

exact spelling, the author, and the date and place of publication, with the statement that he considers the 10 names in question as the correct names of the animals involved.

I will agree to compile all the names sent in, to tabulate the votes on the different names (in respect to their importance and frequency), and if possible to verify the references and the nomenclatural status of the names in question. I will further agree to submit a list of say 100 to 300 such names to the International Commission on Nomenclature and to recommend that the commission report upon the list to the international congress.

All communications on this subject should be addressed to me as follows:

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CH. WARDELL STILES

GLACIAL CLAYS OF THE MAINE COAST

FOR a number of years these clays have been greatly neglected by geologists and zoologists. Mr. Frederick G. Clapp, in his recent paper,¹ has summarized and added to the work on this region.

Mr. Clapp gives a list of the Pleistocene fossils found in the clays. To this list should be added the following species of ophiuroids, which I found in August, 1909: two specimens of *Ophiura sarsii* Ltk., and one of *Ophiura nodosa* Ltk. These three specimens were found in close proximity in clay about 110 feet above sea level, by aneroid, and the location was at the Rockland Lime Company's deepest quarry, about two miles west of Crockett Point, in Rockland Harbor. This horizon is in the "Upper Clay" of Mr. Clapp's provisional division of these clays. I am indebted to Dr. Hubert L. Clark, for the determination of the species.

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¹ "Complexity of the Glacial Period in North-eastern New England," *Bulletin of the Geological Society of America*, Vol. 18, pp. 505-556, 1908.

SCIENTIFIC BOOKS

The Natural History of Igneous Rocks. By ALFRED HARKER, M.A., F.R.S., Lecturer in Petrology in the University of Cambridge. New York, The Macmillan Company. 1909. Pp. 383, with 112 diagrams and 2 plates.

This volume by Mr. Harker, which presents the substance of a course of lectures delivered at the University of Cambridge, is not a textbook of petrography but treats in a general way of igneous action and igneous rocks in their relation to the structure of the earth's crust, and of the constitution of igneous magmas considered as complex solutions. In the latter portion of the work an exposition is given of numerous and often rather recondite researches into the physico-chemical relations of natural magmas and artificial slags which have been carried out in recent years by Vogt and others.

With respect to the question of the ultimate source of igneous action the author adopts an attitude which is frankly agnostic.

The nebular hypothesis in Laplace's form, if not discredited, has at least been shown to involve great difficulties to which no answer is yet forthcoming; the meteoric hypothesis, resting from the first on a more precarious basis, is involved practically in the same damaging criticism; and the planetesimal theory has as yet scarcely emerged from the tentative stage.

After considering the relation of igneous action to crustal movements and pointing out that while there has been a rough periodicity in times of activity and repose, there is nothing to support the opinion that there has been a secular waning of igneous action, the geographical distribution of the younger igneous rocks and the question of cycles of igneous activity are discussed. It is shown that the differences in composition of the lavas emitted from neighboring vents, as well as the very unequal heights to which such lavas rise, prove that they can not draw directly from a common source. Each volcanic center must possess its own proper reservoir of lava, but we

must conclude that the local reservoir of an individual volcano is supplied by drafts from some much larger body of rock magma with which it is from time to time in communication. The various types of igneous intrusion are then considered, especial attention being paid to the numerous varieties of laccolitic and bathylitic intrusion. The important question of petrographical provinces and the mutual relations of associated igneous rocks are discussed at length. While recognizing many local and subordinate petrographical provinces, Mr. Harker distinguishes two petrographical regions of the first order of magnitude, an Atlantic and a Pacific region, the two being separated in America by the line of the Andes and Cordillera folding. The former region is characterized by a prevalence of magmas rich in alkalis, while in the magmas of the latter, lime and magnesia are relatively more abundant. The mutual relations of the magmas in a number of well-known igneous areas within these great petrographical regions is then considered and is illustrated by the aid of variation diagrams.

A very interesting and valuable portion of the book is that in which the physical chemistry of rock magmas and the laws which govern their crystallization is considered. In this results of the recent researches of Vogt, Miers, Day, Doelter and others are presented and critically discussed. The structures of igneous rocks are also considered in the light of recent work in the field of physical chemistry. Thus in hypabyssal porphyritic rocks, the phenocrysts often represent the excess over eutectic proportions and the ground mass the quasi eutectic residuum, while in the volcanic rocks the distinction is obscured by the effects of the discontinuous change of physical conditions at the time of extrusion. Micrographic intergrowths, corona, spherulitic and variolitic structures are explained in the light of the laws of crystallization as elucidated by recent studies in physical chemistry.

The function of mineralizers in rock magmas and the formation of certain minerals through their agency is then discussed, leading to the consideration of the active rôle of

the volatile constituents, which on the crystallization of the rock enter upon a new phase of activity, partly of a destructive kind to which Bunson applied the term *pneumatolitic*. Then follows the consideration of the metasomatic changes developed in certain rocks when penetrated by igneous intrusions, more especially the phenomenon termed "granitization" by the French geologists.

The very important question of magmatic differentiation in its various phases is then considered, together with the allied question of hybridism in igneous rocks to which Harker has recently made such important contributions as the result of his studies in the western islands of Scotland.

The last chapter deals with the question of the classification of igneous rocks. The "quantitative system" is adversely criticized and the opinion is expressed that a satisfactory classification can not be expected until our knowledge in the domain of petrogenesis is much more extended than it is at present.

The work traverses a portion of the field of geological knowledge which is not covered by our ordinary text-books, although many of the questions discussed are also treated of in the first volume of Professor Iddings's work on "Igneous Rocks," which has just appeared. It is well and clearly written and will repay a careful perusal by all interested in the modern developments of the science of geology.

McGILL UNIVERSITY FRANK D. ADAMS

Croisière Océanographique accomplie a bord de la Belgica dans la Mer du Grönland, 1905.
DUC D'ORLÉANS. Bruxelles, 1907. 4to, 573 pp., 80 plates and charts.

In June, 1905, the Duke of Orleans, having in view a study of the Greenland Sea, sailed from Tromsø, Norway, in the well-known steamer *Belgica*, commanded by A. de Gerlache de Gomery, accompanied by an effective staff. The season being too early for navigation on the Greenland coast the course of the expedition was laid first to the northward by Bear Island, the west and north coasts of Spitzbergen, and then as closely as opportunity permitted skirted the compact southward