, so long opposed by English petrographers and fast losing its hold in all directions will not eventually be discarded, being replaced perhaps by some simple method of distinction such as that recently proposed by Dr. Williams and Miss Bascomb, which consists in placing the prefix *apo* before the name of any rock which

can be proved to have been derived from any of the ordinary types by a process of alteration. Thus there would be Rhyolites and Aporhyolites, Andesites and Apandesites, and so on.

Another point in the classification adopted by Prof. Zirkel is the retention of the old use of the terms Diabase and Gabbro, the former being a rock composed of plagioclase and augite and the latter one composed of plagioclase and diallage, the distinction between the two being thus made to depend on the presence or absence of a cleavage parallel to the orthopinacoid of the pyroxene. This cleavage, which is often nothing more than a parting, is now generally considered to be a most unsatisfactory basis of division, not nearly so good as that afforded by the ophitic (diabase) and granitoid structures displayed respectively by the two rocks—which structures although occasionally found in different portions of the same mass, certainly form a better and more distinct ground of classification than a more or less distinct or indistinct orthopinacoidal parting in a single constituent.

Prof. Zirkel's book is an excellent one and represents an enormous amount of careful work, and will take rank with the works of Prof. Rosenbusch as one which must find a place in the library of every petrographer.

FRANK D. ADAMS.

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