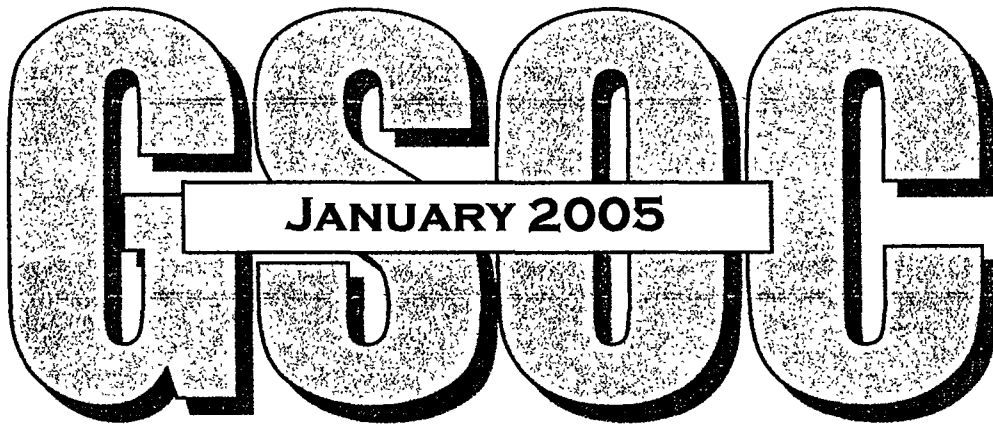


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PORTLAND, OR 97207**



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# **THE GEOLOGICAL NEWSLETTER**

# GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

2004-2005 ADMINISTRATION

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**Business Manager:**

Rosemary Kenney – 503/892-6514

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Cecelia Crater – 503/235-5158

### ACTIVITIES:

**ANNUAL EVENTS:** President's Field Trip—Summer or Fall; Banquet—March; Annual Business Meeting—February.

**FIELD TRIPS:** About 6 per year. Fees: see field trip announcements on the calendar next page.

**GEOLOGY SEMINAR:** Usually held on the third Wednesday of some winter months, 8:00 p.m., Rm. S17, Cramer Hall, PSU. See calendar for details

**GSOC LIBRARY:** Rm. S7, Open 7:30 p.m. prior to meetings.

**PROGRAMS:** EVENING: Second Friday evening most months, 8:00 p.m., Rm. 371, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon. NOON: Usually first Friday monthly except June, July, August, and holidays, usually at noon, Oregon State Office Building, 800 NE Oregon St., Portland, Oregon (near Lloyd Center), Crooked River Suite room 120B. Consult current calendar (next page) or verify by phone: 503/235-5158 or 503/892-6514.

**MEMBERSHIP:** Per year from January 1: Individual--\$20.00, Family--\$30.00, Junior (under 18)/Student--\$10.00.

**PUBLICATIONS:** THE GEOLOGICAL NEWSLETTER (ISSN 0270 5451), published monthly and mailed to each member. Subscriptions available to libraries and organizations at \$15.00 per year. Individual Subscriptions \$13.00 per year. Single Copies: \$1.00. Order from:

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# **GEOLOGICAL NEWSLETTER**

The Geological Society of the Oregon Country  
P.O. Box 907, Portland, OR 97207

VISITORS WELCOME AT ALL MEETINGS

INFORMATION: [www.gsoc.org](http://www.gsoc.org)

Clay Kelleher, President, 503-775-6263

Calendar Editor, John Teskey, 503-641-7746, [Lawlib@Teleport.com](mailto:Lawlib@Teleport.com)

VOL. 71, No. 1  
JANUARY, 2005

## **JANUARY ACTIVITIES.**

**Friday evening talk, January 14th 2005, 8:00 P.M. What's Up with Those Columbia Flood Basalts and Other Exciting DOGAMI Projects.** Presented by Vicki McConnell, State Geologist at Room S17, Cramer Hall, Portland State University. **ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT MAIN OFFICE**

**Seminar, Wed. evening, January 19, 8:00 p.m.: Seminar, Wed. evening, May 19, 8:00 p.m.: Mt. St. Helens for Non-Science Majors.** Were you excited by last October's eruptions but unsure of what exactly was going on? Did the news reports and scientific explanations not explain things to your liking? Still don't understand what a "dome-building eruption" is? Come to a night of down-to-earth information regarding what's up with the Northwest's most active volcano. We will discuss the formation of Mt. St. Helens, why it's so active, and what might happen in the future. Tara Schoffstall, GSOC Member. Room S17, Cramer Hall, Portland State University.

**PLEASE NOTE: PARKING AT PORTLAND STATE UNIVERSITY IS AVAILABLE AFTER 7 P.M. IN THE PARKING STRUCTURE ON BROADWAY DIRECTLY ACROSS FROM CRAMER HALL**

## **PREVIEW OF FEBRUARY ACTIVITIES**

**NO INFORMATION AVAILABLE AT THIS TIME**

## **REMINDERS:**

**ANNUAL DUES ARE PAYABLE STARTING JANUARY 1, 2005**

**ANNUAL GSOC BANQUET TO BE HELD IN MARCH. MORE INFORMATION TO FOLLOW IN SUBSEQUENT NEWSLETTERS**

**Calendar items must be received by 15<sup>th</sup> of preceding month.  
Call John Teskey, 503-641-7746 [Lawlib@Teleport.com](mailto:Lawlib@Teleport.com)**



## FIELD GUIDES

If you feel like studying geology at home, or making your own field trip excursions, you can purchase the following GSOC field trip guides from years gone by:

|  |        |
|--|--------|
| Geologic Trip Log through Eastern Foothills of Oregon Coast Range between Vernonia and Banks, 1964 ..... | \$0.75 |
| Columbia River Gorge and Grand Canyon of the Deschutes River, 1964 .....                                 | 0.75   |
| Geological Guide Book for Central Oregon, Prineville, Paulina, Suplee, Delintment Lake, 1965 .....       | 0.75   |
| Condon's First Island, Geological Trips in the Siskiyou and along the Rogue River, 1970 .....            | 1.25   |
| Field Trips along the Oregon Coast in Lincoln County, 1974.....  | 2.25   |
| Field Guide to Geologic Sites in the Newberry Crater Area, 1976.....                                     | 2.00   |
| Investigating the Geology of the North Cascades, Washington state, 1977.....                             | 2.25   |
| Sawtooth Mountains and the Stanley Basin, Idaho, 1978 .....  | 1.75   |
| Lewiston, Idaho, 1984 .....  | 3.50   |
| Northern Idaho and Montana, 1988.....  | 6.50   |
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| Field Trip to Southwest Oregon Coast, 2003 .....   | 8.00   |

Contact Rosemary Kenney 503/892-6514.

## BANQUET SALES TABLE DONATIONS

Rosemary Kenney will be accepting donations of books and other geology/natural history related items for the sale at the upcoming Annual Banquet. Rosemary asks that you do NOT donate the following:

- NO rocks
- NO textbooks older than 5 years

For more information call Rosemary at 503/892-6514.

## GSOC Rosters

GSOC members who wish a copy of the GSOC membership roster should contact Beverly Vogt, GSOC Secretary, phone 503/292-6939.

## WINTER WEATHER IN OREGON(?)

Here are some websites to peruse for the climate in Oregon, so you can decide whether the weather this winter is within reason:

The Oregon Climate Service (OCS), located on the Oregon State University campus in Corvallis, Oregon, is the state repository for weather and climate information. They are affiliated with Oregon State University's College of Oceanic and Atmospheric Sciences (COAS).

Oregon Climate Service website  
<http://www.ocs.orst.edu/>

Oregon Climate Summaries from the Desert Research Institute, Western Regional Climate Center:

<http://www.wrcc.dri.edu/summary/climsmor.html>

NOAA (National Oceanic and Atmospheric Association), National Climatic Data Center, Asheville, North Carolina, Oregon Climate Summary:

<http://lwf.ncdc.noaa.gov/oa/climate/research/cag3/OR.html>

Also the NOAA Snow Climatology site:

<http://lwf.ncdc.noaa.gov/oa/climate/monitoring/snowclim/mainpage.html>

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Volume 70, 2004

compiled by Rosemary Kenney

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### Nominating Committee Results

The following slate of officers has been selected by this year's nominating committee:

- President.....Charles Carter
- Vice President.....Bonnie Prange
- Secretary.....Beverly Vogt
- Treasurer.....Marvel Gillespie
- Director, 3 years.....Janet Kaye-Rasmussen
- Director, 2 years.....John Teskey
- Director, 1 year.....Richard Meyer

The slate of officers will be voted on and approved at the February monthly meeting.

The Nominating Committee members are Rosemary Kenney and Clay Kelleher. Our thanks to the selected members and members of the Nominating Committee!

Don't forget that annual **DUES PAYMENTS** are coming up! Think about all those great member benefits for a mere annual fee of \$20 (individual)!!!

PS – If you joined GSOC in September or later, your 2005 dues are paid, good deal!!!



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FEBRUARY 2005

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Phone (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ Email address \_\_\_\_\_

Geologic Interests and Hobbies \_\_\_\_\_

Please indicate Membership type and include check for appropriate amount:

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VOL. 71, No. 2  
FEBRUARY, 2005

## **FEBRUARY ACTIVITIES.**

**Friday evening talk, February 11th, 2005, 8:00 P.M. "From the Mist Gas Storage Wells to our Home Furnaces, or How Pores, Pore Throats, and Wavelets Keep Our Homes Warm." Presented by Jack Meyer, Geologist with Northwest Natural Gas, in Room S17, Cramer Hall, Portland State University. ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT MAIN OFFICE**

**Seminar, Wed. evening, February 16, 8:00 p.m.** Come to an evening of information about the causes and effects of tsunamis. Learn different ways tsunamis are created, and how they tie in to Oregon's past, present, and future. Seminar will be conducted by Tara Schoffstall, GSOC member, in Room S17 Cramer Hall, Portland State University. As always, all are welcome!! **ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT MAIN OFFICE**

**PLEASE NOTE: PARKING AT PORTLAND STATE UNIVERSITY IS AVAILABLE AFTER 7 P.M. IN THE PARKING STRUCTURE ON BROADWAY DIRECTLY ACROSS FROM CRAMER HALL**

## **MARCH ACTIVITIES**

**GSOC's 70th Annual Banquet is at the Rheinlander Restaurant on Sunday, March 13th at 12:30 P.M. The banquet speaker is Professor Curt Peterson, a coastal geologist at Portland State University. Prof. Peterson will talk about the catastrophic Indian Ocean tsunami. To register for the banquet, please go to the last page of the newsletter.**

## **REMINDERS:**

**ANNUAL DUES ARE PAYABLE STARTING JANUARY 1, 2005**

**Calendar items must be received by 15<sup>th</sup> of preceding month.  
Call John Teskey, 503-641-7746 [Lawlib@Teleport.com](mailto:Lawlib@Teleport.com)**

# Magnitude 9.0 Earthquake off the West Coast of Northern Sumatra -- 2004 December 26

*edited and italicized commentary by Carol Hasenberg*

*One day after Christmas day 2004, people began to get reports of a devastating earthquake and subsequent tsunami that occurred off the coast of Sumatra and affected many of the coastlines of the Indian Ocean. As the days since the disaster went by, more and more persons, it was realized, were victims of the awful waves which destroyed much in their paths. I have assembled some information about this terrible event, in the hopes that public awareness may allow us to prepare for such catastrophes in the future, as much as our abilities will allow.*

*This description came from the USGS website a few days after the earthquake*

*(<http://earthquake.usgs.gov/recenteqsww/Quakes/uslav.htm>):*

*"The devastating megathrust earthquake of December 26, 2004, occurred on the interface of the India and Burma plates and was caused by the release of stresses that develop as the India plate subducts beneath the overriding Burma plate. The India plate begins its descent into the mantle at the Sunda trench, which lies to the west of the earthquake's epicenter. The trench is the surface expression of the plate interface between the Australia and India plates, situated to the southwest of the trench, and the Burma and Sunda plates, situated to the northeast."*

*"Preliminary locations of larger aftershocks following the megathrust earthquake show that approximately 1200 km of the plate boundary slipped as a result of the earthquake. By comparison with other large megathrust earthquakes, the width of the causative fault-rupture was likely over 100*

*km. From the size of the earthquake, it is likely that the average displacement on the fault plane was about fifteen meters. The sea floor overlying the thrust fault would have been uplifted by several meters as a result of the earthquake. The above estimates of fault-dimensions and displacement will be refined in the near future as the result of detailed analyses of the earthquake waves."*

*"The world's largest recorded earthquakes have all been megathrust events, occurring where one tectonic plate subducts beneath another. These include:*

- the magnitude 9.5 1960 Chile earthquake*
- the magnitude 9.2 1964 Prince William Sound, Alaska, earthquake*
- the magnitude 9.1 1957 Andreanof Islands, Alaska, earthquake*
- and the magnitude 9.0 1952 Kamchatka earthquake."*

*"As with the recent event, megathrust earthquakes often generate large tsunamis that cause damage over a much wider area than is directly affected by ground shaking near the earthquake's rupture."*

*On January 13, 2005, the USGS website published these statistics about the quake and its aftermath (<http://earthquake.usgs.gov/eqinthenews/2004/uslava/>):*

*"This is the fourth largest earthquake in the world since 1900 and is the largest since the 1964 Prince William Sound, Alaska, earthquake. The tsunami caused more casualties than any other in recorded history. In total, more than 153,200 people were killed, 27,000 are still listed as missing and 1,236,000 were displaced in South Asia and East Africa. At least 106,500 people were killed by the earthquake and tsunami in Indonesia. Tsunamis killed at least 30,800 people in Sri Lanka, 10,300 in India, 5,300 in Thailand, 150 in Somalia, 82 in Maldives, 68 in Malaysia, 59 in Myanmar, 10 in Tanzania, 3 in Seychelles, 2 in Bangladesh and 1 in Kenya. Tsunamis caused damage in Madagascar and Mauritius and also occurred in Mozambique, South Africa, Australia and Antarctica. The tsunami crossed into the Pacific and Atlantic Oceans and was recorded in New Zealand and along the west*

and east coasts of South and North America. The earthquake was felt (VIII) at Banda Aceh and (V) at Medan, Sumatra and (II-IV) in parts of Bangladesh, India, Malaysia, Maldives, Myanmar, Singapore, Sri Lanka and Thailand. Subsidence and landslides were observed in Sumatra. A mud volcano near Baratang, Andaman Islands, began erupting on December 28.”

*This Sumatran earthquake is important to people in Oregon, not only for its devastating consequences to citizens and tourists in countries bordering the Indian Ocean, but because it is an example of the type of earthquake which is expected along the Oregon coast. For this reason I am including a number of comparisons of the Sumatran quake to the megathrust earthquake we expect to occur on the Cascadia Subduction Zone.*

*The Federal Emergency Management Agency (FEMA) weighs in on the subject of tsunamis in the Northwest with this item from the FAQ page updated January 6, 2005 ([http://www.fema.org/hazards/tsunamis/tsunami\\_questions.shtm#general\\_05](http://www.fema.org/hazards/tsunamis/tsunami_questions.shtm#general_05)):*

“Probably the greatest risk to the U.S. is believed to be a tsunami that would be generated by an earthquake along the Cascadia subduction zone off the coast of Washington, Oregon, and northern California. Similar to the northern coast of Sumatra, a Cascadia earthquake would be very large, would result in a tsunami, and would only give a few minutes of warning time to the residents along the Pacific Northwest coastline, in many cases not enough time to allow for evacuation, especially during vacation season. This fault last generated an estimated magnitude 9.0–9.5 earthquake and tsunami on January 26, 1700. While there is Native American folklore and geologic evidence, such as sand deposits, to prove the impact of the tsunami, the actual date has been confirmed from Japanese tsunami records.”

*Again, more info from the USGS Earthquake Hazards program last updated December 25, 2005 (<http://www.tsunamiwave.info/>):*

“The historic record of tsunamis along the U.S. west coast includes mainly teletsunamis, generated from large earthquakes around the Pacific Rim. Nevertheless, potentially tsunamigenic fault structures do exist locally offshore the U.S. west coast, most notably from the Cascadia subduction zone. The Cascadia subduction zone is a 750-mile (1,200 km) -long offshore fault that extends from northern California to southern Canada and accommodates motion between the Pacific and North American plates at a rate of about 40 mm/yr (1.6 inches/year). This subduction zone is thought to have last ruptured in a M 9.0 earthquake in 1700; the resulting tsunami was recorded in northern Japan historical accounts. However, this fault has been quiescent since that large rupture. It has generated no great earthquakes (M>8) and very few large earthquakes (M>6) during the 150 years of recorded history.”

*And from The Pacific Northwest Seismograph Network website ([http://www.pnsn.org/HAZARDS/CASCADIA/cascadia\\_zone.html](http://www.pnsn.org/HAZARDS/CASCADIA/cascadia_zone.html)):*

“The last known great earthquake in the northwest was in January, 1700, just over 300 years ago. Geological evidence indicates that great earthquakes may have occurred at least seven times in the last 3,500 years, suggesting a return time of 400 to 600 years.”

*This quote is from the Tuesday, December 28, issue of The Oregonian, pp. A-1 and A-9, in an article titled “Oregon’s coast faces latent threat of a tsunami”, by Michelle Cole:*

“Within the past 10,000 years, the Cascadia Subduction Zone, a region under the Pacific Ocean stretching from British Columbia to Northern California, has had 19 earthquakes of similar type and magnitude to the offshore earthquake that occurred on Christmas Day near the island of Sumatra, said Chris Goldfinger, an OSU marine geologist.”

*A few additional quotes from the FEMA FAQ page referenced earlier, concerning preparations for tsunamis:*

“Question: Is [it] possible to build a structure that would be capable of resisting the extreme forces of a tsunami?”

Answer: This question takes on a greater significance because there are several coastal communities along our Nation’s West Coast that are vulnerable to tsunami triggered by an earthquake on the Cascadia Subduction Zone. An earthquake along this fault could potentially generate a tsunami within minutes, similar to what happened on the north end of Sumatra. Given that many of these coastal communities are located in areas that would be impossible to evacuate in time, and could result in a significant loss of life, FEMA and its mitigation partners at the Federal, State and local levels are looking for alternatives. The only feasible alternative would be vertical evacuation, providing such a structure could be constructed to resist tsunami loads... For the average structure, it would generally not be economically feasible to construct to withstand the extreme loads of a tsunami. However, we believe it would be possible that a specially designed structure could be built to withstand at least specific tsunami loads without collapse for the purposes of providing community shelter for vertical evacuation.”

*To read about additional efforts to design tsunami-resistant shelters, see the website at [http://www.fema.org/hazards/tsunamis/tsunami\\_questions.shtml#bldgsci\\_01](http://www.fema.org/hazards/tsunamis/tsunami_questions.shtml#bldgsci_01).*

*The question about tsunami-resistant structures is an important one, since there are questions about whether Oregon citizens, especially children and seniors, will have time to evacuate in the event of a local megathrust earthquake. Approximately 90,000 people live within 0.6 miles of the shoreline in Oregon. Even with the tsunami warning sirens in place, people will have only minutes to evacuate. We would like to give our citizens options on safe evacuation from the inundation zone.*

*And, last but not least, a few quotes from the Monday, January 17, issue of The Oregonian, pp. A-1 and A-4, in an article titled “One-two punch lurks in the Pacific”, by Richard Hill:*

“...as the four-minute [Cascadia subduction] quake starts to subside, survivors on the coast have precious little time: a tsunami as high as 50 feet is headed for the beach...and is due to arrive...in the next 15 to 30 minutes...A recent state study conservatively estimated the event would kill more than 5,000 people...summertime population bulge was not factored in...there’s a 10% to 20% chance of a great subduction zone earthquake occurring in the next 50 years.”

“[George Priest, state geologist and tsunami expert] hopes a pilot project he helped launch in Seaside will come up with an effective, inexpensive tsunami-awareness program...[Tom Horning, Seaside geologist] said coastal towns must take these programs seriously. A few people have a “Jaws’ syndrome”, he said...[Jay Raskin, Cannon Beach architect and city councilor] would like to see a region-wide approach. “There are a lot of good things happening piecemeal but no global plan”.”

*This article discussed the dangers to citizens in Oregon from a tsunami hazard. We will discuss more hazards posed by a Cascadia Subduction Zone event in next month’s newsletter, plus we will cover seismic safety policy efforts being made to prepare for such hazards around the region. ☺*

Links for further information:

- An updated Sumatra info site (USGS website): [http://earthquake.usgs.gov/eqinthenews/2004/us\\_slav/](http://earthquake.usgs.gov/eqinthenews/2004/us_slav/)
- For information about the seismicity and geology of Indonesia see this website: <http://neic.usgs.gov/neis/world/indonesia/>
- To compare the size of the Sumatra quake with that of the Cascadia Subduction Zone, see this section of the USGS website: [http://earthquake.usgs.gov/eqinthenews/2004/us\\_slav/rupture\\_area-nw.html](http://earthquake.usgs.gov/eqinthenews/2004/us_slav/rupture_area-nw.html) The poster from that site is printed as a part of this newsletter. See Figure 1, page 10.
- Tsunami Links compiled by NOAA: <http://www.pmel.noaa.gov/tsunami/sumatra20041226.html>

- To see an animated model of the Sumatran tsunami wave, visit the International Tsunami Warning system in the Pacific (ITSU) website: <http://ioc.unesco.org/itsu/>
- For an animated version of a potential Cascadia subduction zone tsunami, see this USGS website page: <http://temp.water.usgs.gov/tsunami/research2.html>

## ...HUYGENS PROBE LANDS ON TITAN...

adapted from the NASA CASSINI-HUYGENS website <http://saturn.jpl.nasa.gov/home/index.cfm>:

"The Cassini spacecraft is the first to explore the Saturn system of rings and moons from orbit. Cassini [entered] orbit around Saturn on Jun. 30, 2004 and [immediately began] sending back intriguing images and data. The European Space Agency's Huygens Probe [was set to be released from the spacecraft in late December 2004 and] to dive into Titan's thick atmosphere in January 2005.

After a seven-year voyage that [included] four gravity-assisted maneuvers, Cassini [entered] Saturn's orbit. It [then began] a four-year mission that will include more than 70 orbits around the ringed planet and its moons. Pointing its various instruments at carefully calculated scientific targets, Cassini [has been designed] to collect detailed data on Saturn, its rings and the 30 known moons orbiting this gas giant. The information will aid scientists in understanding this complex and fascinating region. Main scientific goals include measuring Saturn's huge magnetosphere, analyzing from up close those stunning rings and studying Saturn's composition and atmosphere.

Cassini's cloud-penetrating imaging system will also be able to map Titan, Saturn's largest moon. This is a task that none of the three previous NASA missions that flew by Titan were able to do because of the thick, hazy atmosphere that engulfs this celestial body - the only moon in the solar system with its own atmosphere.

Once the spacecraft's onboard recording device reaches capacity, it will point its high-gain antenna toward Earth and download the data through one of the 70-meter (230-foot) antennas of the Deep Space Network. Cassini will be sending home several gigabytes of data daily. The data will then be analyzed by more than 250 scientists worldwide.

The Huygens Probe was named after Christiaan Huygens, a Dutch astronomer who in 1655 discovered Titan, Saturn's largest moon. The probe was designed by the European Space Agency (ESA), to perform an in-depth study of the clouds, atmosphere, and surface of Titan. The Huygens probe [plunged] into a planetary atmosphere farther away from Earth than any other deep space probe has gone before.

NASA Administrator Sean O'Keefe [offered congratulations] to the European Space Agency (ESA) on the successful touchdown of its Huygens probe on Saturn's moon Titan. The probe sent back data for more than 90 minutes after reaching the surface. The probe entered Titan's upper atmosphere at about 5:15 a.m. EST Jan. 14. During its two and one-half hour descent to the surface of the moon, it sampled the chemical composition of the atmosphere. The probe continued transmitting data for more than 90 minutes after reaching the surface.

