# GEOCHEMISTRY OF THE AMPHIBOLITES OF CENTRAL PARK, NEW YORK CITY.

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The amphibolites of Central Park make up approximately 5 percent of the exposed bedrock. They are interbedded with schists that make up about 90 percent of the bedrock with pegmatites and granitic rock constituting the remaining 5 percent. Most of the amphibolite layers are less than 0.5 m thick but a few layers or zones of closely spaced parallel layers, such as those near the Bird Sanctuary and west of The Lake, are about 3 m thick. The layers are consistently parallel to the foliation of the schist. Individual layers do not maintain a uniform thickness and are discontinuous. The amphibolite is typically composed of hornblende and plagioclase with highly variable biotite, epidote, and quartz and minor accessory garnet, magnetite, ilmenite, and pyrite. The layers less than 0.5 m thick are probably too thin to be metamorphosed basalt flows but may be metamorphosed volcaniclastic sediments or pyroclastic deposits.

Chemical analyses of six samples from some of the thicker layers indicate an approximately uniform composition averaging 47% $SiO_2$, 1.1% $TiO_2$, 13% $Al_2O_3$, 10% FeOt, 8% MgO, 11% CaO, 3% $Na_2O$, 0.6% $K_2O$, 4.4% loss on ignition, 200 ppm Cr, 60 ppm Ni, 10 ppm Rb, and 75 ppm Zr. Sr content, however, is highly variable ranging from 15 to 100 ppm. We expected compositions consistent with calc-alkaline, island-arc volcanism typical of continental margin tectonic settings, such as generally proposed for the protolith of the Manhattan Schist. However, the $SiO_2$, $Al_2O_3$, and Sr contents of the amhibolites are much less than typical of calc-alkaline volcanic rock. If, instead, the protolith of the enclosing schist was a deep water shale deposited on ocean crust, as generally proposed for the Hartland Formation, we might expect compositions consistent with mid-ocean ridge basalt (MORB). The chemical compositions of the Central Park amphibolites are within the range of MORB, although the Cr and Ni values are somewhat less that typical of MORB. We, therefore, conclude that the chemical composition of the amphibolites may have been affected by sedimentary, hydrothermal, or metamorphic processes and may not be useful indicators of tectonic setting.