ISSUE VIII JANUARY 2007

NARG Newsletter

North America Research Group

INSIDE THIS ISSUE

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Northwest Fossil Fest Recap

Tami Smith making a batch of Trilobite Cookie

More Trilobite Cookie making

The ever popular Screen for Shark Teeth activity

Last August NARG held it's first annual Northwest Fossil Fest held at the Rice Museum in Hillsboro Oregon. The goal of the Fest was to promote, educate, showcase fossils from the Pacific NW, and to have fun, all of which was accomplished.

The tagline for the Fest is "Inspire, Inquire, Interact" and nothing inspires more than displaying some of the amazing fossils specimens that have been found in the Pacific NW. Many guests where surprised at the wide range of life forms that once lived where we do today.

Inquiry minds want to know and we had a top-notch line up of guest speakers such as Dr.
Dr. Ellen Morris Bishop, Dr. Jeffrey A. Myers, and Dr. William. N. Orr. This was a great opportunity for guest not only to learn more about the paleontology and geology of Oregon but also to meet 3 of the leading professionals in these fields.

There were many ways to interact, from the fossil preparation area where demonstrations took place on tools and techniques used to prepare fossils, to fossil identification, and of course all the kids activities that NARG setup. The Screen for Shark Teeth was probably the biggest hits and over 1000 Bone Valley shark teeth where given away. Also popular was the Geologic Time Machine and Grow Your Own Living Fossil, where

continued on page 2

Northwest Fossil Fest Recap

continued from page 1

A young guest taking a spin on the Geologic Time Machine

we handed out packets of Metasequoia seeds and instructions. Metasequoia are pretty cool in that not only are they a living fossil but have also been designated Oregon's state fossil.

In all we had over 200 guests participated in the Northwest Fossil Fest and we look forward to next years, where we hope to see that number grow.

NARG would like to thank the guest speakers and all the NARG members that helped in the preparation and participation in this event. In addition a special thanks goes out to Karen Carr for the premission to use her wonderful artwork on the posters and brochures.

Chuck Hunt, Dr. Ellen Morris Bishop, and Rick Johnson. I'm sure they're talking about something important

Tim Fisher and Steven Bland hard working hard at the fossil prep demonstration

Robert Rose explaining some of the cretaceous fossil that have been found in Oregon.

Dr. Jeffery Myers and Aaron Currier

NARG's Radiocarbon Dating Fund

NARG is seeking your donations for the Radiocarbon Dating Fund. To date, $375.00 of the needed $700.00 has been raised but we're not there yet. The money raised will be used for dating a specimen that may be from the late Pleistocene as there is uncertainty of its age. Thank you all that have donated.

Contributions can be sent to:
North America Research Group
Radiocarbon Dating Fund
P.O. Box 2207
Beaverton, OR 97075-2207

John Day Fossil Beds National Monument

John Day Fossil Beds National Monument is a 14,000 acre (57 km²) park near Kimberly, Oregon. Located within the John Day River Basin, this U.S. National Monument is world-renowned for its well-preserved, remarkably complete record of fossil plants and animals, a record that spans more than 40 of the 65 million years of the Cenozoic Era (also known as the Age of Mammals and Flowering Plants). The monument is divided into three units: Painted Hills (named for the delicately colored stratifications) northwest of Mitchell, Sheep Rock which is northwest of Dayville, and Clarno which is 20 miles west of Fossil. Blue Basin is a volcanic ash bowl transformed into claystone by eons of erosion, colored pastel blue by minerals.

Visitors can follow trails into the badlands and examine fossils displayed at the visitor center while scientists continue field investigations and the painstaking analysis of the monument's vast fossil record.

The fossil beds contain vestiges of the actual soils, rivers, ponds, watering holes, mudslides, ashfalls, floodplains, middens, trackways, prairies, and forests, in an unbroken sequence that is one of the longest continuous geological records. The rocks are rich with the evidence of ancient habitats and the dynamic processes that shaped them; they tell of sweeping changes in the John Day Basin. Great changes, too, have taken place in this area's landscape, climate, and in the kinds of plants and animals that have inhabited it.

