

large part of Kimberley and Yarrow townships is underlain by granite; another mass underlies about 30 square miles of the eastern part of Cairo and Alma, and a third, good-sized body is found in the northern part of Baden township, extending eastward into Alma. In addition there are several small bodies in the southern part of Powell township in the neighbourhood of the gold discoveries.

LITHOLOGICAL CHARACTERS.

There is a considerable variation in the composition of these various granitic intrusives, together with certain similarities. W. H. Collins,¹ in describing the granites of the Gowganda area to the south, has divided them into two main classes according to whether the ferromagnesian mineral present is biotite or hornblende. On this basis of classification all the granites of Matachewan area will fall into one class, as all are hornblende granites with syenitic phases. The criterion, however, is a poor one, since the presence of mica or of hornblende seems to have been a function of the original wetness or dryness of the magma,² and micaceous phases or hornblende phases might, therefore, occur in different parts of the same batholith. Certain writers have used gneissic textures as a criterion for the separation of granites, with the implication that those bodies possessing the gneissic textures must be older than bodies without such textures. This, however, would be true only when the gneissic textures were produced by regional deformation acting on a mass of solid granite. The gneissic textures commonly found in granites have been clearly shown³ to be not the result of deformation, but merely flow textures developed during the solidification of the granite mass, so that they may have developed in any intrusive in which movement occurred under proper conditions of viscosity, and cannot, therefore, be taken as a criterion of age. A. G. Burrows⁴ has recently advanced the idea that strong resemblances in chemical composition are indicative of identity of intrusion, and has used the idea to correlate two bodies both of which possess unusually high percentages of potash. The conception appears to be a good one, its main objection in practice being that it requires a slow and expensive chemical analysis before any conclusions can be drawn. The converse of the proposition cannot, however, be accepted as true, namely, that granites of unlike composition are of different ages or even come from different sources. The analyses of the granites of the Haliburton area, which Adams and Barlow by a careful detailed study have shown to be of a single age and source, show rather wide variations in their chemical compositions.⁵ However, Burrow's suggestion of using some chance excess of one of the rarer constituents—in this case potash—as a criterion for comparison, is a good one, and is the best means yet offered of classifying and grouping granites by internal evidence. It is along the lines suggested and used by Derby, who found that he could classify his granites with a high degree of certainty by measuring the relative proportions of their heavy residual minerals, the garnet, zircon, titanite, etc.

¹ Geol. Surv., Can., Mem. 33, 1913, p. 43.

² Bowen, N. L., Jour. of Geol., supplement to vol. 23, No. 8, 1915, pp. 45-46.

³ Adams, F. D., and Barlow, A. E., Geol. Surv., Can., Mem. 6, 1910, pp. 73-87.

⁴ Burrows, A. G., Rept. Ont. Bureau of Mines, 27, 1918, pp. 225-227.

⁵ Adams and Barlow, Geol. Surv., Can., Mem. 6, 1910, pp. 52-62.