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## A TREATISE ON IGNEOUS ROCKS.

*Igneous Rocks. Composition, Texture and Classification, Description and Occurrence.* By Joseph P. Iddings. In Two Volumes. Vol. i. Pp. xi+464+3 plates. (1909.) Price 21s. net. Vol. ii. Pp. ix+685. (London: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1913.) Price 25s. 6d. net.

UNIFORM with the "Rock Minerals" of the same author, now in its second edition, the work which Prof. Iddings has now completed will take an assured place as the fullest and most comprehensive treatment of the subject in our language. Nor is it of the nature of a compilation, but presents numerous features of originality. There are novelties which will be cordially welcomed, and others which will probably meet a more doubtful reception. The author has not shrunk from introducing many debatable questions, and has pronounced on them in no uncertain tone. Although the spirit is that of the missionary rather than the controversialist, this somewhat impairs the utility of the work as a hand-book for students.

The first volume, which has been for some time in the hands of petrologists, deals with the composition, texture, and classification of igneous rocks. It includes a good account of the chemical composition of the rocks and of their component minerals, a discussion of the chemistry and physics of rock-magmas, an admirable and well-illustrated chapter on rock-textures, and a statement of the problem of magmatic differentiation. The last three chapters are concerned with the thorny subject of nomenclature and classification. Here we have first a historical sketch, then an arrangement of the principal igneous rocks in a "qualitative" mineralogical scheme, and finally an exposition of the "Quantitative Classification," of which our author is one of the creators.

The second volume, recently issued, deals with the description and occurrence of the rocks, and is divided into two equal parts. The final test of any classificatory scheme is its applicability in practice; and doubtless many petrologists have waited with curiosity to see how the author would develop a systematic treatment of igneous rocks on the lines of the Quantitative Classification. It seems that we may now congratulate him on recognising the impossibility of the task, for the system actually adopted does not differ in general plan from others in current use. The rocks are first divided into those characterised by (1) pre-

ponderance of quartz, (2) quartz and felspar, (3) felspar, (4) felspar and felspathoids, (5) felspathoids, and (6) ferro-magnesian minerals. Under each head "phanerites" and "aphanites" are separated, while the subdivisions are again based on mineralogical characters. To introduce the quantitative element, the author has often re-defined terms already in use (a practice which he deprecates in others); but he has succeeded in producing a working scheme with less disturbance of accepted usage than we had expected. The principal relic of the specific "Quantitative Classification" is the use of an ideal mineral composition (the "norm") instead of the actual composition.

Nevertheless, there are many signs that the author is reluctant to abandon the conception of a classification laid down *a priori*. The precise boundaries which he demands are to be fixed by arithmetic, not by chemistry. He counts it a defect of the current systems that special importance is attached to the presence of even very small amounts of certain minerals, such as nepheline and leucite; but, as he has himself pointed out (prior to the birth of the Quantitative Classification), the mere appearance of one of these minerals shows that we have crossed a significant boundary-line in respect of chemical composition. Surely it is he, not his critic, who has lost appreciation of "the mathematical precision of stoichiometric chemistry" (p. 7).

The second part of the volume we can praise without reserve. It is an account, such as has never been attempted before, of the geographical distribution of igneous rocks over the globe, with special reference to their chemical composition. This has not been merely compiled in the library, but represents the results of much travel and study in many lands. It is illustrated by maps of the several continents, and by more than 1200 analyses. We hope that in another edition some attempt will be made to distinguish on the maps igneous rocks of different geological ages.

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## MATHEMATICS FOR FRENCH FRESHMEN.

*Les Principes de l'Analyse Mathématique: Exposé Historique et Critique.* By Prof. P. Boutroux. Tome Premier. Pp. xi+547. (Paris: A. Hermann et Fils, 1914.) Price 14 francs.

PROF. BOUTROUX appears to belong to the school of the laughing philosophers; for, like many of his distinguished compatriots, he has composed a work which is amusing as well