up to many inches in diameter. Similar masses of pyroxene as well as crystals are also sometimes imbedded in the apatite."

It is also worthy of note that the form of the deposits in both gneiss and pyroxenite is strongly suggestive of crushing and squeezing. This was remarked by Harrington,* who says: "The apatite masses look as if they had been driven or squeezed into the curious forms which they now present during the folding or crumpling of the enclosing rock."

The explanation of the large apatite crystal (pages 103, 127) in the leopard rock is not without difficulty. One or two instances only were observed and we have no information that they ever occur in the streaked gneiss. From the manner in which the ellipsoids and bands of the gneiss arrange themselves concentrically about the apatite, it is clear that the crystallization of the apatite took place prior to the development of the gneissic structure.

Four views may be suggested to account for the apatite crystal in its present position:

1. That it crystallized out of the original magma before the solidification of the latter. From the relations of both the crystallized and granular deposits of apatite occurring in the syenite-gneiss, it is evident that an explanation that will account for the presence of one must apply also to the other. We have considered already the objections to the view of the formation of these deposits in the original magma (page 127). These are the large size of the crystals, their inclusions and rounded outlines, and the extent and more or less crushed condition of the deposits.

2. That it is due to segregation and crystallization after the solidification of the rock. The belief is expressed by Harrington in the report above cited that in many cases there has been a segregation of apatite and other minerals which accompany it from the surrounding rock into irregular or lenticular masses without any true cavity or crevice having ever existed. The growth of crystals by replacement in situ has been noted by various observers.†

Indications of such development appear in the small hornblende crystals occurring in the streaked gneiss, as described in another part of this paper (page 118). The development of large crystals by this process, however, has not been demonstrated and is considered improbable.

3. The third view is that they were deposited in a cavity in the syenite prior to the development of the gneissic structure. The objection to this hypothesis lies in the difficulty of accounting for the obliteration of the cavity without crushing the apatite. It may be supposed that the cavity was large in proportion to the size of the crystal and did not become closed at once but gradually, and that by the time the walls had closed in, the surrounding rock had become sufficiently plastic to adjust itself about the crystal without breaking it. The objections to the view that the rock had reached such a condition of plasticity have been considered (page 130). Moreover, the former presence of a cavity should be indicated by an irregularity in the arrangement of the ellipsoids about the apatite, which does not appear to be the case, though the observations upon this point were not conclusive.

* B. J. Harrington: Geol. Survey of Canada, Report G, p. 7.

† C. R. Van Hise: Am. Jour. Sci., 3d ser., vol. 33, 1887, p. 385.