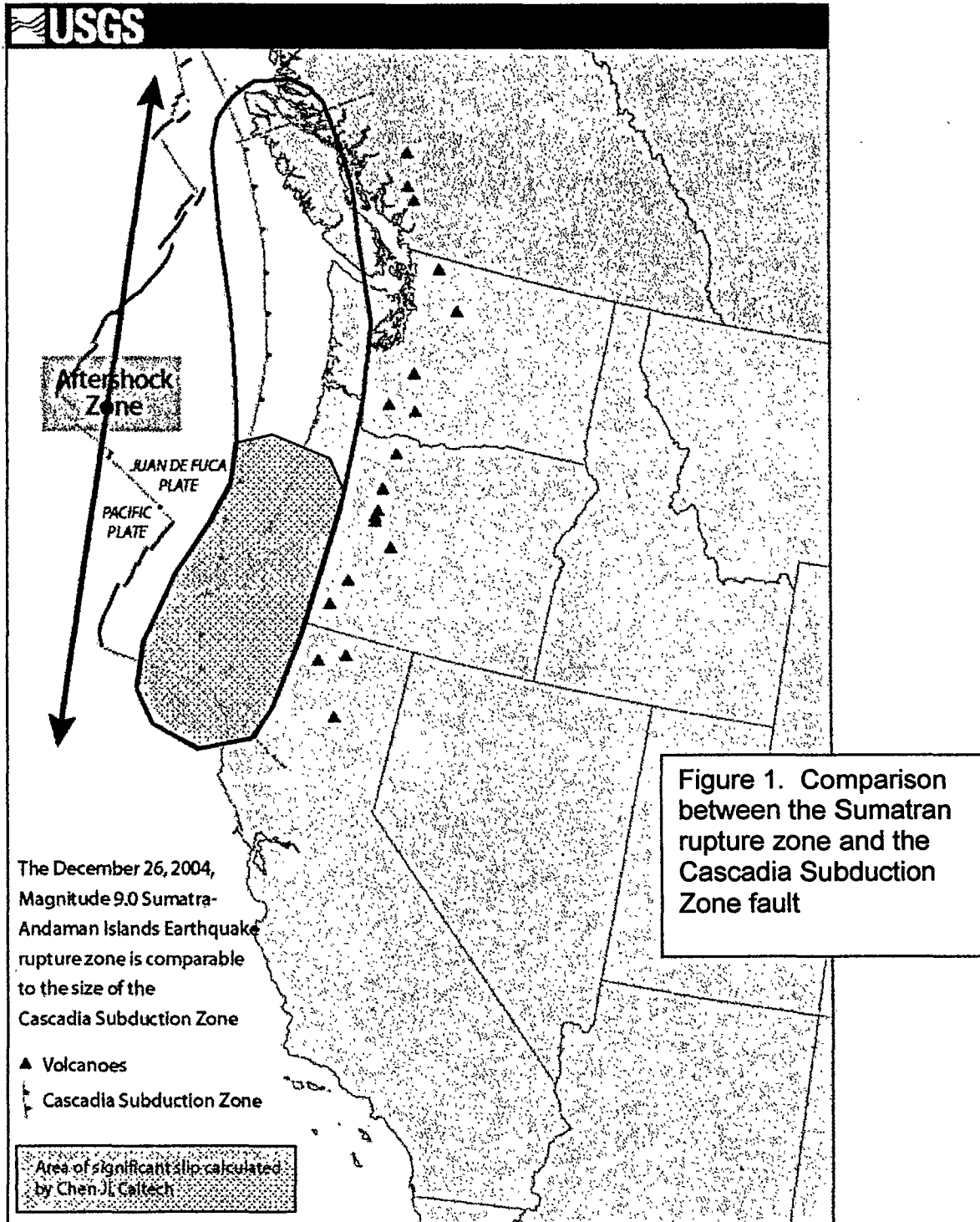
The data was sent to NASA's Cassini spacecraft, and was recorded and relayed through NASA's Deep Space Network to the Jet Propulsion Laboratory, Pasadena, Calif., and to ESA's Space Operations Center in Darmstadt, Germany. The European Space Agency facility is the operations center for the Huygens probe mission.

Cassini-Huygens is an international collaboration between three space agencies. Seventeen nations contributed to building the spacecraft. The Cassini orbiter was built and managed by NASA's Jet Propulsion Laboratory (JPL). The Huygens probe was built by the European Space Agency. The Italian Space agency provided Cassini's high-gain communication antenna. More than 250 scientists worldwide are studying the data streaming back from Saturn on a daily basis."

For more information about the Cassini-Huygens mission, refer to the following links:

- ESA CASSINI-HUYGENS home page: <http://www.esa.int/SPECIALS/Cassini-Huygens/index.html>
- NASA JPL Laboratory: <http://saturn.jpl.nasa.gov/home/index.cfm>

- Space Flight Now: It's full of space news, space links, and even space shopping for you space cadets out there: <http://spaceflightnow.com/>





## Nominating Committee Results

The following slate of officers has been selected by this year's nominating committee:

- President..... Charles Carter
- Vice President..... Bonnie Prange
- Secretary..... Beverly Vogt
- Treasurer..... Marvel Gillespie
- Director, 3 years..... Janet Kaye-Rasmussen
- Director, 2 years..... John Teskey
- Director, 1 year..... Richard Meyer

The slate of officers will be voted on and approved at the February monthly meeting.

The Nominating Committee members are Rosemary Kenney and Clay Kelleher. Our thanks to the selected members and members of the Nominating Committee!

Don't forget that annual **DUES PAYMENTS** are coming up! Think about all those great member benefits for a mere annual fee of \$20 for an individual and \$30 for a family!

PS – If you joined GSOC in September or later, your 2005 dues are paid, good deal!!!

## **RUBY TURNER DECEASED**

Ruby Turner, a long-time member of GSOC, died December 14, 2004. She was born in Chicago, moved to Portland in 1951 and married Jay Turner. Shortly afterwards they became members of GSOC. Ruby held various positions and was especially active with Publicity and the Newsletter. Ill health prevented both her and her husband from attending GSOC functions for the past few years.

# GEOLOGICAL SOCIETY OF THE OREGON COUNTRY SEVENTIETH ANNUAL BANQUET

## Speaker

The Geological Society of the Oregon Country will be having its 70<sup>th</sup> Annual Banquet on Sunday, March 13, 2005. The program topic will be "The Catastrophic Indian Ocean Tsunami" presented by Dr. **Curt Peterson**, a coastal geologist at Portland State University. Prof. Peterson viewed firsthand a tsunami's devastating force during his recent travels to some of the affected coastal areas of the Indian Ocean.

## Where and When

Location of the banquet will be the Rheinlander Restaurant, 5035 NE Sandy Blvd., Portland, Oregon. There is ample free parking next to the restaurant, behind the restaurant and across Sandy Blvd. Public transportation riders may get there by bus on the #12 Sandy Blvd. bus route. One may also take the MAX train to the Hollywood Transit Station, but will need to walk two blocks north to Sandy Blvd. to transfer to the Sandy Blvd. bus, which does not stop in the Hollywood Transit Station. Dinner will be served starting at 12:30 p.m. The program will begin at 2:00 p.m.

## Menu

### **Chicken Jaeger**

Served with sweet and sour red cabbage and homemade spatzle.

### **Munich Sausage Trio (Bratwurst, Weiswurst, and Bier Sausage)**

Served with sweet and sour red cabbage and homemade spatzle.

### **Grilled Marinated Portabella Mushrooms**

Served with zucchini planks, roasted garlic, and sweet potato rounds.

All dinners include a mixed green salad, fresh baked rolls with butter, apple strudel and hot beverage.

\_\_\_\_\_ Number of tickets at \$20.00 each (includes tip). Please indicate entrée choice. Also, if you have a table preference, please indicate it on the reservation.

Names of persons attending:

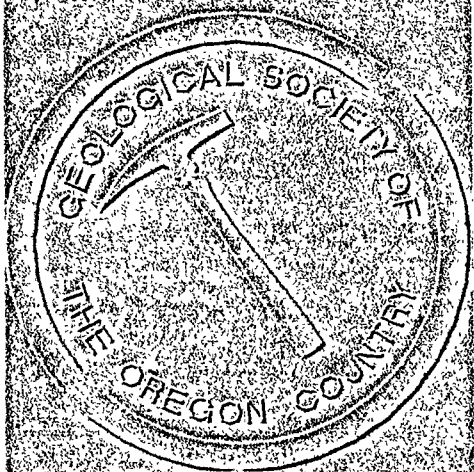
\_\_\_\_\_ Meal choice (circle one) Chicken Sausage Vegetarian  
\_\_\_\_\_ Meal choice (circle one) Chicken Sausage Vegetarian  
\_\_\_\_\_ Meal choice (circle one) Chicken Sausage Vegetarian  
\_\_\_\_\_ Meal choice (circle one) Chicken Sausage Vegetarian

\_\_\_\_\_ Amount enclosed. (Reservations must be received by Monday, March 1, 2005)

**Please mail reservations and checks to GSOC, PO Box 907, Portland, OR 97207-0907**

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2005-2006 ADMINISTRATION

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## THE GEOLOGICAL NEWSLETTER

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**Calendar:**

John Teskey – 503/641-7746

**Business Manager:**

Rosemary Kenney – 503/892-6514

**Assistant Business Manager:**

John Newhouse – 503/224-2156

### ACTIVITIES:

**ANNUAL EVENTS:** President's Field Trip—Summer or Fall; Banquet—March; Annual Business Meeting—February.

**FIELD TRIPS:** About 6 per year. Fees: see field trip announcements on the calendar next page.

**GEOLOGY SEMINAR:** Usually held on the third Wednesday of some winter months, 8:00 p.m., Rm. S17, Cramer Hall, PSU. See calendar for details

**GSOC LIBRARY:** Rm. S7, Open 7:30 p.m. prior to meetings.

**PROGRAMS:** Second Friday evening most months, 8:00 p.m., Rm. S17, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon.

**MEMBERSHIP:** Per year from January 1: Individual--\$20.00, Family--\$30.00, Junior (under 18)/Student--\$10.00.

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**TRIP LOGS:** Write to the same address for names and price list.

**WEBSITE:** [www.gsoc.org](http://www.gsoc.org). Email address: [gsoc@spiritone.com](mailto:gsoc@spiritone.com).

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### APPLICATION FOR MEMBERSHIP-

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Name \_\_\_\_\_ Spouse \_\_\_\_\_

Children under age 18 \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ Email address \_\_\_\_\_

Geologic Interests and Hobbies \_\_\_\_\_

Please indicate Membership type and include check for appropriate amount:

Individual \$20.00 \_\_\_\_\_ Family \$30.00 \_\_\_\_\_ Student \$10.00 \_\_\_\_\_

Make Check Payable to: **The Geological Society of the Oregon Country**  
PO Box 907  
Portland, OR 97207-0907

# **GEOLOGICAL NEWSLETTER**

The Geological Society of the Oregon Country  
P.O. Box 907, Portland, OR 97207

VISITORS WELCOME AT ALL MEETINGS

INFORMATION: [www.gsoc.org](http://www.gsoc.org)

Clay Kelleher, President, 503-775-6263, [ckellehe@mail.mesd.k12.or.us](mailto:ckellehe@mail.mesd.k12.or.us)

Calendar Editor, John Teskey, 503-641-7746, [lawlib@Teleport.com](mailto:lawlib@Teleport.com)

VOL. 71, No. 3

MARCH, 2005

## **MARCH ACTIVITIES.**

**GSOC's 70th Annual Banquet is at the Rheinlander Restaurant on Sunday, March 13th at 12:30 P.M. The banquet speaker is Professor Curt Peterson, a coastal geologist at Portland State University. The program topic will be "The Catastrophic Indian Ocean Tsunami". Registration for the banquet closes March 1, 2005. Registration forms were distributed in the February 2005 newsletter.**

**Seminar, Wednesday Evening, March 16, 8:00 p.m.: Where Did That Earthquake Come From?** How can scientists tell if an earthquake felt in the Northwest originated in the Northwest? Did it occur near the Cascade Volcanoes or near the offshore Juan de Fuca subduction zone? Perhaps it was a part of a larger quake that was centered in California or Alaska. Think it's hard finding the origin of an earthquake? It's not! You don't have to be a seismologist to figure out the location of an earthquake's epicenter. Find out Wednesday, March 16th at 8 pm. All are welcome! Tara Schoffstall, GSOC Member. Room 69 (Note the new room change!), Cramer Hall, Portland State University.  
**ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT MAIN OFFICE**

**PLEASE NOTE: PARKING AT PORTLAND STATE UNIVERSITY IS AVAILABLE AFTER 7 P.M. IN THE PARKING STRUCTURE ON BROADWAY DIRECTLY ACROSS FROM CRAMER HALL**

## **APRIL ACTIVITIES**

**No information available at this time.**

**Calendar items must be received by 15<sup>th</sup> of preceding month.  
Call John Teskey, 503-641-7746 [Lawlib@Teleport.com](mailto:Lawlib@Teleport.com)**

## DR. KENNETH YOST DECEASED

Dr. A. Kenneth Yost died January 7, 2005. Dr. Yost was a former member of GSOC and enjoyed taking GSOC field trips. Dr. Yost was a professor of art and educational media at what is now Western Oregon University for 36 years. Remembrances can be sent to the ARC of Multnomah County.

## Cascadia Subduction Zone Earthquake Preparedness Report

*edited and italicized commentary by Carol Hasenberg*

*One day after Christmas day 2004, people began to get reports of a devastating earthquake and subsequent tsunami that occurred off the coast of Sumatra and affected many of the coastlines of the Indian Ocean. As the days since the disaster went by, more and more persons, it was realized, were victims of the awful waves which destroyed much in their paths. Last month I described the terrible effects of the tsunami. Unfortunately since that article was written, the death toll swelled by many more people. My purpose in writing this article is to let the awful consequences of the Sumatra earthquake serve as a reminder to our own earthquake and tsunami hazard in Oregon.*

*In addition to describing the effects of the tsunami, last month I compared the seismic setting of the Sumatra earthquake to that of the Cascadia Subduction Zone off the coast of Oregon. I also described some of the tsunami preparedness for the coast of Oregon. This month I'd like to describe the ground shaking associated with great subduction zone earthquakes in general and the shaking expected in Oregon in particular. Then I'd like to update you on the current state of seismic preparedness, especially legislation for seismic preparedness in our state.*

*Cascadia Subduction Zone earthquakes are expected to cause widespread and significant shaking along the coasts of Oregon and Washington and east as far as the Cascade mountains. Expected levels of shaking are expected to be as much as 0.4 g along the southern Oregon coast. Shaking levels of about 0.2 g are expected in the Portland area. (See Figure 1.) Although these levels of shaking are strong, they are not expected to be as strong as the strongest levels of shaking in a crustal earthquake, such as what we get in earthquakes in California near the fault rupture areas. What makes the levels of shaking experienced in great subduction zone earthquakes is the duration of strong shaking. During the recent Sumatran event the shaking was between 3 and 4 minutes along the rupture, and shaking duration on the island lasted several minutes, depending on the location. Durations of about 4 minutes were reported for the 1964 Good Friday earthquake in Alaska.*

*Long duration earthquakes can have several devastating effects. The first is the cumulative effects on weak or poorly connected buildings. As the earthquake progresses they become increasingly more damaged and may collapse. Unreinforced masonry buildings, typified by old all-brick buildings in Oregon, are especially susceptible to damage and collapse. (Recall the effects of the 2001 Nisqually earthquake on the old brick buildings in Seattle.)*

*Another effect of long duration earthquakes is a phenomenon called liquefaction, which often causes permanent ground deformations. Liquefaction occurs in loose, coarse, granular soils such as sand and fine gravel, with high water tables. River valleys typically contain areas of liquefiable soil. As shaking continues in a strong earthquake, the granular particles lose contact with one another and float in the water. The soil then has no strength to support objects on it. Buildings can sink, tilt, and crack when this happens. If the liquefied soil layer is on even a slight slope, it will begin to flow downhill, creating cracks and slumps. All of these features occurred both in the Nisqually and Good Friday earthquakes. The longer the duration of the*

*earthquake, the greater will be the damage caused by liquefaction.*

*The reader might be wondering about our current level of seismic preparedness, since we have recognized that there is a danger of great earthquakes here in western Oregon. Well, some distinctly positive steps have been initiated when it comes to new building construction. The seismic zone designation was raised to reflect the current knowledge of the seismicity, and also the building codes have undergone tremendous improvements for earthquake-resisting construction. The bad news is that there are many existing buildings that were built long before the new improved construction standards existed. Existing buildings are often difficult to assess and expensive to rehabilitate. This is a problem that has been discussed extensively but has not been solved, although a number of communities and private individuals have voluntarily seismically rehabilitated some or all of their buildings.*

*Oregon's leaders for studying earthquake hazard policy, The Oregon Seismic Safety Policy Advisory Commission (OSSPAC), otherwise known as the Earthquake Commission, has the unique task of promoting earthquake awareness and preparedness through education, research, and legislation. Here is some information about this commission and its plans for Cascadia Subduction Zone earthquake preparedness, from the January 2005 meeting notes:*

**OSSPAC Objectives (taken from Oregon at Risk, 2000):**

Objective 1: Earthquake awareness and education,

Objective 2: Earthquake risk info

Objective 3: Earthquake safety of buildings and lifelines

Objective 4: Geoscience and technical info

Objective 5: Emergency pre-disaster planning, response and recovery efforts

**Cascadia earthquake and tsunami mitigation framework and ideas**

Objective 1: Earthquake awareness and education

- Wide range of education (including tourists)

Objective 2: Earthquake risk info

Update risk models (seismic hazard and fragility curves)

- Complete risk studies of damage and loss (life safety, property, infrastructure, indirects)

Objective 3: Earthquake safety of buildings and lifelines

- Mitigate schools and emergency facilities in inundation zone and throughout state
- Identify and mitigate critical infrastructure
- Identify existing and future high-risk developments; explore avoidance options.

Objective 4: Geoscience and technical info

- Secure permanent, ear-marked funding for State mitigation and mapping (e.g., through the National Tsunami Hazard Mitigation Program (NTHMP), FEMA and USGS)
- Update inundation models
- Update the 1995 SB 379 regulatory boundary with newest inundation mapping information.
- Complete inundation maps for entire populated coastline

Objective 5: Emergency pre-disaster planning, response and recovery efforts

Emergency response planning efforts (including signage, evacuation, telecommunications infrastructure upgrades – emphasis on “all hazards” approach)

- Recovery planning (isolated communities)
- Review and update early warning systems for distant tsunamis (community sirens, off-shore detection)
- Review and update early warning systems for Cascadia tsunamis (community sirens, off-shore and onshore detection). Explore innovative new ideas such as direct sensing of onshore uplift and subsidence in real time utilizing accelerometers on the coastline; seafloor seismographs and tsunami meters, etc.

*This description of current building codes and seismic legislation was obtained from Yumei Wang of the Oregon Department of Geology and Mineral Industries (DOGAMI):*

### Oregon Legislation and Building Codes

- In 1974, Oregon adopted its first state building code (Uniform Building Code 1973), which classified all of Oregon under seismic zone 2.
- During the late 1980's and early 1990's, significant scientific advances were made by researchers and practitioners on the seismic risk in the Pacific Northwest, which eventually led to building code upgrades. The most significant building code upgrade occurred in western Oregon in 1993 (Zone 3 in 1993 and the 1998 upgrade of the southwestern coast to Zone 4).
- The current building code is the 2003 International Building Code (IBC), which was adopted in October 2004.
- 1995 laws require site-specific studies for new major and critical buildings in mapped tsunami inundation zones.
- Laws require earthquake and tsunami drills in public schools.
- In 2001, Oregon Senator Peter Courtney championed the passage of Senate Bills 14 and 15 required public schools (kindergarten to universities) and emergency facilities (hospitals, fire and police) to have life safety standards, which are set forth in the Oregon Revised Statute 455.400. Senator Courtney also championed SB 13, which requires earthquake drills in businesses with over 250 employees.
- Also in 2001, Senate Joint Resolutions 21 and 22 were passed. These resolutions placed earthquake safety ballot measures 15 and 16 on the 2002 ballot, which were passed by the voters. The public's opinion is that schools and emergency facilities should be safe.
- The 2002 votes created the Oregon Constitution Articles XI-M and XI-N, which allows for state general obligations (GO) bonds to pay for earthquake mitigation.

### Oregon's Current Understanding of Risk

- Oregon does not have a statewide database to assess how many and which school buildings are below "life-safety" levels.
- Roughly three-quarters of kindergarten through high school (K-12) buildings were built prior to the 1974 statewide building code.

- Oregon does not have a statewide database to assess how many and which emergency facilities (fire, police and hospitals) are below "life-safety" levels. Ideally, these emergency facilities should be "operational" so that they can serve the effectively communities after a major earthquake.
- Oregon does not have a statewide database to assess which buildings are unreinforced masonry (URM), which are the most likely to collapse during an earthquake.
- A preliminary 1999 statewide study of a magnitude 8.5 Cascadia earthquake off the Oregon coast indicates over 5,000 fatalities will be suffered, which are mostly due to tsunami and URM damage. Over \$12 billion of building damage is expected and over 37,000 buildings are expected to be "red tagged" and unsafe. Over 35% of the schools and emergency facilities are expected to be closed one day after the earthquake.

*In early 2005, Senate "President" Peter Courtney introduced Senate Bills 2, 3, 4 and 5 to assess and authorize bonding for seismic rehabilitation of education and public safety buildings. This is another step in the direction of preparing Oregon for these great Cascadia Subduction Zone earthquakes. ☺*

### Links for further information:

- USGS Earthquake Hazards Program:  
<http://earthquake.usgs.gov/>
- The Pacific Northwest Seismograph Network:  
[http://www.pnsn.org/INFO\\_GENERAL/faq.htm](http://www.pnsn.org/INFO_GENERAL/faq.htm)  
!
- USGS FAQ - Everything Else You Want to Know About this Earthquake & Tsunami:  
[http://earthquake.usgs.gov/equinthenews/2004/us\\_slav/neic\\_slav\\_faq.html](http://earthquake.usgs.gov/equinthenews/2004/us_slav/neic_slav_faq.html)
- OSSPAC website:  
<http://www.wsspc.org/links/OSSPAC/>



Peak Accel. (%g) with 10% Probability of Exceedance in 50 Years  
USGS Map, Oct. 2002

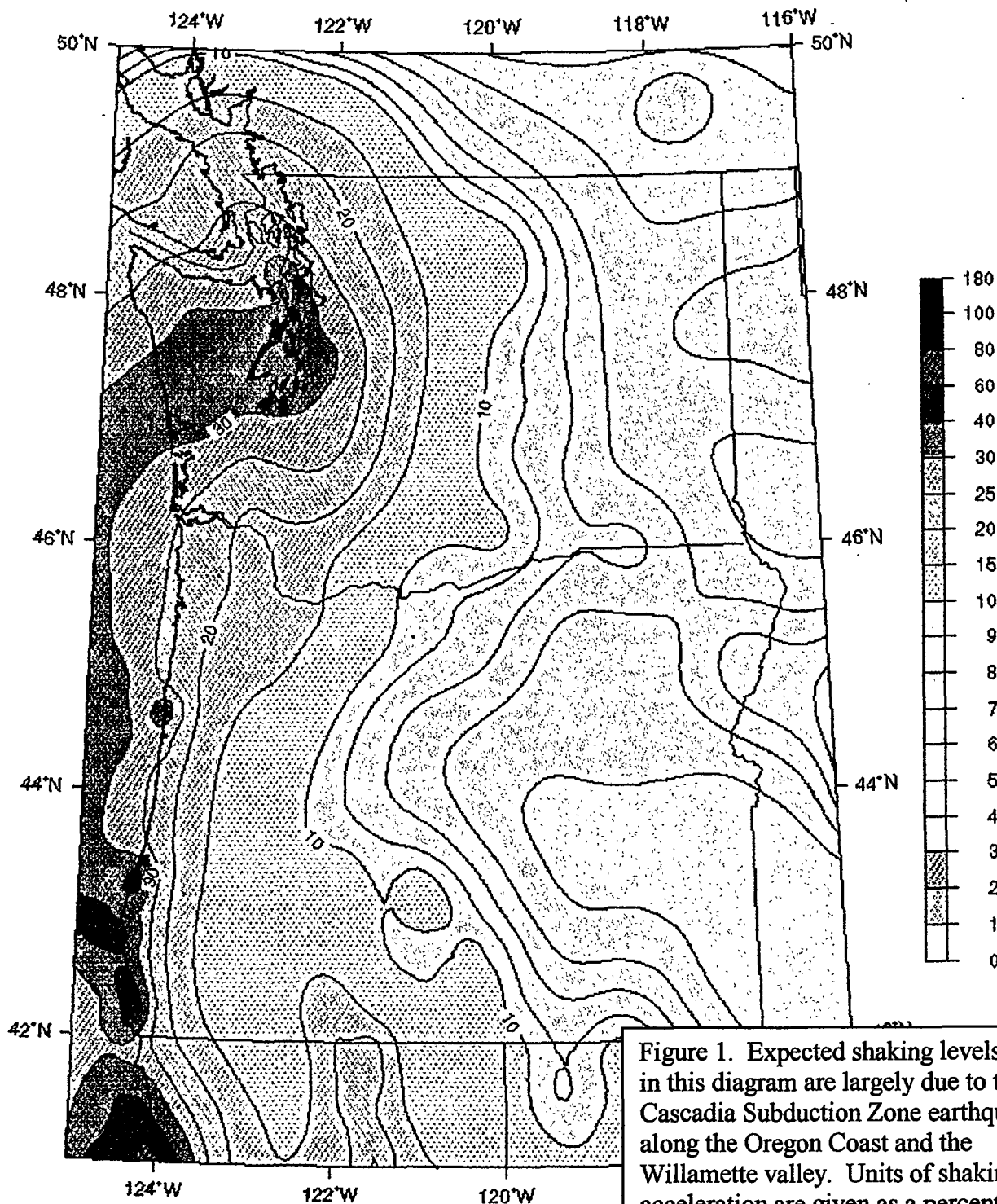


Figure 1. Expected shaking levels shown in this diagram are largely due to the Cascadia Subduction Zone earthquakes along the Oregon Coast and the Willamette valley. Units of shaking acceleration are given as a percent of gravitational acceleration (%g). Source: USGS Earthquake Hazards Program.

