



YELLOWSTONE

VOLUME 26, NUMBER 4 WINTER 2011

# DISCOVERY

A QUARTERLY PUBLICATION OF THE YELLOWSTONE ASSOCIATION

## Yellowstone's Hidden Treasures



Fossils are abundant in the rocks and limestone of Yellowstone. Photo: Jonmikel Pardo

By April Christofferson  
Yellowstone Association

**W**ould it surprise you to learn that thousands of years ago, dinosaurs lumbered across the Yellowstone landscapes now roamed by bison, bears, and wolves? Yellowstone's wildlife, geothermal features, and magnificent scenery offer an endless array of wonders for visitors to learn about and explore. Geysers and hot springs draw hundreds of thousands of visitors, as does the park's wildlife, visible along roadways, especially in the Lamar Valley. Backcountry hikers may thrill at a rare pine marten sighting, or an encounter with a black or grizzly bear. And that's usually enough

excitement for visitors. Yet, if they are willing to look a little more closely, Yellowstone offers more.

A lesser-known kind of treasure also exists in Yellowstone, sometimes right under one's feet—a treasure that tells an

important story about Yellowstone's history. And that treasure consists of Yellowstone's fossils.

Fossils are the preserved remains of organisms—plants and animals—that lived long ago. Frequently they consist of only a fragment of the whole organism that was preserved by one of many natural processes, over hundreds or even thousands of years. Fossils can even be the tracks, teeth marks, or other indications of the former presence of organisms.

*In a given instance a fossil may be a bone of some animal belonging to an extinct race that has lain buried for centuries in the accumulated debris within a cave, or it may be a shell dislodged by the waves from its resting place in the hard rocks along the shore.*

*Continued on page 2*

### What's Inside...

- HOLIDAY GIFT IDEAS FROM YELLOWSTONE
- SUMMER 2012 INSTITUTE COURSES ANNOUNCED
- WAYS TO EXPLORE YELLOWSTONE IN WINTER

*Or it may be the imprint of a leaf on a slab of fine-grained sandstone, or a fragment of charred wood in a lump of coal.... In addition, therefore, to actual parts, anything resulting from or indicating the former presence of organisms, such as tracks, trails, borings, teeth marks, coprolites, and in some cases even chemical precipitates are regarded as fossils.” Arnold, Chester. An Introduction to Paleobotany*

When studied, these relics of the past divulge valuable information about the history of a region.

Unfortunately, the science of paleontology has lagged behind that of more high profile sciences. For decades, the two top sources for students of paleobotany (the study of fossil plants), Seward’s *Fossil Plants* and Scott’s *Studies in Fossil Botany*, were books written between 1898 and 1923! But paleontology in Yellowstone has progressed significantly over the past two decades, especially with recent studies conducted in and around the park.



Yellowstone’s petrified forests are an especially valuable resource and research opportunity. Photo: Will Finley

### Fossil Findings

Despite the fact that few of its visitors today spend time searching for or viewing them, Yellowstone is rich in fossils—nearly 150 species of fossil plants, including ferns, horsetail rushes,

conifers and deciduous plants such as sycamores, walnuts, oaks, chestnuts, soapberries, maples and hickories have been identified. Taken together, they indicate Yellowstone was once a warm temperature sub-tropical environment.

The earliest fossils date from the middle Cambrian period, approximately 510 million years B.P. (before the present). And while Yellowstone’s paleobotany has not been the subject of as much research as the park’s geothermal features or wildlife, its fossils have been a source of excitement and discovery since before 1870, as indicated by the following:

- Jim Bridger’s report of Yellowstone’s petrified trees in the 1830s is believed to be their first sighting by a white man. One version of Bridger’s tale quotes him as saying: “petrified birds a sittin’ on petrified trees a singin’ petrified songs in the petrified air. The flowers and leaves and grass was petrified, and they shone in a peculiar moonlight. That was petrified too.” (Santucci, V.L. 1998).
- Members of the Hayden Survey of 1871 are credited with the first fossil collection from Yellowstone, which included fossil plants (believed to be from the Eocene epoch, approximately 50 million years ago) taken from Elk Creek.
- William Henry Holmes, in his report in the 1878 Hayden Survey, identified the petrified trees on the north slope of Amethyst Mountain.