Painted Hills Unit near Mitchell, Oregon

The strata represented at John Day Fossil Beds consist of four geologic formations, presented here from top (most recent) to bottom (oldest):

Rattlesnake Formation (8 - 6 mya) These most recent strata, named for typical exposures along Rattlesnake Creek, are less fossiliferous than the older formations but contain fragmentary fossils of horses, sloths, rhinos, camels, peccaries, pronghorns, dogs, bears and others, with a preponderance of grazing animals over browsers, betokening a dry, cool climate that was dominated by grasslands.

Mascall Formation (15 - 12 mya) This is a warmer, wetter period. At its base, a roughly five-million-year interval between deposition of the Mascall Formation and the John Day Formation that underlies it is marked by intermittent flows of basaltic lava that repeatedly leveled and denuded the region. A period of moderate climate ensued, with more precipitation than today's, building up some 200 m of fluvial-lacustrine siltstones and sandstones that are the remains of highly fertile volcanic soil which supported a lush mixture of hardwood forest and open savanna

continued on page 4

John Day Fossil Beds National Monument

continued from page 3

grassland, already home to a great variety of recognizable horses, camels, and deer, as well as bears, weasels, dogs, and cats. At the same time large mammals made a resurgence: among them were the gomphotheres rhinos and bear-dogs.

John Day Formation (37 - 20 mya) Deciduous forests in a wide range of systems characterize this early Miocene sequence. More than 100 groups of mammals have been found in this formation as well, including representatives of dogs, cats, swine, oreodonts, horses, camals, rhinos, and rodents. During this time, repeated volcanic events each left their unique "fingerprint" in thin layers of volcanic ash that have hardened to tuff. Securely dated by direct radiometric means and by comparison with the same ash layers at other locations the ash layers, like chapter headings, provide dated markers for the formation.

Clarno Formation (50 - 35 mya) The mantle of evergreen tropical to subtropical forests are revealed by a splendid sample of fossil seeds, nuts and fruits, leaves and woody structures, including fossilized remains of a member of the banana genus. Hundreds of species have been identified in this richly diverse ecosystem. Among the notable mammals were the giant browsers, the brontotheres and amynodonts, strong-jawed scavengers, hyaenadonts, and ruggedly framed predators such as Patriofelis. None of these left modern descendants.

Did You Know?

50 million years ago, what is now a near desert in Oregon, was a near tropical environment, where crocodiles and palm trees once flourished.

Clarno Formation at
Clarno, Oregon

The John Day Basin was first recognized as an important paleontological site in the 1860's, thanks to the ability of a young frontier minister, Thomas Condon, who recognized the fossil beds as a scientific treasure. At the time, paleontology was still a new science. However, discoveries such as Condon's galvanized scientific interest. By the late 19th-century, researchers at Yale, Princeton, and the Smithsonian Institution had requested and received hundreds of specimens from the John Day Basin. They were then classified and described in the scientific literature. This early work set the stage for field paleontologists such as John C. Merriam, who in 1899 began the task of placing the John Day fossils in their geological, chronological, and paleoecological context. His efforts were instrumental in the preservation of the area.

Exploration and study of the John Day fossil beds continues today. In many of the beds, the fossils are widely scattered, and their occurrence cannot be predicted. Many types of fossils deteriorate rapidly once erosion exposes them to the elements. Thus the fossil beds are continually canvassed by paleontologists.

The area's National Monument status was authorized October 26, 1974 and established in 1975.

John Day National Monument Homepage:
http://www.nps.gov/joda/

The Taxonomy Report #6 - Clams of the Astoria Formation

Submitted by Aaron Currier

One of the important aspects of research is not only the labeling of specimens with accurate scientific binomial names, but understanding how a species fits into the hierarchal tree of life... otherwise known as the scientific system of classification, or taxonomy. In the "Taxonomy Report" we look at how species fit together, both in relation to other related species, as well as their ancestry.

Here in the Pacific Northwest, primarily in Oregon, tertiary marine sedimentary deposits are plentiful. Most of these formations contain a variety of fossilized marine organisms representing all of the common phyla. Specimens in the phylum Mollusca in particular have been well documented and published.

