

the uncertain gneisses involved often with the Grenville rocks, yet without any Grenville admixture, and the relationship of such rocks forms a very difficult problem. The Grenville belts and patches and the areas occupied by the later igneous intrusions have been in the main discovered and mapped. There yet remains the exceedingly difficult problem of the separation of these mixed belts into their several elements, and the working out of their affiliations. This is likely in many cases to prove impossible, and in nearly all cases the amount of intermingling is so great as to render attempts at detailed mapping of the several elements futile, and to require their designation as belts of mixed rocks.

**Grenville rocks.** The most characteristic of these are the limestones. They are always thoroughly, and usually coarsely crystalline marbles, which even when purest contain scales of graphite. They vary greatly in purity and usually contain green and white pyroxenes, apatite, phlogopite, quartz and scapolite, often in large quantity. In the thick beds these are more apt to be concentrated in the outer portions, in fact the limestone often grades into a pyroxene quartz rock, with or without scapolite, or else into a nearly pure pyroxene rock. Some beds of apparently pure limestone are found to contain a large quantity of white pyroxene, and when this has altered to serpentine, as it tends to do, the white and green mottled, calcite serpentine rock known as opihalcite results.

There is always found associated with the limestones a series of curious schists and gneisses, often found also where no limestone is present, which are difficult to describe, owing to their many phases, but which are easy of recognition and are as characteristic of the series as are the limestones. They vary from exceedingly quartzose to quite basic rocks. Garnet, graphite, sillimanite, pyrite and white pyroxene are very frequent and characteristic minerals. Many of the beds, specially those which contain pyrite, weather readily to a peculiar, rusty looking rock, seemingly much more altered than is actually the case. Many others are exceedingly quartzose, so much so as strongly to resemble quartzites, but these are found to contain usually much alkali feldspar, rocks that