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

SINCE 1935

GSOC

JANUARY 2003

THE GEOLOGICAL NEWSLETTER

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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ANNUAL EVENTS: President's Field Trip—Summer or Fall; Banquet—March; Annual Business Meeting—February.
FIELD TRIPS: Usually one per month. Fees: Members, free, Non-members, $2.50. See calendar next page.
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GSOC LIBRARY: Rm. S7, Open 7:30 p.m. prior to meetings.
PROGRAMS: EVENING: Second Friday Evening each month, 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.
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Tom Gordon, President, 360-835-7748
Ted Walling, Calendar Editor, 503-598-8067

VOL. 69, No. 1
January 2003

JANUARY ACTIVITIES

Fri. Jan. 3, 12:00-1:30 PM: Report on GSOC Trip to Central Washington and Wenatchee. Area Geology and Ancient Core Complexes. Carol Hasenberg, past president. Rm 120B (Crooked River Suite), Oregon State Office Building, 800 NE Oregon St.

Fri. Jan. 10, 8:00 PM: Oregon Sand Dunes – An update on the Last Ten Years of Research. Frank Reckendorf. Rm 371 Cramer Hall, PSU.

Seminar Wed. Jan. 15, 8:00 PM: Older Extinct Accretionary Wedges in Pacific NW, Part One. Richard Bartels, past president. Rm S17 Cramer Hall, PSU.

* *

PREVIEW OF COMING EVENTS

Fri. Feb 7, 12:00-1:30 PM: To Be Announced. Rm 120B (Crooked River Suite), Oregon State Office Building, 800 NE Oregon St.

Fri. Feb 14, 8:00 PM: To Be Announced. Rm 371 Cramer Hall, PSU.

Seminar Wed. Feb 19, 8:00 PM: Older Extinct Accretionary Wedges in Pacific NW, Part Two. Richard Bartels, past president. Rm S17 Cramer Hall, PSU.

Calendar items must be received by 15th of preceding month. Call Ted Walling 503-598-8067.

UPCOMING ANNUAL BANQUET

The GSOC Annual Banquet will occur in the month of March. The date, location and speaker will be announced in next month's newsletter and we hope you all can attend.

FIELD TRIPS COMMITTEE

Volunteers needed for field trips

GSOC members love to go on field trips, but organizing and leading such trips is a lot of work. A field trip leader needs to be able to concentrate on leading the trip, which means he or she needs help from other GSOC members with setting up the trip and keeping track of details during it. The Field Trip Committee is looking for GSOC volunteers to help the leaders. A volunteer can be either a (1) Field Trip Assistant, who will help out during a trip doing such things as pass out and collect waivers, be the last car on a car caravan, help keep track of people, and assist the leader in a variety of other ways; or (2) Email/Phone Contact Person, who will be the person field trip participants will contact by phone or email before a field trip with questions or reservations. Doing these jobs requires no special geologic knowledge—just the desire to help out and the ability to keep track of details and people. If you want to help out as either a Field Trip Assistant or Email/Phone Contact Person--or if you just want more information about what such jobs involve, contact Field Trip Committee Chair Beverly Vogt, phone 503-292-6939, or email bevfrob@teleport.com.

The Field Trip Committee would also like to talk with anyone who would like to lead a field trip during the 2003 field season. If you are interested or have some ideas for a field trip, contact Beverly Vogt, phone number and email address above.

GSOC exists because its members are willing to work on its activities. We need your help with field trips. Here is your chance to help with one of the Society's most enjoyable activities.

COMPLETELY FRACTURED GEOLOGY

by Ralph & Evelyn Pratt

Thanks to Tom & Diana Gordon for 1. and 2.

1. **Bedrock**: (1) a chunk of agglomerated minerals that one finds in one's bed (2) what you get for buying that cheap mattress
2. **Zinc**: (1) what you do when you're solving a problem (2) what happens to you when you can't zwim.
3. **Brothers fault zone**: in an all-boy family, the supper table
4. **Joint**: (1) a crummy restaurant (2) what a pothead smokes (3) as in "How did I become a GSOC member? I joint!"
5. **Substrate**: what the customer at a fast-food joint said to the guy fixing his French bread sandwich: "It's crooked! Make my substrate!"
6. **Agglutinate**: as in, "Keep baby Tim away from the art supplies! Yesterday agglutinate made him sick."
7. **Transfer percentage**: what Arthur Anderson's CPAs received from some shady stock market deals.
8. **Anomalous**: a college in Maryland where the U. S. Navy trains cadets.
9. **Underfitstream**: a river that needs more exercise and a better diet. It probably should have its flood pressure checked.
10. **Tritium**: (1) as in a blues song: "Mah man left me 'cuz I didn't tritium right." (2) at the end of October, a mineral found in association with trickium.

Answers on page 5.

COMPLETELY FRACTURED GEOLOGY

Adapted from AGI Dictionary of Geological Terms, 3rdED., Bates & Jackson, by E. Pratt
Correct definitions:

1. **Bedrock**: the solid rock that underlies gravel or soil.
2. **Zinc**: a ductile, blue-white metallic element.
3. **Brothers fault zone**: a large-scale fracture system that extends SE by NW across central Oregon. (Geology of Oregon, Orr & Orr)
4. **Joint**: a fracture or crack in bedrock along which little or no displacement has occurred.
5. **Substrate**: the substance or nutrient on or in which an organism lives.
6. **Agglutinate**: A pyroclastic deposit welded together by glassy material.
7. **Transfer percentage**: for an element, the ratio of the amount present in sea water to the amount supplied to sea water during geologic time by weathering and erosion, multiplied by 100.
8. **Anomalous**: departing from the expected or normal - an adjective describing geological features that are different from their general surroundings.
9. **Underfit** stream: a stream that appears too small to have eroded the valley in which it flows.
10. **Tritium**: a radioactive isotope of hydrogen having two neutrons and one proton in the nucleus.

Nominating Committee Results

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

President	Evelyn Pratt
Vice President	Clay Kelleher
Secretary	Beverly Vogt
Treasurer	Phyllis Thorne
Director, 3 years	Richard Meyer
Director, 2 years	Sue Ikeda
Director, 1 year	John Newhouse

The slate of officers will be voted on and approved at the February monthly meeting. The Nominating Committee members include John Newhouse, Chair; Bev Vogt; Carol Hasenberg; and Taylor Hunt. 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 2003 dues are paid, good deal!!!

THE GEOLOGICAL NEWSLETTER INDEX
Volume 28, 2002
compiled by Rosemary Kenney

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VOL. 69, No. 2
February 2003

FEBRUARY ACTIVITIES

Fri. Feb. 7, 12:00-1:00 PM: Mammoth Lakes, Mono Lake and Yosemite. Tom Gordon, President. Rm 120B (Crooked River Suite), Oregon State Office Building, 800 NE Oregon St.

Fri. Feb. 14, 8:00 PM: Central California's Active Geology, and Bodie - California's Official Ghost Town. Tom Gordon, President. Rm 371 Cramer Hall, PSU. ALSO, ANNUAL BUSINESS MEETING AND ELECTION OF SOCIETY OFFICERS.

Seminar - Wed. Feb. 19, 8:00 PM: Older Extinct Accretionary Wedges in Pacific NW, Part Two. Richard Bartels, Past President. Rm S17 Cramer Hall, PSU.

* *

PREVIEW OF COMING EVENTS

ANNUAL BANQUET Sunday, March 2, 12:00 PM. Hot and Cold Running Water in Southeastern Oregon. Michael Cummings, Chairman, Geology Department, PSU. Rhinelander Restaurant, 5035 NE Sandy Blvd.

Fri. Mar. 14, 12:00-1:00 PM: Geology of Planet Venus. Lamont Brock. Rm. 120B (Crooked River Suite), Oregon State Office Building, 800 NE Oregon St.

Seminar – Wed. Mar 19, 8:00 PM: Geology of the Pacific NW. Richard Bartels, Past President. Rm S17 Cramer Hall, PSU

Calendar items must be received by 15th of preceding month. Call Ted Walling 503-598-8067.

BOARD MEETING NOTES

Summary of January 4 Board Meeting

The Board of Directors of the Geological Society of the Oregon Country (GSOC) met January 4, 2003, at the home of Rosemary Kenney. Main topics of discussion were the upcoming banquet and the computerization of the membership list and mailing labels. The annual banquet will be held on Sunday afternoon, March 2, at the Rhinelander Restaurant. See details elsewhere in the Newsletter. The Board also accepted with thanks a generous donation of $200 from Catherine Ellis, a GSOC member who lives in Bend. The next Board meeting will be on Saturday morning, March 15.

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Volunteers needed for field trips

GSOC members love to go on field trips, but organizing and leading such trips is a lot of work. A field trip leader needs to be able to concentrate on leading the trip, which means he or she needs help from other GSOC members with setting up the trip and keeping track of details during it. The Field Trip Committee is looking for GSOC volunteers to help the leaders. A volunteer can be either a (1) Field Trip Assistant, who will help out during a trip doing such things as pass out and collect waivers, be the last car on a car caravan, help keep track of people, and assist the leader in a variety of other ways; or (2) Email/Phone Contact Person, who will be the person field trip participants will contact by phone or email before a field trip with questions or reservations. Doing these jobs requires no special geologic knowledge—just the desire to help out and the ability to keep track of details and people. If you want to help out as either a Field Trip Assistant or Email/Phone Contact Person--or if you just want more information about what such jobs involve, contact Field Trip Committee Chair Beverly Vogt, phone 503-292-6939, or email bevfrob@teleport.com.

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GSOC Member Donates $200 to Society

The Board of Directors of the Geological Society of the Oregon Country (GSOC) wishes to acknowledge the generous donation of $200 from Catherine Ellis, a GSOC member who lives in Bend. Donations such as this are extremely helpful in covering the expenses of the society as we continue to bring programs that present accurate and up-to-date information about geology of the region to our members. The Board thanks Catherine for her interest in and support of GSOC activities.

Lectures and Exhibits at the Hatfield Marine Science Visitor Center

Current Exhibit (January 9 – March 10): The Big One: Earthquakes in the Pacific Northwest, on loan from the Burke Museum of Seattle, Washington

February 8 - Activities and Lectures – Fossil Identification – bring your fossils for expert identification by Dr. William Orr, also:

- Fossil swap
- Lecture, 11:00 am – "Fossils from Oregon", by the "OregonFossilGuy" Ditorrice
- Lecture, 1:30 pm – "Thomas Condon's Coastal Experience", Dr. William Orr, U of O

February 15 – Lecture – "Earthquake Hazards on the Oregon Coast: Evidence from Offshore", Dr. Robert Yeats, OSU

February 22 – Lecture – "Erosion of the Oregon Coast: The Roles of El Nino and Global Warming", Dr. Paul Komar, OSU

March 1 – Lecture – "Vulnerability of Pacific Northwest Coastal Communities to earthquakes and Tsunamis", Dr. Nathan Wood, USGS

March 8 – Lecture – "Engineering Solutions for Oregon Coastal Hazards", Dr. Stephen Dickenson, OSU

For more information about the Hatfield Marine Science Center, go to the website at http://hmsc.oregonstate.edu/

NICARAGUAN VOLCANOES AND VOLCANIC HAZARDS

GSOC Friday night meeting presentation by Cynthia Gardner, Cascade Volcano Observatory December 13, 2002

During the past two years Cynthia Gardner and William Scott, USGS, have been working on volcano hazard assessments for three volcanoes in Nicaragua. She divided her talk into a quick reprise of Nicaragua in general, a list of some of its volcanoes and their characteristics, and assessments of the hazards that they pose.

Nicaragua is a bit more than half the size of Oregon. Over 90% of its 5 million people live along the Pacific coast, away from malarial swamps to the east. This is also where most of the country's volcanoes are clustered. Along the volcanic chain lie Lakes Managua and Nicaragua. The latter, the largest lake in Central America, is more than 100 miles long. Lake Nicaragua was once an arm of the Pacific, and is home to the world's only known freshwater sharks. Spaniards once sailed up the Rio San Juan directly into Lake Nicaragua from the Caribbean, but an earthquake in the 1700's blocked the river, and thus the lake, from the sea.

Nicaragua became a country in 1838. Between 1838 and 1858, two colonial cities, Leon Viejo and Granada, vied with each other to be the Nicaraguan capital. Instead of giving power to either city, the Nicaraguans built a new capital city between them - Managua, between Lakes Managua and Nicaragua, became the country's capital in 1858. A geologic map shows that the city is riddled with faults. In 1972 a 6.2 earthquake leveled its downtown, killing over 20,000 people. Collapsing tile roofs caused most of the casualties. The damage to the entire country amounted to two times Nicaragua's gross national product at that time.

