

ART ANCIENT



## FOSSIL BRANCH WITH LEAVES AND BERRIES

Of the Araliaceae Family  
Eocene, circa 50 million years before present  
100 x 89 cm

### PROVENANCE

Discovered by Liz Lindgren on Lewis Ranch, in the Green River Formation, Wyoming, 3 August 2021.

A remarkably well-preserved botanical fossil, with leaves and small berries, from the renowned Green River Formation.

Both of scientific importance and of such pleasing composition that it seemingly resembles a still life, the present piece is notable for its preservation of even the most fragile structures. Immaculately preserved with life-like quality, it perfectly illustrates what Dr. Lance Grande has called a 'snapshot from deep time', and captures an ephemeral moment of prehistoric existence with unparalleled clarity.

The branch, splitting into three main offshoots, exhibits leaves and fruiting structures attached to the stem. A solitary leaf displays damage from leafcutter ants, a subtle hint to the dynamic interactions within the Eocene world. Resting at the branch's base is a partial fossil of a fish, *Diplomystus dentatus*, a reminder of the Fossil Lake itself.





### An Ancient Ecosystem

Today, the Fossil Basin in southwestern Wyoming, US, is a harsh, mountain desert environment. But 50 million years ago, during the early Eocene, it was a subtropical lake bursting with life and lush vegetation. At the end of the late Cretaceous period (c. 66 million years ago), the impact of the Chicxulub asteroid resulted in a mass extinction, famous for wiping out the dinosaurs. Sea levels plummeted and tectonic uplift resulted in a dramatic loss of biodiversity, including an estimated 75 percent of all living species on the planet. However, in the wake of this destruction, the Earth's biota slowly began to renew itself in a different form. Flowering plants and trees, sprouting from the ashes, began to diversify, along with the animals that pollinated and fed on them. Mammals returned in vast numbers, taking over from the dinosaurs and reptiles that had once ruled the Earth. Teleost fish also expanded their dominance to both salt and freshwater environments, and life in all forms began to flourish into what would eventually evolve into the major families and orders of all animals living today.

Of all the freshwater lake systems to have formed during this period, the most remarkable to appear was the Green River Lake System. At its height, it comprised three lakes - Lake Uinta, Lake Gosiute and Fossil Lake - and is thought to have lasted a phenomenal 12 million years. Today, the locality of the Fossil Butte Member in Fossil Lake, southwestern Wyoming, is particularly well known to paleobotanists and enthusiasts, as its abundant fossils provide us with a remarkable 'window into the deep past'.<sup>1</sup> Here, the long buried sedimentary rock preserves, to an impressive degree of detail, the earliest comprehensive evidence for this post-dinosaur environment.<sup>2</sup> Preserving both animal and plant matter that fell to the bottom of Fossil Lake, these specimens illuminate the types of biodiversity populating the planet during this epoch, as well as the interactions of flora and fauna within this prehistoric community. From the earliest mammals, to the distant ancestors of today's plant life, buried deep within the limestone deposits of Wyoming's Fossil Basin, is a remarkable picture of an ancient ecosystem, and the beginning of life as we know it today.

1 Damage caused by leafcutter ants.



### In Bloom

As noted by Dr. Lance Grande, the world's leading expert on the Fossil Butte Member, extant plant fossils from this locality include a variety of well preserved leaves, pollen grains, flowers, fruits and branches. Unfortunately, 'these parts are rarely, if ever, found attached to each other,' hindering scientific analysis.<sup>3</sup> The present fossil however, displays, in perfect and unparalleled detail, the delicate leaves, berries and sprouting formations of this plant, all still attached to the stem. As a remarkable example of one of the most well-preserved prehistoric ecosystems, it displays a beautiful snapshot of life that blossomed after the reign of the dinosaurs.

