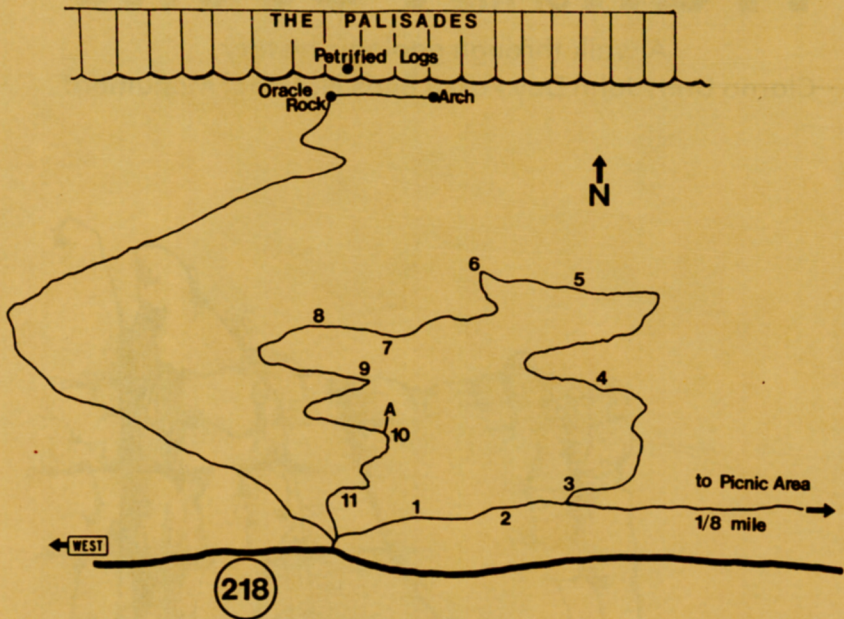


Trail of the Fossils

A walk through geologic history,
Clarno Unit, John Day Fossil Beds National Monument



CLARNO PALISADES TRAILS



The Trail of the Fossils: a 1/4 mile self-guided loop trail
(center of map)

Clarno Arch Trail: a 1/4 mile moderately strenuous hike to
the Clarno Arch and the base of the Palisades (left-hand
side of map)

Wayside Trail: a 1/4 mile walk which branches off the Trail
of the Fossils near Stop 3 and connects the picnic and
wayside exhibit area with the Palisades trails (right-hand
side of map)

**Please remember those who will follow and do
not remove any rocks or fossils.**

TRAIL OF THE FOSSILS

This 1/4 mile loop will lead you through an area which was once a lush subtropical forest of sycamores, palms and cycads. Alligators, rhinoceroses and titanotheres flourished in the warm, moist climate. Volcanoes too were common, periodically spewing forth lava, cinders and ash. Heavy rains inundated the loose ash, producing tremendous mudflows which encased plant leaves and wood. Pressure, millions of years of time, and the slow percolation of groundwater containing silica cemented the mud, ash and other debris together to form the rocks of the Clarno Palisades.



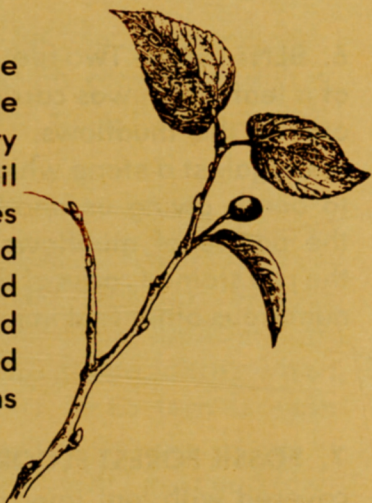
1. TIME TRAVEL - Along this trail you will have the opportunity to look back through time---only a fragment of time compared to the total geologic history of the earth, but to the human mind an incomprehensible length of time---40 million years. Plant and animal species, and even mountain ranges, have come and gone. In comparison mankind's time on earth has been short.

2. TIME CLUES - Stately spires, leaf imprints and broken boulders characterize this Palisades landscape today. The gouge to the left of the trail ("A") presents evidence that this boulder fell from the cliffs above, slid a short distance and flipped over before coming to rest. The presence/absence of colored lichens on the boulder gives a clue as to how recently this happened. Evidence of much more ancient geologic action is found in the leaf impressions seen one foot to the right of sign 2. Careful observation will reveal others along the trail.