# GEOLOGICAL SOCIETY OF THE OREGON COUNTRY SEVENTIETH ANNUAL BANQUET

## Speaker

The Geological Society of the Oregon Country will be having its 70<sup>th</sup> Annual Banquet on Sunday, March 13, 2005. The program topic will be "The Catastrophic Indian Ocean Tsunami" presented by Dr. **Curt Peterson**, a coastal geologist at Portland State University. Prof. Peterson viewed firsthand a tsunami's devastating force during his recent travels to some of the affected coastal areas of the Indian Ocean.

## Where and When

Location of the banquet will be the Rheinlander Restaurant, 5035 NE Sandy Blvd., Portland, Oregon. There is ample free parking next to the restaurant, behind the restaurant and across Sandy Blvd. Public transportation riders may get there by bus on the #12 Sandy Blvd. bus route. One may also take the MAX train to the Hollywood Transit Station, but will need to walk two blocks north to Sandy Blvd. to transfer to the Sandy Blvd. bus, which does not stop in the Hollywood Transit Station. Dinner will be served starting at 12:30 p.m. The program will begin at 2:00 p.m.

## Menu

### **Chicken Jaeger**

Served with sweet and sour red cabbage and homemade spatzle.

### **Munich Sausage Trio (Bratwurst, Weiswurst, and Bier Sausage)**

Served with sweet and sour red cabbage and homemade spatzle.

### **Grilled Marinated Portabella Mushrooms**

Served with zucchini planks, roasted garlic, and sweet potato rounds.

All dinners include a mixed green salad, fresh baked rolls with butter, apple strudel and hot beverage.

\_\_\_\_\_ Number of tickets at \$20.00 each (includes tip). Please indicate entrée choice. Also, if you have a table preference, please indicate it on the reservation.

Names of persons attending:

\_\_\_\_\_ Meal choice (circle one) Chicken Sausage Vegetarian  
\_\_\_\_\_ Meal choice (circle one) Chicken Sausage Vegetarian  
\_\_\_\_\_ Meal choice (circle one) Chicken Sausage Vegetarian  
\_\_\_\_\_ Meal choice (circle one) Chicken Sausage Vegetarian

\_\_\_\_\_ Amount enclosed. (Reservations must be received by Monday, March 1, 2005)

**Please mail reservations and checks to GSOC, PO Box 907, Portland, OR 97207-0907**

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# **THE GEOLOGICAL NEWSLETTER**

# GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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### APPLICATION FOR MEMBERSHIP- THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Name \_\_\_\_\_ Spouse \_\_\_\_\_

Children under age 18 \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ - \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ Email address \_\_\_\_\_

Geologic Interests and Hobbies \_\_\_\_\_

Please indicate Membership type and include check for appropriate amount:

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Make Check Payable to: The Geological Society of the Oregon Country  
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VISITORS WELCOME AT ALL MEETINGS

VOL. 71, No. 4

INFORMATION: [www.gsoc.org](http://www.gsoc.org)

APRIL, 2005

Charles Carter, President, 503-469-8353, [chcarter39@hevanet.com](mailto:chcarter39@hevanet.com)  
Calendar Editor, John Teskey, 503-641-7746, [lawlib@Teleport.com](mailto:lawlib@Teleport.com)

## **APRIL ACTIVITIES.**

**Friday Evening Talk, April 8th, 2005, 8:00 P.M. "Looking for Active Faults in the Portland Urban Area"**, presented by Ian Madin, Oregon Department of Geology and Mineral Industries. This talk will look at recent efforts using geophysics and trenching to locate faults around Portland and determine if they are active. Cramer Hall, Portland State University. **ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT'S MAIN OFFICE**

**Wednesday Seminar, April 20th at 8pm: The Richter Scale: How To Find the Magnitude of an Earthquake.** All are welcome! Tara Schoffstall, GSOC Member. **Room 69** (Note the new room change!), Cramer Hall, Portland State University

## **MAY ACTIVITIES**

**Field trip, Sunday, May 15: Two museums: Thomas Condon Museum of Paleontology and Museum of Natural History, both at the University of Oregon.** Professor William Orr will personally take us into the Thomas Condon Museum to see the collection of fossils rarely available to the general public. Bring a bag lunch and meet in Eugene at 10:30 a.m. Further details will be announced in the May Newsletter. Cost: \$5 for GSOC members and \$7 for nonmembers. Children under 12 years of age are free but should be under supervision of their parents. Members are urged to carpool, and passengers are expected to help pay cost of gasoline. If you plan to attend, call John Teskey, 503-641-7746, give your name and phone number, tell how many will be with you, and tell him if you can take passengers or need a ride

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**CHECK THE GSOC WEB PAGE FOR THE LATEST GSOC CALENDAR OF EVENTS,  
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Calendar items must be received by **15<sup>th</sup> of preceding month.**  
Call John Teskey, 503-641-7746 [Lawlib@Teleport.com](mailto:Lawlib@Teleport.com)

# MAY FIELD TRIP PLANNED TO FOSSIL MUSEUM

The May GSOC field trip will be on Sunday, May 15, and will be to see the Thomas Condon Museum of Paleontology and the Oregon Museum of Natural and Cultural History at the University of Oregon (Eugene, Oregon). Dr. William Orr, Professor of Geology and well-known expert on fossils, will meet us at 10:30 in Eugene to show us the museum collections. The Natural History museum is always open to the public, but the Thomas Condon Museum is open only for special occasions, such as our field trip. This is a rare opportunity to see fossils that are not always available to the public and to learn about them from an expert.

Final details of the trip will be announced in the May Newsletter. Members are urged to car pool, and passengers are expected to share in gas expenses. We need to know how many people plan to attend, so call John Teskey, 503-641-7746, and give him your name and phone number and tell him how many people will be with you, if you can take passengers, or if you need a ride.

Cost of the trip is \$5 for GSOC members and \$7 for non-members. Children under the age of 12 are free, but parents are expected to supervise them. Bring a bag lunch, and prepare for a wonderful day. Watch for final details in the May Newsletter.

## UPCOMING GEOLOGY LECTURES AND SEMINARS ON MT. ST. HELENS ERUPTIONS

A series of seminars will be presented at the Department of Geology, Portland State University, entitled "Monitoring Volcanoes and Mt. St. Helens' Ongoing Eruption." Presented by members of the

Cascade Volcano Observatory, Vancouver, WA, of the U.S. Geological Survey. All are being held in Cramer Hall S17 (subbasement, NE corner of building) at 3.30-4:30 p.m.

- April 6, 2005. "Mount St. Helens Seismicity Then and Now: What the Last 25 Years Have Taught Us About How the Volcano Works." Speaker Seth C. Moran.
- April 20, 2005. "Airborne Volcanic Gas Measurements at U.S. Volcanoes with Recent Results from Mount St. Helens." Speaker Kenneth A. McGee.
- April 27, 2005. "Deformation of Cascades Volcanoes: Monitoring Techniques and Their Recent Application." Speaker Rick G. LaHusen.
- May 4, 2005. "Petrologic Monitoring of Active Volcanoes." Speaker Carl R. Thorber.
- May 11, 2005. "Field Geology and Petrology of the 2004-2005 Eruption of Mount St. Helens." Speaker John S. Pallister.

For information contact Martin Streck, 503-725-3379, [streckm@pdx.edu](mailto:streckm@pdx.edu).

Remember the Portland Streetcar goes right past Cramer Hall and stops in the Park Block. It's a good way to go to the PSU campus.

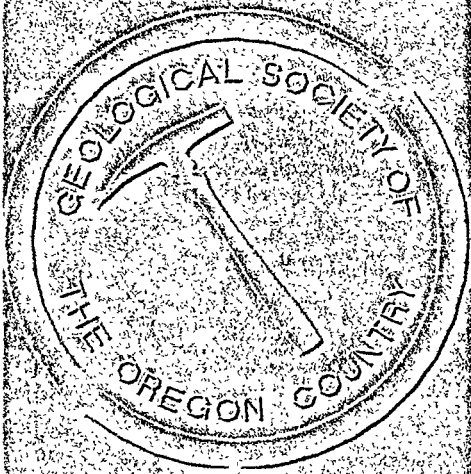
On page A6 of The Oregonian, Thursday, 10 March 2005: "Government scientists will present evening seminars on March 21, April 18 and April 25, detailing what researchers have learned about Mt. St. Helens volcano since its massive 1980 eruption.

- On March 21st, Seth Moran, of the U.S. Geological Survey Cascade Volcano Observatory, will discuss "Mount St. Helens Seismicity Then and Now."
- On April 18th, Peter Frenzen of the Mount St. Helens National Volcanic Monument will speak on "Out of the Ash: Survival and Recolonization in a Volcanic Landscape, and
- Charlie Crisafulli, an ecologist with the U.S. Forest Service, will discuss "Mount St. Helens: A Story of Survival and Revival of Life."
- Then, on April 25th Dan Dzurisin, also of the Cascade Volcano Observatory, will speak on "Something Extraordinary is Happening in the Crater at Mount St. Helens."

All start at 7 p.m. in Room 110 of the Student Services Building at Washington State University-Vancouver, 14204 N.E. Salmon Creek Ave. More

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Portland, OR 97207-0907



information about the topics, speakers and schedules is on the Web at [www.vancouver.wsu.edu/news.htm#mtsthelens](http://www.vancouver.wsu.edu/news.htm#mtsthelens). Information on other events commemorating the big blast's 25th anniversary is at [www.fs.fed.us/gpnf/msh25/index.shtml](http://www.fs.fed.us/gpnf/msh25/index.shtml) "

## APRIL BOOKWORMS



Sitting around while the spring rain and hail thunder down outside? Feeling like you already had your springtime last winter? Check out a couple of new books and look forward to the next GSOC field trip!

These book reviews were inspired by the recent lecture by Dr. Peter Ward on March 11, 2005, at the Arlene Schnitzer Concert Hall in Portland. The lecture was part of the Science, Technology, and Society lectures sponsored by the Institute for Science, Engineering and Public Policy ([www.isepp.org](http://www.isepp.org)). The reader is also referred to the article discussing the lecture in this newsletter.

## GORGON

by Dr. Peter D. Ward,  
University of Washington



book review by Paul E.  
Hammond

*Gorgon-Paleontology, Obsession, and the Greatest Catastrophe in Earth's History*, by Peter D. Ward, 2004, Viking Press of the Penquin Group Inc., 375 Hudson Street, New York, NY 10014, 257 pages, hardback and paperback.

Between September 1991 and November 2001, Dr. Peter Ward, a professor of zoology and geological sciences at the University of Washington, Seattle, made several trips to the Karoo Desert of South Africa to determine the cause of the largest mass

extinction in earth's history, at the close of the Permian, 250 million years ago. He went to the Karoo because this area has one of the most complete and well-exposed stratigraphic records of continental sedimentary rocks, sandstone, shale, and conglomerate, extending from the Permian into the middle Mesozoic.

Dr. Ward gives a vivid description of his field experiences—the bleak terrain of the Karoo Desert, its inaccessibility, the often thwartive weather, insects, and poisonous snakes—the geologic rewards and disappointments, the finding and recovery of large vertebrate fossils—*Lystrosaurus*, *Dicynodon*, among others—his working compatriots, the peoples of South Africa and their living conditions during the transition from the harsh apartheid system to the new government under Nelson Mandela, and his remorse in the 1 to 3 months separations from his young family.

Dr. Ward went to the Karoo with the belief that the P/T (Permian/Triassic) extinction was caused by the collision of a meteor with the earth, like that at the K/T (Cretaceous/Tertiary) boundary, 65 million years ago. But his findings in the field were not indicative of this interpretation. It was other researchers, looking at sudden shifts in climatic conditions, who came up with the theories best fitting the geologic evidence—an increase in global temperature and carbon dioxide along with a decrease of oxygen in the atmosphere. Carbon dioxide was derived from an increase in methane in the atmosphere along with the extensive eruption of Siberian flood basalt lava flows. Oxygen content fell as low as 10% (compared with 21% oxygen and 79% nitrogen in today's atmosphere), equivalent to altitudes above 15,000 feet. About 1 million years before the end of the Permian, sea level began to drop, exposing organic-rich sediments, which extracted oxygen from the atmosphere, forming red beds, and released methane into the atmosphere. This low-oxygen condition continued until the middle Jurassic, when sediments yellow (to gray) colored were again deposited, dinosaurs began to thrive, and early small mammals evolved.

This is highly readable book, well written, with clear, visual descriptions. The text moves right

along, almost like a good detective story. There's few passages of abstract discussion, except toward the end of the book where Ward questioned the accomplishment of this scientific endeavor, the adversities, and the time away from his family. The book lacks the detailed, technical discussion of many scientific books, and explains in clear language the few technical procedures employed, and his and the thinking of others in attacking this major problem. One of the best books I've read describing geologic field conditions and methods.

A gorgon (short for gorgonopsian) is a fierce-looking, mammal-like reptile, with a large head, long saber-like teeth, huge front and short hind legs, and up to about 8 feet tall, who died off (was asphyxiated) at the end of the Permian. It is a specimen prized by natural history museums.

## **The Life and Death of Planet Earth: How the New Science of Astrobiology Charts the Ultimate Fate of Our World**



by Peter D. Ward and Donald Brownlee

book review by Carol Hasenberg

published by Henry Holt and Company, LLC, New York, N.Y., 2002; Owl Books Edition (paperback) published in 2004, 240 pages.

There are many levels of understanding to be obtained by the current state of scientific research, and this book is an excellent example of this phenomenon. From the work of a multitude of scientific disciplines, and a culmination of many years of research, scientists are beginning to see a big picture emerging about the evolution the solar system and our planet.

This book is actually a continuation of a book called *Rare Earth: Why Complex Life is Uncommon in the Universe*, published in 2000 by the same authors. Dr. Ward is a paleontologist specializing in mass extinctions at the University of Washington in Seattle, and Dr. Brownlee is an astronomer in the same institution and a director of NASA's *Stardust* mission. In *Rare Earth*, Drs. Ward and Brownlee discuss the evolution of solar systems and life on earth and present a case for why it would be difficult to find planets with complex life on them.

This book is a continuation of the argument, and explains what the current state of knowledge of planetary evolution spells out for the future of our own world. It is not an especially bright future, in the geological short or long term, and it is closely tied to the dynamic systems that the earth has developed which regulate temperature and atmospheric content. Three cycles - plate tectonics, the carbon cycle and the carbonate silicate cycle - are critical to life on earth and will be involved in the demise of life as we know it.

The book is divided into a series of chapters which first discuss the evolution of the earth, and then a sequence of events which will bring about the gradual decline and destruction of life. These events include the return of the Ice Age, the end of plant life from carbon dioxide depletion, the end of animal life from plant life extinction and increasing solar output, the end of all life from a continuation of increased solar output, and the melting of the earth in the eventual red giant stage of the sun's life. Sprinkled within are also the threat of catastrophic events such as the clumping of the continents and comet/asteroid doomsday strikes.

What surprised me about this prediction of the end of things is that complex life on earth only has about another 500 million years to exist on this planet - indeed, we have just passed the noontime of complex life and are already headed for the twilight. I had always heard as a child that the sun would become a red giant, but not to worry because that's 5 billion years in the future. Now, according to the authors, the bleak future is uncomfortably closer, and not only that, but the mass extinctions that the human race itself is responsible may

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Calendar Editor, John Teskey, 503-641-7746, [lawlib@Teleport.com](mailto:lawlib@Teleport.com)

VOL. 71, NO. 5

MAY, 2005

## **MAY ACTIVITIES.**

**Friday Evening Talk, May 13th, 2005, 8:00 p.m. "Snapshot Tour of Buried and Submerged Forests of the Pacific Northwest: Time Capsules that Record Paleo-earthquakes, Volcanic Eruptions, and Landslides",** Pat Pringle, geologist, Washington Dept of Natural Resources, Room S17, Cramer Hall, Portland State University. **ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT'S MAIN OFFICE**

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**Friday Evening Talk, June 10th, 2005, 8:00 p.m., "Surviving Great Earthquake Disasters: Lessons from the December 2004 Sumatra Quake",** Yumei Wang, geotechnical engineer, Oregon Department of Geology and Mineral Industries, Room S17, Cramer Hall, Portland State University.

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## MAY FIELD TRIP PLANNED TO FOSSIL MUSEUM

May field trip to fossil museum rare opportunity to learn more about fossils from Dr. William Orr

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For information contact Martin Streck, 503-725-3379, [streckm@pdx.edu](mailto:streckm@pdx.edu).

Remember the Portland Streetcar goes right pass Cramer Hall and stops in the Park Block. It's a good way to go to the PSU campus.

Information on other events commemorating the big blast's 25th anniversary is at [www.fs.fed.us/gpnf/msh25/index.shtml](http://www.fs.fed.us/gpnf/msh25/index.shtml) "

## ICE AGE FLOODS INSTITUTE FIELD TRIP

The Ice Age Floods Institute announces a May field trip: "Flood Features and Wildflowers of Magnificent Frenchman Coulee: A Hiking Field Trip" (location of the trip is near Quincy, WA)

Saturday, May 7

Leader: Bruce Bjornstad, Lake Lewis Chapter (Tri-Cities)

seriously deplete biodiversity of life on earth for all time.

I'm not in a position to judge whether all the ideas presented in this book are exactly correct – the ideas presented are on the cutting edge of our understanding of the complex interactions between astronomical, atmospheric, and biological systems. However, these are well-respected scientists in their fields, and the ideas that they present all are founded in well-documented current research. They are well-presented and easily understood by the average reader. They present a glimpse of the big picture of the future of the earth. And they are extremely thought-provoking about our place as an agent of change in the world and how precious is our time here on earth.

## Life's Rivers in Time

synopsis of a Science, Technology, and Society lecture given by Dr. Peter Ward, University of Washington, March 11, 2005, at the Arlene Schnitzer Concert Hall in Portland - csh

Dr. Ward came to Portland to discuss material from his most recent popular science publications:

- *Rare Earth: Why Complex Life is Uncommon in the Universe*, 2000, co-authored with Donald Brownlee
- *Future Evolution*, 2001
- *Gorgon: Paleontology, Obsession, and the Greatest Catastrophe in Earth's History*, 2004 (paperback sub-title is slightly different)
- *The Life and Death of Planet Earth: How the New Science of Astrobiology Charts the Ultimate Fate of Our World*, 2004, co-authored with Donald Brownlee

By far the bulk of the presentation concerned the *Rare Earth* and *Life and Death of Planet Earth* series. These books explain the authors' understandings of the findings of researchers in the science of astrobiology, a topic which incorporates a wide range of scientific disciplines, including astronomy, geology, paleontology, climatology and biology. Astrobiology seeks to determine how

macroscopic and microscopic systems work together to produce worlds and life, and the processes which shape and ultimately destroy them.

The reason this topic is so important is that, not only will it tell us about our past, but also predict the future and how the changes we make to the earth will affect the systems that regulate life on our planet.

In setting the stage for discussing the cycles important to the evolution of life on earth, Dr. Ward spoke about the solar systems that have been studied and the hazards that can befall aspiring earth-like planets. It's really important to be just the right distance from a star on the outskirts of a galaxy. It's good to have a fairly circular orbit with just the right axis of tilt. Gas giant planets like Jupiter must stay far enough away from the star, yet be there to attract rogue visitors to the system. Plate tectonics are a must. Dr. Ward used the Three Bears analogy – everything must be “just right”.

Next Dr. Ward discussed the evolution of life on earth, and how long it took for complex life forms to develop. Life developed very early in the history of our world, yet it remained fairly simple until the Cambrian explosion, which began about 500 million years ago, quite late in the earth's history in fact. Dr. Ward summarized the types of life which developed on the earth (bacteria, archaea, eucarya) and discussed the possibilities of life which might be found on other planets (DNA based, carbon-based, non-carbon based).

After setting the evolutionary stage and discussing the past history of life on earth it was time to discuss the predictions scientists are making about the future of life on earth. Due to the combined systems of plate tectonics and the precipitation of carbonate in the oceans to produce limestone, the earth's atmospheric carbon dioxide has been steadily decreasing over the eons. This is why, in combination with the current continental positions, we are in the middle of a series of ice ages. It is also the reason that eventually, when the CO<sub>2</sub> content gets low enough, at about 10 ppm in about 500 million years, that green plants will not be able to survive on our planet.

In addition to this unpleasant scenario, our sun is also going through its own lifecycle, and as it ages it will continue to become brighter and hotter. When the earth's surface temperature gets about 40° C., complex animal life will have difficulty surviving. So in the twilight years of life on earth, life will devolve back into the simpler forms of its youth. Even then, the earth's oceans will eventually evaporate and earth will become sterile. All this will take place in the next billion years, give or take.

Of course, in assuming this course of events, we have not yet considered a more rapid demise at the hand of random astronomical catastrophe such as an asteroid or comet, a nearby supernova, or a gamma ray jet from a neutron star. Dr. Ward went through some of the more common doomsday scenarios, including a discussion of past mass extinctions on the earth and their causes.

I attended this lecture thinking that I would come away with a few "fun facts" about the Permian extinction. I came away from it a little depressed about the inevitable end of life on our planet, but also with a reaffirmation about how precious life really is, and how blessed we are to have it.

## The December 2004 Indian Ocean Tsunami

synopsis of a talk given by Dr. Curt Peterson, Portland State University, on the reconnaissance team he participated in after the December 26 tsunami in the Indian Ocean - csh

Dr. Peterson, a coastal stratigrapher and sedimentologist, was deployed on a team of scientists investigating the tsunami that struck the southeast coast of India. He spoke at the GSOC Annual Banquet on March 13, 2005. His team, composed of "Peterson, Arun Chawla of Oregon Health & Science University's OGI School of Science and Engineering, and Harry Yeh and Solomon Yim of Oregon State University, joined researchers from Korea, Japan and India to survey a 250-mile stretch of the Indian coast." (Richard Hill, Oregonian, March 2, 2005).

Dr. Peterson's work gave us a better idea what happened as a result of the tsunami from the M9.3 earthquake in the Indian Ocean. First of all, he told the GSOC audience that although the earthquake was felt in most coastal locations around the perimeter of the ocean, no-one in India, including the geohazard professionals in the country, realized that there would be a tsunami resulting from the quake. People in India definitely had time to escape the disaster, but they just weren't educated about such hazards. Also, about 90% of the devastation occurred in the poorest areas of the Indian coast – a fact which the up-and-coming country was not inclined to advertise. Only scientists, not the press, were allowed to travel along the coast to view the devastation.

Language translations were an issue when speaking to the adults who experienced the tsunami, since there are about 200 languages spoken in the country. Since the team traveled through 13 language zones on the mission, they hired drivers who were able to translate into Hindi, which the Indian members of the team were able to translate into English, the internationally accepted documentation language for the work. However, the village children could already speak English, having learned it in school.

A few facts about the character of the Indian Ocean tsunami waves start with the tsunami wavelengths being very long. This meant that high water duration was between 10 and 15 minutes for any particular wave. The waves arrived in the negative or "trough" phase which fooled a lot of people into going into the water. The second incoming wave was the big one in India. There was a longshore wave as well as an oncoming wave which caused damage. There were a total of 4 damaging waves which lasted for about 3 hours.

Dr. Peterson compared the wave runup data to what is expected on the Oregon coast in a Cascadia Subduction Zone earthquake. Runup heights were between 2-1/2 and 4-1/2 meters along the Indian coast; they are expected to be about 8 meters on the Oregon coast.

Meeting Place: if you want to carpool meet at upper parking lot of CREHST museum in Richland at 9AM, or 10AM at Frenchman Coulee

Directions to Frenchman Coulee: Take I-90 East to Exit 143 (Silica Rd). Turn left (west) onto Silica Rd. At ~1/2 mile turn left (west) down Vantage Rd., which winds down into Frenchman Coulee. At 1.5 miles on Vantage Rd pull off and park in lot with portable toilets.

If you're planning to drive you'll need a Washington Dept. of Fish and Wildlife parking permit. You should already have this permit if you have a current hunting or fishing license. If not, parking permits can be purchased separately at any sporting goods store (e.g., Big 5) for ~\$12.

Bring: water, lunch, hiking boots, sunscreen, weather protection, parking permit (if driving), wildflower book.

Hiking Distance: 3-4 miles, easy to moderately strenuous (most of the hike is flat to gently rolling with only a single, short, steep uphill climb). A geocache (Frenchman Coulee Rib; [http://www.geocaching.com/seek/cache\\_details.aspx?guid=a2076bfc-f712-4776-9e7a-3ecedaf10fd4](http://www.geocaching.com/seek/cache_details.aspx?guid=a2076bfc-f712-4776-9e7a-3ecedaf10fd4)) is hidden en route, so bring a GPS receiver if you wish. Total time on trail with lunch stop = 2 to 3 hrs. A short geologic field guide will be provided free of charge.

