destroyed by the later metamorphism, or else the two pressures came from the same direction, and the later foliation was superimposed on the earlier, this being much the more probable of the two.

It has previously been stated that the character of the metamorphism which these rocks have undergone is indicative that they must have been deeply buried at the time of metamorphism. The igneous rocks specially are rocks of the most massive and resistant sort; yet over a large part of the region their constituent crystals have been broken up into a mass of granular fragments, accompanied by much recrystallization. The rock masses have also been shortened in the direction of greatest pressure and extended in the plane at right angles to this, with the production of foliation in this plane; and all this has taken place under such great load that no permanent cracks could form, all breaks being closed up by welding as soon as formed, so that the rocks have in general not been weakened and have often been made stronger by the process. The depth below the surface at which permanent cracks can not exist is considerable and moreover varies with the nature of the rock concerned, being greatest for strong, massive igneous rocks of this character. Yet during metamorphism these rocks were at that depth. The change in shape has been effected by actual movement of the rock particles, so that the rock must have been sufficiently loaded to be plastic. Large feldspar crystals have been bent through considerable angles without breakage. Quartzes have been drawn out into long lenses and spindles. A multitude of phenomena showing stretching of the rock, accompanied by actual flowage of the material, could be cited, yet the strength of the rock has not been impaired. The rocks have been under a pressure whose amount exceeded their ultimate strength, and under a load sufficient to cause welding up of all cracks. The exact depth of burial necessary to bring about these conditions in rocks of this sort is uncertain, but a depth of 5 miles is probably not more than a mile or two wide of the mark in either direction.

As near as can be judged from the small and scattered Grenville exposures in the heart of the district, their foliation is everywhere parallel to the original bedding. It is also true that, over much of the district, the foliation dips are compara-