

* * *. Ils [micaschistes] y alternent avec des lits subordonnés de gneiss à grains fins, d'amphibolites, de chlorito schistes, de schistes micacés, et comprennent des masses interstratifiées de diorites et de granulites, d'origine éruptive. Ces roches subordonnées forment avec les micaschistes, dans lesquels elles sont injectées, de longues bandes parallèles, * * *.

Newton's description of the geology of the Black Hills of Dakota † leaves little room for doubt but that the rocks which he calls Archean correspond to the upper Archean or Ontarian system of central Canada, and that his irruptive granite, though not described as foliated, is the analogue of the commonest phase of the Laurentian. The same relationship holds between the two rock systems in both regions, and many of the Laurentian granites are devoid of foliation.

GEOGNOSTICAL EQUIVALENTS OF THE ARCHEAN.

In assemblages of rocks of indeterminate or post-Archean age complexes of gneissic irruptive rocks and older metamorphic strata of elastic or volcanic origin are now well known. These cannot be spoken of as the geological equivalents of the Archean complex on account of their diverse age, but may be referred to as its geognostical equivalents, since their development appears to depend upon universal sub-crustal conditions, which are to a large extent independent of geological age.

McMahon,‡ in his studies of the great "central gneiss" formation of the Himalaya mountains, has demonstrated clearly that the formation is not, as was long supposed, the Archean basement upon which the Paleozoic sediments were deposited, but is an irruptive mass breaking up through the Silurian and later rocks, altering them, holding detached fragments of their strata, and being injected within the strata. Speaking of this formation, which he calls gneissose granite, he cites the following evidences in proof of its irruptive origin: 1. The granite has produced a certain amount of contact metamorphism on the rocks touching it. 2. Tongues and intrusive veins have been sent from the granite into the adjoining rocks; in other places the granite appears in sheets between the beds of the sedimentary rocks at some distance from the junction of the latter with the main mass of the granite, and in some cases these sheets or dikes have cut through the beds and passed from one horizon to another. 3. The main mass of the granite appears at different geological horizons. § 4. The granite contains

* Structure Géologique du Finistère. Bull. Soc. Geol. de France, 3me Série, t. XIV, 1886, p. 657.

† Report on the Geology and Resources of the Black Hills of Dakota. By Henry Newton and Walter P. Jenney, Washington, 1880, pp. 45-80, 220-222.

‡ Geol. Survey of India, Records, Vol. XVIII, Part 4, 1884, p. 168; *ibid.*, Vol. XVII, Part 2, 1885, p. 79. Geol. Mag., N. S., 1. c. 2e série III, Vol. IV, 1887, p. 212.

§ As it does when it comes at one place against the Keewatin and at another against the Coutchiching in the Rainy lake region.