Please RSVP and let me know how many in your party so I can get an estimate of how many people to expect and how many field guides to print.

Bruce Bjornstad  
[bjorn99352@yahoo.com](mailto:bjorn99352@yahoo.com)

Other upcoming IAFI activities:

Saturday, May 14th 10a - 4p: "Lockfest" (at the Willamette Falls Locks in West Linn) LCFC will host a booth featuring a 1:5 scale replica of the Willamette Meteorite, 10 IAFI exhibit panels depicting the Ice Age Floods story and sales of Meteorite replicas & T-shirts for fundraising.

Lockfest is a celebration of the Willamette Falls Locks and its related history.

Saturday, May 14th 7p - 9p: Public presentation of the Missoula Floods by local floods enthusiast Jeff Murray at the West Linn Public Library.

Saturday, June 18th 7p-9p: Public presentation of the Missoula Floods by USGS Scientist Richard Waitt at the West Linn Public Library.

Mark Buser, President  
Lower Columbia Floods Chapter, Ice Age Floods Institute  
[mark.buser@agedwards.com](mailto:mark.buser@agedwards.com)  
[www.iceagefloodsinstitute.org](http://www.iceagefloodsinstitute.org)  
To download membership application click on the link below:  
<http://www.iceagefloodsinstitute.org/pdf/MEMBERappln2005.pdf>

## Rock'n Auction

A Rice NW Museum Fundraising Event

Rice NW Museum of Rocks and Minerals  
26385 NW Groveland Dr.  
Hillsboro, OR 97124  
Phone: 503-647-2418  
e-mail: [info@ricenwmuseum.org](mailto:info@ricenwmuseum.org)  
<http://www.ricenwmuseum.org>

Auction is Saturday, June 4th 2005  
3:00 pm – 5:00 pm – Auction Preview  
5:00 pm – Auction Starts

Summer is finally here and it's time to have some fun! Start at the Rice NW Museum's Rock'n Auction where you can bid on a number of items from rocks and minerals to equipment & gems. We have gift items and treasures for everyone, not just rock enthusiasts! Come out and enjoy this fabulous event! Reservations are required as seating is limited. Just fill out the form below and return it with payment to the Rice NW Museum.

Directions:  
To reach the Rice Museum, travel west from Portland on Hwy. 26 towards the coast. Take exit

61 and turn right at the stoplight on to Helvetia Rd. Proceed 100 feet, turn left on Groveland Drive and travel 1.3 miles to the museum.

Taylor Hunt

## **News Release:**

# **Oregon State Fossil Designation Sought**

February 10, 2005

Guy DiTorrice, [guy@orcoast.com](mailto:guy@orcoast.com)

Salem, OR – Oregon State Representative Alan Brown of Newport has introduced House Joint Resolution #3, which designates the Metasequoia (Dawn Redwood) as Oregon's State Fossil. The fossil -- over 120-million years old -- is found throughout Central Oregon and often collected by visitors from ancient beds located in Fossil, Oregon. (Legislation is available on the web at: <http://landru.leg.state.or.us/05reg/measures/hjr1.dir/hjr0003.intro.html>.)

Of the many fossil plants in Oregon, the best known are from the Miocene epoch, between 25 to five million years ago. During this time, Metasequoia was THE characteristic tree, making up most of the flora in prehistoric Central Oregon, according to Oregon's State Paleontologist, Dr. William Orr, and author of PLANT & ANIMAL FOSSILS OF OREGON and OREGON FOSSILS.

The designation of Metasequoia as Oregon's State Fossil provides a unique specimen as very few states consider plants for their official fossil. This designation also recognizes Oregon's timber-rich heritage, with this ancient plant indeed being a real "living fossil".

There are no hard costs associated with the designation. Official State literature, which presently includes other official state designations,

would include Metasequoia as "Oregon's State Fossil" when materials are reprinted and routinely updated (e.g. Oregon Blue Book, official State highway map, Oregon's websites). The State may choose to issue a news release upon approval of the designation, while supporters of the designation will provide the information to interested groups, publications, websites and news media.

The Metasequoia also provides an excellent symbol or logo for the Oregon Paleo Lands Institute and it's many fossil-related projects planned for Central Oregon. To that end, the Oregon Paleo Lands Institute Board of Directors has endorsed the Metasequoia for designation as "Oregon's State Fossil."

Less than a dozen states do not have a designated state fossil, with Oregon being the only western state without one. Other western states and their official fossils:

- Alaska: Mammuthus primigenius -- woolly mammoth
- California: Smilodon californicus -- saber-toothed cat
- Colorado: Stegosaurus syenops -- dinosaur
- Idaho: Equus simplicidens -- horse
- Montana: Maiasaura -- dinosaur
- Nevada: Shonisaurus popularis -- ichthyosaur
- North Dakota: Teredo -- petrified wood
- South Dakota: Triceratops -- dinosaur
- Utah: Allosaurus -- dinosaur
- Washington: Mammuthus columbi -- woolly mammoth
- Wyoming: Knightia -- fish

Interested individuals supporting House Joint Resolution #3 to designate the Metasequoia as Oregon's State Fossil are asked to send letters of support to their state legislator at 900 Court St NE Salem, OR 97301.

Additional information about the state fossil designation is available on the Web at [www.oregonfossilguy.com](http://www.oregonfossilguy.com).



**GEOLOGICAL SOCIETY OF  
THE OREGON COUNTRY  
P. O. Box 907  
PORTLAND, OR 97207**



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**THE  
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**Calendar:**

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**Business Manager:**

Rosemary Kenney – 503/892-6514

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John Newhouse – 503/224-2156

### ACTIVITIES:

**ANNUAL EVENTS:** President's Field Trip—Summer or Fall; Banquet—March; Annual Business Meeting—February.

**FIELD TRIPS:** About 6 per year. Fees: see field trip announcements on the calendar next page.

**GEOLOGY SEMINAR:** Usually held on the third Wednesday of some winter months, 8:00 p.m., Rm. S17, Cramer Hall, PSU. See calendar for details

**GSOC LIBRARY:** Rm. S7, Open 7:30 p.m. prior to meetings.

**PROGRAMS:** Second Friday evening most months, 8:00 p.m., Rm. S17, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon.

**MEMBERSHIP:** Per year from January 1: Individual--\$20.00, Family--\$30.00, Junior (under 18)/Student--\$10.00.

**PUBLICATIONS:** THE GEOLOGICAL NEWSLETTER (ISSN 0270 5451), published monthly and mailed to each member. Subscriptions available to libraries and organizations at \$15.00 per year. Individual Subscriptions \$13.00 per year. Single Copies: \$1.00. Order from:

Geological Society of the Oregon Country, P.O. Box 907, Portland, Oregon 97207

**TRIP LOGS:** Write to the same address for names and price list.

**WEBSITE:** [www.gsoc.org](http://www.gsoc.org). Email address: [gsoc@spiritone.com](mailto:gsoc@spiritone.com).

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### THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ Email address \_\_\_\_\_

Geologic Interests and Hobbies \_\_\_\_\_

Please indicate Membership type and include check for appropriate amount:

Individual \$20.00 \_\_\_\_\_ Family \$30.00 \_\_\_\_\_ Student \$10.00 \_\_\_\_\_

Make Check Payable to: The Geological Society of the Oregon Country  
PO Box 907  
Portland, OR 97207-0907

# **GEOLOGICAL NEWSLETTER**

The Geological Society of the Oregon Country  
P.O. Box 907, Portland, OR 97207

VISITORS WELCOME AT ALL MEETINGS  
INFORMATION: [www.gsoc.org](http://www.gsoc.org)

VOL. 71, NO. 6  
JUNE, 2005

Charles Carter, President, 503-469-8353, [chcarter39@hevanet.com](mailto:chcarter39@hevanet.com)  
Calendar Editor, John Teskey, 503-641-7746, [lawlib@Teleport.com](mailto:lawlib@Teleport.com)

## **JUNE ACTIVITIES**

**Friday Evening Talk, June 10th, 2005, 8:00 P.M., "Surviving Great Earthquake Disasters: Lessons from the 2004 Sumatra Quake"** Yumei Wang, Oregon Department of Geology and Mineral Industries, Room S17, Cramer Hall, Portland State University. **ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT'S MAIN OFFICE**

**Field trip, Sunday, June 19: Fossil collecting near Vernonia.** GSOC President Charlie Carter will lead a fossil hunting trip to Vernonia on June 19. Meet at 9:00 a.m. at the parking lot near the Sylvan exit off Highway 26. Take the Sylvan exit, go north on Skyline past the Chevron station, and at the first stop light turn right onto SW Westgate Drive. Park opposite 5201 building. Wear boots and bring a lunch, drinking water, a small shovel and/or pick, a hand lens, and some kind of bag (cloth or plastic) for your samples. Cost is \$5 for GSOC members and \$7 for nonmembers. Contact Beverly Vogt (503-292-6939 or [bevvoigt@comcast.net](mailto:bevvoigt@comcast.net)) if you have any questions.

### **Future Upcoming Events**

**Field trip, Saturday, July 23: Mount St. Helens National Volcanic Monument.** Pat Pringle, a geologist with the Washington Department of Natural Resources and author of the *Roadside Geology of Mount St. Helens National Volcanic Monument and Vicinity*, will lead a field trip to Mount St. Helens National Volcanic Monument on Saturday, July 23. The group will meet at the Silver Lake Visitor's Center, and the trip will take most of the day. Participants are to wear boots, bring a lunch, and dress appropriately for the weather. Cost will be \$5 for GSOC members and \$7 for nonmembers, plus the entrance fee to the monument. For details, contact Clay Kelleher (evenings and weekends at 503-775-6263, or [ckellehe@mesd.k12.or.us](mailto:ckellehe@mesd.k12.or.us)).

**President's Field Trip, September 16-19, Central Oregon.** President Charles Carter will lead the President's trip to central Oregon. Participants will drive their own cars and stay at Camp Hancock. Reserve this date on your calendar, and look for details in the next month's newsletter.

**PLEASE NOTE: PARKING AT PORTLAND STATE UNIVERSITY IS AVAILABLE AFTER 7 P.M. IN THE PARKING STRUCTURE ON BROADWAY DIRECTLY ACROSS FROM CRAMER HALL**

**CHECK THE GSOC WEB PAGE FOR THE LATEST GSOC CALENDAR OF EVENTS,  
WWW.GSOC.ORG, OR CALL JOHN TESKEY 503 641 7746**

**Calendar items must be received by 15<sup>th</sup> of preceding month.  
Call John Teskey, 503-641-7746 [Lawlib@Teleport.com](mailto:Lawlib@Teleport.com)**

## GSOC BOARD MEETING

Summary of May 14, 2005, GSOC Board meeting

The meeting was called to order at the home of Rosemary Kenney. GSOC members present included Charles Carter, Bonnie Prange, Beverly Vogt, Janet Kaye-Rasmussen, John Teskey, Richard Meyer, Clay Kelleher, and Rosemary Kenney,

**Field trips** were discussed at the meeting. A total of 27 people have signed up for the Orr field trip to the museums at Eugene on the 15th. John Teskey will collect money from participants leaving from Portland, and Beverly will collect from the participants meeting in Eugene. Charles Carter agreed to lead a fossil hunting trip to Vernonia on June 19. John Teskey will help Charlie scout out the trip. Beverly will be Charlie's assistant and phone and email person. Pat Pringle and Ken Cameron will lead the July 23 field trip to Mount St. Helens. Clay Kelleher will be his assistant, and Beverly Vogt, Rosemary Kenney, John Teskey, and Bonnie Prange said they would help with crowd control and traffic issues during the trip. We need to find some sort of loudspeaker for Pat to use on the trip.

Bonnie Prange discussed the **Friday night talks**. She is still looking for a July speaker.

Bonnie also will make arrangements for the **annual picnic**. It will be August 21 or 28, and will be at Mount Tabor, if space is available for that weekend.

Charlie discussed his plans for the **President's Field Trip**. It will be September 16-19 at Camp Hancock in central Oregon. Cabins for \$20/person/night are available, and meals cost \$5/breakfast, \$4/sack lunch, and \$6/dinner. Members will drive their own cars. More details will be available in the July newsletter.

We need to clarify the process whereby PSU students receiving a **scholarship** from GSOC do a Friday night presentation. At the next meeting, we will find out if the scholarship that was not paid a couple of years ago and this year's scholarship have been paid, decide how much we want to increase the scholarship because we are getting a free

meeting room through the Geology Department, and then Beverly will send a letter to Mike Cummings to make sure we know who gets the money and that the grantee knows he or she is invited to give a talk to GSOC.

The next Board meeting will be held one hour before the annual picnic, whenever and wherever that turns out to be.

adapted from notes by Beverly Vogt, Secretary

## June fossil hunting trip announced

GSOC President Charlie Carter will lead a fossil hunting trip to Vernonia on June 19. Participants are to meet at 9:00 a.m. at the parking lot near the Sylvan exit off Highway 26. Take the Sylvan exit, go north on Skyline past the Chevron station, and at the first stop light turn right onto SW Westgate Drive. Go about a block down the incline and park in the parking lot opposite 5201 building. Wear boots and bring a lunch, drinking water, a small shovel and/or pick, a hand lens, and some kind of bag (cloth or plastic) for your samples. Contact Beverly Vogt at 503/292-6939 or email at bevvoigt@comcast.net) if you have any questions. The trip should last partway through the afternoon.

## July field trip to Mount St. Helens set for July 23

Pat Pringle a geologist with the Washington Department of Natural Resources will lead a field trip to Mount St. Helens National Volcanic Monument on Saturday, July 23. He will be assisted by Ken Cameron, Oregon Department of Environmental Quality. Both are experienced and knowledgeable geologists. Pat is the author of the Roadside Geology of Mount St. Helens National Volcanic Monument and Vicinity, and Ken has led several GSOC field trips. This will be an exceptional field trip. The group will meet at the Silver Lake Visitor's Center, and the trip will take most of the day. Participants are to wear boots, bring a lunch, and dress appropriately for the weather. Cost will be \$5 for GSOC members and

\$7 for nonmembers, plus the entrance fee to the monument. For additional information, contact Clay Kelleher (evenings and weekends at 503-775-6263, or ckellehe@mesd.k12.or.us).

## President's Trip will be to central Oregon in September

President Charles Carter announced that the President's Field Trip will be on September 16-19 in central Oregon. The trip will focus on the John Day Basin. Participants will drive their own cars and can stay at Camp Hancock. Mark this date on your calendars and look for details in the next month's newsletter.

Beverly Vogt

## Buried and Submerged Forests of the Pacific Northwest



synopsis of the GSOC May 13, 2005, Friday night meeting with guest speaker Pat Pringle, geologist, Washington Dept of Natural Resources

photo on left modified from Henri D.

Grissino-Mayer's Ultimate Tree-Ring Web Pages (see link below)

Pat Pringle discussed **dendrochronology**, or the dating of tree growth rings and its usefulness in dating past events. Dendrochronology can be used for a variety of purposes, including climatic studies, catastrophic event dating, and the effects and dating of human actions. In the studies in which Pringle has been involved, the technique has been primarily used in dating catastrophic natural events, and also to develop a dendrochronological base line from which other studies can be done. Radiocarbon dating is used in addition to the tree ring samples to establish approximate dates of the wood.

Pringle started the talk with a discussion of some of the pioneers of dendrochronology in the Northwest. He introduced Donald Lawrence, who studied the submerged forests of the Columbia River before and after the Bonneville Dam was constructed. We'll talk more about his work later in this article. Then Pringle discussed the work of Dave Yamaguchi in the 1980's at Mt. St. Helens. Yamaguchi was able to revolutionize knowledge of Mt. St. Helens by dating buried trees in the lahar deposits from the eruptions. He was able to identify and date several eruptions within eruption cycles of the mid-1800's and late 1400's.

Later dendrochronology studies included work by Gordon Jacoby, Brian Atwater, and Yamaguchi which helped to date great earthquakes from the Cascadia subduction zone. The last eruption of Mt. Hood was dated from snags found in the Old Maid Flats lahar near Zigzag, Oregon. Ken Cameron and Pat Pringle worked on this project. An interesting piece of detective work was done by Cameron, who noted that the descriptions of the Sandy River delta by Lewis and Clark sounded like they were describing a volcanic lahar. This observation helped to give the researchers an idea about when the last eruption may have occurred.

Work has progressed on dating the Bonneville landslide near Stevenson, Washington, over the years since the Bonneville Dam was built. The Bonneville landslide is a huge landslide on the Washington side of the Columbia between Cascade Locks and the Bonneville Dam. Donald Lawrence had originally done some studies of tree snags in the Columbia whose deaths would have been a result of the landslide; however, his samples of these snags were thought to have perished in the World Forestry Center fire in 1964. Subsequent studies of various radiocarbon dates and more recent lichen studies gave conflicting results—the slide could be as old as 900 years and as young as 300 years. More evidence has come to light recently which Pringle has studied—including Donald Lawrence's snag samples—and the date is more certain at between 1415 and 1455. One question Pringle needed to clear up was whether the big slide could have been triggered by the latest Cascadia Subduction Zone megathrust earthquake in 1700. This does not

appear to be the case; the misleading date based on lichen is thought to have been caused by a large fire on the slide at about that time (which is also apparent from the tree ring data).

Another interesting study by Pringle and others with public safety ramifications has been the studies of Mt. Rainier lahars to Puget Sound. Mt. Rainier has produced huge volumes of lahar flows in the past; the Osceola Mudflow (5,000 years ago) is in the top twenty in volume of known lahars. Pringle also has studied the Puyallup Mudflow from about 500 years ago.

Next Pringle described studies done in the Puget Sound area and also reviewed some of the dendrochronology procedures by which the chronological record can be extended into the past. It was a fascinating talk from an interesting researcher.

Carol Hasenberg

Further reading of Pringle projects and other dendrochronology sites:

Pringle, Patrick, and Scott, Kevin, "Postglacial Influence of Volcanism on the Landscape and Environmental History of the Puget Lowland, Washington: A Review of Geologic Literature and Recent Discoveries, with Emphasis on the Landscape Disturbances Associated with Lahars, Lahar Runouts, and Associated Flooding", presented at Puget Sound Research 2001, the fifth Puget Sound Research Conference, February 12 to 14, 2001 at the Meydenbauer Center in Bellevue, Washington. The article is available at the conference website:

[http://www.psat.wa.gov/Publications/01\\_proceedings/sessions/sess\\_4d.htm](http://www.psat.wa.gov/Publications/01_proceedings/sessions/sess_4d.htm)

Hill, Richard, "A New Look at an Old Landslide", The Oregonian, Portland, Oregon September 29, 1999. Article about the dating of the Bonneville landslide:

[http://landslides.usgs.gov/html\\_files/bonneville/](http://landslides.usgs.gov/html_files/bonneville/)

DNR press release of the Columbia Gorge research project:

<http://www.dnr.wa.gov/hdocs/adm/comm/nr02-25.htm>

Henri D. Grissino-Mayer's Ultimate Tree-Ring Web Pages, Department of Geography, The University of Tennessee, Knoxville, Tennessee

<http://web.utk.edu/~grissino/default.html>

The Laboratory of Tree Ring Research, University of Arizona, Tucson

<http://www.ltrr.arizona.edu/dendrochronology.html>

The Malcolm and Carolyn Wiener Laboratory for Aegean and Near Eastern Dendrochronology at Cornell University, includes LINKS to other sites

<http://www.arts.cornell.edu/dendro/>

## EERI TSUNAMI BRIEFING

synopsis of April 18, 2005, meeting at Portland State University was co-sponsored by the Earthquake Engineering Research Institute (EERI), Portland State University Civil and Environmental Engineering Department, Association of Engineering Geologists (AEG), and American Society of Civil Engineers' (ASCE) Geotechnical Group

This briefing was set up as part of EERI's Learning from Earthquakes program (<http://www.eeri.org/lfe.html>) to inform the public about the effects of the Indian Ocean Tsunami on December 26, 2004, the results of the investigative teams sent out by EERI and others to gather the data, and to discuss the similarities between the Sumatra earthquake and the anticipated Cascadia Subduction Zone earthquake. Five speakers were involved in the briefing which was moderated by EERI President Craig Comartin: Harry Yeh, Yumei Wang, Don Ballantyne, Jane Preuss, and George Priest. Here, briefly, are summaries of their talks

**Harry Yeh**, Oregon State University, Civil Engineering Department – Dr. Yeh discussed wave

height models for the tsunami and the reconnaissance team he led to the Indian coast (this was the group which Dr. Curt Peterson from Portland State University joined). He also showed a video of some wave tank scour studies being conducted at OSU which is being used to investigate tsunami damage patterns. He also discussed the shaking and subsidence of land observed in the Nicobar Islands in the Indian Ocean near the rupture zone.

**Yumei Wang**, Oregon Department of Geology and Mineral Industries (DOGAMI) – Ms. Wang was sent to Thailand as part of the ASCE/TCLEE reconnaissance team to investigate lifeline performance. She described the damage found to lifelines and buildings in three areas of coastal Thailand: Phuket, Khao Lak, and Phi Phi Don Island. The wave that hit the island resort wrapped around the island and completely destroyed much of the development.

**Don Ballantyne**, ABS Consulting, Seattle, WA – Mr. Ballantyne traveled to Sri Lanka as part of an extensive survey of damaged structures and infrastructure on the island. He observed many damaged buildings of unreinforced masonry and masonry infill construction, and noted that the transportation infrastructure in coastal and low lying areas were destroyed. The team reviewed damaged buildings, bridges, railways, boats and ports.

**Jane Preuss**, Planwest Partners, Kirkland, WA – Ms. Preuss was also included on the team to Sri Lanka. As a land planner, her role was to survey the societal impacts of the damage. One key factor in the damage found was that there was very lax land use enforcements in the coastal zones. This meant that although building construction is not permitted within 50 m. of the shore there were a lot of buildings there anyway, and so greater losses. Most hotels built to “western standards” survived, but there were greater than 500 schools destroyed by the tsunami. The fishing sector was badly damaged but the ports, although somewhat damaged, survived. She provided some recommendations for building a safer environment.

**George Priest**, Oregon Department of Geology and Mineral Industries (DOGAMI) – As DOGAMI’s resident expert on tsunamis, Dr. Priest attended the briefing to make some comparisons between the Sumatra quake and its accompanying tsunami with the expected quake and tsunami which will be produced by the Cascadia Subduction Zone. The two faults have many similarities, including the youth of the subducting plate, the low convergence rate, and the length of the rupture zone. There was also about 6 minutes of strong ground motion associated with the Sumatra quake. The tsunami is expected to arrive in the range of 10 to 30 minutes along the Oregon coast during a Cascadia event.

Carol Hasenberg

Further reading – conference reports and other information about the briefing speakers:

Natural Hazards Center, University of Colorado, Boulder, CO, “A Special Report on Tsunami Reconnaissance Activities: EERI Sends Teams to Indian Basin”, Natural Hazards Observer, Vol. XXIX No. 4, March 2005

<http://www.colorado.edu/hazards/o/mar05/mar05d.html>

Wang, Yumei, “SURVIVING GREAT EARTHQUAKE DISASTERS: LESSONS FROM THE 2004 SUMATRA QUAKE” International Conference on Energy, Environment and Disasters – INCEED2005, Charlotte, NC, USA – July 24-30, 2005

[http://www.iseg.giees.uncc.edu/inceed2005/Abstracts/Abstract\\_ID\\_449.pdf](http://www.iseg.giees.uncc.edu/inceed2005/Abstracts/Abstract_ID_449.pdf)

Schwab, Jim, “Responding to the Tsunami and Coastal Hazards”, American Planning Association 2005 Conference Session. This site describes Jane Preuss’ reconnaissance work:

<http://www.planning.org/conferencecoverage/2005/sunday/tsunami.htm>

## News Release: Oregon State Fossil Designation Obtained!

May 3, 2005

by Guy DiTorrice, [guy@orcoast.com](mailto:guy@orcoast.com)

Salem, OR – My sincere thanks to MacKenzie Smith (and his parents) as well as St. Rep. Alan Brown (and his staff) for all their hard work these past months.

Today, the Oregon State Senate voted to approve House Joint Resolution #3, designating *Metasequoia* as Oregon's State Fossil.

MacKenzie was on-stage for a good part of the Legislative process. A note of appreciation to St. Senator Joanne Verger for acknowledging his parents in the Senate gallery today. They've been working around Mackenzie's school and swimming schedule to represent our efforts in Salem.

Next steps?

Signed and sealed copies of the resolution will be prepared by the Speaker of the House and the Senate President, with copies being sent to MacKenzie (as our 'lobbyist') and yours truly (as the chief petitioner).

Thank you cards and letters are being prepared for the many legislators who supported the measure (only three 'no' votes in the State Senate and none in the House).

I'll be acquiring public domain images and artwork for the various state agencies who will be updated printed and web-based materials on the various official State designation (apparently the pear is about to become Oregon's State Fruit).

Messages are being prepped for the various websites (e.g., [www.statelystatefossils.com](http://www.statelystatefossils.com)) where such information is posted.

And, we're letting the news media know about the big news.

