

National Park College Geology Field Trip Saturday, October 15, 2016



Figure 1 – National Park College, geology students on fall field trip. From Left to right: Sarah Wilkinson, Austin Johnson, Melissa Brown, Brad Sexton, Karoline Beaver, Emmanuel Rodriguez, Bryan Massey (in back wearing hat), Daniela Rodriguez, Grant Carter, Alex Falconburg, Tylor Clark, Katlen Lawson, Emily Barajas and Aladdin Hamdan.

Students from National Park College, participating in Dr. George Maxey's geology field trip, discovered graptolites in the Womble formation west of Checkerboard Point on Lake Ouachita (Fig. 2).



Figure 2 – Graptolites found on an Island in Lake Ouachita, 10/15/2016. Photo by Sarah Wilkinson, and used with permission.

Approximately 470-458 million years ago (mya), floating on the surface of a proto-Gulf sea that once existed between Laurentia (North America) and South America, were a colony of animals called graptolites (Kingdom Animalia, Phylum Hemichordata, Class Graptolithina). Eventually the colony died. The stipe and theca that were attached to the underside of the colony fell to the ocean floor, in anoxic waters, called the Tethys Sea (Fig. 3). There, the stipe and theca were preserved as a carbon imprint.

The Tethys Sea no longer exists; plate tectonics closed the ancient sea and scraped the sediments off the bottom of the sea floor and folded the sediments up and onto what is

present day Arkansas - forming the Ouachita Mountains. The upper folds eroded away leaving the roots of the mountains that are exposed at present. In 1953 Blakely dam was finished and Lake Ouachita began to fill, creating over 975 miles of shoreline and approximately 200 islands. On one of the islands, Checkerboard Point, can be found a contact between the Blakely Sandstone and the Womble Shale. The Checkerboard is comprised of the stress fractured Blakely Sandstone. Just to the west of the Checkerboard is a contact with the Womble Shale and in the shale are found graptolites.

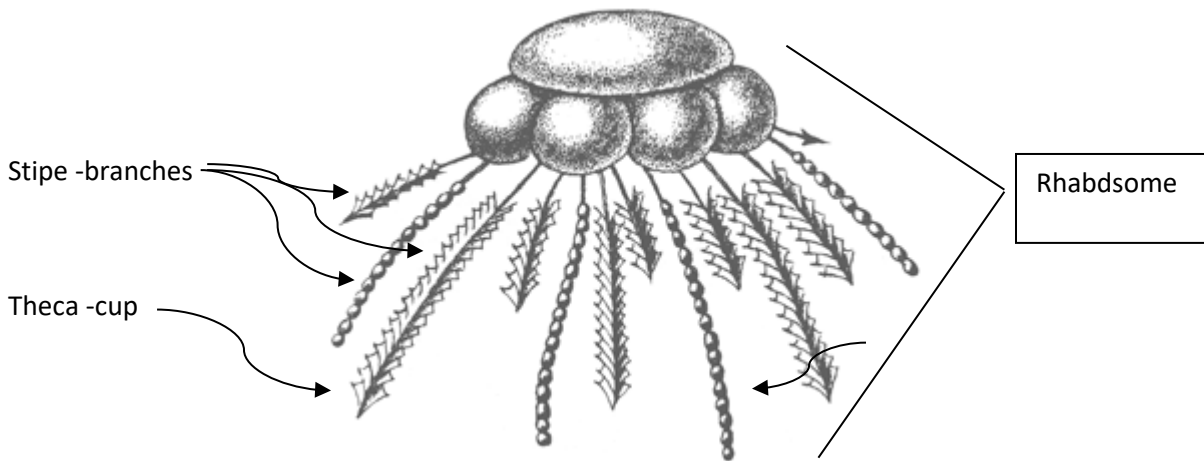


Figure 3 – Artist rendition of a graptolite colony, modified from <https://www.isgs.illinois.edu/outreach/geology-resources/graptolites>.