Even the basics of Nicaragua's geology are not well known. CVO researchers work with INETER, the country's equivalent of USGS, to learn more about Nicaraguan geology and how to cope with its hazards.

The actively-subducting Cocos plate offshore dives eastward under Central America at 8 to 9 centimeters a year, about three times the rate of our Juan de Fuca plate. Instead of moving diagonally as the latter does, the Cocos plate pushes perpendicularly against the coast. As a result, ten large and many small volcanoes have erupted in a line from Cosaguina Volcano in the country's northwest corner south 150 miles to Madeira Volcano - about the distance from Seattle to Portland.

Although we don't know the ages of most of the volcanoes, many of the basaltic cones in the chain are young, probably less than 5000 years old. Coseguina at the northwest end of the chain is a silicic volcano that last erupted in 1835. During the '90's a major hurricane initiated a 1.6 million cubic meter debris avalanche off of Casita volcano killing more than 2500 people. When Momotombo erupted in 1609, it destroyed Leon Viejo and was partly responsible for people abandoning this first capital city. Several calderas around Momotombo have produced many huge ignimbrite sheets. Now locals cut them into building blocks with their machetes.

Apoyeque, a silicic volcano near Managua, had a significant eruption 16,000 years ago that created a 2.75 km wide crater. Masaya has emitted sulfur dioxide fumes from its broad basaltic shield since 1993, damaging the health of plants, animals, and people for 15 km downwind. An 11 cubic km silicic eruption of Apoyo about 3000 years ago created a caldera lake. A Mt. St. Helens look-alike without a dome is Mombacho, which is known for its debris avalanches. Its history hasn't been determined yet, though it probably erupted within the last 2000 years. Concepcion's history isn't known.

Cynthia, William, and others from CVO are completing a hazards assessment for 1 km. high Telica Volcano and are talking with local officials about how to reduce future risks from that mountain. Geologists are hampered by (1) lack of preserved organic material for radioactive dating, and (2) lack of data on how long soil has been accumulating on and around the volcano. Characteristically it has emitted lava flows, scoria falls, near-vent ballistic showers, and lahars. Red scoria rubble covers the top. There is no evidence for debris avalanches or pyroclastic flows. Telica had a major eruption in 1529 and 30 to 40 small ones since then. The lahars typically start with rain washing newly deposited tephra off the flanks of the volcano. The initial mass increases in size as it descends. The 1529 eruption produced a lava flow that traveled up to 10 km from its source, and an extensive blanket of tephra.. Seven km from the volcano the tephra from that eruption is over a meter thick. Many of Nicaragua's people travel by horseback, and during the dry season locals use some of Telica's lahar channels as roads for riders and carts.

Wind is a major factor in risk assessment. NOAA figures show that along the west coast of Nicaragua the prevailing wind at lower elevations comes from the east, while around 20,000-30,000 feet it blows out of the northwest. During and after an eruption, pilots need to keep airplanes out of the path of blowing volcanic ash. To this end, researchers are developing "wind roses" (patterns of prevailing winds and wind strengths) for every month of the year. Unfortunately, so far the reality of where ash has gone doesn't always match the models that have been developed. This could be because the tephra didn't get high enough, or several eruptions occurred close together, or simply because wind patterns vary from year to year more than the models have accounted for.

In conclusion, it is now known that the main hazard of Nicaragua's many young basaltic volcanoes is local lava flows. Older ones tend to have debris avalanches. Little is known about the country's silicic volcanoes, which are potentially much more dangerous. CVO is sending Cynthia Gardner, Willie Scott, and others to Nicaragua again this spring to do more research on the country's interesting and exciting volcanic history.

Reviewer: Evelyn Pratt

Oregon Sand Dunes - Research Update

GSOC Friday night meeting presentation by Frank Reckendorf, PhD.
Frank retired from the Soil Conservation Service after 30 years of service in 1994, then started a consulting business, Reckendorf and Associates, in Salem, Oregon. Frank's research has involved the following areas:

- Stream Processes
- Stream Habitat
- Streambank Protection
- Wetland Rehabilitation
- Landscape Geomorphology
- Flood Plain ID and Mapping
- Sand Dune Processes and Mapping

Dune Construction in Oregon – Geological Hazards

European beach grass was purposefully planted in the early part of the century in Oregon, and has been steadily spreading ever since. It has replaced American dune grass in many locations in Oregon, and its spread has changed dune formation as well as ecology in Oregon. People planning a construction project in the dunes may think that these are permanent unchanging features when in

fact they are fairly recent in origin and are also continuously changing by the forces of wind and wave.

American dune grass does not form a continuous fore dune. Appearance of native grass dunes are hummocky. European beach grass survives burial better, and will fill in the gaps to produce a fore dune of about 35 feet. Sand blowing down the beach cannot top the fore dune, so these dunes are stable from wind erosion; however, they can be eroded by waves. Frank refers to this as conditionally stable.

Behind the fore dune is a deflation plane where the wind has blown out material behind the fore dune. Often this area is blown down to the water table. In this area transverse dunes can also develop, ridges perpendicular to the wind direction. Predominant wind direction along the beaches in Oregon is southwest but a lesser northwest wind can also form oblique dunes.

These fore dunes are less than 100 years old, except in Clatsop county, where about 17 parallel ridges exist. The sand has been constantly accumulating for at least 5000 years near the mouth of the Columbia River. European beach grass was planted in Clatsop County to stabilize the sand dunes, which were blowing into Coffinberry Lake.

One of the problems with construction in the fore dune is that the home owner is always fighting the processes of erosion and deposition. In the construction of a home on the dune, the fore dune is typically notched and so the sand keeps blowing up around the house in normal years. La Nina events produce large amounts of erosion on the Oregon coast (El Nino affects California more and the difference is the location of the trade winds).

Frank illustrated these processes with many pictures of buried homes or homes destroyed by beach erosion. A historical slide was of the natatorium at Bayocean, a development on Tillamook Bay, falling off the dune. Several spits and fore dunes in Oregon have been developed. Frank showed some slides of the great quantities of logs produced by the 1962 blowdown from the Columbus Day storm. Years later these logs were still being carried around by the waves and threatening beach structures.

One of the species threatened by the change in dune habitat was the snowy plover, who likes the open character of the native dunes so predators can be spotted. Another ecological consideration of the recent dune formation is that fire spreads rapidly through the dune grass. This is a concern both of planting European beach grass or the spreading wild grass.

Pollutants are common in beach front developments due to these houses having septic tanks. The deflation plane can have contaminated water, or contaminated water can be spilling onto the beach.

Other Topics of Research

Frank participated in a study by OSU of the sand accumulation in the Columbia cell in Clatsop County. While the majority of the sand supply from the Columbia River travels north into the Long Beach area; some of the sand travels south.

A combination of sand augering and ground penetrating radar was used to determine the scarp produced by the subsidence in a subduction zone earthquakes from the Cascadia subduction zone. Brian Atwater was involved in this study. Core samples of the sand were also obtained and studied.

Reviewer: Carol S Hasenberg

Don't forget that annual **DUES PAYMENTS** are past due! 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 2003 dues are paid, good deal!!!

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY
SIXTY-EIGHTH ANNUAL BANQUET

Speaker

The Geological Society of the Oregon Country will be having its 68th Annual Banquet on Sunday, March 2, 2003 (starting at 1:00 pm). The program topic will be "Hot and Cold Running Water in Southeastern Oregon", with **Dr. Michael Cummings**, Professor and Department Chair, Portland State University Department of Geology. Dr. Cummings has been involved in geological mapping of southeastern Oregon for a number of years.

Where and When

Location of the banquet will be Gustav's 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 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.

Menu

Chicken Schnitzel
With fresh seasoned mushrooms served with seasoned vegetable and spatzel.

Sauerbraten (braised beef)
With sweet and sour sauce served with braised sweet and sour red cabbage and spatzel.

Grilled Marinated Portabella Mushrooms
Topped with roasted garlic and feta cheese, served with zucchini planks and scalloped potatoes.

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

_____ Number of tickets at **$18.50** each. 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 Sauerbraten Vegetarian

_____ Meal choice (circle one) Chicken Sauerbraten Vegetarian

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_____ Amount enclosed. (Reservations must be received by Tuesday, February 18, 2003)

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John Newhouse (1 year) – 503/224-2156

Immediate Past Presidents:
Tom Gordon – 360/835-7748
Sandra Adamson

THE GEOLOGICAL NEWSLETTER

Editor:
Carol Hasenberg – 503/282-0547
Calendar:
Ted Walling – 503/598-8067

Business Manager:
Rosemary Kenney – 503/892-6514
Assistant Business Manager:
Cecelia Crater – 503/235-5158

ACTIVITY CHAIRS

Field Trips: ..... Beverly Vogt – 503/292-6939
Publications: ..... Rosemary Kenney – 503/892-6514
Geology Seminars: ..... Richard Bartels – 503/292-6939
Publicity: ..... Ted Walling – 503/598-8067
Historian: ..... Charlene Holzwarth – 503/284-3444
Noon Program: ..... Robert Strebin – 503/665-2756
Library: ..... Diana Gordon – 503/835-7748
Evening Program: ..... Clay Kelleher - 503/775-6263
Web Site: ..... Carol Hasenberg – 503/282-0547
Refreshments (Evening Program): ..... Tom and Diana Gordon

ACTIVITIES:

ANNUAL EVENTS: President's Field Trip—Summer or Fall; Banquet—March; Annual Business Meeting—February.
FIELD TRIPS: Usually one per month. Fees: Members, free, Non-members, $2.50. See calendar next page.
GEOLOGY SEMINAR: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.
GSOC LIBRARY: Rm. S7, Open 7:30 p.m. prior to meetings.
PROGRAMS: EVENING: Second Friday Evening each month, 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.
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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 or e-mail:gsoc@spiritone.com
Tom Gordon, President, 360-835-7748
Ted Walling, Calendar Editor, 503-598-8067

VOL. 69, No. 3
March 2003

MARCH ACTIVITIES

ANNUAL BANQUET Sunday, March 2, 12:30 PM. Hot and Cold Running Water in Southeastern Oregon. Michael Cummings, Chairman, Geology Department, PSU. Rheinlander Restaurant, 5035 NE Sandy Blvd. Note: lunch will be served at 1:00 PM.

Fri. Mar. 14, 12:00-1:00 PM: Geology of Planet Venus. Lamont Brock, Rose City Astronomers. Rm. 120B (Crooked River Suite), Oregon State Office Building, 800 NE Oregon St.

Seminar – Wed. Mar. 19, 8:00 PM: Geology of the Pacific NW. Richard Bartels, Past President. Rm S17 Cramer Hall, PSU

* *

PREVIEW OF COMING EVENTS

Field Trip Sat. Apr. 5: Portland Building Stone. Joseph Conrad, longtime stone cutter and sculptor, will lead a field trip **starting at 9:00 AM** at his workplace and studio and ending in the early afternoon in downtown Portland. Emphasis of the trip will be the development of stone cutting techniques and how they influenced building design at various periods in Portland's development. A nominal fee ($3.00 for GSOC members, $4.00 for nonmembers) will be charged, and attendance will be limited to the first 30 who sign up. Registration begins on March 5. For details of the trip and to register, call Cecelia Crater (503-235-5158) starting March 5. Any other questions call Beverly Vogt (503-292-6939). This is a rare opportunity to see beautiful stone and learn about it from an artist and master craftsman who knows and loves his work.

Fri. Apr. 11, 8:00 PM: To Be Announced.

Seminar – Wed. Apr. 16, 8:00 PM: Geology of the Pacific NW. Richard Bartels, Past President. Rm S17 Cramer Hall, PSU.

Note: There is no noon meeting scheduled for April.

Calendar items must be received by 15th of preceding month. Call Ted Walling 503-598-8067.

SU IKEDA NEW PRESIDENT

GSOC elects new slate of officers at annual business meeting!

The annual business meeting of the Geological Society of the Oregon Country was held on February 14, 2003, in Room 371 of Cramer Hall at Portland State University. President Tom Gordon called the meeting to order. Tom explained that Evelyn Pratt, the previously announced presidential candidate, would not be able to take office for personal reasons. A revision of the bylaws which had been unanimously approved by the Board of Directors at its January 27, 2003, meeting, whereby a vacancy to the office of the President can be filled either by the current Vice President or, if he or she prefers, by an appointee of the Board, was unanimously approved by voice vote of the GSOC membership. The previously announced slate of officers was elected by voice vote of the GSOC members, with the understanding that Evelyn Pratt would not serve as the new President, that Board member Su Ikeda would be appointed by the Board to the position of President, that newly elected Vice President Clay Kelleher chose not to move up to the office of President but would serve as Vice President, and that Evelyn Pratt would fill out Su Ikeda's term of office as Board member.