For this report we will examine the orders and families of the common clams (class Bivalvia) found in the Astoria Formation as reported by Dr. Ellen J. Moore in *Fossil Shells from Oregon Beach Cliffs*. In Dr. Moore's publication, the chapter reviewing the Miocene mollusks of the Astoria Formation, 14 species of bivalves are listed. An additional four have been collected and identified by NARG members using Dr. Moore's original treatise *Miocene Marine Mollusks from the Astoria Formation in Oregon*.

The Order, Family and Generic names for the 18 species are as follows:

Order	**Family**	**Genus species**
Nuculoida	Nuculidae	*Acila (Truncacila) conradi* (Meek)
Nuculoida	Nuculidae	*Nucula nuculana* (Dall)*
Nuculoida	Nuculanidae	*Saccella calkinsi* Moore
Nuculoida	Nuculanidae	*Saccella amelga* Moore
Nuculoida	Nuculanidae	*Saccella oschneri* (Anderson and Martin)*
Arcoida	Arcidae	*Anadara devincta* (Conrad)
Mytiloida	Mytilidae	*Modiolus directus* Dall*
Mytiloida	Mytilidae	*Mytilus (Plicatomytilus) middendorffi* Grewingk
Pterioida	Pectinidae	*Patinopecten propatulus* (Conrad)
Veneroida	Carditidae	*Cyclocardia subtenta* (Conrad)*
Veneroida	Lucinidae	*Lucinoma acutilineata* (Conrad)
Veneroida	Veneridae	*Chione (Securella) ensifera* (Dall)
Veneroida	Veneridae	*Katherinella angustifrons* (Conrad)
Veneroida	Tellinidae	*Macoma albaria* (Conrad)
Veneroida	Tellinidae	*Macoma arctata* (Conrad)
Veneroida	Mactridae	*Spisula albaria* (Conrad)
Veneroida	Solenidae	*Solen conradi* Dall
Myoida	Hiatellidae	*Panopea abrupta* (Conrad)

*Not listed in *Fossil Shells from Oregon Beach Cliffs*.

Of the 15 genera listed above, all but one are still living along the Pacific Coast of North America. However, Anadara and Katherinella are locally extinct. The species collected do not represent all of the groups of bivalves that might be expected to have lived in the warm-temperate waters along the Oregon coast during the Miocene. These mollusks represent those that lived in shallow to moderate depths and those that were adapted to, if not actually preferring, a bottom sediment ranging from a fine-grained sand to a silty mud.

Bibliography

Moore, Ellen J.; Fossil Shells from Oregon Beach Cliffs. Chintimini Press, Corvallis, 1994, 88p.

Moore, Ellen J.; Miocene Marine Mollusks from the Astoria Formation in Oregon. Geological Survey Prof. Paper 419, 1963, 109p.

Web References

http://shells.tricity.wsu.edu/ArcherdShellCollection/BivalveClassification.html

What is “Fossil Search and Rescue”?

Submitted by Aaron Currier

The goal of NARG is to develop an affiliation of fossil enthusiasts working together, to continue research, perform site investigation, and contribute to the growth and development of an active, premier group of avocational paleontologists. Here in the Pacific Northwest, we have a wealth of fossils in the geologic record. Responsible actions must be taken to "search" for and "rescue" these valuable clues to Earth's history. Exposure to both
natural and human elements and subsequent erosion of fossil strata destroys specimens, not only in beauty but in scientific value.

It's not enough to just hunt for specimens, but to be truly responsible paleontologists, we must document our findings and strive to improve communication for scientific contribution and public benefit. With proper collecting methods, accurate data recording, careful preservation techniques, and communication with our professional advisors, these
specimens of Earth's history will survive long after we are gone.

Postscript: Andrew and I were discussing t-shirt ideas and we came up with this phrase. I searched on the internet for "Fossil Search and Rescue" and there are no results. Although the concept is not original, the phrase is truly unique to NARG!