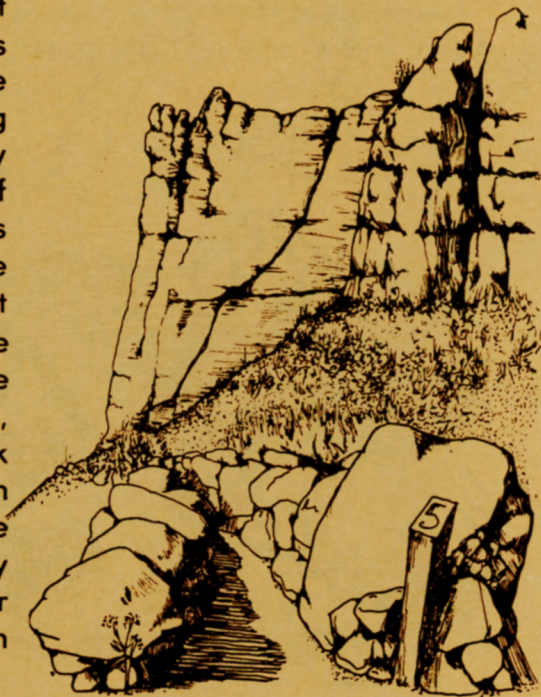


3. MUDFLOW BOULDER - This boulder also carries stories of geologic action both recent and long past. Recently the boulder crashed down from one of the layers in the cliffs above. Those layers represent various mudflows of the distant past. The sizes of rocks and debris embedded in the layers are directly related to the speed, size and viscosity of the ancient mudflows in which the rocks and debris were carried. The thin layers indicate quiet times between flows when calmer water deposited finer sediments. Fossils found in different layers show that enough time passed between some of the mudflows for woodlands to become reestablished.

4. HACKBERRY: ANCIENT TREE - The hackberry apparently has been able to adapt to a climate of hot, dry summers and cold winters. Fossil wood and seeds of hackberry trees closely related to this one are found nearby in 45-50 million-year-old rocks. Fossils of palms, cycads and tree ferns found in the same bed indicate that subtropical conditions existed here at that time.



5. ROCKFALL - A crack, a rumble and a roar greeted nearby ranchers one morning in 1962 when a large section of cliff came crashing down---a reminder that the geological processes which sculpture the landscape are taking place today just as they have been for millions of years. Among the cracks visible in the cliffs above see if you can pick out the one directly in line with this trail, 1/8 mile to the west. It is a long, curving diagonal crack that continues through to the other side of the cliff. Someday it may cause a rockfall similar to the one through which you have been walking.



6. BENT LEAF - Two feet behind this sign is the impression of a leaf which was carried along in one of the mudflows. It came to rest against a stone which caused it to bend, giving us another clue to the nature of mudflows. Look on the red stained rocks of this cove for numerous other leaf impressions.



7. FOSSIL FOREST FLOOR - This large, flat, upturned slab is covered with leaf imprints and forms of wood and limbs that were covered with mud as one of the great mudflows poured over the forest floor.



8. ROCK ARCH - At the top of the cliff you can see a rock arch. Water erosion and frost action combined with a weakness in a lower rock layer have caused this unusual feature.

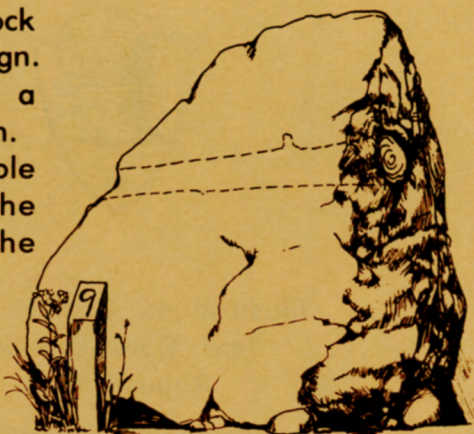


9A SYCAMORE LEAF FOSSILS -

The fingered leaf impressions which cover this boulder are those of a sycamore, a tree which is not native to Eastern Oregon today. Sycamores do grow in areas of the South, East and Midwest where the rainfall is greater and the climate milder. Such evidence suggests that the sycamore species did not adapt enough to survive in the severe, desert-like climate found here today.

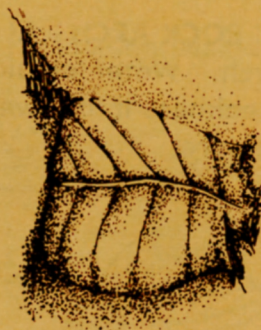
9B. EMBEDDED TREE LIMB-

Look for a round green-colored area in the rock 2 feet above this sign. It is one end of a fossilized tree branch. The other end is visible coming out of the opposite end of the boulder 3 feet to the right. Limbs, leaves, seeds and nuts are all found in the Clarno Fossil Beds---a



rare occurrence that makes this fossil area world-famous.

10. ROLLED LEAF — The motion of the mud as it flowed downslope twisted and rolled the leaf whose impression is 6 inches above this sign. Rolled leaves are characteristic of mudflows and help geologists determine when one has occurred.



TREE TRUNK — Fifteen feet to the left near the sign marked "A" is the concave, reddish end of a tree trunk 9 inches in diameter. Several other leaf impressions, branch ends, and limb casts occur in this area. How many can you locate?

11. RETURN TO THE PRESENT - You have walked back through a bit of Oregon's geologic history. Think of all that has gone on since the rocks around you were a muddy ooze 40 million years ago. Humans now dominate the earth. Our decisions are altering the face of the land and will affect the survival of plant and animal species which have taken millions of years to develop.



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Text - Dale Schmidt

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