The new slate of officers who will be installed at the Banquet on March 2 are as follows: President, Su Ikeda; Vice President, Clay Kelleher; Secretary, Beverly Vogt; Treasurer, Phyllis Thorne; member at large (three years), Richard Meyer; member at large (two years), Evelyn Pratt; member at large (one year), John Newhouse.

President Tom Gordon then adjourned the business meeting and presented the evening's slide program, which was a summary of his presidential field trip to California. After his program, the group adjourned to the geology department office, where refreshments prepared by Tom and Diana Gordon were served.

FIELD TRIP COMMITTEE MEETING NOTES

The field Trip Committee meeting was held at 8:00 pm., Monday, January 27, 2003. Present were Beverly Vogt, Richard Bartels, Su Ikeda, John Newhouse, Carol Hasenberg, and Evelyn Pratt. The tentative schedule for the upcoming season is:

- **April 5,** Building Stones of Downtown Portland, leader Joseph Conrad. Starting at 9:00 a.m., this trip to learn about the development of stone cutting techniques and their effects on the buildings of downtown Portland. The trip will be led by Joseph Conrad, longtime stone cutter and sculptor. Participation limited to 30 pre-registered people. A fee of $3 for GSOC members and $4 for nonmembers will be charged and will include the cost of Tri-met bus tickets. Registration begins on March 5. For registration and details about the trip, call Cecelia Crater, 503-235-5158, starting on March 5. For any other questions, call Beverly Vogt, 503-292-6939.
- **May 17,** Landslides in the Columbia Gorge, leader Yumei Wang, geologist and earthquake expert from the Oregon Department of Geology and Mineral Industries.
- **July 12,** The Buried Forests of Mount Hood, leader Ken Cameron, geologist, Oregon Department of Environmental Quality.
- **August 2,** The Geology of Sauvie Island, leader Pete Patterson, retired geologist with the USDA Forest Service and longtime resident of Sauvie Island.
- **End of August or early September,** GSOC President's field trip, Geology of the Southern Oregon Coast. Trip will be a long weekend in duration. Dates and details to be announced in upcoming issues of the GSOC Newsletter.

The next committee meeting will be on Monday, February 24, at the home of Beverly Vogt and Richard Bartels.

Field trip of Portland building stone scheduled for April 5, 2003

GSOC members have a rare opportunity to learn about Portland's building stones from a master stone cutter and sculptor. Joseph Conrad, Portland stone cutter and sculptor, will lead a field trip starting Saturday, April 5, at 9:00 a.m., at his workplace and studio and ending in the early afternoon in downtown Portland. The emphasis of the trip will be the development of stone cutting techniques and how they influenced building design at various periods of Portland's development.

Conrad, who was born and raised in the stone cutting business in Cold Springs, Minnesota, has spent his life working in all aspects of the stone cutting business. We will meet at his workplace on the east side of the river to see beautiful stone, tools used in cutting, photographs of various quarries, and some of his sculptures. We will then go downtown by Tri-Met bus to look at buildings.

A fee of $3.00 for GSOC members and $4.00 for nonmembers will be charged, and attendance will be limited to the first 30 who sign up. The cost will include the bus tickets. Registration begins on March 5. For details of trip and to register, call Cecelia Crater (503-235-5158) starting on March 5. For any other questions, call Beverly Vogt (503-292-6939).

In Memory of Margaret Baldwin

1915 - 2002

Mrs. Ewart Baldwin is survived by her husband and two sons, Donald and Neil. She will be remembered well by our members who were privileged to attend field trips and meetings led by Dr. Baldwin. The service in the First United Methodist Church in Eugene, Oregon, was attended by their many friends. (Ewart M. Baldwin is a GSOC Fellow and Honorary Life Member). Contributions may be made in Margaret's name to the Vivian Olum Child Development Center at the University of Oregon.

Report from Tucson, Arizona

Your intrepid editor is on the move, reporting from the Fossil, Gem and Mineral show in Tucson, Arizona! Our little entourage, consisting of myself, my husband John, and two engineering friends, had a great adventure cruising the **Tucson Gem Show** on the weekend of February 15 and 16 for minerals, fossils and jewelry and sampling some of the geological treats of the region. Not to mention escaping from the Oregon rain for a little while.

First of all, the Gem Show is Mecca for those interested in rock collecting. You are not going to see a bigger spread of exciting rocks, minerals, gems, or fossils anywhere. Dealers come from virtually the four corners of the earth to ply their wares – fossil dealers from Morocco, amber dealers from Poland, Russia, and Mexico, turquoise brokers from the Western US and China, African bead specialists, and many, many more. The show takes over a good portion of the downtown area of Tucson, including the convention center, a dozen or so hotels/motels, and numerous large tents.

Then there are the prices. Since we came the last couple days of the show, dealers were letting things go cheap. My friends went into a "feeding frenzy" and started buying flats of minerals and fossils, not just single specimens. They got lots of calcite, pink Smithsonite, schorl (the most common mineral in the tourmaline group), aragonite, grossular garnet, wulfenite and more! Then there was the Bag O' Fossils that they got for free because they purchased a number of Orthoceras (the original "conehead") and Ammonite fossils.

If you have deep pockets, there are quite a lot of goodies for you at the Gem Show. The convention center display is open to the public the last few days of the show and contains many prize mineral specimens, worth thousands each, plus gold nuggets, fine jewelry (lots of opals), and many other amazing things.

I have been to the Gem Show a number of times and so I am a little more restrained in the buying department. Besides, I get so many rock specimens on GSOC outings that I don't have a lot of room for any other rock collecting. However, I do appreciate a nice specimen of amber. This year I purchased a small piece of **red Chiapas amber**. The dealer told me that the red color is obtained by just the right amount of oxidation of the amber-bearing layer at sea level. It is certainly very unique in color.

Another item I purchased was a nice little curled-up specimen of the trilobite Phacops from the Devonian period in Morocco. As you might recall, I discussed this charming little fellow in my review of Richard Fortey's book Trilobite in January 2002. The texture of his amazing eyes can be clearly observed in this walnut sized specimen.

For those of you who are thinking of attending the Tucson Gem Show sometime, it starts usually the first weekend of February and lasts about 2 weeks. Some exhibits end sooner than others, so it is best to plan ahead. There are a number of websites with information about the show. I would also recommend securing your accommodations well in advance.

There's also plenty of great geology and other natural history – oriented activities in the Tucson area. This year we hiked in the Tucson mountains at Saguaro National Park, visited Kitt Peak National Observatory, and toured Kartchner Caverns.

The Tucson mountains are thick with saguaro and associated Sonoran desert species. We stayed at a bed and breakfast on the border of **Saguaro National Park** about 15 miles northwest of downtown Tucson. Abundant outcrops of Mesozoic granite in the Tucson mountains create very sandy soils in this area. The ridge directly east of the site was capped with a Tertiary welded tuff. The nearby Hugh Norris trail in the park offers some spectacular views of the surrounding terrain on your way up to Wasson Peak.

Kitt Peak is also composed of granite, and at 7000 feet is higher than the surrounding terrain. The series of intersecting ridges at the peak of the mountain hold 23 telescopes with their stark white domes (and other assorted enclosures). We arrived just before sunset and caught the evening viewing

program. To the south we could see the rest of the Quinlan range and the Baboquivari Mountains, which contain a metamorphic core complex. The massive granite dome of Baboquivari Peak is reminiscent of Sugarloaf Mountain. The sunset view of the mountains to the southwest was awesome.

For the astronomy buffs, the night viewing was great as well. We viewed celestial objects from a 16" reflecting telescope, one of two such scopes maintained by the visitor center. The list of objects included M42, the Great Orion Nebula, M79 globular cluster in the constellation Lepus (just below Orion), M31 the Andromeda Galaxy, Jupiter, Saturn, and the Moon. The moon was very bright which made it difficult to see the dimmer objects. However, the magnificent moonlit scenery made up for this.

If you decide to plan a trip to Kitt Peak, don't forget to pack your **winter gear**, including gloves and hat. The staff told us that it can be as cold as –5°F and windy up there. We were lucky and it was a very nice evening, maybe 45°F and no wind. You will also want to reserve your spot in the viewing program well in advance. You can do this online. The cost is about $35, and includes a boxed dinner.

Last but not least is Kartchner Caverns, near Benson, Arizona. We had toured nearby Colossal Cave a few years ago and it was pretty ho-hum. Not so for Kartchner. This is a cave which was discovered by two spelunkers about 1974, and these two did not want to see their discovery get vandalized or compromised as to its fragile environment. They and the land owners worked with the state of Arizona to develop a public access to the cave while preserving its still growing formations. It is now a state park.

To preserve the 99% humidity in the cave, tunnel entrances behave like airlocks. The developers also installed a misting system in the cave and at the entrances, and visitors may not touch anything other than the steel handrail on the path.

The cave is situated in a graben in a formation of Carboniferous Escabrosa Limestone. The length of the cave is 3 km, although the tour is limited to only two of the large chambers. Cave formations, or **speleothems**, include soda straws, stalactites and stalagmites, columns, draperies, shields, and several other types of formations. Most speleothems are composed of calcite which is deposited from the water flowing through the cave. Formations are ochre to maroon in color while they are active. They leach to white once the water ceases to flow. The formations take many thousands of years to form. The age of the formations has been dated to a little less than 200,000 years, and they are really spectacular.

Just to make sure you return for another visit, a second path and tour is being developed in different area of the cave. I'm sure we'll have to see this section sometime. Tours are $14 and you need a reservation well in advance of your visit.

Well, back to the rain of the Northwest! Hope you enjoyed your little tour and I would highly recommend checking out Tucson for a February sun break!

Carol S Hasenberg

EERI ANNUAL MEETING

The Earthquake Engineering Research Institute met in Portland on February 6-8, 2003, at the Marriott Hotel downtown, Portland. This national organization of geologists, seismologists, engineers, planners, public policy makers, and emergency planners are focused upon earthquakes and their effects on society. Several well-known regional and national geologists and seismologists were in attendance. Speaking at the meeting were:

- Dr. Chris Goldfinger from Oregon State University, discussing exploration of turbidites, or underwater landslides, caused by Cascadia Subduction Zone earthquakes
- Dr. Eddie Bernard of NOAA, describing the network of tsunami monitoring buoys in the Pacific Ocean
- Dr. Meghan Miller of Central Washington University, explaining the GPS research on the locked zone of the Cascadia Subduction Zone

- Dr. Art Frankel of USGS in Golden, Colorado, reviewing the national seismic shaking maps his group has produced since 1996

The organizing committee co-chair for the meeting was GSOC Past President Carol Hasenberg.

Lectures and Exhibits at the Hatfield Marine Science Visitor Center

Current Exhibit (January 9 – March 10): The Big One: Earthquakes in the Pacific Northwest, on loan from the Burke Museum of Seattle, Washington

March 1 – Lecture – "Vulnerability of Pacific Northwest Coastal Communities to earthquakes and Tsunamis", Dr. Nathan Wood, USGS

March 8 – Lecture – "Engineering Solutions for Oregon Coastal Hazards", Dr. Stephen Dickenson, OSU

For more information about the Hatfield Marine Science Center, go to the website at http://hmsc.oregonstate.edu/

GEOLOGICAL TIME CHART

Rusty on your geological time chart? Here's the latest version from the USGS web site:

Phanerozoic Eon (544 ma to present)
- Cenozoic Era (65 ma to present)
  - Quaternary Period (1.8 ma to present)
    - Holocene Epoch (8,000 years ago to present)
    - Pleistocene Epoch (1.8 ma to 8,000 years ago)
  - Tertiary Period (65 to 1.8 ma)
    - Pliocene Epoch (5.3 to 1.8 ma)
    - Miocene Epoch (23.8 to 5.3 ma)
    - Oligocene Epoch (33.7 to 23.8 ma)
    - Eocene Epoch (55.5 to 33.7 ma)
    - Paleocene Epoch (65 to 55.5 ma)
- Mesozoic Era (248 to 65 ma)
  - Cretaceous Period (145 to 65 ma)
  - Jurassic Period (213 to 145 ma)
  - Triassic Period (248 to 213 ma)
- Paleozoic Era (544 to 248 ma)
  - Permian Period (286 to 248 ma)
  - Carboniferous Period (360 to 286 ma)
    - Pennsylvanian Period (325 to 286 ma)
    - Mississippian Period (360 to 325 ma)
  - Devonian Period (410 to 360 ma)
  - Silurian Period (440 to 410 ma)
  - Ordovician Period (505 to 440 ma)
  - Cambrian Period (544 to 505 ma)

Precambrian Time (4500 to 544 ma)
- Proterozoic Era (2500 to 544 ma)
  - Vendian Period (544 to 650 ma)
- Archaean Era (3800 to 2500 ma)
- Hadean Time (4500 to 3800 ma)

For more info on geological time, visit the USGS web site at:
http://geology.er.usgs.gov/paleo/geotime.shtml
http://pubs.usgs.gov/gip/geotime/

or, try the University of California (Berkeley) Museum of Paleontology's excellent Web Geological Time Machine:
http://www.ucmp.berkeley.edu/help/timeform.html

or this one:
Do you keep forgetting the geo time chart? Read some hilarious pneumonic sayings on Dr. Bob's Geologic Time Page:
http://oldsci.eiu.edu/geology/jorstad/geoltime.html
One of my favorites was "Quit Telling Crazy Jack That Perry Como Died Slowly Over Coals"!!!