Again, our four-year effort to get an official State Fossil is complete.

Makes you feel reassured about the governmental process.

Thank you one and all!

Additional information about the state fossil designation is available on the Web at [www.oregonfossilguy.com](http://www.oregonfossilguy.com).

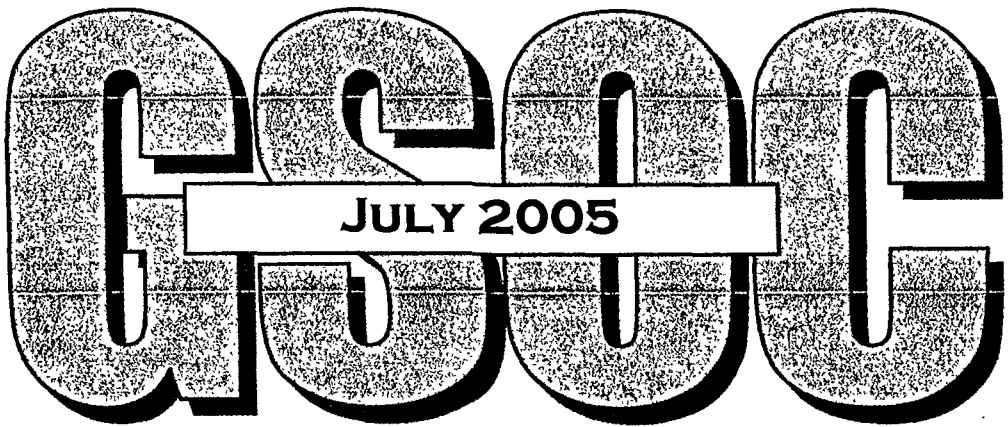


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**ACTIVITIES:**

**ANNUAL EVENTS:** President's Field Trip—Summer or Fall; Banquet—March; Annual Business Meeting—February.

**FIELD TRIPS:** About 6 per year. Fees: see field trip announcements on the calendar next page.

**GEOLOGY SEMINAR:** Usually held on the third Wednesday of some winter months, 8:00 p.m., Rm. S17, Cramer Hall, PSU. See calendar for details

**GSOC LIBRARY:** Rm. S7, Open 7:30 p.m. prior to meetings.

**PROGRAMS:** Second Friday evening most months, 8:00 p.m., Rm. S17, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon.

**MEMBERSHIP:** Per year from January 1: Individual--\$20.00, Family--\$30.00, Junior (under 18)/Student--\$10.00.

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Phone (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ Email address \_\_\_\_\_

Geologic Interests and Hobbies \_\_\_\_\_

**Please indicate Membership type and include check for appropriate amount:**

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# Geological Newsletter

The Geological Society of the Oregon Country  
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VISITORS WELCOME AT ALL MEETINGS

INFORMATION: [www.gsoc.org](http://www.gsoc.org)

Charles Carter, President, 503-469-8353, [chcarter39@hevanet.com](mailto:chcarter39@hevanet.com)

Calendar Editor, John Teskey, 503-641-7746, [lawlib@Teleport.com](mailto:lawlib@Teleport.com)

VOL. 71, NO. 7

JULY, 2005

## JULY ACTIVITIES

**Friday Evening Talk, July 8th, 2005, 8:00 P.M., Bioengineering for Habitat Restoration: Geomorphology and Engineering Challenges.** Focus will be on how environmental geology and related disciplines are handling the tough issues facing today's Portland urban area. Speaker: Jennifer Berry, Registered Geologist, City of Portland Bureau of Environmental Services. Room S17, Cramer Hall, Portland State University. ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT'S MAIN OFFICE

**PLEASE NOTE: PARKING AT PORTLAND STATE UNIVERSITY IS AVAILABLE AFTER 7 P.M. IN THE PARKING STRUCTURE ON BROADWAY DIRECTLY ACROSS FROM CRAMER HALL**

**Field trip, Saturday, July 23: Mount St. Helens National Volcanic Monument.** Pat Pringle, a geologist with the Washington Department of Natural Resources and author of the *Roadside Geology of Mount St. Helens National Volcanic Monument and Vicinity*, will lead a field trip to Mount St. Helens National Volcanic Monument on Saturday, July 23. The group will meet 9 a.m. at the Silver Lake Visitor's Center, and the trip will take most of the day. Participants are to wear boots, bring a lunch, and dress appropriately for the weather. Bring hand lens, but no rock hammers, as rock collecting is not allowed. Cost will be \$5 for GSOC members and \$7 for nonmembers, plus the entrance fee to the monument. For details, contact Clay Kelleher (evenings and weekends at 503-775-6263, or [ckellehe@mesd.k12.or.us](mailto:ckellehe@mesd.k12.or.us)).

## **Future Upcoming Events**

**GSOC Picnic** will be from 10-2 on August 21<sup>st</sup> at Montavilla Park, NE 82<sup>nd</sup> and Glisan. Look for further details in the August Newsletter...

**President's Field Trip, September 16-19, Central Oregon.** President Charles Carter will lead the President's trip to central Oregon. Participants will drive their own cars and stay at Camp Hancock. Reserve this date on your calendar, and look for details in this month's newsletter.

**CHECK THE GSOC WEB PAGE FOR THE LATEST GSOC CALENDAR OF EVENTS,  
WWW.GSOC.ORG, OR CALL JOHN TESKEY 503 641 7746**

**Calendar items must be received by 15<sup>th</sup> of preceding month.  
Call John Teskey, 503-641-7746 [Lawlib@Teleport.com](mailto:Lawlib@Teleport.com)**

## ERRATA

Errata to the May 2005 Issue of The Geological Newsletter:

The header incorrectly reads May 2004.

The article entitled News Release: Oregon State Fossil Designation Sought incorrectly lists woolly mammoth as the common name for the species *Mammuthus columbi*, the state fossil of Washington. This correction was noted by Pat Pringle, Washington Department of Natural Resources, who sent GSOC a copy of the Washington Geology article by Bax Barton referenced below.

The article by Barton names the different North American ice age mammoth species, and then describes mammoth fossil sites in the state of Washington, which are mostly Columbian mammoths (*M. columbi*). The other mammoth species found in Washington is Imperial mammoth (*M. imperator*). Woolly mammoth (*M. primigenius*) has not been found in Washington, according to the article.

Barton, Bax R. "Notes on the new Washington State fossil, *Mammuthus columbi*", Washington Geology, vol. 26, no. 2/3, September 1998

For further information about mammoths in North America, see The Mammoth Site, Hot Springs, SD: <http://www.mammothsite.com/MammothInformation.html>

## VOLUNTEERS NEEDED

GSOC Business Manager Rosemary Kenney is looking for one or two volunteers to help with the mailing of the newsletter. It will take about 1 to 2 hours per month. Call Rosemary at 503/892-6514 for more information.

## WILLIAM ORR-LED TOUR OF CONDON MUSEUM

synopsis of GSOC tour conducted Sunday, May 15, 2005, at the University of Oregon

Dr. Orr led the tour with a little help from Beverly Vogt

What a treat! A trip back in time to the underground vaults housing the collection of Oregon's first State Geologist, Thomas Condon. A fair number of GSOC enthusiasts piled into the UO offices of Dr. William Orr on May 15 for a rare peek at Oregon's premier fossil collection.

On our way down to the Condon collection we were shown various exhibits and works-in-progress by Beverly Vogt. A newly acquired invertebrate and marine mammal collection from donor Guy Pierson was in the process of being identified and catalogued. We also viewed a mineral collection in Columbia Hall, viewed the specimens embedded into the courtyard outside Cascade Hall, and then viewed another mineral collection inside Cascade Hall. The Condon collection is housed in the basement of Pacific Hall.

The Condon collection is a working resource for scientific inquiry, so it is not enshrined in glass cases. Instead it is housed in a large bank of cabinets which are stacked against one another on a track which permits access to one section at a time. This has been done to achieve the maximum space efficiency. The collection consists of fossils from the collection of Thomas Condon and other noteworthy Oregon collectors. Since this is an Oregon fossil collection, the fossils are rarely, if ever, older than the Eocene period, that is, 55 million years old and younger. This also means that the vertebrate fossils in the collection are predominately mammals. Along with the fossils the collection contains a collection of modern species (again, mostly mammals) for comparative research and also for teaching. This feature is very powerful and was very effectively demonstrated by Dr. Orr during the tour.

As you might be aware, many genera of mammals that we are familiar with today were present in Oregon during earlier ages. Oregon had species of horse, camel, bison, elephant and mastodon, sloth, and many species less familiar to us. Many of these animals are not present in Oregon today but are found elsewhere in the world. For his first demonstration of **comparative anatomy**, Dr. Orr showed us the "wrist bone" of a modern camel, then showed us two fossil examples, one from the Pliocene (great big) and one from the Pleistocene (bigger than the modern but not as big as the Pliocene species). This sort of comparison gives the viewer a pretty good idea how gigantic the Pliocene camel must have been. Another demonstration was the comparison of the "foot bones" of a modern horse to that of a smaller Pleistocene species. Dr. Orr pointed out that studies of this kind were the first evidence of the process of evolution, and showed us several more examples.

The Condon collection contains much more than just large mammal fossils. It contains small mammals, other animals including many invertebrates, and fossil fruits, nuts, seeds and leaves (many of these are from the Clarno Formation in what is now John Day National Monument). An important aspect of the collection is that it contains many **type specimens**, or specimens for which a species is named. These are carefully "enshrined" for research. Often a type specimen will be only a tooth or a jawbone (mandible) of an animal. One important part of the Condon collection is a collection of mouse tooth type specimens. These are carefully mounted on pins encased in plastic tubes for study. Since mice evolve quickly, the tooth fossils can be a very important indicator of the age of a rock environment.

The last important information provided by the tour was the **historical background** of the collection— who were the curators of the collection, and who made contributions to it. Thomas Condon (1822-1907), Oregon's first geologist and the first professor of geology at the University of Oregon, was the first curator. He was succeeded by Earl Packard, who introduced many of his fossils to the collection during the 1940's. The next curator was

Arnold Shotwell, whose contributions occurred mainly in the 1950's and 1960's. Condon, Packard, and Shotwell contributed the bulk of the type specimens to the collection. Another important contributor to the collection was Lon Hancock, for whom the famous Hancock Field Station is named.

Dr. Orr has been the curator of the collection since 1982, and he supports the Museum by performing consulting work and soliciting private donations. The Museum operates on donations which can be made specifically to the Condon Museum Fund at the Department of Geological Sciences, University of Oregon (see the museum website below for additional information). The irreplaceable collection, housing over 100,000 specimens, is an Oregon treasure and well worth supporting.

Carol Hasenberg

Further reading:

The Condon Museum Site from the University of Oregon:

<http://darkwing.uoregon.edu/~dogsci/facilities/condon.html>

The Oregon Blue Book site has two pages which concern Thomas Condon:

<http://bluebook.state.or.us/notable/notcondon.htm>

[http://bluebook.state.or.us/state/executive/Geology/Mineral\\_Industry/geology\\_mineral\\_history.htm](http://bluebook.state.or.us/state/executive/Geology/Mineral_Industry/geology_mineral_history.htm)

The National Park Service website for John Day Fossil Beds Historic Resources Study:

<http://www.nps.gov/joda/hrs/hrst.htm>

Clark, Robert D., *The Odyssey of Thomas Condon*, the Oregon Historical Society Press, 1989, 567 pages.

## ROWENA HOVEN, PHILLIP JOHNSON DECEASED

Rowena Hoven, a past member of GSOC, passed away in February 2005 at the age of 96. She was born in Los Angeles but grew up in Eugene and graduated from the University of Oregon in 1930. After living 34 years in Portland, she returned to Eugene where she lived until she died. She was an active member of GSOC, not only while she lived in Portland, but also after she returned to Eugene. She enjoyed hunting and collecting rocks and bird watching.

Phillip Johnson, a past member of GSCO, passed away in March 2005 at the age of 82. Mr. Johnson had been a GSOC member for a short time in the 1990's.

## Comments on the glacial erratic found in Erratic Rock State Park

The following remarks were made by Dr. Jim O'Connor, USGS, at the dedication of a new glacial erratic sign on June 11, 2005. We are reprinting them here because we think GSOC members will find them interesting. The new marker is at the start of the trail to the glacial erratic, which is located in Erratic Rock State Park, located on Oldsville Road, just off Highway 18 between Sheridan and McMinnville. The new fiberglass sign replaces the badly worn old wooden marker originally located along Highway 18.

### 1. What is an erratic?

An erratic is a rock in the wrong place. Western Oregon is made up of relatively young but grungy volcanic rocks and sedimentary rocks. This glacial erratic found near Sheridan is metamorphic rock, a rock which has been so deeply buried, cooked, and squeezed that it has been transformed from whatever it was before to what it is now—an

argillite. These types of rocks are definitely not from around here.

### 2. How did it get here?

It was probably carried here by an iceberg. Recorded observations of erratics in the Pacific Northwest go back to at least the John Wilkes Expeditions of 1841, but certainly they were noticed before then by the local residents.

In the Willamette Valley, most early theories dating back to the 1880s and the State's first geologist, Thomas Condon, suggested that these boulders were evidence that the Willamette Valley was once inundated by a vast inland sea, like Puget Sound to north, and that these boulders were rafted to the shoreline of this sea aboard large icebergs.

Later work revealed that these exotic rocks were indeed delivered by large icebergs, but not in ocean bays or sounds, but by humongous floods coming down the Columbia River during the last ice age.

The story of these Missoula Floods, as they are now called, first developed by J Harlen Bretz in the late 1920s, is a scientific classic. Against the geologic paradigm of landscapes being carved by slow processes acting over millions and millions of years, Bretz argued instead that these rocks were transported in geologic instants by gigantic floods which broke free from a huge lake in western Montana—a lake dammed by a glacial wall of ice nearly 2,000 feet high. This lake contained up to 500 cubic miles of water which, once released, coursed across eastern Washington, carving the coulees of the channeled scabland in eastern Washington and flowing down the Columbia River Gorge—in some places with depths of over 1,000 feet and speeds greater than 60 miles per hour. Bretz's radical ideas were not well received, but the weight of the evidence finally prevailed against geologic dogma. Now we think that there may have been dozens of such floods during the end of the last ice age about 15,000 years ago, some with discharges more than 300 times as great as the largest historic Columbia River floods.

These erratics are the calling cards of the Missoula Floods. In areas of slack water, up backflooded valleys like the Willamette, masses of ice broken

from the glacier dam and carried downstream by the ensuing flood would beach against hillsides, where they would eventually melt and drop any debris that they carried. All along the flood route we find these, and they help tell us where the water went and how high it was. In the Willamette Valley, about 400 erratics have been found, and they clearly indicate that the water got to about 400 feet above sea level. During the Missoula Floods, water poured down the Columbia River and backflooded UP the Willamette River, as far upstream as Eugene.

### 3. What about this erratic?

The Sheridan erratic is one of the largest. First described in the geologic literature in 1950, when it was measured and determined to weigh about 160 tons. It is the largest found so far in the Willamette Valley.

The closest outcrop of similar rock types is about 400 miles away in western Idaho, but this rock is likely to be much more far traveled, probably carried from somewhere in British Columbia by the lake-blocking glacier before being carried by flood to this hillside.

It would have taken a very large iceberg to float this rock here, one approximately 50 feet to a side (enough for 15 gin and tonics every Oregonian, adult and child).

This one is at an elevation of about 300 feet above sea level. The highest flood would have reached a height about 100 ft above where the new sign is located.

### 4. Why are the Missoula Floods important?

They are important for a variety of scientific and social reasons. They are the biggest known freshwater floods in earth history, and study of the Missoula Floods has helped geologists understand landscapes all over the world, and even on Mars, where it seems that parts of that planet may have been carved by floods even larger than the Missoula Floods.

The story of the discovery of Missoula Floods continues to teach modern geologists about the

value of good observation untainted by scientific dogma.

But perhaps most important to us here, besides bringing icebergs to the Willamette Valley, the Missoula floods brought dirt—and this was not just any dirt—it was rich crop-growing soil—a soil enhanced by volcanic ash blown eastward to the plains of eastern Washington from the Cascades before it was stolen by the floods and brought here. It is this soil that nurtures the grapes growing on the hillsides around us, as well as the nursery stock, grass seed, and hops on the valley floor. In fact the floods brought about 30 billion cubic yards of here, coating the valley bottom and sides with rich silt loam, in places more than 100 feet thick. It would take dump trucks, entering the valley one-a-second twenty-four hours a day, seven days a week, nearly 100 years to bring in all the dirt that the Missoula Floods brought in. And it is this thick soil which transformed the Willamette Valley from a gravelly and marshy plain to the rich agricultural paradise that it now is. If it were not for the Missoula Floods, the Oregon Trail might not have come to Oregon.

## First Annual "Geology of Oregon" Symposium Planned

Sponsored by the Portland Regional Gem and Mineral Show [PRG&MS]

The 25th Portland Regional Gem and Mineral Show is scheduled for September 30, and October 1 and 2, 2005. The theme for this year is "Geology of Oregon". PRG&MS is inviting interested parties to share in the educational and display parts of the program designed to inform the public about the fascinating geological history of our region.

PRG&MS is looking for help in the following projects:

1. A "Geology of Oregon" symposium, in conjunction with the 25th annual show. The symposium would be held on Wed. or Thurs. evening before the show and would be repeated

on the Saturday of the show. Preliminary plans would have the first presentation at PSU or somewhere downtown and the Saturday event at the fairgrounds as part of the show. Various topics related to the "Ice Age Floods", "Local Geological structures" and the "Extreme Volcanism of the Oregon landscape" are proposed and to be decided depending on the participating parties. Topics may vary in length and may be presented more than once. PRG&MS is seeking topics that are of interest to the public and attractive to the news media.

2. The show features over 160 display cases. PRG&MS is seeking featured educational displays that relate to " Geology of Oregon". Expert presenters in these areas could be helpful in raising the educational value of the show.
3. PRG&MS needs help in locating speakers and finding what topics would most interest the public. When the time comes, PRG&MS will need help with publicity and planning of the Symposium. Volunteers will be needed to help arrange guest travel and accommodations and a downtown location for the program.

Volunteer organizations will receive table space at the symposium and the show for promotional activities.

Please contact Taylor Hunt at 503-662-4790 or Keene Clay at 503-558-8500 with questions, ideas and commitments to help. Taylor's e-mail is [hunt6422@hevanet.com](mailto:hunt6422@hevanet.com)



**President's Field Trip  
The John Day Fossil Beds  
September 16 to September 19, 2005**

The focus of this year's trip is the remarkable Cenozoic geology and paleontology of North Central, Oregon. More details in the August Newsletter.

September 16: Leave Portland in the morning in private vehicles. Field trip stops will be made along I-84 .....en route to Camp Hancock, our home base for the next 3 days.

September 17: Travel to the Sheep Rock Unit of the John Day Fossil Beds National Monument. Here we will visit the new Thomas Condon Paleontological Center where we will find out what research is being done in the Monument, and then we will explore the geology and paleontology of the Monument.

September 18: Study the rocks and fossils of the Clarno Unit in the Camp Hancock area and, possibly, the Painted Hills Unit of the JDFBNM.

September 19: Leave Camp Hancock in the morning with field trip stops en route to Portland, via U.S. Route 26.

Members \$76 and Nonmembers \$86 with tents/RV's or Members \$97, Nonmembers \$107 in multi-person A-frame cabins. The per person cost includes meals; breakfasts and dinners will be at the camp dining hall, where we will make sack lunches for the field.

Please make checks out to the "President's Field Trip" and send to the Geological Society of the Oregon Country, P.O. Box 907, Portland, Oregon 97207-0907 by 10 August 2005. This is also the last date for a full refund. We are restricting the number of participants to 40, so please register early to get a place.

Policy for Minors: In order to attend a GSOC field trip, participants under 21 are required to have permission in writing from a parent or other legal guardian. In addition, minors must be accompanied by a parent, guardian, or responsible adult designated by that person.

Name(s) \_\_\_\_\_

Name(s) \_\_\_\_\_

Number of registrants \_\_\_\_\_ Payment enclosed \_\_\_\_\_

Address \_\_\_\_\_

Telephone \_\_\_\_\_ Email \_\_\_\_\_

For questions call Charles Carter at (503) 469-8353. Car pooling is encouraged; let me know if you can provide a ride or need a ride.

**Important: A waiver/medical form for each participant must accompany this registration form. See next page.**

**Geological Society of the Oregon County**  
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**President's Field Trip to the John Day Fossil Beds**

Note: Please fill out a separate waiver form for each participant.

I understand that the Geological Society of the Oregon County field trips may involve inherent risks. I realize that natural hazards do exist, and that falls and collisions do occur, that therefore injuries may result, and therefore accept the risks to myself and others and I agree to use extreme caution at all times on this trip.

I understand that any costs for medical expenses incurred as a result of accidental injury or death while participating in the field trip **WILL NOT BE PAID BY THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.**

I, undersigned, intending to be legally bound, hereby for myself, my heirs, executors, and administrators, waive and release any and all rights and claims for losses and damages I may have against the Geological Society of the Oregon Country, its officers, board members, and field trip leaders, and all other parties and their representatives, successors, and assigns for all and any injuries suffered by me on this field trip. I attest and verify that I am participating at my own risk.

Signed: \_\_\_\_\_ Dated: \_\_\_\_\_

Parent or other legal guardian signature: \_\_\_\_\_

**Medical Information**

Name \_\_\_\_\_

Phone number \_\_\_\_\_; Email \_\_\_\_\_

Name of physician \_\_\_\_\_; Phone number \_\_\_\_\_

Allergies \_\_\_\_\_

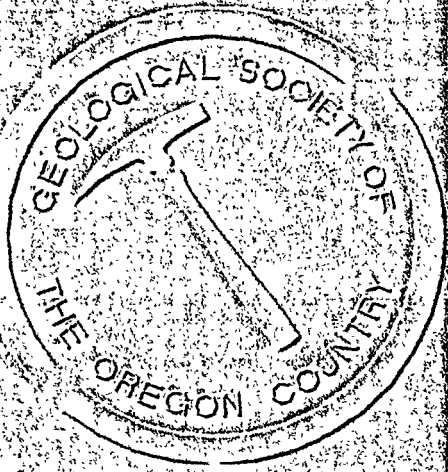
Special medications \_\_\_\_\_

Special medical conditions \_\_\_\_\_

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## THE GEOLOGICAL NEWSLETTER

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**Business Manager:**

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**GSOC LIBRARY:** Rm. S7, Open 7:30 p.m. prior to meetings.

**PROGRAMS:** Second Friday evening most months, 8:00 p.m., Rm. S17, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon.

**MEMBERSHIP:** Per year from January 1: Individual--\$20.00, Family--\$30.00, Junior (under 18)/Student--\$10.00.

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# **GEOLOGICAL NEWSLETTER**

**The Geological Society of the Oregon Country  
P.O. Box 907, Portland, OR 97207**

**VISITORS WELCOME AT ALL MEETINGS**

**INFORMATION: [www.gsoc.org](http://www.gsoc.org)**

**Charles Carter, President, 503-469-8353, [chcarter39@hevanet.com](mailto:chcarter39@hevanet.com)  
Calendar Editor, John Teskey, 503-641-7746, [lawlib@Teleport.com](mailto:lawlib@Teleport.com)**

**VOL. 71, NO. 8  
AUGUST, 2005**

## **AUGUST ACTIVITIES**

**GSOC Picnic** will be from 10-2 on August 21<sup>st</sup> at Montavilla Park, NE 82<sup>nd</sup> and Glisan. Look for further details in this Newsletter.

### **Future Upcoming Events**

**Friday Evening Talk, September 9th, 2005, 8:00 P.M., "The Natural History of the John Day Country: Geology, Paleontology, Botany, and Archaeology".** Don Barr, Geology teacher in the Portland Public Schools for 30 years and long time GSOC member. **ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT'S MAIN OFFICE**

**President's Field Trip, September 16-19, Central Oregon.** President Charles Carter will lead the President's trip to central Oregon. Participants will drive their own cars and stay at Camp Hancock. Reserve this date on your calendar! For details, registration form and waiver, see July 2005 Geological Newsletter.

**CHECK THE GSOC WEB PAGE FOR THE LATEST GSOC CALENDAR OF EVENTS,  
WWW.GSOC.ORG, OR CALL JOHN TESKEY 503 641 7746**

**Calendar items must be received by 15<sup>th</sup> of preceding month.  
Call John Teskey, 503-641-7746 [Lawlib@Teleport.com](mailto:Lawlib@Teleport.com)**

## ANNUAL GSOC PICNIC

Sunday, 21 August, 10 to 2 pm

**Location/Facilities:** Montavilla Park, 8219 NE Glisan. There is one picnic site with a shelter and nine tables that faces NE Glisan (just east of the Community Center building). The site is reserved from 8 to 2 pm. The Bible College to the east of the park boundary and the picnic site (entrance off Glisan) allows free parking in its lot on weekends and this is closer to the picnic area than any of the parking lots at Montavilla.