The present branch has been identified as a member of the *Araliaceae* family.<sup>4</sup> Made up of flowering, primarily woody plants, the family is sometimes known today as the 'ginseng family', on account of its famous species, *Panax ginseng*. Today, it is commonly found in Southeast Asia and tropical America, but 50 million years ago, the subtropical climate of the Green River Formation provided the perfect environment for its germination. Accompanying this warm climate was the growth of a herbivorous insect population. Evidence of this early insect-plant relationship is preserved in remarkable detail on the present fossil. The successive, scalloped incisions on the leaf's edge are consistent with damage caused by leafcutter ants (Fig. 1).<sup>5</sup> Moreover, at the base of the stem, there is also a partial fossil of a fish, reflecting the abundance and distribution of fish species among the freshwater localities of Fossil Lake. Preserving the tail on the left and head on the right, this has been identified as an early freshwater herring, called *Diplomystus dentatus* (Fig. 2).<sup>6</sup>

2 Partial fossil of *Diplomystus dentatus* at the base of the branch.



### Recovering a Lost World

In 1870, local merchant and fossil enthusiast, Fielding Bradford Meek (1817-1876), published the very first descriptions of fossils from the Fossil Butte Member. Since then, fossil hunting in the area has greatly aided scientific research on this ancient ecosystem.<sup>7</sup> Its importance was formally recognised in 1972, with the establishment of the Fossil Butte Monument, where the visitor centre is now home to a large collection of fossils from the locality. Indeed, on account of their renowned preservation, pieces from this area also line the walls of some key natural history museums, with the largest collection in the Field Museum in Chicago, under the direction of Dr. Lance Grande.<sup>8</sup>

The present piece was discovered by fossil hunter, Liz Lindgren on Lewis Ranch in the Fossil Butte Member of the Green Lake Formation on 3 August 2021 (Fig. 3). Its counterpart now resides in the collection of the Fossil Butte Monument, as a key example of specimens collected from this locality (Fig. 4). Lewis Ranch was a family run cattle ranch until the 1980s, when the family started leasing out land to fossil hunters. Over the last forty years, their land has produced some of the most remarkable fossils, including an example of the famous 'dawn horse', or *Eohippus*, discovered by Jim E. Tynsky in 2003.<sup>9</sup> Aware of the importance of this particular locality, every year, a crew from the Field Museum led by Dr. Grande, quarry a five-acre section of the ranch in search of fossils that can aid the study of this prehistoric ecosystem.<sup>10</sup>

**3** Liz Lindgren and the fossilised branch *in situ* at Lewis Ranch.



Of all those to be recovered from the Fossil Butte Member, the present fossil is a particularly remarkable and well-preserved example. As noted by Dr. Grande, it is unusual to find plants fossilised intact. However, not only are the leaves and sprouting berries here attached to the stem as if the branch had only just fallen, but there is also evidence of insect damage, illuminating the biological interactions between these early species. Reflective of a world undergoing a process of regeneration and renewal, the present fossil provides an incredible snapshot of prehistoric life, and the rarest example of a plant from the world-famous Green River Formation.

**4** The fragmentary counterpart to the present fossil, now on public display at the Fossil Butte Monument.

### Footnotes

**1** L. Grande, *The Lost World of Fossil Lake: Snapshots from Deep Time*, (Chicago: The University of Chicago Press, 2013), 5.

**2** For the conditions of fossilisation, see: 'Fossils', *Fossil Butte National Monument, Wyoming*, March 2023, URL: <https://www.nps.gov/fobu/learn/nature/fossils.htm>

**3** L. Grande, *The Lost World of Fossil Lake*, 281.

**4** As identified by Prof. Steven Manchester, Curator of Paleobotany, Florida Museum of Natural History, 16.01.23.

**5** As identified by Dr. Conrad Labandeira, Curator of Fossil Arthropods, Smithsonian Institution, 24.01.23. Other margin-feeding insects, principally *Orthoptera* and *Coleoptera*, may produce similar damage.

**6** As identified by Arvid Aese, Museum Curator at the Fossil Butte National Monument, 17.01.23.

**7** For a history of fossil hunting in the FBM, see: L. Grande, *The Lost World of Fossil Lake*, 17-42.

**8** Grande also sought to acquire the present piece for this collection in January 2023.

**9** R. Conniff, 'The 50 Million-Year-Old Treasures of Fossil Lake', *Smithsonian Magazine*, September 2022, URL: <https://www.smithsonianmag.com/travel/treasures-of-fossil-lake-180980544/>

**10** For more information, see: L. Grande, *The Lost World of Fossil Lake*, 34-40.

