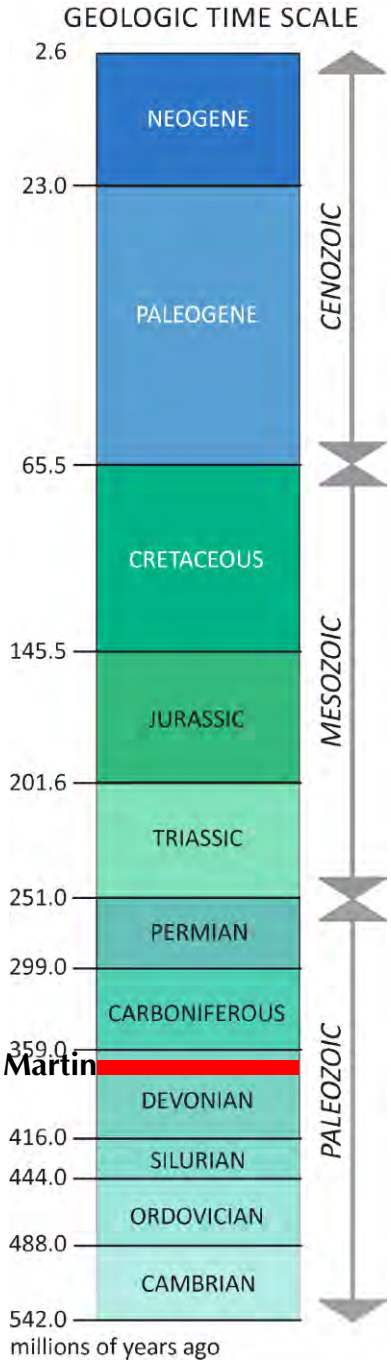
Martin Formation

LATE DEVONIAN
(Frasnian)
374 to 367 Million Years Ago



(Based on Geological Society of America timescale, 2009)

LITHOLOGY:
Jerome Member: dolomite mudstone, sandy dolomite; medium to dark gray, thin-bedded

FOSSILS:
Corals, brachiopods, bryozoans, crinoids, conodonts, fish, stromatolites

SEDIMENTARY STRUCTURES:
Thin, horizontal bedding

DEPOSITIONAL ENVIRONMENT:
Shallow marine

PALEOGEOGRAPHY/ TECTONIC SETTING:
Continental shelf, platform; wedges out against Defiance-Zuni positive area to the east

MISCELLANEOUS:
The Becker's Butte Member in Salt River Canyon has record of earliest land plants and defines a local shoreline

During the late Devonian Period, the western part of the North American continent was located south of the equator and was generally submerged beneath shallow tropical seas. The lower part of the Martin Formation, the Becker's Butte Member, contains sediments that were deposited in coastal plain environments as well as fossils of early land plants. At the Cholla Power Plant site, we find the upper part of the Martin Formation, the Jerome Member, which was deposited in a shallow marine shelf near the continental shoreline. It contains an abundance of shallow marine fossils, indicating that it was deposited after the sea encroached across the land surface.

Martin Formation in Salt River Canyon, Arizona

A variety of brachiopods from the Martin Formation

Brachiopods—Tenacious Survivors of Mass Extinctions

Brachiopods are shellfish that secrete a shell consisting of two parts called valves. These valves are bilaterally symmetrical—the right half is a mirror image of the left half. This bilateral symmetry differentiates brachiopods from clams and other bivalved mollusks, with which they are sometimes confused.

The fossil record for brachiopods dates back to the early part of the Cambrian Period. They were extremely abundant, but were decimated in the Permian mass extinction. This event was the largest of all extinction events (larger than the major extinction 65 million years ago that killed off the dinosaurs).

Still, some brachiopods survived the Permian extinction (as well as subsequent mass extinctions). Their descendants live in today's oceans, however, they have never achieved their former abundance and diversity.

Generalized map of environments across Arizona during the late Devonian, time of deposition of the Jerome Member of the Martin Formation (modified from Beus, 1989; Blakey and Ranney, 2008)

Fossils of psilophytes, the first known land plants, found in the Becker's Butte Member of the Martin Formation

Fossil of Hexagonaria, *a coral that indicates Devonian age and a marine depositional environment*

Artist's reconstruction of the late Devonian environment of deposition for the Becker's Butte Member

All images courtesy of Dale Nations. Information provided by WESTCARB at www.westcarb.org