morphic] are in reality only different portions of one and the same mass. * * * As a result of this summer's work, I think it may be safely concluded that the rocks comprising the principal area of anorthosite above referred to, as well as most, if not all, of the smaller areas, are of eruptive origin." *

He confirms this in his summary for 1888 in the following words:—

"All the areas of anorthosite now known to occur in the district have been examined, and mapped, and have proved to be either eruptive masses cutting through the gneisses, or masses interstratified with the latter, but probably still of eruptive origin." †

Callaway has shown, in his paper on the granitic and schistose rocks of northern Donegal, that the granite-gneisses of that region, which have been regarded as Laurentian and which correspond closely in lithological characters and mode of occurrence with the Laurentian of Canada, are really irruptive through older rocks, which must have arched them over, and present all the evidences of irruption which have been adduced by the writer in support of the irruptive origin of the Laurentian northwest of Lake Superior. He thus states his conclusions:—

"1. The granite rock of northern Donegal, originally supposed to be the result of the metamorphism of sediments, and recently referred to the Laurentian system, is a true igneous granite, as seen in its intrusion into the adjacent schists, in its inclusions of masses and fragments of other rocks, and in its metamorphic action on limestone in contact. 2. This granite is distinctly foliated, the gneissic structure being caused by lateral pressure, * * * 3. The granite is intrusive in a thick group of quartzites, quartz-schists, hornblendic, micaceous and talcose (?) schists, and crystalline limestones, called the *Kilmacrenan series*. These rocks are truly crystalline, but usually thin-bedded and fine-grained. 4. The crystalline schists are bounded on the east by a semi-crystalline series, consisting of quartzose grits and itacolumites, quartzites, crystalline limestones, compact dolomites, phyllites, interlaminations of grit and schistose matter, and finely foliated micaceous schists." ‡

These conclusions as to the irruptive origin of the gneiss are confirmed by later observations of the same investigator on the Galway gneiss. §

In the pre-Cambrian or Archean of Brittany, Barrois recognizes the irruptive character of the gneisses which correspond to our Laurentian. He says—

"Ces gneiss alternent avec des lits interstratifiés de micaschistes et d'amphibolites, et passent à des granites gneissiques qui les pénètrent à la façon d'une roche éruptive. L'ensemble des *gneiss et micaschistes granitiques* avec granites gneissiques rappelle par ses caractères lithologiques *l'étage dimétien*, proposé par M. Hicks, dans le pays de Galles, le gneiss fondamental d'Ecosse, certains gneiss laurentiens du Canada,

* Geol. Survey of Canada, Summary Report for 1887 and 1888, 1889, p. 27A.
† Ibid., p. 85A.
‡ Quart. Jour. Geol. Soc., Vol. XLI, 1885, p. 239.
§ Quart. Jour. Geol. Soc., Vol. XLIII, 1887, p. 517.