Associated with these are numerous pegmatites. The entire series has been mapped as Byram because more detailed study and mapping than that possible on the scale of the map used here, will be necessary to delineate the various facies. In the sequence of pre-Cambrian events, therefore, we are able to state only that during later Proterozoic time extensive granitic intrusion prevailed in the area under discussion. That this intrusion was in part deep-seated is evidenced by the highly irregular and injected and contorted nature of the contact between the Byram and Pochuck. It follows, therefore, that after the granitic invasion there was very extensive erosion before the surface upon which the Cambrian rocks were deposited could have been exposed. Proterozoic magmatic activity continued into early Paleozoic time or repeated invasions of magmatic material may be suggested with the later activity continuing into at least Lower Paleozoic time. The evidence for this is the occurrence of quartz-feldspar dikes in the Hardyston sandstone near its contact with the pre-Cambrian granitic material. With the dying stages of magmatic action existent into Lower Paleozoic time, at least some of the quartz veins found in the Cambrian and Ordovician rocks may well be of magmatic origin.

Cambro-Ordovician History

The Paleozoic history of this section recorded in the rocks begins with the deposition of the Hardyston sandstone in the Lower Cambrian period. There is, however, a big gap between these deposits and the underlying crystalline rocks of the pre-Cambrian.

The Hardyston sandstones, wherever contacts have been observed, rest unconformably upon greatly metamorphosed gneisses. An examination of these basal rocks shows that they attained their present character of coarse-grained and banded crystalline rocks while deeply buried beneath enormous loads of other rocks. The Byram gneiss, which is the most common type of rock on which the Hardyston rests, was originally a granite and it is now generally recognized that granites are igneous rocks that cooled at considerable depth beneath the surface. The gneissic banding, which the Byram shows, is believed to have been developed as the result of subsequent excessive compression and resultant heating such as can also take place only at great depth. These features must have been acquired long before the Hardyston strata were laid down since these deposits show positively that they have never been subjected to such metamorphic agencies. The conclusion, therefore, seems certain that a long period of erosion, during which a great thickness of pre-Cambrian rocks was removed, preceded the opening of Cambrian deposition. One can only guess at the depth of surface rocks carried away but it appears to the writer that the amount was upwards of a thousand feet and probably