GEOLOGICAL SOCIETY
OF THE OREGON
COUNTRY
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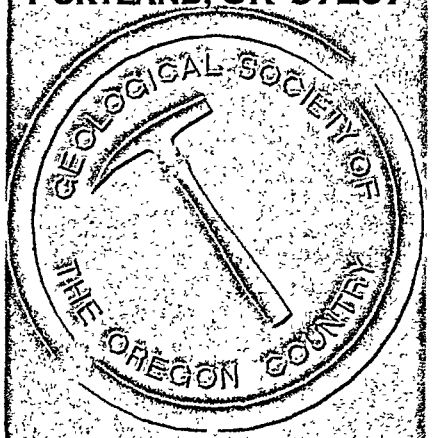
PORTLAND, OR 97207



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APRIL 2003

THE GEOLOGICAL NEWSLETTER

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

2003-2004 ADMINISTRATION
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Vice-President:
Clay Kelleher – 503/775-6263
Secretary
Beverly Vogt – 503/292-6939
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Directors:
Richard Meyer (3 years) – 503/236-7795
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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.
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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: **The Geological Society of the Oregon Country**
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GEOLOGICAL NEWSLETTER

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Su Ikeda, President, 503-246-1385
Ted Walling, Calendar Editor, 503-598-8067

VOL. 69, No. 4
April 2003

APRIL ACTIVITIES

Field Trip Sat. Apr. 5: Portland Building Stone. Joseph Conrad, longtime stone cutter and sculptor, will lead a field trip **starting at 9:00 AM** at his workplace and studio and ending in the early afternoon in downtown Portland. Emphasis of the trip will be the development of stone cutting techniques and how they influenced building design at various periods in Portland's development. A nominal fee ($3.00 for GSOC members, $4.00 for nonmembers) will be charged, and attendance will be limited to the first 30 who sign up. For details of the trip and to register, call Cecelia Crater (503-235-5158). Any other questions call Beverly Vogt (503-292-6939). This is a rare opportunity to see beautiful stone and learn about it from an artist and master craftsman who knows and loves his work.

Fri. Apr. 11, 8:00 PM: Missoula Flood Rhythmites in the Northern Willamette Valley. David James, Graduate Student, Department of Geology, PSU. Rm 371 Cramer Hall, PSU.

Seminar – Wed. Apr. 16, 8:00 PM: Geology of the Pacific NW. Richard Bartels, Past President. Rm S17 Cramer Hall, PSU.

Note: There is no noon meeting scheduled for April.

PREVIEW OF COMING EVENTS

Fri. May 9, 8:00 PM: New Portland Geologic Information From the CSO Program. Susan Bednarz, Parsons Brinkerhoff Quade & Douglas, Inc. Rm 371 Cramer Hall, PSU.

Field Trip Sat. May 17: Landslides in the Columbia Gorge. Leader is Yumei Wang, geologist and earthquake expert from the Oregon Department of Geology and Mineral Industries. Watch for details in the next calendar. See field trip note below.

Note: The normal noon meeting and monthly seminar will not occur in May.

For Field Trips: Children must be accompanied by a parent or responsible adult, and their safety is the responsibility of that adult.

Calendar items must be received by 15th of preceding month. Call Ted Walling 503-598-8067.

BOARD MEETING NOTES

GSOC board meeting, March 15, 2003

Attending:

Su Ikeda	Clay Kelleher
Beverly Vogt	Phyllis Thorne
John Newhouse	Richard Meyer
Richard Bartels	Carol Hasenberg

GSOC is completing its assessment of this year's annual banquet – 53 people attended, and most agreed it was held at a great place for a great price!

102 GSOC members have paid dues so far (out of 160). Please pay your dues if you have not done so!!!

Field Trip Committee Report

The tentative date for a family outing with fossil collecting with Su Ikeda's group is June 21. Announcement to be made in later newsletters.

Policies for field trip fees and honorariums are being discussed. Expect some revisions to fees for some of the professionally guided trips this year. Costs will be kept as affordable as possible.
Policy of children on field trips – "Children must be accompanied by a parent or responsible adult, and their safety is the responsibility of that adult."

Increasing Membership

Su would like to appoint a committee whose focus is to brainstorm ideas to attract new members. Board meeting participants observed the following as good new member attractors:

- field trips – geared to suit all types of members
- rock/fossil hunting trips
- banquet – prominent speakers, open to the public

Next board meeting will be June 7, 2003. Location to be announced. Agenda items will include:

- Future of GSOC seminars
- Picnic plans
- Changing quorum numbers in the by-laws
- Insurance report
- Computerization progress
- Committee reports

VENUS, EARTH'S BAD TWIN

Longtime Rose City Astronomer Lamont Brock gave last month's noon talk about the planet Venus. Lamont had some very nice slides of the surface of Venus mostly comprised of data taken from the 1989 NASA Magellan radar mapping mission to the planet. Particularly striking was a low-altitude simulation of Maxwell Montes, the highest mountain on Venus, five times higher than Mt. Everest! Lamont also gave a few interesting facts about the surface of Venus:

- Surface temperature of 900°F
- Pressure similar to that of one mile below Earth's ocean, due to the thick "greenhouse" atmosphere of Venus
- Rain is sulfuric acid
- Approximately one million volcanoes are estimated to exist on the surface of Venus
- Rotation of Venus (Venusian day) is completed in 243 earth days.

FIELD TRIP SCHEDULE

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- **August 2,** The Geology of Sauvie Island, leader Pete Patterson, retired geologist with the USDA Forest Service and longtime resident of Sauvie Island.
- **August 29 – September 2,** GSOC President's field trip, Geology of the Southern Oregon Coast. Dates and details to be announced in upcoming issues of the GSOC Newsletter.

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GSOC members have a rare opportunity to learn about Portland's building stones from a master stone cutter and sculptor. Joseph Conrad, Portland stone cutter and sculptor, will lead a field trip starting Saturday, April 5, at 9:00 a.m., at his workplace and studio and ending in the early afternoon in downtown Portland. The emphasis of the trip will be the development of stone cutting techniques and how they influenced building design at various periods of Portland's development.

Conrad, who was born and raised in the stone cutting business in Cold Springs, Minnesota, has spent his life working in all aspects of the stone cutting business. We will meet at his workplace on the east side of the river to see beautiful stone, tools used in cutting, photographs of various quarries, and some of his sculptures. We will then go downtown by Tri-Met bus to look at buildings.

A fee of $3.00 for GSOC members and $4.00 for nonmembers will be charged, and attendance will be limited to the first 30 who sign up. The cost will include the bus tickets. Registration begins on March 5. For details of trip and to register, call Cecelia Crater (503-235-5158) starting on March 5. For any other questions, call Beverly Vogt (503-292-6939).

Book Review

The Restless Northwest,
A Geological Story, by Hill Williams, 2002, Washington State University Press, Pullman, WA, paperback, size 5.5x8.25 in; text 150 p.; Pacific Northwest Geological Almanac (of events and landmarks), p. 151-154; Glossary of Geological Terms, p. 155-157; Index, p. 159-163; 36 diagrams;10 black-and-white photos; 19 sidebars (boxes) of specific information; no bibliography. Cost $19.95 at Nature of the Northwest Information Center and Powell's Bookstore, a fairly high price for a book this size. Hill Williams is a former science writer for the Seattle Times.

Submitted by Paul E. Hammond

This handy book is a concise description, written for the layman, about the salient geologic features and processes in the Pacific Northwest. Easily read, this book gives a very good overall view of the geology, starting about 1.5 billion years ago to the present. Different geologic topics are covered in 12 chapters, varying from 5 to 15 pages in length. For example, the Juan de Fuca Ridge, Cascadia Basin, channel, and subduction zone are briefly covered in the first chapter. But a short book of this length about an area of such geologic breadth leaves out details, and readers may be left with questions. Some passages are difficult to fully visualize. Although diagrams are simple and easy to understand, some features are left out or not clearly identified. In spite of these shortcomings, the book is well recommended for the person wishing a simple, short description of the broader geologic aspects of the Pacific Northwest.

The Port Orford Meteorite – Hidden or Hoax?

On page 98 of Roadside Geology of Oregon (1978), authors Alt and Hyndman report that in the hills near Port Orford is a giant meteorite discovered in 1856, but never seen again. Samples allegedly taken from the estimated 10-ton rock and sent to the Smithsonian Museum confirmed that it contained typical meteorite minerals, iron and nickel imbedded with crystals of olivine. Hundreds (some say thousands) of people have subsequently searched the hinterlands of Curry County for this extraterrestrial object without success.

Some now regard the original report as a hoax. Here's a summary of what is known and not known. The discoverer (if that is what he was) was Dr. John Evans, and "explorer-geologist" working for the Department of the Interior, surveying the Oregon Territory between 1851 and 1856. The meteorite sample was among the rocks he collected during his final survey on the southern Oregon coast.

One reason some are suspicious is that there is no mention of this rock in Evans' existing journals of this trip. Identification of the rock as a meteorite came from a Boston chemist named Charles Jackson who analyzed Evans' samples and reported his results in 1859. Jackson started a correspondence with Evans and it is from this correspondence that we have Evans' only accounts of this rock and its alleged location. He said about three feet was exposed above ground on the grassy slope of a mountain, with much more buried underground. He said it would be a simple matter to relocate it. Evans died soon after in 1861.

The hoax theory was articulated in 1993 by three authors on the basis of the following findings.

1. They claim that Evans was "ill-trained for his scientific field work," meaning that he was not formally trained in geology.
2. There is no mention of the find in Evans' existing journals. (Others suggest we may not have all of his journals.)

3. The area was a hotbed of gold prospecting at the time, so it is unlikely that so distinctive an object would not have been found by others.
4. Evans' sample is very similar to a meteorite found in Chile in 1820. The authors suggest that Evans deliberately introduced a sample of the Chilean rock into his samples in the hope that his "discovery" would lead to financial gain. He supposedly was in financial difficulty.

Richard Meyer

Notes about the article and references from Richard Meyer:

The three authors mentioned in the article are Roy S. Clarke, Jr., Museum of Natural History (no doubt referring to the NMNH or Smithsonian); Howard Plotkin, historian of science from Western Ontario University, London, Ontario; and V.F. Buchwald, metallurgist from the Technical University of Denmark. I became aware of the issue from reading Alt and Hyndman, then was curious why it was not mentioned in Geology of Oregon by Orr & Orr. The rest of the info I got from the internet.

While a hoax may seem possible or even likely, I'm not sure I agree with the certainty of Plotkin, et al, and I would certainly not agree that a hoax has been "proved." Evans pointed out in his journal entries that the area was prone to landslides, and it would seem possible that it could have been buried subsequent to Evans' first observation.

Dick

Print references include:
Roy S. Clarke (ed.), The Port Orford, Oregon, Meteorite Mystery, Smithsonian Institution Press, 1993.
Plotkin, Howard. "The Port Orford Meteorite Hoax". (In The Port Orford, Oregon, Meteorite Mystery.) Smithsonian Contributions to the Earth Sciences, no. 31 (1993), 24 pp.
"The Port Orford Meteorite Hoax," Sky and Telescope, vol. 86, no. 3(1993), pp. 35-38.
January 21, 1993, The World, Coos Bay, ran a story under the headline, "Port Orford Meteorite proved Hoax."

