

differentiated from a magma closely related in time and origin to the magma of the simple sills.

Granting this, there may be two ways in which the granite may have originated:—

(1) The granite (micropegmatite) may represent the simple fusion of the sediments into which the gabbro was intruded. The presence of a granite (micropegmatite) zone in the interior of some of the sills at once prevents this from being a working hypothesis.

(2) The granite (micropegmatite) may represent the assimilation of blocks of the surrounding sediments which have been stoped off by the intruding gabbro. After the assimilation of the sediments, this syntectic differentiated under the action of gravity giving the mass a stratiform appearance. (Daly's assimilation-differentiation theory).

This hypothesis is based on the idea of an intrusion of a homogeneous gabbroidal magma into sills of various thickness, and as Daly has pointed out¹ demands that "a great absolute amount of thermal energy be credited to a sill in which secondary granite has been formed; that the sill must be thick. Other things being equal, granite formed by mere differentiation should be found in sills of less thickness, though here again the thickness must be considerable. True granite with relations described in this paper has never been found in any intrusive sheet 500 feet or less in thickness. The assimilation-differentiation theory readily interprets the facts as due to the relatively enormous amount of heat required for the generation of the granite-granophyr zone, namely, the amount of heat characteristic of thick intrusive sheets."

Field work by the writer subsequent to the publication of the article containing the above extract, revealed the presence of sills 140 feet thick which contained 70 feet of granite (micropegmatite) at the upper contact. Applying the hypothesis propounded by Daly, it is necessary to suppose, in such a case, that a sheet of gabbro with a thickness of about 70 feet rifted off and absorbed an equal thickness of quartzose sediments; this credits the gabbro body with an amount of thermal energy

¹R. A. Daly, Amer. Jour. Sci., vol. 20, 1906, p. 214.