Oregon Fossils - Plants of the Jurassic Period

Elizabeth L. Orr, William N. Orr

Like the Pennsylvanian floras, those from the Jurassic between 200 to 140 million years ago are preserved in fragments of exotic terranes. These fossils were part of extensive forests recorded in Mesozoic rocks. While this vast plant system was originally thought to reflect tropical conditions worldwide during this interval, the far-reaching nature of Jurassic floras my more likely represent an ancient continent broken up and dispersed by tectonic processes.

Ferns, cycad-like plants, conifers, and gingkoes were common. Most are not extinct, but descendants of cycads grow in the tropics today, and ginkgo, whose modern fan-shaped leaves are less deeply lobed, are found throughout the world. Preserved needles of a pine-like tree suggest these ancient conifers may have had some resemblance to those of the present time, but it is doubtful that any true members of *Pinus* existed back then. Although this Jurassic vegetation looks unusual, it is by no means as distinctive and archaic in appearance as that of the earlier Pennsylvanian.

In Oregon, Jurassic plants have been located in only two regions, near the town of Riddle in the Klamath Mountains and across the state in rocks of the Snake River Canyon in the Blue Mountains. The discovery of plants in the Klamaths has a curious history. As far back as 1872 a mining engineer, Aurelius Todd, accumulated several loads of plant fossils from a hard siltstone only a few feet thick near Buck Mountain is Douglas County. Of this extensive collection, a single plant specimen mixed in with some shells ultimately reached Lester Ward by way of two well-known invertebrate paleontologists, William H. Dall and Timothy Stanton. Ward, who was the head of the U.S. Geological Survey, turned the specimen over to William Fontaine who identified it as *Dryopteris monocarpa*, a dainty fern from the Jurassic.

More than 25 years after Todd's plants reached Washington D. C., Lester Ward led an expedition to Buck Mountain assisted by the private collector James Storrs and mining engineer Will Q. Brown. The party included Joseph Diller, who was mapping southwest Oregon for the Geological Survey. Traveling by horse and pack animals along a mountain trail to Buck Peak, they camped for several days. The field season produced a sizeable suite of Jurassic plants from Douglas County localities such as the abandoned Nichols railroad station, Thompson Creek, and Buck Mountain. The finest specimen from this expedition were obtained by Ward and Storrs in 1899 from slates in the bed of Thompson Creek.

Todd's original fern specimen, which had earlier found its way to Ward, had been mislabeled as from the Kootenai Formation of Great Falls, Montana. In order to determine if it really had been collected from Montana or southwest Oregon, Ward and Diller needed to locate Todd, who had since moved to Dunedin, Florida. Diller persevered and finally found Todd who wrote that he had given quite a few specimens to Thomas Condon at the University, he had left others at Horn and Pain's gun store, "a sporting emporium", and he had stored boxes of specimens in the bard behind the house at 14th and Hilyard, all in Eugene. He generously offered the material to the Geologic Survey, if it could be located,

continued on page 10

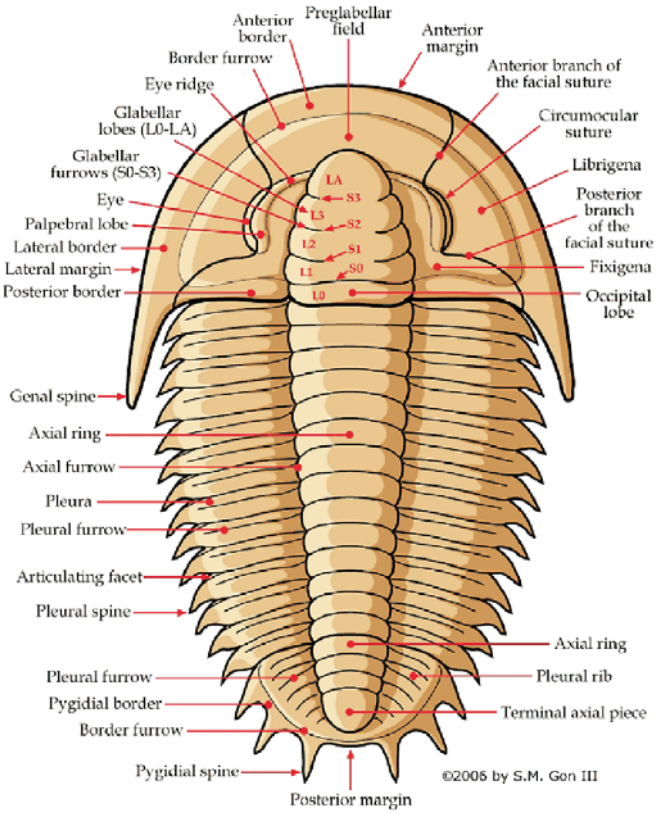
Quillworts are considered by some to be the last remnant of the fossil tree Lepidodendron with which they share some unusual features including the development of both wood and bark, a modified shoot system acting as roots, bipolar growth, and an upright stance.