Internet URLs include:
http://www.curryhistory.com/Port%20Orford%20Meteorite.htm
http://www.museumofhoaxes.com/portorford.html
http://www7.pair.com/arthur/meteor/archive/archive7/June99/msg00340.html
http://www.pairlist.net/pipermail/meteorite-list/2002-December/016606.html

Radiometric Dating

Adapted from the USGS publication, "Geologic Time"

A chemical element consists of atoms with a specific number of protons in their nuclei but different atomic weights owing to variations in the number of neutrons. Atoms of the same element with differing atomic weights are called isotopes. Radioactive decay is a spontaneous process in which an isotope (the parent) loses particles from its nucleus to form an isotope of a new element (the daughter). The rate of decay is conveniently expressed in terms of an isotope's half-life, or the time it takes for one-half of a particular radioactive isotope in a sample to decay. Most radioactive isotopes have rapid rates of decay (that is, short half-lives) and lose their radioactivity within a few days or years. Some isotopes, however, decay slowly, and several of these are used as geologic clocks. The parent isotopes and corresponding daughter products most commonly used in radiometric dating are listed below:

Parent Isotope	Stable Daughter Product	Currently Accepted Half-Life Values
Uranium-238	Lead-206	4.5 billion years
Uranium-235	Lead-207	704 million years
Thorium-232	Lead-208	14.0 billion years
Rubidium-87	Strontium-87	48.8 billion years
Potassium-40	Argon-40	1.25 billion years
Samarium-147	Neodymium-143	106 billion years
Carbon-14	Nitrogen-14	5730 years

The mathematical expression that relates radioactive decay to geologic time is called the age equation and is:

$$t = \frac{1}{\lambda} \ln\left(1 + \frac{D}{P}\right)$$

Where t is the age of the rock or mineral specimen
D is the number of atoms of a daughter product today,
P is the number of atoms of the parent isotope today,
Ln is the natural logarithm of the expression in parentheses,
and λ is the appropriate decay constant.

The decay constant for each parent isotope is related to its half-life, $t^{1/2}$, by the following expression:

$$t^{1/2} = \frac{\ln 2}{\lambda}.$$

Dating rocks by these radioactive timekeepers is simple in theory, but the laboratory procedures are complex. The numbers of parent and daughter isotopes in each specimen are determined by various kinds of analytical methods. The principal difficulty lies in measuring precisely very small amounts of isotopes.

The potassium-argon method can be used on rocks as young as a few thousand years as well as on the oldest rocks known. Potassium is found in most rock-forming minerals, the half-life of its radioactive isotope potassium-40 is such that measurable quantities of argon (daughter) have accumulated in potassium-bearing minerals of nearly all ages, and the amounts of potassium and argon isotopes can be measured accurately, even in very small quantities. Where feasible, two or more methods of analysis are used on the same specimen of rock to confirm the results.

Another important atomic clock used for dating purposes is based on the radioactive decay of the isotope carbon-14, which has a half-life of 5,730 years. Carbon-14 is produced continuously in the Earth's upper atmosphere as a result of the bombardment of nitrogen by neutrons from cosmic rays. This newly formed radiocarbon becomes uniformly mixed with the nonradioactive carbon in the carbon dioxide of the air, and it eventually finds its way into all living plants and animals. In effect, all carbon in living organisms contains a constant proportion of radiocarbon to nonradioactive carbon. After the death of the organism, the amount of radiocarbon gradually decreases as it reverts to nitrogen-14 by radioactive decay. By measuring the amount of radioactivity remaining in organic materials, the amount of carbon-14 in the materials can be calculated and the time of death can be determined. For example, if carbon from a sample of wood is found to contain only half as much carbon-14 as that from a living plant, the estimated age of the old wood would be 5,730 years.

The radiocarbon clock has become an extremely useful and efficient tool in dating the important episodes in the recent prehistory and history of man, but because of the relatively short half-life of carbon-14, the clock can be used for dating events that have taken place only within the past 50,000 years.

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MAY 2003

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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: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.
GSOC LIBRARY: Rm. S7, Open 7:30 p.m. prior to meetings.
PROGRAMS: EVENING: Second Friday Evening each month, 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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TRIP LOGS: Write to the same address for names and price list.
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GEOLOGICAL NEWSLETTER

The Geological Society of the Oregon Country
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VISITORS WELCOME AT ALL MEETINGS
VOL. 69, No. 5
May 2003
INFORMATION: www.gsoc.org or e-mail:gsoc@spiritone.com
Su Ikeda, President, 503-246-1385
Ted Walling, Calendar Editor, 503-598-8067

MAY ACTIVITIES

Fri. May 9, 8:00 PM: New Portland Geologic Information From the CSO Program. Susan Bednarz, Parsons Brinkerhoff Quade & Douglas, Inc. Rm 371 Cramer Hall, PSU.

Field Trip Sat. May 17: Landslides in the Columbia Gorge. Leader is Yumei Wang, geologist and earthquake expert from the Oregon Department of Geology and Mineral Industries. Meet at **8:30 AM** in the parking area just west of the Oregon State Building, 800 NE Oregon St. Fee schedule: members $3.00, non-members $4.00. Bring lunch, water and adequate clothing. The trip will last until about 4 PM, with four stops. Cecelia Crater is coordinating the carpooling. Her number is 503-235-5158. A small donation for gas is recommended for the drivers. **See field trip note below.**

Note: The normal noon meeting and monthly seminar will not occur in May.

* *

PREVIEW OF COMING EVENTS

Fri. June 13, 8:00 PM: To be announced.

June Field Trip: To be announced.

* *

For Field Trips: Children must be accompanied by a parent or responsible adult, and their safety is the responsibility of that adult.

Calendar items must be received by 15th of preceding month. Call Ted Walling 503-598-8067.

WELCOME

We welcome the following new members to the Geological Society of the Oregon Country

Kurt Rolfes
Mei Rolfes
Frank Reckendorf
Kathleen Brophy
Sarah Brophy

BOOK YOUR LODGING NOW FOR THE GSOC PRESIDENT'S FIELD TRIP

This year GSOC will be organizing the President's field trip as a do it yourself-er. Persons going will be providing their own transportation (or carpooling) and their own lodging. This will make it easier to organize, members will be able to decide if they want to go closer to the event, and it will keep the cost low (or as low as you want).

This means that if you are interested in going, **book your rooms or camping NOW!** (You can always cancel later if you change your mind.) The field trip is over Labor Day Weekend. Here is the itinerary for lodging needs:

Friday, August 29, 2003 – Coos Bay Area
Saturday, August 30 – Gold Beach Area
Sunday, August 31 – Coos Bay Area

Carol Hasenberg (503/282-0547) has assembled a list of nicer motels and campgrounds in the area to aid your search:

Motels in Reedsport and Winchester Bay (about 15 miles north of Coos Bay):

- Salbasgeon Inn, Reedsport.....541/271-4831
- Winchester Bay Inn 541/271-4871

Motels in North Bend, Coos Bay and Bandon:

- Best Western Holiday Motel (Coos Bay) 541/269-5111
- Mill Casino 541/756-8800
- Edgewater Inn.....541/267-0423
- Red Lion 541/267-4141
- Bandon Dunes Golf Resort.....541/347-4380

Campgrounds in Winchester Bay and Coos Bay areas:

- Salmon Harbor Marina RV Resort (Winchester Bay).....541/271-0287
- Umpqua Lighthouse State Park campground... 1-800-452-5687
- Tugman State Park campground..... 1-800-452-5687
- Bastendorff Beach County Park campground.. .....541/888-5353
- Sunset Bay State Park campground..... 1-800-452-5687
- Bullard's Beach State Park campground (Bandon) 1-800-452-5687

Motels in Gold Beach:

- Gold Beach Resort.....541/247-7066
- Jot's Resort.....541/247-6676

Campgrounds in Gold Beach:

- Lobster Creek.....541/247-3600
- Quosatana 541/247-3600
- Illahe 541/247-3600

The focus of this year's President's field trip will be stratigraphy and fossils of the Tyee Basin and the south Oregon coast.

Disaster and Natural Hazards Lectures at Oregon State University

Lectures are sponsored by the OSU geosciences department and are free and open to the public. Lectures begin at 4 p.m. and are held in Gilfillan Auditorium, Wilkinson Hall, Corvallis.

May and June lecture schedule:

May 6: "Geospatial Information Management in a Hostile Environment", Babs Buttenfield of the University of Colorado.

May 15: "Millennial-Scale Variations in Vegetation, Fire and Climate in the Seasonal Temperate Rain Forest of Western North America", by Colin Long of the University of Oregon.

May 29: "Rivers of Fire and Ice: Observations on Catastrophic Fluvial Disturbances at Mount Pinatubo and Eastern Tibet", by Dave Montgomery, professor of Earth and space sciences at the University of Washington.

June 3: "Geomorphology and American Dams: The Scientific, Social and Economic Context", by William Graf, professor in the geography department at the University of South Carolina.

June 5: "Japanese Records of the 1700 Cascadia Tsunami", by Brian Atwater of the U.S. Geological Survey.

Ice Age Rhythmites

From the April 11 GSOC Friday night meeting entitled "Missoula Flood Rhythmites in the Northern Willamette Valley", by David James, Graduate Student, Department of Geology, Portland State University.

James has studied rhythmites along the Willamette River at two very different sites –

- Along Greeley Avenue in Portland from a landslide occurring during the winter of 1996
- In Dayton, Oregon, also on a landslide site

The landslide sites are important because the landslides bare soil that has not been exposed to weathering or vegetation. Each bed contained about 30 different Ice Age Flood layers (rhythmites), although the two sites could not be absolutely correlated to one another by age dating or stratigraphy. However, James did correlate the two records due to both the composition of the material and the relative thickness of the layers. This was the essence of the study.

The differences between the two sites were largely due to their positions within the Willamette valley and the path of the floodwaters. The north-most Greeley site is at the point of entrance of the floodwaters from the Columbia River Gorge to the Willamette Valley, where the floodwaters transition between a linear, constrained width space where the floodwaters would swiftly and deeply flow, to the wide Willamette valley where they would lose a lot of energy. Thus the particle size that the water can carry will reduce between the gorge and the valley. So at this transition area large coarse particles are deposited, whereas further down in the Willamette Valley the depositions are much finer. Also, each rhythmite contains both a coarser section below and a finer section above at both sites.

The Greeley site rhythmites are thicker largely due to a thick layer of coarse materials. The average thickness is about one meter with the largest bed (15^{th} down from the top of the sequence) being the thickest at four meters.

James graphed a number of characteristics of the rhythmites from each site and used these to compare the two sequences:

- Overall layer thickness
- Coarse and Fine section thicknesses
- Particle size thickness
- Concentrations of various elements in the layers from a geochemical analysis performed on samples at the Reed College nuclear bombardment facility

Several very interesting observations were made from studying these graphs:

- Both sites contained a very thick rhythmite layer near the middle of the beds. Above and below this layer the geochemical analyses of the layer samples showed consistent differences.
- The older layers below the thick bed contained a geochemical signature that was nearly identical to that of Palouse silt from the eastern Washington floodways.

- The younger layers above the thick bed consistently had a geochemical signature distinct from the lower beds, and this signature was more similar to that of Columbia River Basalt than that of the lower beds.

These findings suggest to James that a number of Ice Age floods occurred before eastern Washington Palouse silt was completely stripped from the floodways. Then a very high energy event occurred which added a large sediment load to the flood to be deposited in the Willamette Valley. Subsequent floods were less sediment-rich and contained more material from Columbia River Basalt layers. James is very interested in having other investigations of the rhythmites conducted to clarify this issue.

by Carol Hasenberg

Field trip Review: Portland Building Stone

GSOC members had a rare opportunity to learn about Portland's building stones from a master stone cutter and sculptor. Joseph Conrad, Portland stone cutter and sculptor, lead a field trip on Saturday, April 5, at his workplace and studio and ending in the early afternoon in downtown Portland. The emphasis of the trip was the development of stone cutting techniques and how they influenced building design at various periods of Portland's development.

On the trip to downtown Portland Conrad showed the GSOC group examples of the four stone cutting technologies:

- **Hand-cut Stone**, stone worked with chisel and hammer on local materials. This technology flourished in Portland between 1870 and 1930. Portland buildings employing this technology largely used basalt or sandstone. Stone walls were load bearing or stone was used as a veneer, or facing, course. The GSOC group was shown the First Congregational Church and St James Lutheran Church as examples of the hand-cut stone technology.
- **Deep-drilled Hammer Face**, stone blocks are drilled and split with Sullivan channelers and compressed air in the quarry. Blocks are then dressed true by a stone cutter (worker) and finished with a pneumatic chisel in a surfacing machine. Portland buildings using this technology were built from 1910 to 1935. Examples are the Federal Courthouse with a sandstone veneer, the Dekum Building, and the U.S. Customs House. The Federal Courthouse was visited by the group.
- **Polished Smooth Face**, stone is removed from the quarry using wire saws and converted to 2-1/2" to 4" thick stone panels using steel shot gang saws. Since this technology was prevalent in Portland from 1925 to 1985, many examples can be seen. A classic example is the Oregonian Building, which the GSOC tour visited. Conrad guesses that the colorful bottom veneer is a South Dakota granite, whereas the top is probably Indiana limestone. He contends that most buildings in urban America built in this period uses this technology with stone from the Canadian shield. Another building visited on the tour from this period, the Northern Bank of Commerce in the transit mall, has an unusual finish like that used in the Air Force Academy in Colorado Springs. This is a flame finish, a process that explodes off some of the minerals.
- **International Thin Cut Ashler** (or Ashlar), takes advantages of technological improvements to the gang saw and automated surfacing machinery. These improvements have largely taken place in Europe with Italy as the heart of the industry. Stone blocks from all over the world are shipped here and cut and polished into ¾" to 1-1/4" thick panels. This technology is the current one and has been around since about 1960. It has fostered a uniformity in look of modern buildings throughout the world. 1000 Broadway is an example of this technology in Portland.