**Food:** GSOC will provide hamburgers, turkey burgers, veggie burgers and hot dogs, plus the buns and condiments. If your last name begins with A through L, please bring a salad or a side dish, and if M through Z, a dessert to share. Please bring your own drinks: alcohol is approved for beer and wine only under the terms of our permit. Lunch begins at noon.

**RSVP:** Please e-mail (or phone and leave a message) to Bonnie Prange ([bonnie@eco-land.com](mailto:bonnie@eco-land.com); 360-693-8396) and indicate number who will be coming, type of food you will bring, and your choice of burger(s) or hot dog.

**Cost:** Members \$3 and guests \$4, payable at the park.

## VOLUNTEERS NEEDED

GSOC Business Manager Rosemary Kenney is looking for one or two volunteers to help with the mailing of the newsletter. It will take about 1 to 2 hours per month. Call Rosemary at 503/892-6514 for more information.

## ICE AGE FLOODS INSTITUTE FIELD TRIP

Join IAFI on August 27th for a Glacial Lake Missoula field trip. They will leave Missoula, Montana, at 8am and head west on I-90 and up to Plains. They will be having lunch in Plains. After lunch they head north to the Rainbow Lakes area and then over the top to Camas Prairie and back to Missoula. They will be seeing some areas they haven't seen on previous trips.

To go on the trip, you must fill out a Ice Age Floods Institute membership application, a registration form and a waiver for the trip. Send an email to [gsoc@spiritone.com](mailto:gsoc@spiritone.com) if you are interested in going and you will be sent an electronic copy of the forms. Fees range between \$40 and \$75. The registration fee includes lunch, transportation for the day and a field trip guide. Forms and payment must be received by IAFI by August 20.

IAFI will also be having a public program on Friday, August 26th from 6pm to 8pm. The program will be held at The Inn on Broadway in Missoula. The address and phone number are on the registration form.

For more information contact Taylor Hunt or Larry Lambert, President, Glacial Lake Missoula Chapter, Ice Age Floods Institute

## MT. ST. HELENS UPDATE

Just a little reminder to our volcano buffs to keep up on the ongoing activity of Mt. St Helens on the USGS website. Current activity reports, excellent photos, eruption archives, and earthquake activity logs are available.

Cascade Volcanoes Observatory, USGS, Mt. St. Helens page:

<http://vulcan.wr.usgs.gov/Volcanoes/MSH/framework.html>

Here is a reprint of the first half of the article we ran last November from Ken Cameron's talk to GSOC:

Recap of the *Mount Hood Volcanic Hazards* talk by Ken Cameron, Oregon Department of Environmental Quality, pinch-hitting for Patrick Pringle, WDNR geologist who was monitoring the recent Mt. St. Helens activity and could not make the scheduled Friday meeting. Ken did a marvelous job discussing the volcanic hazards of Mt. Hood, with a bonus talk about the recent activity at Mt. St. Helens as the finale.

There are several ways in which Mt. Hood could threaten populated areas if it erupts. These include

- pyroclastic flows – laterally moving ash clouds lubricated by hot air
- lahars – ash deposits which include melted snow, creating large mudflows in valleys and river channels
- magmatic eruptions – hot lava and ash ejected from the mountain
- acid rain – gases spewing from volcanic vents can mix with water in the air and cause widespread damage from acid rain
- sector collapse – a huge landslide caused by an instability of a large section of the mountain slope

We can determine the approximate magnitudes of the danger from these events by examining the remains of previous volcanic activity at Mt. Hood. For example, deposits from lahars have been found approximately 60 miles in both the southeast and west directions from the Old Maid Flats series of eruptions which ended around 1810. These deposits occur in the White and Sandy Rivers. Lahars can be dangerous for several reasons. They can erode down slope obstructions very fast. They are highly acidic. Ken has first-hand knowledge of this from the lahars of the Mt. St. Helens eruption, which disintegrated his boot seams overnight. And of course the mudflows produced by lahars can inundate areas. The average depth of the mudflows on the Sandy River were about 35 feet. The outlet stores near the Marine Drive exit of Interstate 84 are sited on a mudflow at the mouth of the Sandy River.

Possibly the most catastrophic result of a volcanic eruption has happened previously on Mt. Hood. A huge landslide collapsed a large section of the north slope of the mountain in a previous eruption. Today, the town of Hood River sits on the site of this event.

One can also get a glimpse of possible dangers from looking at results of activity of other volcanoes around the world. Acid rain deforestation is very pronounced east of Kilauea in the Hawaiian islands, for example. And of course the explosive eruption of Mt. St. Helens is clearly etched in the memories of many Oregon residents.

Although it is not possible for scientists to predict, or precisely determine, when the next Mt. Hood eruption will occur, monitoring methods can warn of a possible impending eruption. These methods include:

- monitoring the **temperature** of the mountain
- monitoring the **deformation** or swelling of the mountain
- seismograph records can monitor **earthquakes** and tremors produced by the mountain



## FIELD GUIDES

If you feel like studying geology at home, or making your own field trip excursions, you can purchase the following GSOC field trip guides from years gone by:

|  |        |
|--|--------|
| Geologic Trip Log through Eastern Foothills of Oregon Coast Range between Vernonia and Banks, 1964 ..... | \$0.75 |
| Columbia River Gorge and Grand Canyon of the Deschutes River, 1964.....                                  | 0.75   |
| Geological Guide Book for Central Oregon, Prineville, Paulina, Suplee, Delintment Lake, 1965 .....       | 0.75   |
| Condon's First Island, Geological Trips in the Siskiyou and along the Rogue River, 1970.....             | 1.25   |
| Field Trips along the Oregon Coast in Lincoln County, 1974.....  | 2.25   |

|  |       |
|--|-------|
| Field Guide to Geologic Sites in the Newberry Crater Area, 1976.....         | 2.00  |
| Investigating the Geology of the North Cascades, Washington state, 1977..... | 2.25  |
| Sawtooth Mountains and the Stanley Basin, Idaho, 1978 .....                  | 1.75  |
| Lewiston, Idaho, 1984 .....  | 3.50  |
| Northern Idaho and Montana, 1988.....  | 6.50  |
| The Missoula Floods, 2000.....   | 15.00 |
| Field Trip to Southwest Oregon Coast, 2003 .....                             | 8.00  |

Contact Rosemary Kenney 503/892-6514.

### ***Gotta Hava Loupe!!!***



As a geology enthusiast, you might be wondering you can get a loupe or hand lens for GSOC field trips or other exploration.

Here's the info!!!

A loupe, (otherwise known as pocket magnifier or hand lens), is used by geologists to closely inspect small but visible objects. Loupes are handy for GSOC'ers to observe rock crystals and other small details when on a GSOC field trip. But before you rush out to get one for this month's exciting field trip on the Clackamas river, do a little research so that you get the right lens for you.

First, you should know that there are three basic lens configurations for the lenses in a loupe. They are:

- A coddington, or single lens, which is more rugged (especially in watery environments), needs to be larger in diameter due to the fact that the edges are visually distorted.
- A doublet, with two lenses separated by an air space, provides less visual distortion (slight distortion at the edges) than the single lens and is usually very reasonable in price.

- The triplet is the highest quality of lens, and thus is the highest in price. A Hastings triplet has three lenses cemented together in an achromatic configuration (all lenses focus on the same point). Triplets also have the least distortion of the image, and are the standard lens used to grade diamonds.

In addition to the lens configuration, each loupe will have a power specification (10X, meaning 10 times larger than "real life", etc.) and a lens size in diameter. In general, the higher the power, the smaller in diameter the lens will be. Also, the higher the power the lens, the less depth of field you will have. For rock crystal viewing, power in the range of 10X to 15X is generally sufficient. Make sure you bring along a sample to inspect if buying your loupe locally.

Last but not least, make sure you purchase or make a lanyard for your lens. My old hand lens is now rusting at the top of Steens Mountain!!! It is so easy to put the lens down and walk away from it – you won't if it's hanging around your neck.

So, where are you going to get that loupe? Some local places that carry a selection are:

- Ed's House of Gems on NE Sandy Blvd.
- Handley Rock and Jewelry Supply on Hwy 99 in Vancouver, WA

Also check out the following web sites for more info about loupes:

<http://www.kooters.com/handlens.html>

<http://www.indigo.com/magnify/geology-lenses.html>

<http://www.allensinc.com/coins/supplies/magloupe.htm>

<http://www.kassoy.com/loupes01.htm>

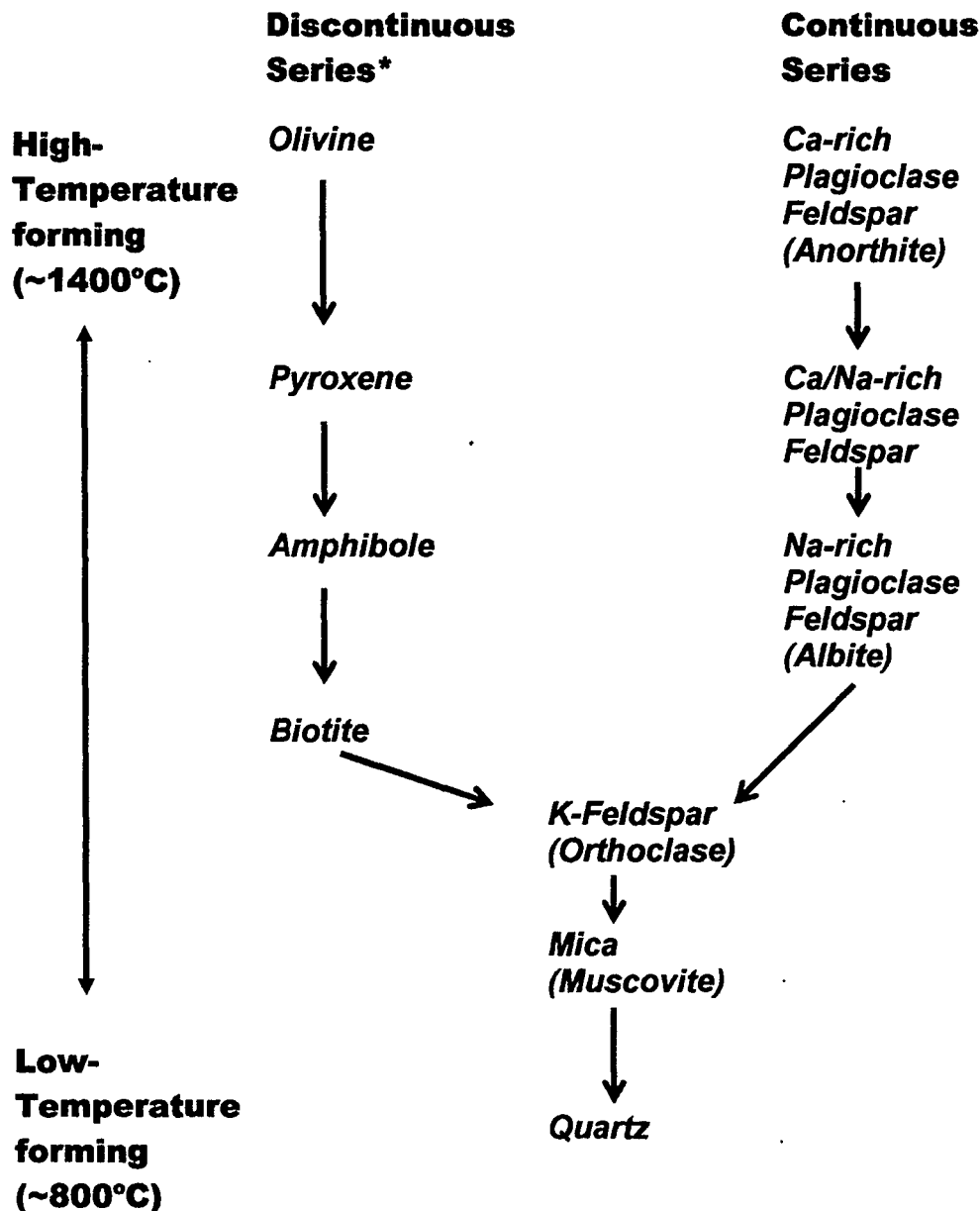
<http://www.frostproof.com/catalog/m37.html>

<http://www.frostproof.com/catalog/meas02.html>



## Bowen's Reaction Series

This chart describes the mineral formation series when magma cools. For more information refer to the June/July 2004 Geological Newsletter.



\*Bowen found that minerals stable at progressively lower temperature would crystallize replacing the higher temperature minerals as the magma continued to cool.

## Igneous Rock Properties Table

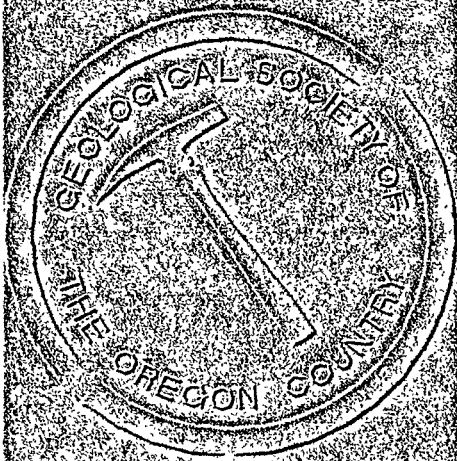
| <b>Magma Type</b>                         | <b>Felsic</b>  | <b>Intermediate</b>                                     |  | <b>Mafic</b>                    | <b>Ultramafic</b>           |
|---|--|---|--|---------------------------------|-----------------------------|
| <b>Intrusive</b>                          | <i>Granite*</i>  | <i>GranoDiorite</i>                                     | <i>Diorite</i>   | <i>Gabbro</i>                   | <i>Peridotite-Dunite</i>    |
| <b>Extrusive</b>                          | <i>Rhyolite</i>  | <i>Dacite</i>   | <i>Andesite</i>  | <b>Basalt*</b>                  | **                          |
| <b>Principal Mineral Contents</b>         | <i>Quartz<br/>Mica<br/>Biotite<br/>K-Felspar<br/>Na-Feldspar</i> | <i>Amphibole<br/>Biotite<br/>Quartz<br/>Na-Feldspar</i> | <i>Amphibole<br/>Pyroxene<br/>Biotite<br/>Ca/Na-Feldspar</i> | <i>Pyroxene<br/>Ca-Feldspar</i> | <i>Olivine<br/>Pyroxene</i> |
| <b>Magma Temperature</b>                  | 800-1000°C   | 1000-1100°C   |  | 1100-1200°C                     |                             |
| <b>Magma fluidity*</b>                    | <i>Highly viscous _____ Very fluid</i>                           |   |  |                                 |                             |
| <b>Silica Content from USGS by weight</b> | >68%   | 63-68%  | 52-63%   | 48-52%                          |                             |

\*Magma fluidity is a direct result of silica content. Since felsic magma is so sticky, the intrusive form granite is far more common than rhyolite (Oregon being an exception to this rule). Also, fluid mafic magma produces more basalt than the intrusive gabbro.

\*\*Since this magma is produced as a result of fractionation of mafic magma and with the high crystallization temperature of the mineral content, this type of magma is almost always intrusive.

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**SEPTEMBER 2005**  
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**THE  
GEOLOGICAL  
NEWSLETTER**

# GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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### APPLICATION FOR MEMBERSHIP-

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Name \_\_\_\_\_ Spouse \_\_\_\_\_

Children under age 18 \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_ - \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ Email address \_\_\_\_\_

Geologic Interests and Hobbies \_\_\_\_\_

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VISITORS WELCOME AT ALL MEETINGS

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Calendar Editor, John Teskey, 503-641-7746, [lawlib@Teleport.com](mailto:lawlib@Teleport.com)

VOL. 71, NO. 9  
SEPTEMBER, 2005

## **SEPTEMBER ACTIVITIES**

**Friday Evening Talk, September 9th, 2005, 8:00 P.M., "The Natural History of the John Day Country: Geology, Paleontology, Botany, and Archaeology". Don Barr, Geology teacher in the Portland Public Schools for 30 years and long time GSOC member. ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT'S MAIN OFFICE**

**President's Field Trip, September 16-19, Central Oregon.** President Charles Carter will lead the President's trip to central Oregon. Participants will drive their own cars and stay at Camp Hancock. Reserve this date on your calendar. Look for details and sign up information in the July newsletter.

**Seminar, Wednesday, Sept. 28th at 8pm, "Mars--It's Not Just a Candy Bar!"** Of all the planets, none inspire and fascinate us Earthlings as much as the Red Planet. Find out what impact it has had on our culture throughout history, and why we can't seem to get enough about our mysterious next-door neighbor. From mythology to geology, and even a little martian-ology, come join us for a down-to-earth evening devoted to all things Mars. All ages are welcome! Seminar will be conducted by Tara Schoffstall, GSOC member, in Room 69, Cramer Hall, Portland State University. **Please note this seminar is being held on the 4<sup>th</sup> Wednesday, not the usual 3rd.**

**PLEASE NOTE: PARKING AT PORTLAND STATE UNIVERSITY IS AVAILABLE AFTER 7 P.M. IN THE PARKING STRUCTURE ON BROADWAY DIRECTLY ACROSS FROM CRAMER HALL**

**CHECK THE GSOC WEB PAGE FOR THE LATEST GSOC CALENDAR OF EVENTS,  
WWW.GSOC.ORG, OR CALL JOHN TESKEY 503 641 7746**

**Calendar items must be received by 15<sup>th</sup> of preceding month.**

**Call John Teskey, 503-641-7746 [Lawlib@Teleport.com](mailto:Lawlib@Teleport.com)**

## President's Field Trip Information

Each person registered for the field trip will receive an informal field guide and other information by mail at least by September 9th.

GSOC President Charles Carter will also phone each participant to answer questions and arrange for transportation. Please remember Don Barr's GSOC talk on the 9th of September at PSU. If you have questions in the meantime please call the President at 503-469-8353.

## BOOK REVIEW – The Odyssey of Thomas Condon: Irish Immigrant, Frontier Missionary, Oregon Geologist

reprinted from Oregon Geology, Volume 51, Number 5, September 1989, with permission from the author. Dr. Agnew saw the review of the trip to Orr's museum (July 2005 issue of The Geological Newsletter) and thought our readers might enjoy his review of the Condon biography.

### BOOK REVIEW

by Allen F. Agnew, Courtesy Professor of Geology, Oregon State University, Corvallis, Oregon 97331

The Odyssey of Thomas Condon: Irish Immigrant, Frontier Missionary, Oregon Geologist, by Robert D. Clark. Oregon Historical Society Press, 1989, 569 p., illust., \$29.95.

### Condon, the teacher, minister, searcher for geologic answers

Thomas Condon (1822-1907) was a teacher, a master teacher who broke with tradition in the middle and later 1800's by introducing his students to what was later to be called the "laboratory"

method: learning by observation and analysis, rather than by memorization and regurgitation.

Condon was also a minister of the Congregational Church who had received his theological upbringing in a Presbyterian Seminary in Auburn, New York, in the 1840's. His belief in God as creator of the world and of all its natural wonders did not get in the way of his scientific observation and objectivity. Rather, by constantly adapting the biblical story of creation as he was assimilating new evidence and new knowledge, he wedded the two in his personal philosophy and in his teaching, which was especially evident during his many lectures and conversations on evolution. He was part of several decades of debate on the "evolution controversy," his lectures being widely reported in the newspapers. His opponents were not only those speaking for the "established" theology of the various Protestant missionary churches but also some of his professorial colleagues in biology at the University of Oregon.

Condon's inquisitiveness was whetted by the books available to him from his earliest days in the United States. When he arrived in New York from Ireland in 1833, he was an 11-year-old Cork County native with no more than the basic elements of an education. He was fortunate to become a house boy and office boy for a physician who possessed a library. This search for knowledge continued to be fed during his three years of working on a farm in the Finger Lakes area of upstate New York, because the farmer there also had a library.

Condon's powers of observation outdoors and his joy in collecting rocks and fossils were stimulated by the geologic wonders of that beautiful Finger Lakes region, where he attended the Cazenovia Academy for a year and then for three years more engaged in what was to be his ultimate profession—teaching.

In 1849, Condon decided to enter the ministry, enrolling at the Presbyterian Seminary in Auburn, New York. The Presbyterians and Congregationalists in the middle 1800's had joint operations in upstate New York and Ohio, he found. He also learned that the issue of slavery and

attendant conservatism had split the Presbyterians in 1837, as it had the Methodists and Baptists. Condon himself was an abolitionist.

While at seminary for three years, Condon taught 200 inmates at the nearby prison, who, as author Clark describes, "were overjoyed with the program—the only minutes in the week...when they were permitted human discourse" (p. 69). Condon empathized with them and was glad as a teacher to provide them with such a humanitarian release.

Upon graduation in 1852, Condon was appointed a missionary to the West by the American Home Mission Society. He learned that not only did the Society (of Presbyterians and Congregationalists) stipulate that the new missionaries be ordained but also expected them to be married. Condon was fortunate to have met Cornelia Holt that summer. She was a school teacher in a town near Buffalo, and they were married on October 31. With seven other missionaries and their families, they sailed from New York City on November 12 on a clipper ship for San Francisco. After 102 days and 17,000 miles on the ocean, the Condons and fellow missionary Obed Dickinson and his wife took another ship and, after five more days at sea, arrived in the small settlement of Portland on March 3, 1853.

For the next 54 years, Condon was to serve churches (as a missionary and minister), teach school (at both pre-college and college levels), and collect fossils and observe the geology around him. Condon's inquisitive nature, his powers of observation and analysis, and his strong religious foundation together enabled him to make his mark on the people of Oregon in the latter half of the 19th century. He was to be a lucid exponent of Darwin's modified evolutionary theory, which was to put him at odds with many of his religious counterparts in Oregon.

However, his continued discovery of fossils and his attempts to fit them into the evolutionary scheme of life brought him to the attention of the famous vertebrate paleontologists of the eastern United States. His collections and his thoughtful analysis of

how they came to be there fueled the ambitions and abilities of two great movers and shakers during that period, Othniel C. Marsh of Yale University and Edward D. Cope of the Philadelphia Museum of Natural History. Joseph Leidy of the Smithsonian Institution likewise enabled that great museum to thrive on Condon's discoveries. By contributing to Condon's library in return for his fossil collecting, they helped Condon to grow intellectually and make his outstanding impact on Oregon.

Condon was not caught up in what we today call "publish or perish". Rather, partly because of his lack of formal training in geology and paleontology, but also because of his personal characteristic of searching for evidence and then seeking introspectively for the ultimate causes, he published only half a dozen articles on his researches. And those publications, he did not hesitate to state, were not intended as scientific discourses but were written for the general public.

Thus he carried out his lifelong bent of sharing his knowledge with those less tutored in those subjects than he—the great number of people in pioneer Oregon who were seeking to establish themselves in this frontier land and at the same time attempting to understand the world in which they were living. Condon's two larger published works—his Report as State Geologist in 1867, and his magnum opus, "Two Islands—and What Came of Them" in 1902, were both directed toward the general public. It was part of his duty, and his joy, to pass along his knowledge, while at the same time he extended his own comprehension by responding to the questions addressed to him by his audiences and through the mail.

Condon's wife Cornelia may have lived to see him complete his book in 1901, but she was unable to share his triumph in its publication a year later. She was ill during much of the summer of 1901 at the cottage on Yaquina Bay and contracted typhoid fever in August. She died on September 2, 1901, at almost 70 years of age. Condon mourned, "The light of my life has gone out."

Condon flowered in The Dalles, where he had gone in March 1862 as a missionary. It was a lively

settlement, with trade not only up and down the Columbia River but also into the gold-mining country to the southeast in the Shoshone (Blue) Mountains. This was the first of his missionary posts that could be called financially successful and thus made the "bringing of the word" and the saving of lives even more satisfying to such a very human person.

But more than that, The Dalles opened up the fantastic fossil-bearing strata of the John Day country to Condon's gaze and collecting acumen. He accompanied U.S. Cavalry there on some assignments to protect the white settlers from the "marauding" Indians who objected to the invasion of their lands in the 1860's.

Oregonians can mark Condon's 11 years in The Dalles as providing the nurturing environment for his greatest contributions—to geology, to his students, and to the general public.

Condon's huge capability at communicating his new knowledge, with newspaper accounts reporting his several series of lectures in The Dalles and in Portland, brought him to the attention of university administrators. Thus, in August 1873, he was attracted, with his collections, to Pacific University in Forest Grove as lecturer. Two years later, the budding University of Oregon offered Condon a professorship in Eugene, and his acceptance inaugurated the final and most significant segment of Thomas Condon's 85 years on earth.

In his first summer after going to the University of Oregon, Condon took his family on a trip of many days to the beach at Newport. Finding an unoccupied cabin on Nye Beach, they settled in and for the next thirty years were regular summer residents of the Newport area. Condon collected fossils, conducted "geological picnics," and recharged his batteries—just as U of O faculty do today, both in the Newport area and along other parts of the Oregon coast.

Condon was good for the University of Oregon, and the university was good to him. Clark's history of Condon's tenure at the U of O is as much a history of that institution as it is a history of the man.