Trilobite Morphology

By S. M. Gon III

Dorsal Morphology

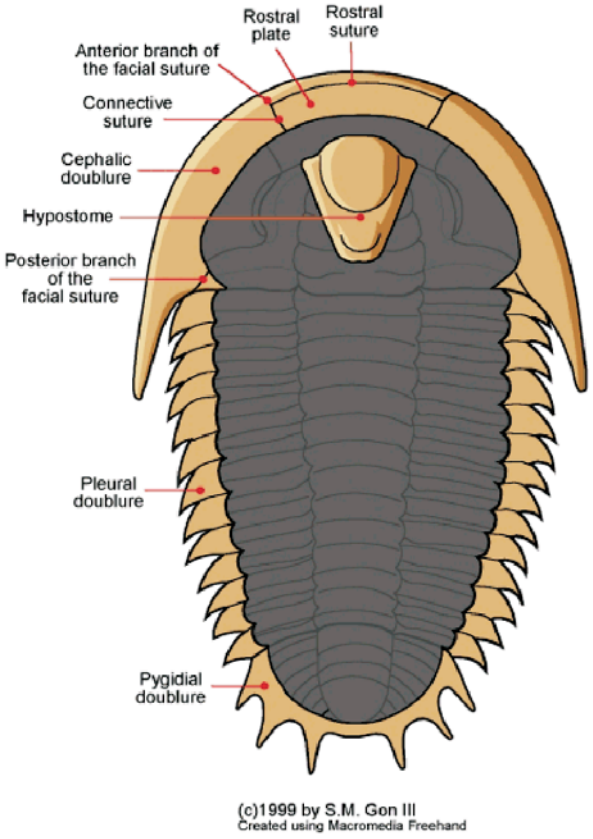
The image to the right provides most of the dorsal morphological terms used to define trilobite species, genera, families, and orders. Ventral (underside) morphology can also be important. For example, there are hypostomal attachment terms describing the way the hypostome (a hard mouthpart on the underside of a trilobite) attaches to the rest of the cephalon. There are also broader categories (Major Trilobite Features), that refer to major body divisions such as cephalon, pygidium, cranidium, axis, etc. There are some terms that relate to the relative sizes of the cephalon and pygidium. Facial sutures (lines along which the exoskeleton split to allow molting) are also important in classifying trilobites. There was also significant variation of trilobite eyes. We don't know very much about a trilobite's internal anatomy, with some exceptions! Finally there are some special morphological terms that apply only to certain groups of trilobites. If you want more detailed definitions of the terms in the image above, I have provided a general alphabetical glossary of terms.



Ventral Morphology

Unlike the thicker dorsal shell of a trilobite, many of the ventral (underside) features, including limbs and antennae, usually are not preserved. The ventral portions that are typically preserved include the doublure (a ventral extension of the dorsal exoskeleton), a special part of the doublure, typically separated by sutures at the anterior of the cephalon, called the rostral plate, and a hard mouthpart called the hypostome, that typically underlies the glabella.