In addition to the buildings mentioned above, the tour visited a number of other interesting stone buildings, walls and other stone features. A building visited on the tour built in the 1960's, the Congress Center (Northern Bank of Commerce) in the transit mall, has an unusual finish like that used

in the Air Force Academy in Colorado Springs. This is a flame finish, a process that explodes off some of the minerals. In the park blocks across from St. James' Church, a pair of sculptured granite blocks from Raymond, California, exhibit wire saw cut marks on their sides. The steps in front of the Bellushi-designed building at the Portland Art Museum are Roman travertine.

by Carol Hasenberg

Clay Kelleher also took many notes on the tour. The following edited notes were taken in the studio prior to the building tour:

Conrad spoke at length of the history of stone cutting and building stones installed in the area, of his own experiences, and the quarrying and stone cutting industry around the world. The Mark Hatfield building has interior "limestone" that takes a high polish, which Conrad found surprising. Marble takes a good polish, and any carbonate rock that takes a polish is called [by stone cutters] "marble", and any silicate rock that takes a polish is a "granite".

Historically in the stone industry, 1900-1930 was a boom time in northern Minnesota. After 1925 the industry was depressed. After World War II the U.S. was dominant but technologically stagnant. Meanwhile other countries improved operations. In 1970 artificial diamonds became plentiful. Coldspring, Minnesota became a center of the stone cutting industry, aided by local abundance of exposed rock of the Canadian Shield. Local independent stone cutters were put out of business. The diamond gang saw and silicon carbide allowed slabs to be cut thinner. "Wire saws" were used. A block of granite used to be 4 ft x 4 ft x 8 ft. In 1930 it took 48 hours to slice off a slab, now it takes 30 minutes. One machine can do the whole cutting operation without being touched. Italy does most of the world's stone cutting and manufacturing of equipment.

Conrad works in the "dimension stone" industry. There are three "marble yards" in the Portland area that act as brokers of slabs. Kitchen counters are the mainstay of most modern stone cutters in Portland. When Conrad started his business about twenty years ago, he was the only stone cutter in Portland. Now there are more than 30 such companies. Conrad's business used to have a 1,500 sq ft display room of stone, but he no longer needs it because "people know what they want".

Conrad does a good business in remnant sales. Thicknesses vary from 5/8" to 7/8". He has a large cutting table with a frame about 12 ft x 12 ft, that holds the saw surrounding the table. All dust is flushed with water then cleaned before discharge. The dust is stored in 55 gal drums and is free to the public. A byproduct of the companies that cut the rough slabs is lime, which they sell to sugar beet refiners, used in the refining process.

The surface of the cutting table on which the slab lays is made of concrete, and has numerous grooves where the saw has cut into it. Conrad says the concrete keeps the blade sharp, but a wood table surface would not be good. The saw turns at 1,600 rpm; Conrad says "slow is good". Stone cutters know which slabs might break in normal use before installation. It rarely happens to a correctly-installed counter top. A broken piece can be "glued" back together. Also, flaws in marble can be cut out and plugged.

Another device in the studio, "R2D2", is a small machine they use to "flame" granite. Flaming textures the granite and makes the granite less slippery. Conrad flamed the walkway to the Multnomah County courthouse.

There is a specialty business manufacturing "surface plates", upon which precision machinery is mounted. A surface plate must be perfectly flat, and costs about "$3,000 per foot".

Geological Society of Oregon Country
Columbia River Gorge Landslides Field Trip Itinerary
May 17, 2003 - 8:30 a.m.-4:00 p.m.

Participants will visit diverse landslide types in the western Columbia River Gorge and discuss their specific hazards. Stops include:

Stop 1- Multnomah Falls rock fall
Stop 2- Warrendale and Dodson debris flows
Stop 3- Tooth Rock and Volcanic hazards at/near Bonneville Dam visitor's center
Stop 4- Cascade Complex and Bonneville landslide at Cascade Locks Park

We'll discuss landslide hazards, geology, volcanic hazards, and public policies, such the regional economic risk along this multi-modal transportation corridor, life-safety and property damage.

Schedule	Description
8:30	Meet in Oregon State Building parking lot; 800 NE Oregon St Portland State Office Building near Lloyd center mall. Arrange carpools to minimize vehicles. Handouts and signups.
9:00	Leave Oregon State Building. Caravan of 8 personal vehicles.
9-9:35	Travel time. Take Exit 28-Bridal Veil. Travel on Historic highway
9:35-10:45	*Stop 1- Multnomah Falls. Meet at west end of parking lot. -Landslides types -Rock falls, fire -Public policy, transportation route
10:45-11:00	Travel time. Continue on Historic highway. Meet on frontage road by Dodson debris flow, Royce residence.
11:00-12:00	Stop 2 a and b – Dodson and Warrendale debris flows
12:00-12:15	Travel time. Continue on Historic highway, merges w/I-84 east. Take Exit 40- Bonneville Dam visitor's center. Meet southwest end of parking lot
12:15- 1:45	*Stop 3 a and b– Bonneville Dam visitor center, OR -Lunch (bring your own) -Tooth landslide, Cascade Landslide Complex. -Geology of the gorge and volcanic hazards and lahars
1:45-2:00	Travel time. I-84 east. Exit 44-Cascade Locks-Bridge of the Gods. East on main road for 1 mile or so. Turn left into park. Drive east and meet in front of tourist boat center roundabout.
2:00-3:15	*Stop 4 –Cascade Locks park. Cascade Landslide Complex and Bonneville Landslide incl. paleoseismic studies overview
3:15-4:00	Travel back to Oregon State Building. West on I-84.

Notes: Dress in layers, raincoat, hat, gloves, walking shoes, camera, bring your lunch.
Trip leaders: **Yumei Wang**, GSOC member and engineer, and **Vicki McConnell**, volcanologist. Carol Hasenberg will be GSOC trip representative and GSOC phone contact is Cecelia Crater, 503/235-5158. See the GSOC May calendar for fee schedule.

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PROGRAMS: EVENING: Second Friday Evening each month, 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.
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INFORMATION: www.gsoc.org or e-mail:gsoc@spiritone.com
Su Ikeda, President, 503-246-1385
Ted Walling, Calendar Editor, 503-598-8067

VOL. 69, No. 6
June 2003

JUNE ACTIVITIES

Fri. June 13, 8:00 PM: What Drives The Tectonic Plates? George Moore, Courtesy Professor of Geology, Oregon State University. Rm 371 Cramer Hall, PSU.

June Field Trip: Not scheduled.

* *

PREVIEW OF COMING EVENTS

Fri. July 11, 8:00 PM: To Be Announced

Field Trip Sat July 12: The Buried Forests of Mount Hood, leader Ken Cameron, geologist, Oregon Department of Environmental Quality. Watch for details in the next calendar. See field trip note below.

* *

For Field Trips: Children must be accompanied by a parent or responsible adult, and their safety is the responsibility of that adult.

Calendar items must be received by 15th of preceding month. Call Ted Walling 503-598-8067.

WELCOME

We welcome the following new members to the Geological Society of the Oregon Country

Kehrnan Shaw
Alesha Estes
TaraSchoffstall

BOOK YOUR LODGING NOW FOR THE GSOC PRESIDENT'S FIELD TRIP

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This means that if you are interested in going, **book your rooms or camping NOW!** (You can always cancel later if you change your mind.) The field trip is over Labor Day Weekend. Here is the itinerary for lodging needs:

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Sunday, August 31 – Coos Bay Area

Carol Hasenberg (503/282-0547) has assembled a list of nicer motels and campgrounds in the area to aid your search:

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- Mill Casino 541/756-8800
- Edgewater Inn.....541/267-0423
- Red Lion 541/267-4141
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- Lobster Creek.....541/247-3600
- Quosatana 541/247-3600
- Illahe 541/247-3600

The focus of this year's President's field trip will be stratigraphy and fossils of the Tyee Basin and the south Oregon coast.

Disaster and Natural Hazards Lectures at Oregon State University

Lectures are sponsored by the OSU geosciences department and are free and open to the public. Lectures begin at 4 p.m. and are held in Gilfillan Auditorium, Wilkinson Hall, Corvallis.

June lecture schedule:

June 3: "Geomorphology and American Dams: The Scientific, Social and Economic Context", by William Graf, professor in the geography department at the University of South Carolina.

June 5: "Japanese Records of the 1700 Cascadia Tsunami", by Brian Atwater of the U.S. Geological Survey.

REMEMBRANCE OF RALPH MASON

Ralph Mason, geologist and Registered Mining Engineer with the Oregon Department of Geology and Mineral Industries (DOGAMI) for 34 years, past Deputy State Geologist and State Geologist, and past president of the Geological Society of the Oregon Country (GSOC), died of stomach cancer on March 30, 2003.

Born in Hood River in 1912, Ralph grew up as the eldest of four children on the family orchard in Parkdale. When Ralph was 12, his father died, so Ralph helped his mother run the family orchard business. This meant that even when he was studying journalism at the University of Oregon, he was unable to take fall classes because of the demands of the orchard business. He met Dorothy, the woman who later became his wife, when they were both journalism students at the U of O. To fulfill a science requirement, he took a course in geology from Warren D. Smith and after the first class changed his major to geology. He then transferred to Oregon State to get his B.S. degree in geology. After both Ralph and Dorothy graduated from their respective schools in 1937, he borrowed a car from John Eliot Allen and drove Dorothy up the McKenzie River, where he proposed. They were married in October 1938 and spent 64 years together. Ralph's first job was looking for chromite with Rustless Iron and Steel Company. During these early years together, the Masons moved several times between Grants Pass and North Bend, Oregon, and Fair Oaks, California. Their daughter Michele was born in 1942 and son Bruce in 1944.

Ralph was hired by DOGAMI in 1943, and the Masons moved to Portland. During his 34 years with DOGAMI, he produced numerous articles and papers on the mineral industry, including many of the annual summaries of mineral and mining activities in Oregon for the Ore Bin, walking tours of building stones of the Lloyd Center for the GSOC Newsletter and of the downtown Park Blocks for Oregon Geology, and studies on coal, chromite, ferruginous bauxite, and other industrial minerals for DOGAMI. He gave hundreds of talks about geology to interested groups and organizations, made numerous radio and television appearances, and answered countless questions from the public, press, other geologists, and industry about Oregon's geology and mineral industry. He took particular pride in two of his pet projects, the production of water from rocks, which was intended to encourage lunar exploration, and the genealogy of pet rocks. Both projects received national media attention. To help with the identification of pet rocks, he devised a method of rock and mineral identification using old style computer punch cards. After his retirement, he wrote a history of DOGAMI called The Way It Was, 1937-1890: A Personal History of the Oregon Department of Geology and Mineral Industries as Seen Through the Eyes of Ralph S. Mason. In it he documented the early days of DOGAMI and its evolving role as the economy and priorities of the state changed during those years.

During his adolescence, Ralph climbed Mount Hood many times, once from the family home in Parkdale. Later as a Mazama he was active in the Mazama Eliot Glacier research project. He was associated with many other societies and groups, including the American Institute of Mining, Metallurgical, and Petroleum Engineers; GSOC; Oregon Museum of Science and Industry (OMSI); Oregon Association of Engineering Employees; Oregon Inventors Council; the Columbia Inter-Agency Task Force on Lands and Minerals; and the Audubon Society. He was an instructor in geology in the Portland State College Evening Program from 1950 to 1972 and a guest lecturer at the Oregon State Junior Engineers Science Summer Institute from 1958 to 1972. He led numerous field trips at

OMSI's Camp Hancock. He loved woodworking, and after he and Dorothy moved from their home to Willamette View, he took great pride in the way he was able to organize one of its woodworking shops.

After his retirement, he continued his interest in geology. While on a trip to Japan in 1980, he heard that Mount St. Helens was about to erupt. He saved three pictures in his camera for his return trip on May 18, just in case. As the plane approached Seattle, the pilot announced that Mount St. Helens had just gone into eruption and turned the plane so they could watch it. And Ralph, always the geologist and journalist, was ready to take his pictures. As Dorothy said, they had a wonderful life together. No matter where they went, they were looking at geology and learning things. Luckily for the rest of us, Ralph loved sharing what he knew about geology with us too.

by Beverly Vogt

What Drives the Earthquake-Generating Plates on the Surface of the Earth ?