## TABLE OF CONTENTS:

Holiday Gift Ideas.....	6–7
Resource Notes.....	8
Institute Programs.....	9–11
Association News.....	12–13
Winter Activities.....	14–15
Just for Kids.....	16
Membership.....	17–23



**YELLOWSTONE ASSOCIATION**

**THE MISSION OF THE YELLOWSTONE ASSOCIATION**  
The Yellowstone Association, in partnership with the National Park Service, connects people to Yellowstone National Park and our natural world through education.

P.O. Box 117 • Yellowstone National Park, WY 82190  
www.YellowstoneAssociation.org • ya@yellowstoneassociation.org  
406-848-2400  
Monday - Friday • 8 a.m. - 4:30 p.m. Mountain Time



Printed on Forest Stewardship Council certified paper with soy-based ink.





William Holmes Photo: NPS

- In 1899, F.H. Knowlton identified 147 species of fossil plants in the park, 81 of which were new.
- In 1939, park naturalist David De Lancey Condon reported finding dinosaur bones around Geode Lake. Later in his book entitled, *Yellowstone: Its Underground World* (Bauer 1962), he stated that “a few dinosaurs” had been found in or near the park.
- During road construction at the East Entrance in 1994, fossilized sycamore leaves from the Eocene Epoch and belonging to genus *Macginitiea* were

uncovered and deposited in the park museum collection.

• More recently, in 1996–97 Vincent L. Santucci, a former national park paleontologist, and Bill Wall conducted the Yellowstone Paleontological Survey that concluded, in part, that while “compared to other natural resources at Yellowstone National Park, fossils have received little attention.... The lack of paleontological research is not due to a lack of significant fossils.”

Over the past decades, new technology has advanced paleontological research. Lakes offer a bonanza to researchers, as materials that sink to the bottom, where there’s little erosion and disturbance, are often preserved, after long periods of time, as fossils.

In a recent study led by Cathy Whitlock, a Montana State University earth sciences professor, researchers extracted core samples of sediment from the bottom of 16 lakes in the Greater Yellowstone Ecosystem. The study’s purpose is to examine ash from volcanoes that erupted thousands of years ago and pollen from forests that landed on the surface of the lakes, both of which became waterlogged, and sank to the lake bottoms, where they had been preserved for centuries. The pollen will tell scientists about the vegetation that existed in the past, while the ash

in the samples collected helps establish the time period the samples come from. Whitlock calls lakes “great record keepers.”

The samples, taken over a three-day period from the deepest parts of lake bottoms, have already told one story: ecosystems generally began with sagebrush, then progressed to junipers, Engelmann’s spruce, fir, whitebark pine, lodgepole pine, and finally, Douglas-fir. Samples like that taken from Cub Creek Pond, which appear to go back to the eruption of Washington’s Glacier Peak some 13,000 years ago, should provide scientists valuable information about the forests that formed thousands of years ago, as well as how today’s vegetation might react to climate change. Whitlock has also examined pollen from Yellowstone in studying the pattern of reforestation and climatic change following late-Pinedale Glaciation (approximately 30,000 to 10,000 years ago). Records from that study indicate a lowering of modern upper treeline by at least 600 meters and a climate that was approximately 5 to 6 degrees centigrade colder than present.

## What’s in a Name?

Just as Jim Bridger discovered petrified trees in his first visit to Yellowstone,

*Continued on page 4*



Fossils indicate Yellowstone was once a warm temperature sub-tropical environment. Photo: R.G. Johnson