

In their description of the Burket member of the Harrell shale in the Bellefonte Quadrangle, Butts and Moore indicated that "in some places there are large calcareous concretions as much as 12 to 20 inches in diameter". Occasional finds of the concretions falling within that size range were brought to the writer's attention near Port Matilda in Centre County. The largest concretions were brought to the writer's attention about 1962, when 17 miles to the southwest along the outcrop of the Burket member of the Harrell shale, about two miles south of Tyrone, at Grazierville, in Blair County, a bulldozer unearthed several on the order of 2½ to 4 feet in diameter, near Route 220. Others found or exposed in cuts ranged in size from about six inches to about eight feet in diameter (see photo).

Besides the large size, there are several interesting aspects about the concretion occurrence: Among them are: (1) the relative abundance of those in the four foot diameter range, (2) the perfection or roundness as opposed to irregularly-shaped masses, and (3) the relatively clean parting which exists between the concretion and the enclosing shale. The writer wishes to suggest that the sharp parting is due to the fact that the shale in this location has a nearly vertical dip, allowing meteoric water to percolate freely downward along the shale layers, causing solution at the shale-concretion interface. This situation contrasts markedly with those concretions often found in the black shales of the anthracite and bituminous coal fields in Pennsylvania in which there is no sharp transition between the concretion itself and the enclosing shale.



**Debbie Danko views concretion at
College of Earth and Mineral Sciences**

Concretions commonly form in unconsolidated sediments because of an abundance of some material, usually calcium carbonate in solution. Chemical precipitation takes place around a nucleus, often a fossil, and the concretion increases in size by successive additions of material to its surface. During this process the original sediment is usually displaced by the enlarging concretion, although it can sometimes incorporate up to about 60% of the enclosing sediment in silt or sand. Little is found in the way of fossil material at the Grazierville site except for occasional calcite or pyrite crystal lined cavities which suggest a fossil may once have occupied the void. Needless to say, there is some inherent difficulty in chopping up a four-foot concretion to find the remains of a fossil in its center.

When a concretion forms in sediments having nearly isotropic qualities with regard to movement of solution, it is likely to be spherical. When forming in an anisotropic media, such as clay or mud where mobility of solutions are greatly restricted in the vertical direction, the results are flattened shapes. In the case of the "Tyrone Concretions" they are often oblate spheroids of rather remarkable perfection, which becomes particularly impressive when their large size is taken into consideration.

Selected Reference: Butts, Charles and Moore, Elwood S., *Geology and Mineral Resources of the Bellefonte Quadrangle, Pennsylvania*, U.S. Geological Survey Bull. 855. (Out of print)



Maynard Williams at excavation near Grazierville.

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