George W. Moore
Department of Geosciences
Oregon State University
Corvallis, OR 97331-5506

In 1502, Amerigo Vespucci charted the east coast of South America and showed that it is a mirror image of the west coast of Africa. That led Abraham Ortelius in 1596 to suggest that at some time in the past America had pulled away from Africa to create the Atlantic Ocean. In 1912, Alfred Wegener proposed that the continents float on the ocean basins and drift through them like rafts. Many geologists realized, however, that if the cool and rigid continents plowed through the ocean basins, their edges would be buckled far more than we see.

Henri Bacquerel had discovered radioactivity in 1896, and that revealed a source of energy for mountain-building processes in the heat from the decay of the Earth's dispersed uranium, thorium, and potassium. In 1925, Arthur Holmes proposed that the 2900-km-thick mantle of the Earth overturns like the contents of a heated pot to move material at the surface.

Study of earthquake waves by Beno Gutenberg during the 1930s hinted that horizontal shearing could occur well below the base of the continental crust, hence eliminating the buckling problem. The viscosity of the mantle decreases as it gets hotter with depth, but at the same time the viscosity increases there as it gets loaded. Heating and loading interact to give a surface of minimum viscosity and maximum slippage at a depth of 100 km.

In 1954, Hugo Benioff proposed that earthquakes that extend to a depth of 700 km at volcanic arcs follow great thrust faults (now called subduction zones) where oceanic slabs slip down beneath adjacent parts of the Earth. In 1965, Tuzo Wilson connected vertical transform faults such as the San Andreas Fault with subduction zones and lines of seafloor spreading to produce an array of moving plates on the surface of the Earth.

Investigators earlier thought that the seafloor spreading axes are underlain by rising sheets between mantle convection cells, but mapping revealed that the axes are offset by long transform faults. This stair-step offsetting proves that the rising sheets are not the drivers of the plates. They are merely passive responses to the pull-apart of the plates.

Using earthquake waves to image the mantle, Stephen Grand in 1994 showed that subducting slabs extend all the way to the Earth's core. The 90-km-thick mantle part of a plate, below the thin oceanic crust, is chilled by its nearness to the Earth's surface. That makes it heavier than the rest

of the mantle, so it sinks down and draws the rest of its plate behind it.

This imaging of subduction zones produced a surprise. Although the sinking slabs are only 100 km thick, the cold zones flanking them at subduction zones are 1000 km thick. Clearly the slabs are drawing down subplate material both from under the moving plate and also from under the adjacent plate that is not subducting. Even though this subplate material is not part of the rigid plate, several hundred kilometers of it are cooler and more dense than the main part of the mantle, so they follow along with the slab, but at a slower rate.

All of this contributes to the overturn of a giant convection cell beneath the moving plate, and also to reverse convection beneath adjacent plates that lack their own subducting slabs. The Pacific Plate moves at 10 cm/yr toward the northwest, then down beneath Japan toward the core, taking 29 million years to traverse the 2900 km thickness of the mantle. The North and South America Plates (including the west half of the Atlantic Ocean) move at 3 cm/yr to the west. This measures the rate of overturning of the West Atlantic Convection Cell, a cell driven not by its own subducting plate but by the adjacent subduction zones along the east side of the Pacific Ocean.

In 1997, John Tarduno measured the paleomagnetic pole positions of seamounts along the Hawaii Hotspot track. They can be interpreted to indicate that the basal return flow of the Pacific Convection Cell is 3 cm/yr, hence matching that of the West Atlantic Convection Cell. A full Pacific circuit, from the East Pacific Rise, down past Japan, back along the top of the Earth's core, and up again to the East Pacific Rise, is 30,000 km. At 3 cm/yr, this plate-driving circuit takes 1 billion years for a complete revolution.

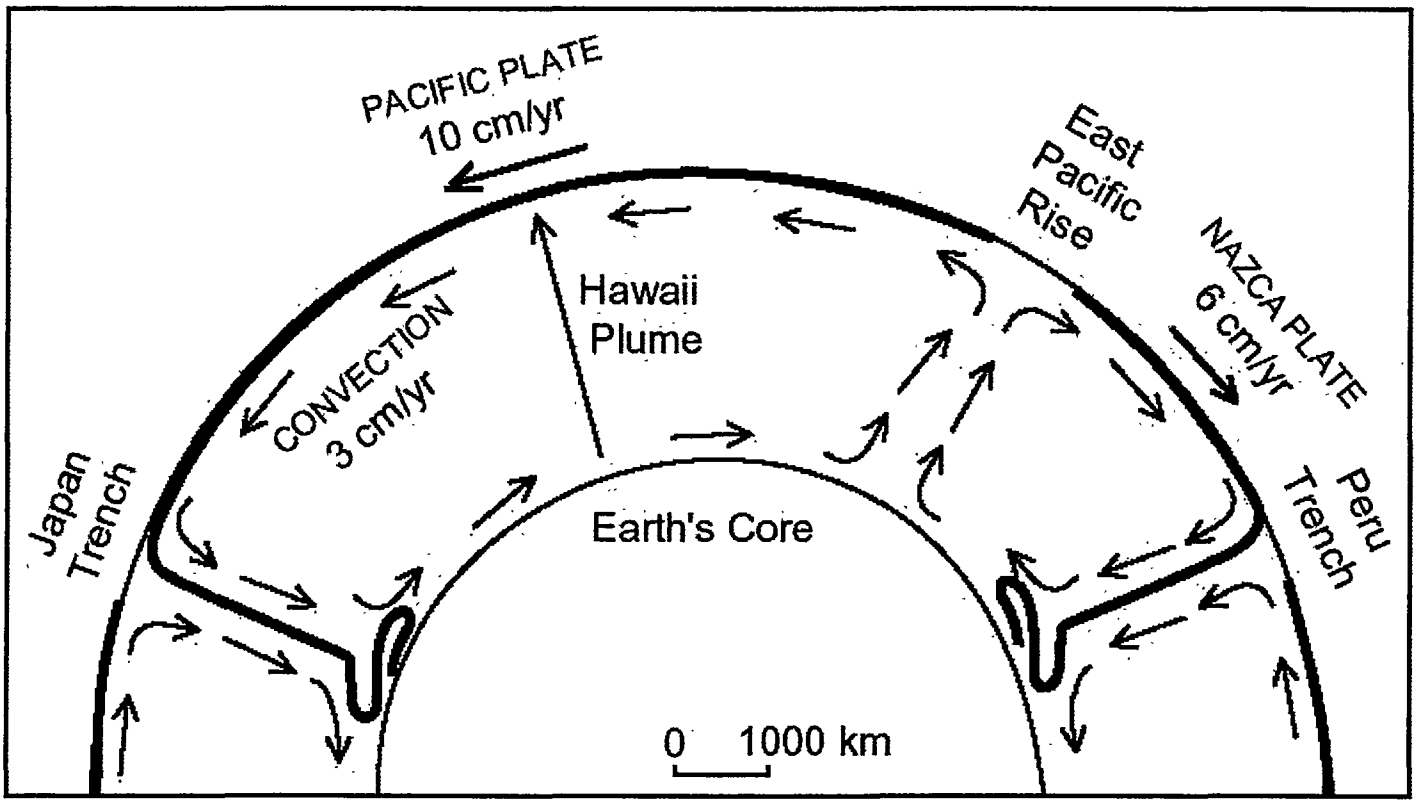

Illustration for Moore article.

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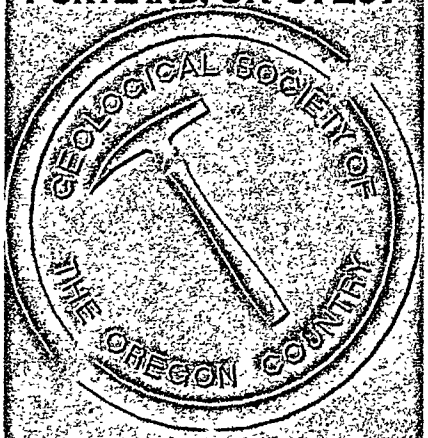

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Guy DiTorrice
Mary R. Pace

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JULY FIELD TRIP ANNOUNCEMENT

July field trip to study the buried forests of Mount Hood:

The GSOC field trip for July will be held Saturday, July 12, 2003. Led by Ken Cameron of the Oregon Department of Environmental Quality and formerly with the US Geological Survey, the trip will examine the eruptive history of Mount Hood and

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VISITORS WELCOME AT ALL MEETINGS VOL. 69, No. 7
INFORMATION: www.gsoc.org or e-mail:gsoc@spiritone.com July 2003
Su Ikeda, President, 503-246-1385 (seeking willing Calendar Editor)

JULY ACTIVITIES

Fri. July 11, 8:00 PM: To Be Announced. Rm 371 Cramer Hall, PSU.

Field Trip Sat. July 12: The Buried Forests of Mount Hood. Led by Ken Cameron of the Oregon Department of Environmental Quality and formerly with the USGS, the trip will examine the eruptive history of Mount Hood and the effect of its eruptions on surrounding trees. Field trip participants are to meet at 9:00 a.m. in the parking lot at the Hoodland Plaza located at Welches on Highway 26 on the way to Mount Hood. The meeting place has a Thriftway grocery store and a 76 gas station and is by the turnoff for the Resort at the Mountain. Ken hopes for no more than 20 cars on the trip, so GSOC members are encouraged to carpool up to the meeting place or to consider carpooling with other participants before starting on the actual trip. There will be three stops: one at the Lost Creek picnic area at Old Maid Flat, the second at the Clear Fork of the Sandy River, and the last in the area around Timberline Lodge. Bring your lunch, wear good walking shoes, and plan for the trip to last until the middle of the afternoon. Cost is $3 for members, and $4 for nonmembers. If you plan on attending or have any questions, contact GSOC Assistant Leader Clay Kelleher (home: 503-775-6263 [allow to ring 6 times for voice mail], work: 503-257-1551, email: claygeo@cs.com).

Note: There is no seminar or noon meeting scheduled for July.

PREVIEW OF COMING EVENTS

Field Trip, Sat. August 2: Geology of Sauvie Island. For information, contact Beverly Vogt (phone 503-292-6939 or email bevfrob@teleport.com).

Annual GSOC Picnic: August 10 (Sunday) Noon-4:00 pm
Beacon Rock State Park "Upper Picnic Area" (excellent view!). The park is in the Columbia Gorge on Washington Hwy #14, 29 miles east of I-205. **Cost**: Picnic fees members $2, guests $3, advance or at site. Also $5 per vehicle parking fee in self-service drop boxes (carpool info below). Money for picnic fees payable to GSOC, hand-deliver or mail to Clay Kelleher 8815 SE Mill St. Portland OR 97216.
Food: Potluck, but GSOC provides hamburger, veggie burgers, hot dogs, and chicken for BBQ.
Lunch time 1:30 pm. **Please call or e-mail** Clay Kelleher to indicate number coming, type of food you are bringing, and if you have or need ride for carpooling. Home 503-775-6263 (voice mail comes on after 6 rings), or office 503-257-1551. Clay's e-mail is claygeo@cs.com.

President's Field Trip: Look for details about this Labor Day Weekend outing in the August newsletter.

Note: The normal evening meeting, noon meeting and monthly seminar will not occur in August.

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Note: The August field trip will be on Saturday, August 2, to see the geology of Sauvie Island. For information, contact Beverly Vogt (phone 503-292-6939 or email bevfrob@teleport.com).

Tunneling Under the Willamette

Report of the Friday, May 9, evening lecture by Sue Bednarz
article by Clay Kelleher

The Willamette River is generally much cleaner than it was thirty years ago, but still gets a heavy shot of pollution in Portland after heavy rain events due to combined sewer overflows (CSOs). Runoff from street drains flows into sewer pipes eventually reaching the treatment plant, but if the combined flow exceeds the system capacity, the excess flows into the river. The Portland Bureau of Environmental Services is sponsoring a number of CSO projects through 2011, some to separate the stormwater from the sewage, but most to increase the capacity of the sewage system. One such project, called the West Side Big Pipe, has been designed by Parsons Brinkerhoff, with Sue Bednarz the project geologist.

The Big Pipe will be 14 feet in diameter, 4 miles long, and run approximately 100 feet underground with a gradual downslope from the foot of SW Clay Street to a pump station on the south end of Swan Island. The alignment is under the west shoreline most of the way, passing under the river in the last half mile. Several large vertical shafts are being excavated now, and later two tunnel boring machines will be lowered in to drill horizontally in either direction from the Nicolai Shaft on Terminal 1.

Sue described many of the geotechnical engineering details of the project. Serious concerns during construction include damage to overlying structures, flooding, and stability of the soil, and the last two are in the geologist's area of expertise. Before major construction began, many tens of boreholes were drilled 80 to 360 feet deep. Sue examined the samples from various depths and summarized findings of interest for the design engineers and the contractor. In the process she drew several stratigraphic sections, which she brought to the meeting. She was pleased to speak to GSOC because of our interest in the geologic aspect of her work.