Condon was able to collect and study and contemplate the geology of new parts of the state—the coast, the Siskiyou (Klamath) Mountains in southwestern Oregon, and the Fossil Lake collecting grounds of east-central Oregon (east of the Cascade Mountains but south of the John Day country).

All the while, Condon was sharing his knowledge with his students, his fellow faculty members, and the townspeople—the latter two groups not always agreeing with him. The students, however, flourished under his "laboratory" method of instruction with which he replaced the traditional dull reading of textbooks or lecture notes, followed by recitation. His faculty colleagues did not take kindly to his nontraditional pedagogy, and they and some of the townspeople did not agree with him on his evolutionary theory or his accommodation of science and religion.

Nevertheless, they appreciated Condon so much that they named the campus oak trees for him, and they celebrated his birthdays—the 75th, the 80th, and annually thereafter. In June 1903, Condon requested that his teaching load be lightened and his salary reduced to \$1,000, with the rest of the money going to an assistant. In 1905 he resigned, "due to the disabilities of old age," and the Regents regretfully elected him Professor Emeritus—at age 83. In January 1907, Condon became ill with influenza and could not get rid of a troublesome cough. Daughter Nellie C. McCornack brought him to her farmhouse about two miles west of Eugene to look after him. He lived for about three weeks and died on February 11, within three weeks of his 85th birthday.

In his old age, Condon had become a legend. Henry F. Osborn is said to have remarked candidly: "Professor Condon deserves the entire credit of the discovery of the upper Oligocene horses in the John Day."

#### **Clark, the chronicler, the historian**

Robert D. Clark. President Emeritus of the University of Oregon, taught speech, rhetoric, and public address for many years there. He wrote an



article on Thomas Condon, "From Genesis to Darwin: The Metamorphosis of Thomas Condon," which was published by the Oregon Historical Society in *The Western Shore* in 1975. Clark was also an author, along with Dorothy Velasco, of "An Evening with Thomas Condon," one of two pieces of history theater that toured eastern Oregon in 1981 and western Oregon in 1981-82 as part of Chautauqua 1981, a project of the Oregon Committee for the Humanities.

In the book being reviewed here, *The Odyssey of Thomas Condon*, author Clark enables us to live Condon's life along with him, sitting, as it were, in an adjoining chair as he talks or thinks. To some readers, used to speed-reading to the end of an account while hurrying over its details, such "extraneous" matter may constitute an impediment. To others, however, interested more in what made Condon "tick" and how he arrived at various decision points in his career and then made those decisions that constituted his life's history, this wealth of detail is most welcome—and makes Condon "come alive." Clark, a supreme chronicler, has done his job well.

For the geologist, Clark's book provides an interesting and exciting walk through the geological controversy surrounding the earth's origin and later development - uniformitarianism and catastrophism. And, for the geologist and the biologist, the Darwinian controversy and its effects on scientists and on the preservers of church doctrine ("as God wrote it") constitutes a thread that continues throughout the book. Condon's theological bent, coupled with his inquisitive mind and willingness to search for the truth and analyze it as a scientist does, enabled him to be an outstanding teacher—which he considered his main life calling.

Clark's book is very rewarding for a geologist such as this reviewer to read, because it enabled me to re-live my own professional life through the various stages that Condon himself had experienced a century earlier.

Clark's book is amazingly free from errors. Only three seem worth noting here:

1. Along the Middle Fork of the Willamette River, Condon is "southwest" from Eugene, whereas he really must have gone southeasterly (p. 301).
2. Sam Williston would have preferred that his name be spelled this way rather than "Willitson" (p. 512, footnote 19).
3. Likewise, Henry Fairfield Osborn would have preferred this middle name rather than "Fairchild" (p. 435 and 563).

But, you won't wish to nitpick, anymore than I did as I was caught up in Clark's gripping account. Rather, you too will want to re-live Condon's Odyssey. I did—and I enjoyed it very much.

Yes, you should read Clark's *The Odyssey of Thomas Condon*. But you may also want to go to your library and check out the other biography of Thomas Condon, published by his daughter Nellie C. McCornack in 1928, *Thomas Condon: Pioneer Geologist of Oregon* (University of Oregon Press, 355 pages). Hers is full of correspondence between her father and the great names of vertebrate paleontology in the latter half of the 19th century—Cope, Marsh, and Leidy.

Ellen T. Drake gave an interesting account ("Horse genealogy: The Oregon connection," *Geology*, v. 6, no. 10, 1978, p. 587-591) of the Marsh/Cope feud, and of Marsh fending off other vertebrate paleontologists while grabbing for the line himself. She tells the story of Marsh (and his successors Charles Schuchert and Richard S. Lull), who claimed that Marsh himself had discovered the important Miocene horse link in the equine evolutionary tree—whereas the record shows that it was Condon who did so and who knew the significance of what he had found in 1871 when he sent his first collection to Marsh.

Shortly after Condon's death, the geological community recognized the value of his imprint upon vertebrate paleontology and geology in a memorial by Chester W. Washburne of the University of Chicago ("Thomas Condon," *Journal of Geology*, v. 15, 1907, p. 280-282), who wrote:

... a life little known among scientists, yet a life of considerable service to geology.

Professor Condon was an unusual man in that he seemed to have no desire to publish the results of his study...But the writings of the scientists of his day...are full of references to Dr. Condon, and all of them acknowledge his contribution to science by exploration and theory.

Condon discovered the famous John Day beds...Here he found some of the specimens of three-toed horses on which Marsh based his theory of the evolution of that animal. In this instance, Marsh gave the discoverer scant credit for his work, and the type-specimens remained in Yale Museum until after Marsh died. The same thing happened to many other valuable specimens loaned to Marsh, Cope, Gabb, and others... it was unjust to Condon not to acknowledge more fully his services and not to return his specimens...

Condon was one of those rare men that study science from an inherent love of nature, not merely for self-advancement, or for the praise of men.

Clark's book is thoroughly footnoted and has a very complete index, making it easy for one who wishes

to retrieve information to do so. Index maps of towns mentioned and a number of good photographs complement this very readable text. □

## **DR. ROBERT VAN ATTA DECEASED**

Dr. Robert Van Atta, Professor of Geology for 32 years in the Geology Department of PSU, and who helped establish the department in 1956, died August 9, 2005. His specialty as a researcher was sedimentary geology. Dr. Atta also did consulting geology for numerous businesses and institutions. His obituary was in the Sunday, August 21, Oregonian.

Dr. Atta was also a deeply religious man, and was very involved in spiritual and social activities at the Burlingame Baptist Church in Portland.

Remembrances may be made to the Bob Van Atta Memorial Fund at Burlingame Baptist Church, the Bob Van Atta Student Scholarship Fund at Western Seminary, or the Bob Van Atta Sedimentary Geology Scholarship Fund at Portland State University.

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**GSOC LIBRARY:** Rm. S7, Open 7:30 p.m. prior to meetings.

**PROGRAMS:** Second Friday evening most months, 8:00 p.m., Rm. S17, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon.

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VOL. 71, NO. 10

OCTOBER, 2005

## **OCTOBER ACTIVITIES**

**Friday Evening Talk, October 14th, 8:00 P.M., LOCATION: PORTLAND STATE UNIVERSITY, ROOM S17. "Oregon's Other Fossil Record", William Orr, Emeritus Professor of Paleontology, University of Oregon. This slide illustrated talk will speak to the fact that in addition to the John Day country there is a superb assemblage of fossils over on the Oregon coast in Tertiary sediments. These marine fossils include whales, seals, sea lions and walrus as well as several mammals without apparent representatives today. Also included are reptiles (crocodiles and turtles), fish (teleosts [bony fish] as well as sharks, and amphibians (frogs and salamanders). NOTE: ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT'S MAIN OFFICE**

**Seminar, Wednesday, October, 19<sup>th</sup>, 8 P.M., LOCATION: PORTLAND STATE UNIVERSITY, Room S17 "President's 2005 Field Trip: John Day Fossil Beds", October's seminar will be a general discussion about the 2005 President's Field Trip to the John Day Country. Highlights will include the geology, paleontology, and history of the area. Please feel free to bring your own pictures and experiences to this seminar. NOTE: ROOM S17 IS ON THE SUB-BASEMENT LEVEL OF CRAMER HALL, DIRECTLY BELOW THE GEOLOGY DEPARTMENT'S MAIN OFFICE**

**PARKING AT PORTLAND STATE UNIVERSITY IS AVAILABLE AFTER 7 P.M. IN THE PARKING STRUCTURE ON BROADWAY DIRECTLY ACROSS FROM CRAMER HALL**

**CHECK THE GSOC WEB PAGE FOR THE LATEST GSOC CALENDAR OF EVENTS,  
WWW.GSOC.ORG, OR CALL JOHN TESKEY 503 641 7746**

**Calendar items must be received by 15<sup>th</sup> of preceding month.**

**Call John Teskey, 503-641-7746 Lawlib@Teleport.com**

# WHAT'S GOING ON BACK EAST?

by Carol Hasenberg

Having tried to look up information on my home state West Virginia (not too successfully at times), I have become interested in eastern United States geology. So I decided to get a resource base together for the eastern U.S.

To start off, let's check out the USGS website. There are several projects currently being conducted by the USGS in the eastern U.S. This includes aquifer studies in several eastern regions, related karst topography studies, wetlands studies, studies related to global warming, and the Chesapeake Bay impact crater. Here are some references to these projects:

USGS Eastern Geology Projects

[http://geology.er.usgs.gov/eespteam/EESPT\\_Projects.html](http://geology.er.usgs.gov/eespteam/EESPT_Projects.html)

USGS National Geological Map Database

<http://ngmdb.usgs.gov/ImageLibrary/>

National Karst Map

<http://geology.er.usgs.gov/eespteam/Karst/karstmap/karstmaphome.htm>

The Chesapeake Bay Impact Crater

<http://woodshole.er.usgs.gov/epubs/bolide/>

Now that we know what the USGS is doing, let's find out what is happening on a smaller scale. Fortunately the USGS site has an excellent links page to the states' geological information. Here it is:

Geological Links to eastern U.S. regions:

<http://geology.er.usgs.gov/states/>

This is a great collection of links to USGS and other research projects going on in the eastern U.S. Here is a sampler of the items you can get to from this site:

"Geology of the New River Gorge". This is the site of the famous bridge from which you see people base-jumping (parachuting). It's part of the West Virginia Geological and Economic Survey site.

<http://www.wvgs.wvnet.edu/www/geology/geoles01.htm>

The Florida Geological Survey site. Includes information on sinkholes, continentals shelves, geological maps, minerals, etc. Great information site if you plan to be traveling to Florida.

<http://www.dep.state.fl.us/geology/default.htm>

Kentucky Paleontological Society site. This is a rare paleontological club with a very informative site. Check out the tetrapod trackway!

<http://www.uky.edu/OtherOrgs/KPS/>

Maine Geological Survey site. This is a very nice website for all aspects of Maine geology – glaciation, geological history, fossils, surficial geology map, publications, Geological Site of the Month, etc.

<http://www.state.me.us/doc/nrimc/mgs/mgs.htm>

Geological Map of Maryland. I used this map in a very interesting drive on interstate 68 between my home town and Washington D.C. in 2000. Maryland cuts across a large swath of varying and interesting geology, from the Permian in the west to the Precambrian in the east.

<http://www.mgs.md.gov/coastal/maps/g2.html>

So what's different about the geology of the eastern United States from Oregon geology? Here are a few reasons why the geology is different. Can you think of more?

- age of the rocks and fossils – Much of the eastern U.S. has surface geology in the Paleozoic Era.
- limestone and karst topography – There are many features of this sort in the eastern U.S., including caves, sinkholes, and more.
- glaciation – Much of the northern part of this region was glaciated during the Pleistocene.
- large flat coastal plain and continental shelf – Because the trailing eastern coast is much older than the active western coast, the topography of

the eastern U.S. is fundamentally different from that of the west.

Enjoy your exploration of eastern U.S. geology!

## **JEAN CORCORAN DECEASED**

Born Gwendolyn Jean Currie in 1927 in Chicago, Illinois, Jean was the wife of GSOC Past President Andy Corcoran. Jean died July 10, 2005.

Jean met Andy Corcoran during high school days and dated until Andy left for service in the Navy during World War II. She and Andy were married in 1948 and moved immediately to Cut Bank, Montana, where Andy was a geologist for Union Oil Co. Andy's job took the family to the Rocky Mountain area, Texas, Jamaica, and California. They moved to Portland in 1953 where Andy worked for Oregon Department of Geology and Mineral Industries. Andy was elected president of GSOC in 1987.

Jean was a very active person. She raised three children, worked in the educational system, and was an active volunteer and hobbyist. She was involved with the Archaeological Society, the Portland Bead Society, the Oregon Historical Museum, and other organizations. Jean is survived by her husband and three children - Michael, Richard, and Deborah. Remembrances may be sent to the American Heart Association.

## **DR. HERBERT L. ARMENTROUT DECEASED**

Dr. Herbert L. Armentrout died July 15, 2005, at age 93.

Dr. Armentrout was born April 18, 1912, in Portland, where he lived all his life. He graduated

from Grant High School and the University of Oregon and received a medical degree from the University of Oregon. During World War II, he served in the Navy. He was a physician for 23 years and founder of Valley Medical Clinic. In 1940, he married Jane A. Myers; she died in 1999. Dr. Armentrout was also a GSOC member for several years.

Survivors include his sons, John M., Richard B. and Thomas S.; six grandchildren; and seven great-grandchildren. Those GSOC members who attended the 2003 southern Oregon coast field trip may recall that we followed geologist Dr. John M. Armentrout's field trip guide at Cape Arago and Cape Blanco.

Remembrances may be sent to Friends of the Columbia River Gateway in Ilwaco, Wash.

## **GSOC Nominating Committee Named**

At the August 21st meeting, the GSOC Board named the following people to the Nominating Committee: Richard Bartels, chair; Charles Carter; and Rosemary Kenney. They will report on their nominees for next year's officers in the November Newsletter. Anyone interested in serving as an officer or board member next year should contact one of the Nominating Committee members as soon as possible.

## **GSOC President Calling for Volunteers**

GSOC needs volunteers to help the organization this coming year. Most of the jobs involve no more than a couple of hours a week and are easy to do. If you are interested as serving as an officer, helping with the newsletter mailing, helping with the upcoming GSOC banquet, etc., please call either Richard (Bart) Bartels at 503/292-6939 or Charles Carter at 503/469-8353. Thank you for considering

to help. We need some new people to be an active part of the organization!!!



## FIELD GUIDES

If you feel like studying geology at home, or making your own field trip excursions, you can purchase the following GSOC field trip guides from years gone by:

|  |        |
|--|--------|
| Geologic Trip Log through Eastern Foothills of Oregon Coast Range between Vernonia and Banks, 1964 ..... | \$0.75 |
| Columbia River Gorge and Grand Canyon of the Deschutes River, 1964 .....                                 | 0.75   |
| Geological Guide Book for Central Oregon, Prineville, Paulina, Suplee, Delintment Lake, 1965 .....       | 0.75   |
| Condon's First Island, Geological Trips in the Siskiyou and along the Rogue River, 1970 .....            | 1.25   |

|  |       |
|--|-------|
| Field Trips along the Oregon Coast in Lincoln County, 1974.....              | 2.25  |
| Field Guide to Geologic Sites in the Newberry Crater Area, 1976.....         | 2.00  |
| Investigating the Geology of the North Cascades, Washington state, 1977..... | 2.25  |
| Sawtooth Mountains and the Stanley Basin, Idaho, 1978 .....                  | 1.75  |
| Lewiston, Idaho, 1984 .....  | 3.50  |
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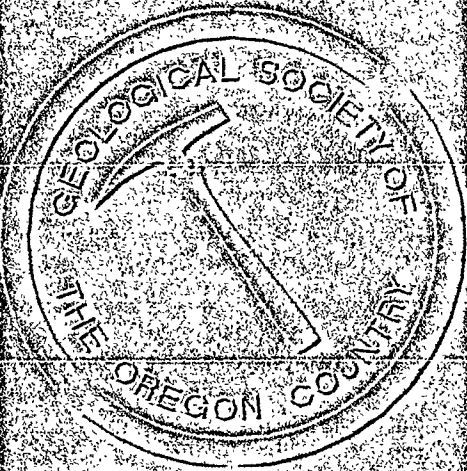
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Calendar Editor, John Teskey, 503-641-7746, [lawlib@Teleport.com](mailto:lawlib@Teleport.com)

VOL. 71, NO. 11  
NOVEMBER, 2005

## **NOVEMBER ACTIVITIES**

Seminar, Wednesday, November 16th, 8 P.M., LOCATION: ROOM S17, PORTLAND STATE UNIVERSITY, "How to Recognize Sea Level Rise and Fall in the Rock Record". Transgression and regression of the Earth's oceans aren't as difficult to spot as we think! Environments are deposited in a specific order. What clues can we amateur geologists see in the rocks in order to tell if the sea level has risen or fallen? Come to the November 16th seminar at 8:00pm to learn how you can identify simple patterns in the rock record showing these critical turning points in geologic history. All ages are welcome!

Friday Evening Talk, November 18, 8:00 P.M., LOCATION: ROOM S17. PORTLAND STATE UNIVERSITY, "Patagonia: Wind, Fire and Ice" Patagonia is famous, for its wind, its extensive glaciers and glacial geology, its spectacular mountains, active volcanoes as well as for its large vertebrates, from whales to dinosaurs. Dr. Georg Grathoff spent 3 months in 2004 as a Fulbright fellow in Neuquen and traveled throughout Patagonia. He will present a geologists perspective of Patagonia as well as his personal research on the origin of therapeutic-hydrothermal clays at the Copahue volcano. **DUE TO VETERANS DAY THIS LECTURE IS BEING HELD ON THE THIRD FRIDAY OF THE MONTH RATHER THAN THE SECOND FRIDAY**

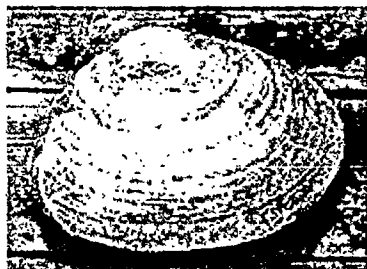
## **DECEMBER ACTIVITIES**

Coming December 21st: Geology Crafts! Join us for an evening of simple projects to make gifts for yourself or others. Kids are especially encouraged to attend! I am asking for some donations of some materials, if possible--especially small, pebble (or smaller) size rocks. If you have some rocks you're willing to part with, or are interested in helping out, please e-mail me, Tara Schoffstall, at [tschoffstall@yahoo.com](mailto:tschoffstall@yahoo.com). Thanks!

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Call John Teskey, 503-641-7746 [Lawlib@Teleport.com](mailto:Lawlib@Teleport.com)



## OREGON'S OTHER FOSSIL RECORD

Notes from presentation by Dr. William Orr, October 14, 2005 GSOC Friday Evening Talk.

When the words "Oregon fossils" are mentioned, most folks think of John Day specimens or mollusks. Let's look at some others.

Fossil sharks and **teleosts** (bony fishes) can tell us a great deal about the temperature and salinity of water, as well as the time the fossils were formed. Sharks, skates, and rays are cartilaginous, so complete skeletons are rare. Thanks in great part to the efforts of paleontologist Bruce Welton, Oregon has a superb record of these fish. Although sharks don't change much through time, their teeth do vary a great deal from species to species. This helps identify them. Even the individual teeth in a shark's mouth differ from one another, though, so for identification it's best to have a set of teeth that is more or less complete. Luckily for paleontologists, sharks' teeth are made of apatite, which is so sturdy that it can outlast quartz and glass.

A shark's teeth are arrayed in banks. If one gets broken it only takes ½ to 1 day for a new tooth to move up and replace the old one. **Denticles**, the tiny toothlike bumps that stick out of a shark's skin and give it a sandpapery texture, have shapes specific to each species – another aid to identification. The teeth of *Myliobatis*, a fossil eagle ray commonly found near Scotts Mills, were flattened with parallel ridges, a good adaptation for mollusk-eating.

Bony fish carcasses can be found whole, but they are more likely to come apart after death. The backbones, skulls, and scales are good for identification. Teleost scales, when preserved, are as distinctive as fingerprints. Ear bones work well, too.

Near the town of Rome in southeast Oregon are thick sediment deposits from **ancient Lake Idaho**. Layers of lava have interbedded with the lake deposits to make natural sediment traps for fossils. An eight-foot long saber-toothed salmon fossil (*Smilodon ichthys*) was found in late Miocene deposits near here. The skull was 1.5 feet long. In spite of its imposing front teeth, those farther back in the jaw indicate that this species of salmon was a plankton-feeder.

Amphibian fossils are fairly common in the state. Many little 2-inch frogs have been preserved in parts of the John Day and Mascall Formations. The leaf beds in Eocene deposits near Goshen, Oregon, have salamanders in them.

Oregon's reptile fossils include turtles, crocodylians, lizards, ichthyosaurs, and pterosaurs. Both sea turtles, which tend to be flattened and streamlined, and land tortoises, with high domed carapaces (backs), have been found here. Miocene-Pliocene Turtle Cove **montmorillite** clay has preserved fossil tortoises very similar to living ones found today in the Galapagos. Dr. Packard dug up Miocene leatherback turtle fossils in the Astoria Formation. Fossils of turtles very similar to present-day green sea turtles are not uncommon.

Within the last few years, a **pleisiosaur** jaw was found in eastern Oregon Cretaceous deposits. A lot of what look like bullets, but are lighter weight, have been preserved in the Eocene Clarno Formation. They are the skulls of burrowing legless lizards.

The constraints of swimming lead to similarities in the shapes of animals that move through water. **Ichthyosaurs** came in a variety of whale- and porpoise-like shapes and sizes, up to 60 feet long. Some could swim in short high-speed bursts; others excelled at covering long distances. One ichthyosaur evidently originated in Asia during the Triassic. Oregon acquired a few terranes during the next 100 million years, and now fossils of this same ichthyosaur are quite common in Cretaceous deposits in the eastern part of the state.

In the early days of fossil-hunting, Eastern paleontologists seemed to consider the West their own giant boneyard. Whatever they found that they wanted got shipped back East. One example was an almost perfect pterosaur skeleton with outspread wings. The humerus (upper arm bone) of a pterosaur is easy to identify even without the rest of the skeleton, as it has a special flange for the attachment of flight muscles.

The **mammal record** in Oregon includes examples of both toothed and baleen whales. One of the most common whale fossils is the baleen whale *Copecetus*, 18-20 ft. long and similar to today's gray whales. An interesting side note: One way that gray whales feed is by plowing through shallow-water sand and sieving out organisms for food. Troughs from this activity remain until disturbed by tides or waves or whatever.

The teeth of a toothed **whale** are a good means of identification. A toothed whale found in Eocene deposits was 50 feet long and had two distinctly different kinds of teeth. The Oligocene Yaquina Fm. and the Scotts Mills Fm. include a "porpoise with swordfish teeth and an overbite."

Two men, Doug Emlon and Guy Pearson, have done a lot of work with **pinniped** (seal and sea lion) fossils. From the Eocene on, diverse environments that developed in and around Willamette Sound - the shallow sea that eventually became the Willamette Valley and surroundings - led to the evolution of various pinnipeds. Particularly during the Oligocene this area had a great range of environments. A Miocene walrus was discovered in the Empire formation. Dr. Condon discovered a manatee-size carnivorous seal similar to today's leopard seal.

Sea lions have sharp incisors and canines, but the back teeth are peglike. This means the animals can eat everything from mollusks to salmon.

Although otters are carnivores, sea otter molars have evolved for eating shellfish. The fossil **Desmostylus**, something like a marine hippo, had developed odd-shaped teeth that looked like bundles of pillars, half-a-dozen or so in a single tooth.

These, too, would have been handy for crushing mollusk shells.

Oregon has been a mecca for paleontologists looking for Cenozoic vertebrates. The John Day beds and coastal sedimentary deposits hold just part of the story.

Evelyn Pratt

Websites for further reading:

Fossils You Can Find on Oregon Beaches, copyright 2004 by Oregon State University, Written by Guy DiTorrice:

<http://seagrant.oregonstate.edu/sgpubs/onlinepubs/g04001.pdf>

(source of Macoma photo rendered above)

Oregon Fossil Guy site:

<http://www.oregonfossilguy.com/index.php>

Peace Corps online recount fossil find:

<http://peacecorpsonline.org/messages/messages/2629/2034821.html>

Fossils from the DOGAMI website:

<http://www.oregongeology.com/learnmore/fossils.HTM>

Oregon Paleo Project:

<http://www.oregonpaleoproject.org/index.html>

## BOARD MEETING NOTES

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

October 22, 2005

The meeting was called to order the home of Rosemary Kenney, 7000 SW 15th Ave., Portland. Board and GSOC members present included Charles Carter, Bonnie Prange, Beverly Vogt, Marvel Gillespie, John Teskey, Richard Meyer, Clay Kelleher, Rosemary Kenney, and Richard Bartels.

Bonnie Prange announced that the November 18th speaker is George Gray, speaking about Patagonia, and the December 9th speaker is Andrew Fountain, speaking about Changing Glaciers of the American West.