The name graptolite was originally used by Linnaeus in the first edition of “Systema Naturae” 1735 to describe the mineralization in the rock that resembled writing or hieroglyphics. (Murchinson, p. 538). Graptolites first appeared approximately 490 mya and died out about 370 mya. There were both pelagic (floating on or near the surface) and benthic (attached to the bottom) varieties of graptolites. Each pelagic colony has tentacle-like branches or stipes dragging beneath the flotation structure. Stipes, were lined with cup-like features called theca that dragged through the waters and captured bits of food (Fig. 3). The graptolites were preserved in a relatively deep, poor bottom circulation, anoxic (deficient in oxygen), seafloor environment. Theca from the colonial, planktonic graptolite would sink to the seafloor. Since there were no scavengers to consume the stipes, they would eventually be buried in the muds and well preserved. Preservation is in the form of a thin carbon film (Fig. 2).

Stipes found at the Womble site on Lake Ouachita most closely resemble: a) *Phylograptus Typus*, b) *Dicranograptus*, c) *Monograptus* and d) *Didymograptus murchinsoni*, (Fig. 4).

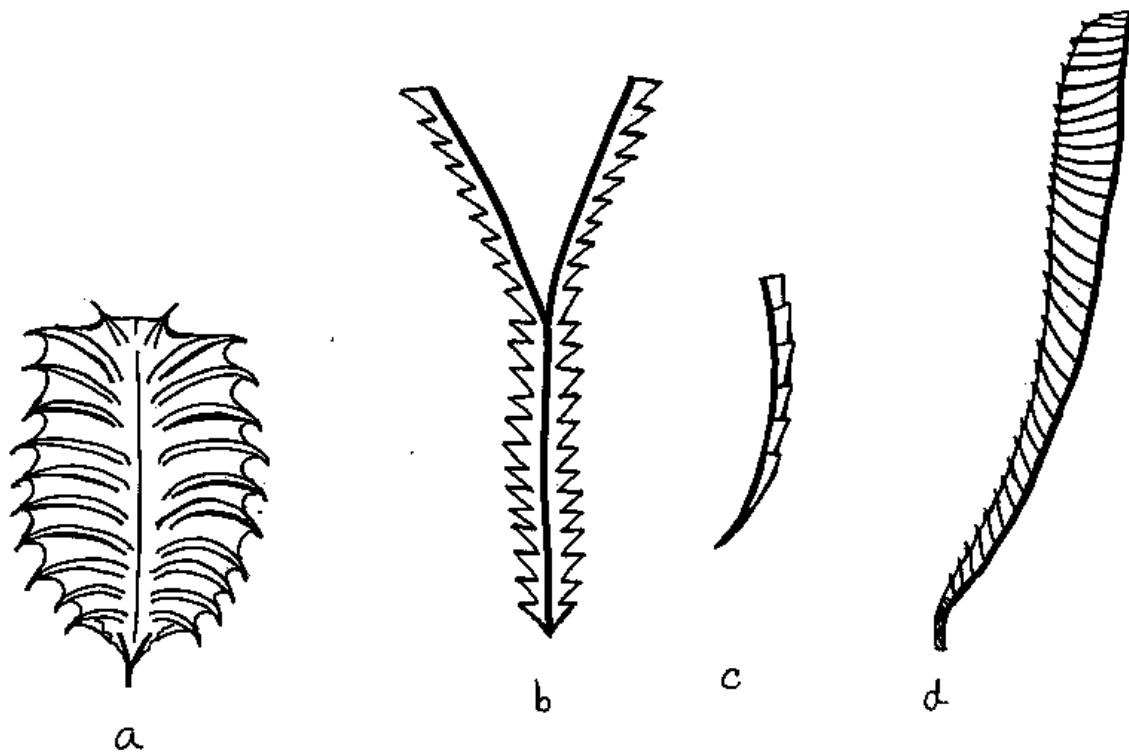


Figure 4 – Drawing of different types of stipes found at Lake Ouachita. Drawing by Sarah Wilkinson, used with permission.

REFERENCES

- Murchinson, Sir Roderick Impey, 1867. *Siluria, A History of the Oldest Rocks in the British Isles, and other Countries*. 4th, ed. London, John Murray, Ablemarle Street. p.538.
- Grabau, A. W and H. W. Shimer, 1909. *North American Index Fossils: Invertebrates*. Vol. I. The New Era Printing Company, Lancaster, PA. New York A. G. Seiler & Company. pp. 30-31. <http://www.oum.ox.ac.uk/thezone/fossils/inverts/grapt.htm>.