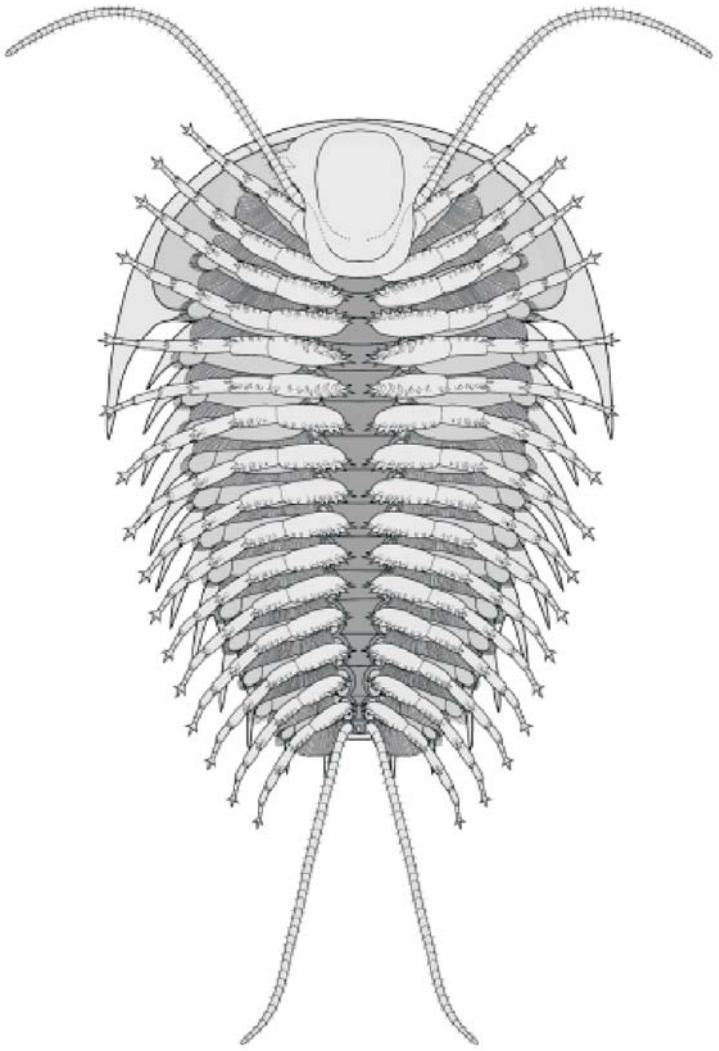
The figure to the right shows the underside of a typical trilobite fossil, with cephalic, thoracic, and pygidial doublure, the rostral plate and associated sutures, and hypostome. The dark gray area represents the hollow interior of the dorsal shell. In this case, the hypostome is separated from the rostral plate, which is called the natant condition. In other species, the hypostome may be connected to the rostral plate (the conterminant condition), separated only by a suture, or even fused to the rostral plate (as in the ventral reconstruction of Olenoides serratus). These hypostome types are important in trilobite classification.



continued on page 11

A recontruction of the ventral limbs of a trilobite

In this depiction, the limbs and other ventral parts of the Burgess shale trilobite Olenoides serratus are shown. As mentioned above, only very rarely are these structures preserved and fossilized (other than the hypostome). Long, many-segmented antennae emerge from lateral notches of the hypostome (which overlies the mouth), and many pairs of legs, varying very little except in size, proceed from the cephalon to the pygidium (three limb pairs under the cephalon, and one pair for each axial segment in the thorax and pygidium). This primitive lack of specialization is one of the features of trilobite limbs, shared with many other Paleozoic Arachnomorpha.



Ventral reconstruction of Olenoides serratus
This figure ©2005 by S. M. Gon III

The limbs are attached to a sequential set of axial sternites (ventral segments) bearing a thin, uncalcified exoskeleton. Each of the bases of the limbs possess jagged toothlike structures that are thought to have processed food passed between the legs forward to the hypostome and mouth. Such food-processing limb bases are referred to as gnathobases (gnathos = jaw). (see Trilobite Feeding Behavior.

Between the endopods (crawling limbs) and the body are pairs of finely branched feathery structures (typically interpreted as gills), borne on the exopods (see additional detail on trilobite limbs, below). In some trilobites, it is thought that movements of the exopods might have allowed the animal to swim (as similar movements provide swimming locomotion in modern marine and freshwater arthropods). Finally, at the rear of the trilobite, two antenna-like cerci (sense organs) are depicted, although Olenoides serratus is the only species among all trilobites that are known to have borne them.