Marvel Gillespie gave the financial report and will be computerizing the GSOC financial records, with assistance from John Teskey and Richard Bartels.

John Teskey has agreed to serve as the new Business Manager, with Rosemary as his assistant, effective March 1. We thank Rosemary from the bottom of our collective heart for all her work as Business Manager over the years and hope she will continue her personal policy of seeing what needs to be done and doing it.

The board discussed reprinting some of John Allen's old Oregonian articles in the Newsletter. Bev Vogt agreed to serve as Field Trip Coordinator for next year. Some suggested trips are Silver Falls (Clay Kelleher as leader), time and place to be suggested by Bonnie Prange, the Gorge, the Coast, Silver Star Mountain, Catherine Creek (Richard Bartels as leader), and some kind of fossil trip possibly led by Guy DiTorre.

The Annual Donation to the Geology Department was discussed. As the Geology Department gives us the lecture room at no cost and as we missed payment for 2004, after discussion and voting it was decided that in November of each year we will donate \$800 to the Geology Scholarship Fund. An additional \$300 being held from the Taylor bequest

will be donated as a one-time donation to the Geology Department Field Camp Fund.

The Annual Banquet was discussed. Charles will approach the Rhinelander about possible revision of their menu choices and about a Sunday date for the banquet in March. The Banquet Committee will be selected at the next meeting.

The next meeting is scheduled for December 10th at Rosemary's house.

Meeting was adjourned.

Beverly Vogt, Secretary

## GSOC President Calling for Volunteers

GSOC needs volunteers to help the organization this coming year. Most of the jobs involve no more than a couple of hours a week and are easy to do. If you are interested as serving as an officer, helping with the newsletter mailing, helping with the upcoming GSOC banquet, etc., please call either Richard (Bart) Bartels at 503/292-6939 or Charles Carter at 503/469-8353. Thank you for considering to help. We need some new people to be an active part of the organization!!!

## LEWIS BIRDSALL DECEASED

Lewis Birdsall, a long-time member of GSOC, died September 28 at the age of 90. An electrical engineer by profession, Lew, with his wife Mura, were active in both GSOC and the Oregon Agate and Mineral Society. Lew also taught lapidary classes at the Sellwood Boys Club. The Birdsalls were longtime residents of Forest Grove. Lew is survived by his wife and children.

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### Nominating Committee Results

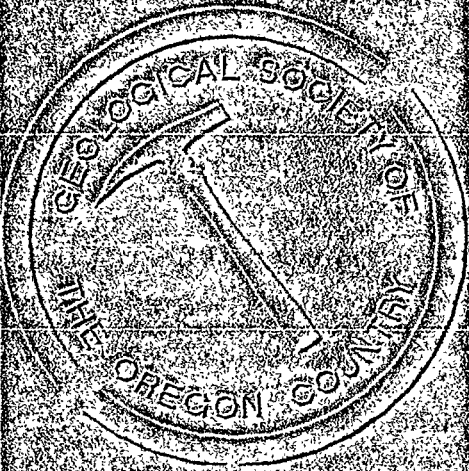
The following slate of officers has been selected by this year's nominating committee:

- President.....Bonnie Prange
- Vice President.....Richard Bartels
- Secretary .....Beverly Vogt
- Treasurer..... Marvel Gillespie
- Director, 3 years ..... Larry Purchase
- Director, 2 years .....Janet Kaye-Rasmussen
- Director, 1 year.....John Teskey

Nominations will also be open at the December club meeting on Friday, December 9, 2005. Consent of the nominees must be secured prior to their nomination. Nominations will be closed after the December meeting. Final nominations will be published in the January newsletter. The slate of officers will be voted on and approved at the February monthly meeting.

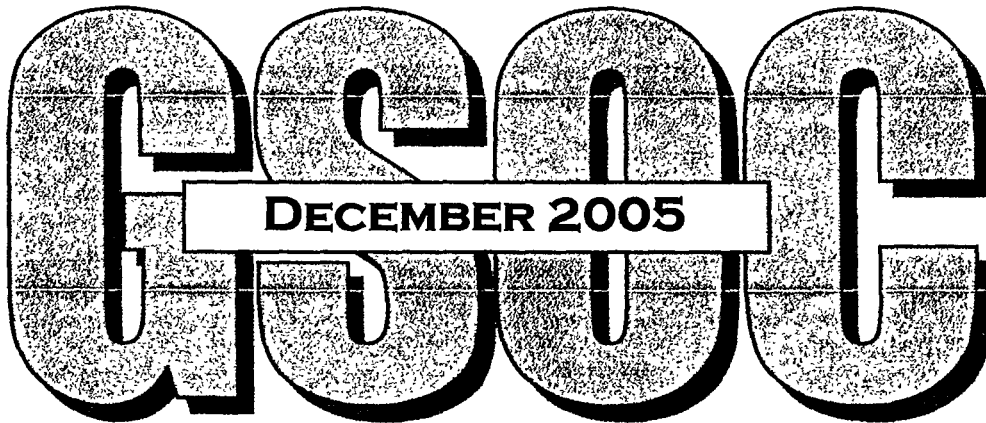
The Nominating Committee members are Richard Bartels, chair, Rosemary Kenney and Charles Carter. Our thanks to the selected members and members of the Nominating Committee!

**GEOLOGICAL SOCIETY OF  
THE OREGON COUNTRY  
P. O. BOX 907  
PORTLAND, OR 97207**



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# GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

2005-2006 ADMINISTRATION

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Bonnie Prange – 360/693-8396

**Secretary**

Beverly Vogt – 503/292-6939

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John Teskey (2 years) – 503/641-7746

Richard Meyer (1 year) – 503/236-7795

**Past Presidents:**

Clay Kelleher – 503/775-6263

Rosemary Kenney – 503/892-6514

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## THE GEOLOGICAL NEWSLETTER

**Editor:**

Carol Hasenberg – 503/282-0547

**Calendar:**

John Teskey – 503/641-7746

**Business Manager:**

Rosemary Kenney – 503/892-6514

**Assistant Business Manager:**

John Newhouse – 503/224-2156

### ACTIVITIES:

**ANNUAL EVENTS:** President's Field Trip—Summer or Fall; Banquet—March; Annual Business Meeting—February.

**FIELD TRIPS:** About 6 per year. Fees: see field trip announcements on the calendar next page.

**GEOLOGY SEMINAR:** Usually held on the third Wednesday of some winter months, 8:00 p.m., Rm. S17, Cramer Hall, PSU. See calendar for details

**GSOC LIBRARY:** Rm. S7, Open 7:30 p.m. prior to meetings.

**PROGRAMS:** Second Friday evening most months, 8:00 p.m., Rm. S17, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon.

**MEMBERSHIP:** Per year from January 1: Individual—\$20.00, Family—\$30.00, Junior (under 18)/Student—\$10.00.

**PUBLICATIONS:** THE GEOLOGICAL NEWSLETTER (ISSN 0270 5451), published monthly and mailed to each member. Subscriptions available to libraries and organizations at \$15.00 per year. Individual Subscriptions \$13.00 per year. Single Copies: \$1.00. Order from:

Geological Society of the Oregon Country, P.O. Box 907, Portland, Oregon 97207

**TRIP LOGS:** Write to the same address for names and price list.

**WEBSITE:** [www.gsoc.org](http://www.gsoc.org). Email address: [gsoc@spiritone.com](mailto:gsoc@spiritone.com).

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### APPLICATION FOR MEMBERSHIP-

### THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Name \_\_\_\_\_ Spouse \_\_\_\_\_

Children under age 18 \_\_\_\_\_

Address \_\_\_\_\_ City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

Phone (\_\_\_\_) \_\_\_\_\_ - \_\_\_\_\_ Email address \_\_\_\_\_

Geologic Interests and Hobbies \_\_\_\_\_

Please indicate Membership type and include check for appropriate amount:

Individual \$20.00 \_\_\_\_\_ Family \$30.00 \_\_\_\_\_ Student \$10.00 \_\_\_\_\_

Make Check Payable to:

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# **GEOLOGICAL NEWSLETTER**

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VISITORS WELCOME AT ALL MEETINGS  
INFORMATION: [www.gsoc.org](http://www.gsoc.org)

VOL. 71, NO. 12  
DECEMBER, 2005

Charles Carter, President, 503-469-8353, [chcarter39@hevanet.com](mailto:chcarter39@hevanet.com)  
Calendar Editor, John Teskey, 503-641-7746, [lawlib@Teleport.com](mailto:lawlib@Teleport.com)

## **DECEMBER ACTIVITIES**

**Friday Evening Talk, December 9, 8:00 P.M., "What is Happening to the Glaciers of the American West and Why?"** Research by Dr. Andrew Fountain of the Portland State University Geology Dept. has found that since the turn of the last century our Western U.S. glaciers have shrunk by 20-80%. Hear the results of his observations and conclusions for this phenomenon. **Room S17, Portland State University.**

**Wednesday, December 21st at 8:00 P.M. Geology Crafts for the Holidays, Room S17, Portland State University.** Tired of the holiday shopping? Kids need something to do during their holiday break? Join us for an evening of making simple geology craft projects to create gifts for yourself or others. Kids are *especially* encouraged to attend! I am asking for donations of some materials, if possible—especially small, pebble (or smaller) size rocks, unused flowerpots, socks without holes, shoelaces, small glass jars with lids, empty tin cans, and other craft supplies and materials (like craft glue, paints, etc). If you have some stuff you're willing to part with, or are interested in helping out, please e-mail or call me, Tara Schoffstall, at [tschoffstall@yahoo.com](mailto:tschoffstall@yahoo.com) (503-513-6925) or bring donations to the next Friday Evening Talk. Thank you for your support!

**PARKING AT PORTLAND STATE UNIVERSITY IS AVAILABLE AFTER 7 P.M. IN THE PARKING STRUCTURE ON BROADWAY DIRECTLY ACROSS FROM CRAMER HALL**

**CHECK THE GSOC WEB PAGE FOR THE LATEST GSOC CALENDAR OF EVENTS,  
WWW.GSOC.ORG, OR CALL JOHN TESKEY 503 641 7746**

**Calendar items must be received by 15<sup>th</sup> of preceding month.  
Call John Teskey, 503-641-7746 [Lawlib@Teleport.com](mailto:Lawlib@Teleport.com)**

## PREFACE TO THIS MONTH'S REPRINTED ARTICLES

This month's articles are reprinted from the December 2000 issue of The Geological Newsletter. The reprints include the articles "Seven Simplified Strata" and "The Not-so-boring Volcanics".

### SEVEN SIMPLIFIED STRATA

Introduction to Clay Kelleher's Boring Lava field trip with embellishments from the Editor. Also references to Orr, Orr, and Baldwin, Geology of Oregon, 4<sup>th</sup> Edition, Kendall/Hunt Publishing Company, 1992.

The seven major rock units in the Portland metropolitan area are as follows:

**Tos** – 30 Ma. Marine sediments, exposed in Tryon Creek State Park, Sellwood, and Waverly Country Club.

**Tcr** - Columbia River Basalt Group flows between 16 Ma. and 12 Ma. in the Portland area (Grand Ronde, Wanapum, and Saddle Mountain formations). The Tualatin Mountains (Portland Hills) and bedrock for east Multnomah County are composed of these basalt flows.

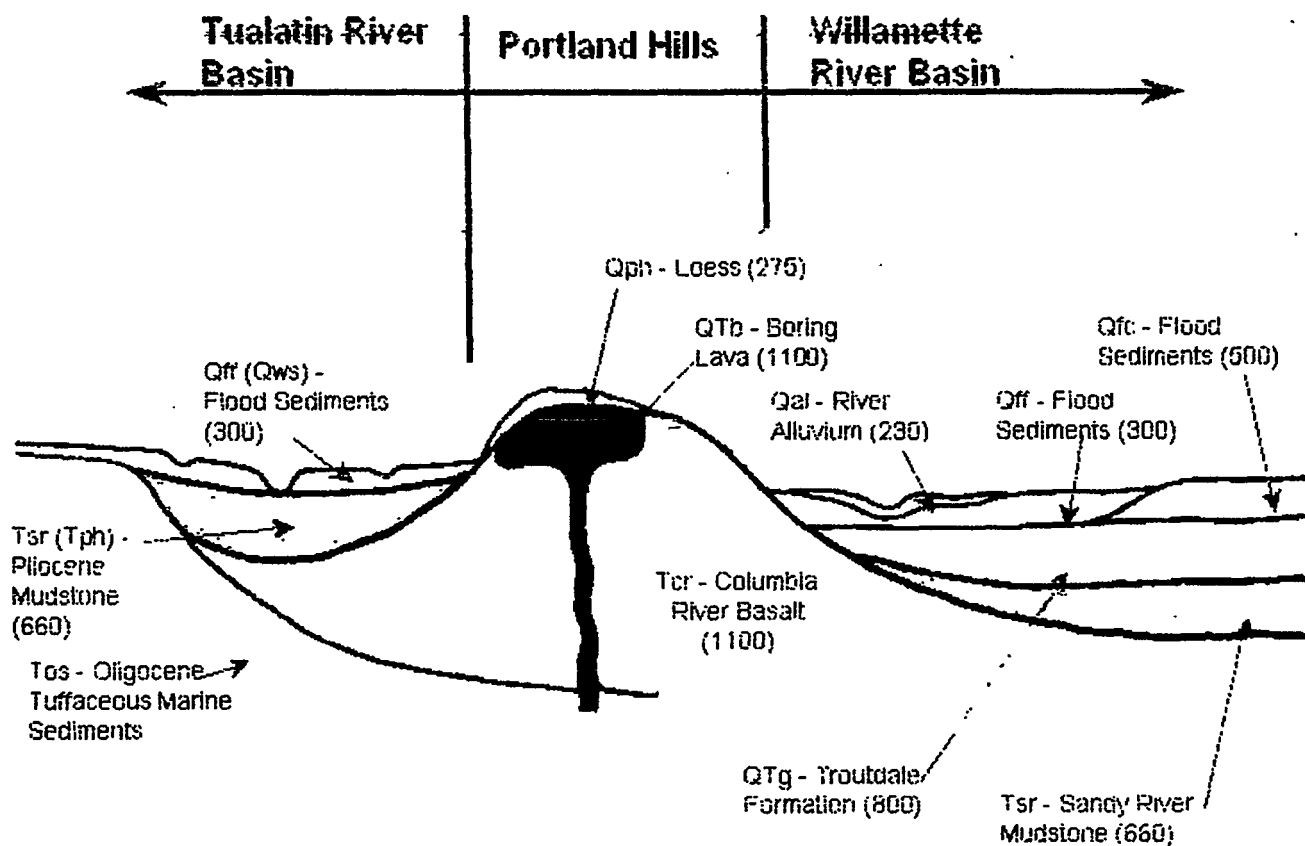
**Tsr** – Sandy River Mudstone from late Miocene to early Pliocene is lake and river deposited sediments created in a basin formed by the ancestral Willamette and Columbia rivers. This layer underlies the Troutdale formation in east Portland and east Multnomah County.

**Tt** - Troutdale formation from late Miocene and throughout Pliocene. Conglomerate composed of "well-rounded pebbles and cobbles of Columbia River Basalt and exotic volcanic, plutonic, and metamorphic rocks". These deposits are from the ancestral Columbia River due to their composition of rocks from the ancestral continental margin and associated plutonic rocks. The Springwater Formation is similar to the Troutdale formation, somewhat younger, with rock composition more local in origin.

**QTb** - Boring Volcanics – 3 Ma. to 250,000 a., westward younging flows of light gray to gray basaltic and basaltic andesite flows which erupted in small vents and cones to larger shield volcanoes. Larch Mountain, Mt. Sylvania, Rocky Butte, Mt. Tabor, Powell Butte, Mt. Scott, and many other buttes in the Portland area, especially west of the town of Boring, contain Boring lavas.

**Qph** – Portland Hill Silt deposited within the last 700,000 years blankets much of the Tualatin Mountains (Portland Hills). The silt is believed to be wind-blown in origin and is similar to the soil in the palouse area of southeastern Washington.

**Qff/Qfc** – Ice Age Flood deposits, both fine-grained and gravelly, were left by the catastrophic flooding from glacial Lake Missoula in western Montana. These deposits are 16,000 to 12,000 years in age.



## Schematic Cross Section - Geology of Portland Metropolitan Area

### THE NOT-SO-BORING VOLCANICS

Saturday, November 4, 2000

By Carol Hasenberg

Field Trip leader Clay Kelleher

For a more complete description of Boring Lava, and a location map of the vents, refer to these pages of the USGS/Cascades Volcano Observatory website:

[http://vulcan.wr.usgs.gov/Volcanoes/Oregon/BoringLavaField/description\\_boring\\_lava.html](http://vulcan.wr.usgs.gov/Volcanoes/Oregon/BoringLavaField/description_boring_lava.html)

Looking out across the Willamette Basin east toward Mt. Hood from the Portland Hills, one sees a series of "bumps" starting with Mt. Tabor and Rocky Butte and continuing toward the horizon, especially ESE towards the town of Boring. They look like a series of little volcanoes, and indeed that is what they are. One might wonder if these are somehow associated with the volcanic processes which created the Cascade Mountains, or even the Columbia River basalts which erupted in the Miocene epoch.

The clues for the answers to those questions are in the composition of the rocks from these volcanoes as well as the age of the rocks. Geologist Ray Treasher first gave the Boring Lava its name in

1942, due to the fact that the densest concentration of Boring Lava volcanoes is just west of the town of Boring. Since then, a series of geologists have been working to solve the puzzle of the origin of these volcanic vents. In the article "Geology of Portland, Oregon and Adjacent Areas:", Trimble (Trimble, 1963) describes the Boring Lava as "exposed in eruptive vents, many of which still have their initial cone shape, and in dissected lava plains...The Boring lava is composed mainly of basaltic flow rocks, but locally contains tuff breccia, ash, tuff, cinders, and **scoriaceous** phases. The flows commonly are light-gray to nearly black, with lighter tones predominating, and are characterized by columnar jointing and flow structure which in places results in platiness of the rock. Typical jointing is exposed along Boones Ferry Road where a tongue of lava from Mount Sylvania flowed down a small valley, cut in the underlying Troutdale sediments. The columns are perpendicular to the walls of the small valley...The Boring lava is characteristically a light-gray **olivine** basalt with a **pilotaxitic** to **diktytaxitic** texture. Light-brown altered olivine **phenocrysts**, altered in part or entirely to **iddingsite**, are characteristic of the rock."

John Allen, in the article "Volcanoes of the Portland Area, Oregon:", compares Boring Lava to Columbia River Basalt, which is referred to as Yakima Basalt. "The Boring, as compared to the Yakima, is gray rather than dark gray to black, and the jointing is generally massive or blocky rather than columnar or brickbat. Still more characteristic of the Boring Lava, as seen in thin section, is the meshwork of minute **plagioclase laths** (pilotaxitic texture) commonly with open spaces between the laths (**diktytaxitic** texture). The Boring Lava contains **olivine**, rare in Yakima Basalt, and there is a very distinct geochemical difference between the two types of lavas (Beeson, personal communication, 1975)."

"Allen(1975) located more than 30 Boring vents within 21 kilometers of here -- ( Mount Tabor) -- and more than 90 vents (about 50 of which he classified as "certain") within 32 kilometers of Troutdale (5 kilometers northeast of Gresham). The Boring in this area is between about 1.3 million years old (Rocky Butte, 3 kilometers northeast of

here) and 2.1 million years old (in bluffs near Oregon City, 18 kilometers south of here), judging from unpublished K-Ar ages (Sherrod, oral communication., 1988) and a K-Ar age of 1.56 +/- 0.2 million years on a flow at Bear Prairie 29 kilometers east-northeast of here (Tolan and Beeson, 1984)." (Swanson, et.al., 1989)

"The setting of the basalt field is puzzling and not understood. The vents lie well west of the crest of the Cascades, and those such as Kelly Butte, Mount Tabor, and the vents in the Portland Hills are in and even west of the Portland basin." (Swanson, et.al., 1989)

The Boring Lava, then, is quite different in composition than the Columbia River Basalt, and it is also much younger in age. Scientists have been puzzled by the location of the volcanism, so far west of the High Cascades. The composition of the lava is much closer to andesite than that of CRB, and an association with High Cascade volcanism is hinted by Tolan and Beeson as they compare the distribution of the Little Butte Volcanics in the Scotts Mills Quadrangle to the Boring Lava:

"Boring vents and flows are found along the western margin of the Portland Basin, many tens of kilometers from the main axis of High Cascade volcanism. Faults associated with the northwest-trending Portland Hills- Clackamas River structural zone...provide a pathway for Boring magmas to migrate away from the axis of High Cascade volcanism." (Tolan and Beeson, 1999)

In the GSOC field trip of November 4, we toured a number of Boring lava outcrops, coming from a number of the different vents. Starting at the top of Mt. Sylvania on the Portland Community College Sylvania campus, we headed north to the youngest of the Boring lava flows, the Basalt of Barnes Road. A lovely, moss-covered outcrop sits next to the home of a Mr. And Mrs. Swanson. Mrs. Swanson's family has been in the area since the late 1800's, and Mrs. Swanson knew of many lava tubes in the area. A remnant of these tubes can be seen near the parking lot for the Catlin Gabel School nearby.

Next the group headed east to the Portland basin where we toured Mt. Tabor and Powell Butte. The cinder cone perched on the northwest side of Mt. Tabor is the vent, and one of the members of the group remembered playing here when she was a girl. Back then you could find a lot of obsidian in the area.

At Powell Butte we observed an outcrop of the lava near the base on the west side of the butte, then observed piles of boulders deposited nearby from the excavations for the water works on the butte. The top of the butte is the Springwater formation (see the preceding article, Seven Simplified Strata) according to Clay.

The last stop of the day was the former site of a quarry off SE Foster Road near Damascus. The cliff face here is an very fine outcrop of Boring lava which shows some exfoliation and very blocky jointing. After observing this for some time, we headed home, enriched by observing the fascinating geology of our own back yard.

#### References:

Tolan, Terry L. and Beeson, Marvin H., U.S. Geological Survey, Geologic Map of the Scotts Mills, Silverton, and Stayton Northeast 7.5 Minute Quadrangles, Oregon, Open-file Report 99-141

Trimble, "Geology of Portland, Oregon and Adjacent Areas:", USGS Bulletin 1119, 1963

Allen, John, "Volcanoes of the Portland Area, Oregon:", State of Oregon, Department of Geology and Mineral Industries, The ORE-BIN, v.37, no.9, September 1975

Swanson, et.al., 1989, IGC Field Trip T106: Cenozoic Volcanism in the Cascade Range and Columbia Plateau, Southern Washington and Northernmost Oregon: American Geophysical Union Field Trip Guidebook T106.

**Vocabulary words** from the preceding article are defined as follows:

**diktytaxitic** – a texture of basalt produced by rapid cooling (quenching) with characteristic deformed, random pores.

**olivine** –

(Mg, Fe)<sub>2</sub>SiO<sub>4</sub> – a hard, medium heavy, fragile, olive-green to yellowish mineral found in some basalts. The gem variety is peridot. Adapted from Simon & Schuster's Guide to Rocks and Minerals, 1978.

**phenocryst** –

a large crystal in a porphyritic rock, a texture in igneous rocks in which conspicuously large crystals (phenocrysts) are imbedded in a finer-grained or glassy groundmass. "Definitions of Some of the More Common Petrographic Terms", O. Don Hermes, Department of Geology, University of Rhode Island,

<http://borealis.lib.uconn.edu/neld/definitions.html>

**pilotaxitic** –

a felty aggregate of tiny, lath-shaped crystals. An equi-granular fabric. - O. Don Hermes, Department of Geology, University of Rhode Island, <http://borealis.lib.uconn.edu/neld/textures.html>

**plagioclase** –

A group of feldspar minerals with a composition range from NaAlSi<sub>3</sub>O<sub>8</sub> to CaAl<sub>2</sub>Si<sub>2</sub>O<sub>8</sub>. This mineral is most abundant in andesitic lava. Adapted from Hamblin, W. Kenneth, The Earth's Dynamic Systems, 4<sup>th</sup> Edition, Burgess Publishing, 1975.

**scoria** -

Scoria forms when blobs of gas-charged lava are thrown into the air during an eruption and cool in flight, falling as dark volcanic rock containing cavities created by trapped gas bubbles. (Clynne, et.al., 1998)

Clynne, et.al., 1998, How Old is "Cinder Cone"? -- Solving a Mystery in Lassen Volcanic National Park, California:

USGS Fact Sheet 173-98

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Nominating Committee Results

The following slate of officers has been selected by this year's nominating committee:

- President.....Bonnie Prange
- Vice President.....Richard Bartels
- Secretary .....Beverly Vogt
- Treasurer.....Marvel Gillespie
- Director, 3 years ..... Larry Purchase
- Director, 2 years .....Janct Kaye-Rasmussen
- Director, 1 year.....John Teskey

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The Nominating Committee members are Richard Bartels, chair, Rosemary Kenney and Charles Carter. Our thanks to the selected members and members of the Nominating Committee!