Field Excursion

Fossilization is the alteration of an organism's remains, impressions or activities by physical, biological or chemical changes retaining the original material in some form. The two most common types of fossilization found within the Morden and District Museum are permineralization and replacement.

Permineralization or commonly petrification, occurs in porous material like wood, bones and shells. Bones are the most abundant type of fossil found in the area with a few large specimens of petrified wood. The organic material of an organism or plant is porous, containing holes within its structure. Once buried, supersaturated ground water supersaturated commonly with calcium carbonate or silica and in some instances gypsum or selenite, precipitates into the spaces or pores. After a duration of time and pressure, the minerals within the structure will stabilize and form the fossil we see today.

Replacement is the other common type of fossilization in the Morden area. In this instance the ground water will seep into the existing remains of an organism and dissolve it. At the same time the space left behind from the dissolved material may be filled in with other sediments or minerals such as silica or pyrite.

Preservation and Taphonomy

Fossil preservation preserves the remains or activities of organisms. Taphonomy is a process that describes the events taken place on an organism from the time of its death to its discovery as a fossil. Only the right circumstances can preserve an organism into a fossil.

Palaeontologists begin their search for fossils with a map and a rock hammer. The geological map used, shows a representation of the topography for a given area and the geological rock units present at the surface.

In order to find fossils you need to be looking in the right place and rocks for that matter. The Morden and District Museum fossils are found within the Pembina Member of the Pierre Shale Formation. We prospect the areas on the map where the Pembina Member is at the surface.

Although the map may indicate the rock unit is at the surface, overburden and vegetation must be taken into account.

Prospecting thus begins with plenty of time and the patience to venture along the escarpment in hopes of finding a fossil. Fossils are rare and it may take several trips out in the field before one is found.

Once the fossil is located preparations must be made to excavate (dig out) the remains. Supplies and tools include; eager staff, brushes, trowels, shovels, burlap, plaster and consolidant. A large area surrounding the original piece would be excavated to ensure all

pieces would be located. The shale (rock) is very brittle and light dusting with brushes is adequate to remove the thin layers.

After the specimen is fully exposed proper analysis must be made of the sight before removal. Field notes are taken including date, time and weather conditions. A brief summary of the site is recorded and photographs are taken along with a site map. A grid is set up and a drawing of the specimen in situ is recorded and numbered for future reference and excavation.

Field notes of the site should include exact location with a GPS (global positioning system) the distribution of the material, association, preservation, sediments/geology and a possible identification of the specimen. The number and type of bones are also recorded for possible identification. All information from the site is filed for future study.

Once the field notes are complete the specimen is ready for removal. Field jackets are applied and transported back to the museum for further preparation.

Fossils within the field jacket are situated in a matrix or rock, ensuring it doesn't move during transport.

In the lab the jacket is cut open with a saw. Using picks the rock layer (matrix) is removed to reveal the fossil. For finer work to remove hardened minerals from the outside of the fossil, microscopes and magnifying glasses are used in conjunction with an air scribe. The air scribe is a movable point that blows out air to remove finer material on the specimen.

Some specimens may require consolidant. The consolidant the MDM uses is B-76. This powder compound is dissolved in acetone for different consistencies. Application is primarily in the field and left to harden before removal. While preparing some fossils consolidant may be used inside the lab but must be left to harden over night. A consolidant acts like a glue from the inside out. The solution seeps into the fossil and begins hardening from the inside to the outside. This provides support and rigidity to the fossil. The fossils are prepared in such a way to leave them in their original state as much as possible.

Once prepared the fossils are ready for storage or display use.