

American resources, actual and potential, but also a useful summary of foreign sources, accounts of the tests for potash, and processes of extraction, and finally a very full bibliography (up to and including 1918) of the whole subject.

ARTHUR HOLMES.

ORIGIN OF THE IRON ORES AT KIRUNA. By R. A. DALY.
 Vetenskapliga och praktiska Undersökningar i Lappland,
 Geology of the Kiruna District, part v. pp. 31, with 4 figures.
 Stockholm, 1915.

THE magnetite ore-bodies of Kirunavaara-Luossavaara are in some respects the finest known examples of the differentiation of oxides from an igneous magma, and there has naturally been a good deal of discussion as to the mechanism by which this has been brought about. Some writers consider the porphyries associated with the ores to be lava-flows, but Daly favours the hypothesis of intrusion. Emphasis is placed on the sequence of rock-types and on the chemical composition of the porphyries as confirmatory of magmatic segregation and particularly of the theory of differentiation in place. The ore-bodies are believed to be basic segregations from the overlying quartz-porphyry intrusion, the upper member of the composite laccolith, accumulated at its base by gravity; while the so-called "inclusions" found scattered throughout its whole thickness are also regarded as units of differentiation, and not xenoliths, as formerly believed. A detailed study of the forms of these masses favours this conclusion. Those masses scattered at higher levels are similar in composition to the ore-bed at the base, and are supposed to have crystallized after the magma had become too viscous to allow them to sink like the earlier ones which formed the ore. An important point is here raised, namely, that since no one disputes that single crystals, say of magnetite, in a magma are formed by differentiation, that is by aggregation of molecules from the solution, there is no reason why compound masses of greater size should not have been formed in an exactly analogous manner, and it is illogical to draw any arbitrary line between such units of varying size by assuming that the larger ones must be xenoliths.

R. H. R.

THE AMISK-ATHAPAPUSKOW LAKE DISTRICT. By E. L. BRUCE.
 Canada, Department of Mines, Geological Survey Memoir 105.
 pp. iii + 91, with 7 plates, 4 figures, and a coloured map.
 Ottawa, 1918.

THIS area lies on the boundary of Manitoba and Saskatchewan, on the divide between three great rivers, the Churchill, Nelson, and Saskatchewan. It forms part of the border of the Canadian shield, about half being occupied by pre-Cambrian rocks and half by Ordovician dolomites. The ancient rocks are divided