Research Project 2: Correlation Ordovician Carbonate rocks
Part 1 - Manny's Corner
Geology 21: Stratigraphy and Depositional Environments of New York

Overview: During the first part of this research project, we will measure a stratigraphic section of carbonate rocks in an abandoned quarry 0.3 miles east of Manny's Corner on the south side of NY State Rt. 67 (several miles east of the town of Amsterdam). The floor of the quarry is composed of the Lower Ordovician Wolf Hollow Member of the Tribes Hill Formation. The Tribes Hill Formation is one of the upper units in the Beekmantown Group, a widespread and relatively uniform sequence of carbonates and dolomites found along the eastern seaboard. The Potsdam and Galway formations, which we examined last week, represent the lower part of the Beekmantown Group. The walls and nearby outcrops (north side of Rt. 67) are composed of the Lowville Ls., the Amsterdam Ls., and the Glens Falls Limestone all of which belong to the Black River Group and the Trenton Group.

Age: The Tribes Hill Formation was deposited during the Gasconadian stage of the lower Lower Ordovician. Using the DNAG time scale, this interval of deposition probably occurred sometime between 500 and 490 Ma. The Lowville and the Amsterdam Limestones were deposited during the Turinian stage of the upper Middle Ordovician and the Glens Falls Limestone was deposited during the Canajoharian stage of the upper Middle Ordovician. The interval of deposition for these units was sometime between about 450 and 440 Ma. Rocks of lower Middle Ordovician and upper Lower Ordovician are missing from the geologic record in this locality.

Objectives: The objectives of this research project are: 1) to measure and describe several meters of carbonate rocks and list their fossil content, 2) interpret the depositional environments and changes of depositional environments through time, 3) relate this stratigraphic sequence and its fossil content to correlative rocks at Canajoharie Creek (next week); and 4) describe the changes in lithology or evidence for a significant unconformity where some 45 MYr. of the geologic record is missing. The goal of this phase of the project is to relate depositional environments and the unconformity to regional or global events that might have produced this particular sequence. Attached to this lab you will find a simple summary of major geologic events in the Cambrian and Ordovician (From Stanley, 1977. The Earth and Life Through Time, Freeman, N.Y., p. 347) . Look at this carefully as you ponder the significance of the unconformity.

Procedure: Examine the outcrop in its entirety. Use a meter stick to measure similar units and describe the fossils and sedimentary structures within them. Record this data on a piece of graph paper using an appropriate scale for a total section of about 5 meters.

Start at the bottom of the quarry. Determine what type of carbonate this is, its thickness, weathering color, bedding characteristics, fossil type and abundance, and sedimentary structures present. Lump units that share the same lithology, most units here are about one meter thick. Continue this process upsection to the top of the quarry. If time permits we will also look at the rocks that are exposed on the north side of Rt. 67. *Start by moving quickly and measuring the main packages of rocks then go back and examine each package in detail*.

Use your fossil identification handout to identify the different fossils. If a fossil type is new to you, make a simple sketch of it in your field notebook. *Ecculiomphalus* (a gastropod); *Parastrophina hemiplicata* (a brachiopod), and *Encrinurus cybeliformis* (a trilobite), *Prasopora* (a bryzoan) are important index fossils for different rocks in this

outcrop. In addition, various types of Gastropods, horn corals, brachiopods, bryzoans, trilobites, nautiloids, and pelecypods are easily recognized in these rocks.

Writeup: Your typewritten lab report, should include the following elements from *this phase* of the research project, but remember you will also include a summary and interpretation of rocks at Canajoharie Creek.

1) Introduction, which should include the field trip locations, formations studied, ages of the rocks, purpose of the trips, and approach to the problem. Remember, do not write this report as a narrative.

2) Discussion of the data including the general trends recognized, and important features of the rocks in the study area. Do not repeat the information on your stratigraphic column!! Break your data section into two parts: one covering Manny's Corners and one covering Canajoharie Creek.

3) Interpretation of the depositional environments of each of the formations measured. Do not interpret the depositional environments of each measured section, but rather, interpret the depositional environments of the Wolf Hollow member, the Lowville Ls, the Amsterdam Ls, and the Glens Falls Ls. Within a formation, such as the Amsterdam Ls., you may want to discuss trends recognized in the outcrop. *Read pages 470-494 in Boggs before you attempt to write this important section*.

4) Discussion of the significance of the unconformity. (*Read pp. 526-528 for the proper nomenclature which should be used in your discussion.*). What might have caused the gap in the geologic record? Tectonics? Sea level change? Please support your statements with facts.

5) A measured stratigraphic section (for both Manny's Corners and Canajorahie Ck.) which should include a neatly redrawn column (in ink please) with symbols that denote rock type and fossil content, detailed rock and fossil descriptions to the right of the stratigraphic column, and a heading or title.

6) All figures should be labeled and referred to sequentially. Figure 1 should be the regional map that includes "Manny's Corners", Figure 2 should show the stratigraphy of the area, and Figure 3 should be your measured section. Additional figures (sea level charts, sketches of fossils, etc.) should appear in your report after these first three figures.