Next Issue: The Trilobite Eye

Oregon Fossils - Plants of the Jurassic Period

continued from page 7

and his letter was accompanied by a detailed map confirming that the correct locality was in Douglas County. It isn't known what happened to the boxes of Jurassic plants that Todd left behind. The day of discovery was memorable to Todd, as he related in his letter, because he came across the fossil bed "during the early seventies [when] my older brother was killed [by a horse] in Lookingglass".

These Jurassic plant locals were described at the turn of the century by Fontaine, Diller, and Knowlton, but since that time the floras have not been reexamined in light of paleobiogeography and modern plate tectonics, which played such a dominate role in the early geolgic history of the Klamath Mountains. Sediments of the Riddle Formation, in which these plants are found, are part of the Snow Camp terrane. The package of conglomerates, sandstones, and siltstones that make up the Snow Camp is believed to have been moved by faulting processes as much as 200 miles northward from the vicinity of the Sacramento Valley in California. Associated with the plants here, rare invertebrate shells of *Buchia piochii*, a mussel-like Jurassic clam, occur in fragmented conditions. In some regions of the Klamaths, reef-like mounds of *Buchia* are indicative of ancient nearshore settings.

It wasn't until 1991, that interest in Oregon's Jurassic floras was rekindled by the discovery of similar plants at the opposite side of the state in the Snake River Canyon. Sidney Ash, of the Geology Department at Weber State University, was able to demonstrate that fossil plants from the Coon Hollow Formation in Wallowa County could be used to help decipher the tectonic history here. Initially discovered by Tracy Vallier of the U.S. Geological Survey, Coon Hollow fossils turned up in rocks of the exotic Wallowa terrane exposed in vast tracts along the Snake River Canyon.

Poorly preserved petrified wood along with leaf and seed impressions make up this 175 million year old flora, dominated by ferns, conifers, and ginkgoes. Broad leaf plants are lacking. Ferns include *Dicksonia*, *Adiantites*, and *Cladophlebis*. The seed fern *Sagenopteris* is rare, but several conifers, resembling modern junipers, *Pagiophyllum*, *Brachyphyllum*, and *Podozamites* are plentiful. All of the fragmentary fossil wood recovered to date is similar to the conifer *Mesembrioxylon*. Specimens up to a foot in diameter and six feel long were dispersed and broken, suggesting transport some distance by streams before burial. A new fern *Phlebopteris tracyi*, which has fronds up to 18 inches in length, and the quillwort *Isoetites rolandii*, also newly discovered here, have not been found in the Riddle flora from the Klamath Mountains.

Coon Hollow plants were deposited in fine-grained sandstone and conglomerates during uplift and erosion of the surrounding region. Volcanic debris in this strata points to eruptions near the coastline. In the moist-temperate climate, turbid, sediment-laden streams spread into deltas and flood deposits. Swampy lowlands supported ferns and quillworts, while drier hills were populated by conifers.

Dicksonia is a genus of tree ferns in the order Cyatheales. It is regarded as related to Cyathea, but is considered more primitive, dating back at least to the Jurassic and Cretaceous periods. The fossil record includes stems, pinnules, and spores.

Rice Northwest Museum of Rocks and Minerals

26385 NW Groveland Drive
Hillsboro, Oregon 97124-9315
Phone: 503-647-2418

Stonerose Interpretive Center & Eocene Fossil Site

Stonerose Interpretive Center: Stonerose is the name of a fossil site, a place where impressions of plants, insects and fish that lived in and around a large lake nearly 50 million years ago can now be found in a large shale deposit. These fossils are the result of events that happened long before there were people to observe them.

Stonerose Interpretive Center is located at 15-1 N. Kean Street, on the corner of Kean Street and Highway 20 W., across from the city park in beautiful Republic, Washington. The fossil site is just a short walk from the Interpretive Center.

For more information please contact us at: (509) 775-2295, or visit us on the web at: www.stonerosefossil.org

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