A simplified stratigraphic section of the Portland basin would show Columbia River Basalt 500 to 1000 feet below the surface, overlain by Sandy River mudstone, overlain by Troutdale formation, with Missoula flood deposits at the surface. In the Big Pipe project area, basalt was generally below the reach of the boreholes except near Nicolai Street, where it rose to within 170 feet of the surface.

The Sandy River mudstone and Troutdale formation are both poorly to moderately consolidated sedimentary rock units of the late Miocene and Pliocene. The Sandy River mudstone tends to be fine grained with occasional cobble lenses, probably

derived from overbank deposits of local streams. The Troutdale formation has substantial cobble beds including quartzite stones with many lenses of sand and finer materials, probably the streambed of the ancestral Columbia River. The Troutdale Formation was exposed prior to the start of Missoula flooding.

During the Pleistocene there were several periods when oceans were lower, causing the Columbia and Willamette rivers to cut narrow gorges into the Troutdale formation and Sandy River mudstone in the Portland basin about 100 feet deep. When a Missoula flood passed over the basin, it deposited much of its sediment load especially infilling low-lying areas such as the Willamette river gorge. The flood deposits are unconsolidated and include a mix of fine-grained sediments to large boulders, some of exotic origin. A line of thick flood deposits marks the location of the Willamette River just prior to the final Missoula flood. Sue found that it roughly followed the present course of the river, but slightly more meandering.

The project engineers do not regard the coarse grained flood deposits to be desirable to tunnel through. However re-aligning the Big Pipe inland to go through the Troutdale formation might gain them only a little in tunneling ease, while elongating the tunnel and carrying some risk of settling of heavy buildings in downtown Portland. The Big Pipe will probably be built where present plans have it mapped. Watch the Portland news media for progress on this project.

PUBLICITY CHAIR RESIGNS

We want to **thank Ted Walling** for the terrific job he did on the calendar the past couple of years. This is a volunteer task which helps our other volunteer staff get the info out to you every month!

If you think you might have about 5 hours per month, email service and phone and can help us out, we'd REALLY appreciate it!!!

How about it?

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AUGUST 2003

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GSOC LIBRARY: Rm. S7, Open 7:30 p.m. prior to meetings.
PROGRAMS: EVENING: Second Friday Evening each month, 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:

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. Email address: gsoc@spiritone.com.

APPLICATION FOR MEMBERSHIP-
THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Name_____ **Spouse**_____
Children under age 18_____

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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
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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 — VOL. 69, No. 8
INFORMATION: www.gsoc.org or e-mail:gsoc@spiritone.com — August 2003
Su Ikeda, President, 503-246-1385 (seeking willing Calendar Editor)

AUGUST ACTIVITIES

Field Trip, Sat. August 2: Geology of Sauvie Island. Led by retired U. S. Forest Service geologist Pete Patterson, who is also a long time resident of Sauvie Island, the trip will focus on the geology of the island, its geologic and water history, and changes over time. Stops to see some of the surrounding geology are also planned. This is a rare opportunity to learn more about one of northwest Oregon's most popular yet least studied recreation areas.

Meeting place is the 7-11 Store on the right-hand (northeast) side of U. S. Highway 30 (also locally called St. Helens Road) in Linnton, located in the northwest industrial area of Portland. Meeting time and date: 9:00 a.m., Saturday, August 2. The trip should last until mid afternoon. Bring lunch, water, good walking shoes, rock hammer, and anything else you think necessary for a good field trip. Cost of the trip is $3 for GSOC members, $4 for nonmembers. Each car should also be prepared to pay $3 for a one-day parking permit for the Sauvie Island Wildlife Refuge.

People planning to attend the trip should call Beverly Vogt, 503-292-6939,or contact her by email at bevfrob@teleport.com by Thursday, July 31, so she knows how many trip guides to have available. Carpooling is encouraged, and arrangements should be made before the trip because there will be no place to leave cars during the trip. Let Beverly know if you need a ride or are willing to take riders.

Annual GSOC Picnic: August 10 (Sunday) Noon-4:00 pm

Beacon Rock State Park "Upper Picnic Area" (excellent view!). The park is in the Columbia Gorge on Washington Hwy #14, 29 miles east of I-205.

Cost: Picnic fees members $2, guests $3, advance or at site. Also $5 per vehicle parking fee in self-service drop boxes (carpool info below). Money for picnic fees payable to GSOC, hand-deliver or mail to Clay Kelleher 8815 SE Mill St. Portland OR 97216.

Food: Potluck, but GSOC provides hamburger, veggie burgers, hot dogs, and chicken for BBQ. Lunch time 1:30 pm.

Please call or e-mail Clay Kelleher to indicate number coming, type of food you are bringing, and if you have or need ride for carpooling. Home 503-775-6263 (voice mail comes on after 6 rings), or office 503-257-1551. Clay's e-mail is claygeo@cs.com.

Facilities. At our reserved site, about 20 heavy tables, lighted covered pavilion with fireplace, rest rooms, small level grassy recreation area. In park, trail to top of Beacon Rock (about 700 feet climb), or trail to Hardy Falls, Rodney Falls, and Little Beacon Rock.

President's Field Trip: August 29 to September 2. Southern Oregon Coast. See details in this newsletter. Call Su Ikeda, (503) 246-1385 or email her at opalsu@comcast.net to sign up or get more information.

PREVIEW OF COMING EVENTS

Fri. September 12, 8:00 PM: To Be Announced. Room 371 Cramer Hall, PSU.

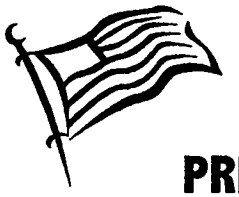
For Field Trips: Children must be accompanied by a parent or responsible adult, and their safety is the responsibility of that adult.

Calendar items must be received by 15th of preceding month. Call Su Ikeda 503-246-1385.

WELCOME

We welcome the following new members to the Geological Society of the Oregon Country

Mark Gawecki



UPDATED INFO FOR THE GSOC PRESIDENT'S FIELD TRIP

This year GSOC will be organizing the President's field trip as a do it yourself-er. Persons going will be providing their own transportation (or carpooling) and their own lodging. This will make it easier to organize, members will be able to decide if they want to go closer to the event, and it will keep the cost low (or as low as you want).

This means that if you are interested in going, **book your rooms or camping NOW!** The field trip is over Labor Day Weekend. Here is the **UPDATED** itinerary for the trip:

- **Friday, August 29, 2003** – meet in downtown Elkton, Oregon, along Oregon Highway 38. To get to Elkton, head south on I-5 to about 10 miles south of Cottage Grove (south of Eugene), then at the bottom of a long slope take exit 162 to Drain and Highway 38. (What is happening here geologically?) Proceed through Drain and continue on Highway 38 to Elkton, the next town. Travel time at the speed limit is approximately 3 to 3 ¼ hours. We will be spending the night in the Coos Bay area.
- **Saturday, August 30** – meeting place to be announced. We will be exploring the Charleston/Cape Arago area, then drive down to Gold Beach for the night.
- **Sunday, August 31** – meeting place to be announced. We will be exploring the Cape Blanco/Humbug Mountain area and driving back to the Coos Bay area for the night.
- **Monday, September 1** – drive home (4 ½ hours approximately)

If you are interested in going on the trip, please call Su Ikeda (503/246-1385) or email at opalsu@comcast.net. Su is making a list of names of participants so we can keep participants informed.

At this point, we have not secured professional geologists to speak on the trip. However, we do have several professionally prepared field guides to the area. We may also be getting some additional information from Ron Metzger of SWOCC (Southwestern Oregon Community College in Coos Bay).

Cost of the trip will be announced via phone. Costs will be set to reimburse the society for copies made and speaker honoraria, should we secure a speaker. Costs will not exceed $50. **Attendees will be expected to pay at the meeting area in Elkton.** Lodging, meals, and transportation to be provided by the participants.

A registration form and waiver can be found on the back of this newsletter. **Participants must bring signed registration and waiver forms to the meeting area in Elkton.**

Here is a list of nicer motels and campgrounds in the area to aid your search:

Motels in Reedsport and Winchester Bay (about 15 miles north of Coos Bay):

- Salbasgeon Inn, Reedsport..... 541/271-4831
- Winchester Bay Inn 541/271-4871

Motels in North Bend, Coos Bay and Bandon:

- Best Western Holiday Motel (Coos Bay) 541/269-5111
- Mill Casino 541/756-8800
- Edgewater Inn..... 541/267-0423
- Red Lion 541/267-4141
- Bandon Dunes Golf Resort..... 541/347-4380

Campgrounds in Winchester Bay and Coos Bay areas:

- Salmon Harbor Marina RV Resort (Winchester Bay).....541/271-0287
- Umpqua Lighthouse State Park campground... 1-800-452-5687
- Tugman State Park campground..... 1-800-452-5687
- Bastendorff Beach County Park campground.. .....541/888-5353
- Sunset Bay State Park campground..... 1-800-452-5687
- Bullard's Beach State Park campground (Bandon)..... 1-800-452-5687

Motels in Gold Beach:

- Gold Beach Resort.....541/247-7066
- Jot's Resort.....541/247-6676

Campgrounds in Gold Beach:

- Lobster Creek.....541/247-3600
- Quosatana 541/247-3600
- Illahe 541/247-3600

The focus of this year's President's field trip will be stratigraphy and fossils of the Tyee Basin and the south Oregon coast.

AUGUST FIELD TRIP ANNOUNCEMENT

Geology field trip to Sauvie Island set for August 2:

The Geological Society of the Oregon Country (GSOC) will conduct a field trip to see the geology of Sauvie Island on Saturday, August 2. Led by retired U. S. Forest Service geologist Pete Patterson, who is also a long time resident of Sauvie Island, the trip will focus on the geology of the island, its geologic and water history, and changes over time. Stops to see some of the surrounding geology are also planned. This is a rare opportunity to learn more about one of northwest Oregon's most popular yet least studied recreation areas.

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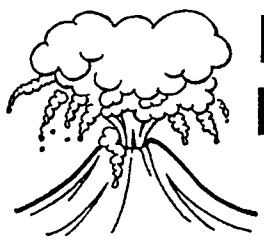


IGNEOUS ROCKS, PHASE DIAGRAMS, AND BOWEN'S REACTION SERIES

Note: This article is a reprint from August 2001 GSOC Newsletter. The site address for Dr. Fichter's site has changed, and the new address substituted. - csh

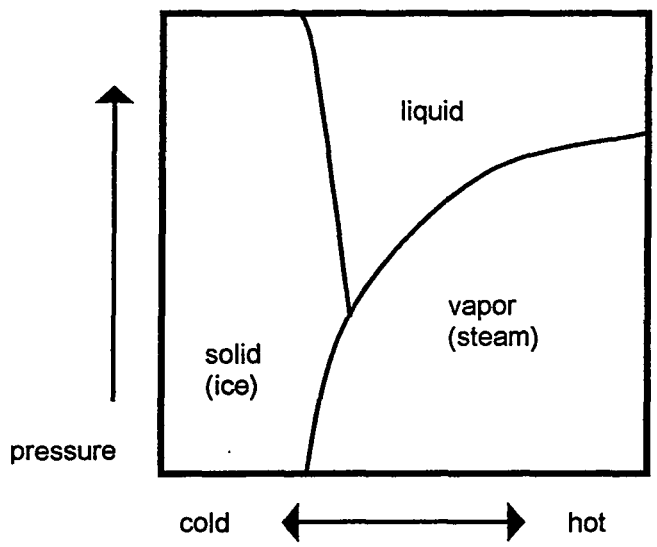
There is an excellent site on the internet about igneous rocks, mineral solutions, and phase diagrams. The author, Dr. Lynn S Fichter (email fichtels@jmu.edu), from the Dept. of Geology & Environmental Science, James Madison University, is permitting us to publish some extracts from the site, (http://www.jmu.edu/geology/) in this month's newsletter.

Why study mineral solutions and phase diagrams? This branch of geology, in which the minerals themselves are studied, explains the processes

which produce rocks of various mineral compositions. Knowing the processes which produce minerals can give clues as to the tectonic settings which created the rocks. The famous pioneer in this work was Norman L. Bowen, who performed experiments on the crystallization of silicate liquids in the early 20th century.

What is a mineral phase? According to Dr. Fichter's site, "A phase is anything that can be mechanically separated. For example, minerals in a rock are each different phases, and liquid and vapor are different phases. More importantly here, in a partially, or fractionally, melted rock the melt portion is one phase and the unmelted residue is a second phase."

A very simplified phase diagram for water is shown below. This diagram shows the phases of water dependent on the environmental temperature and pressure.



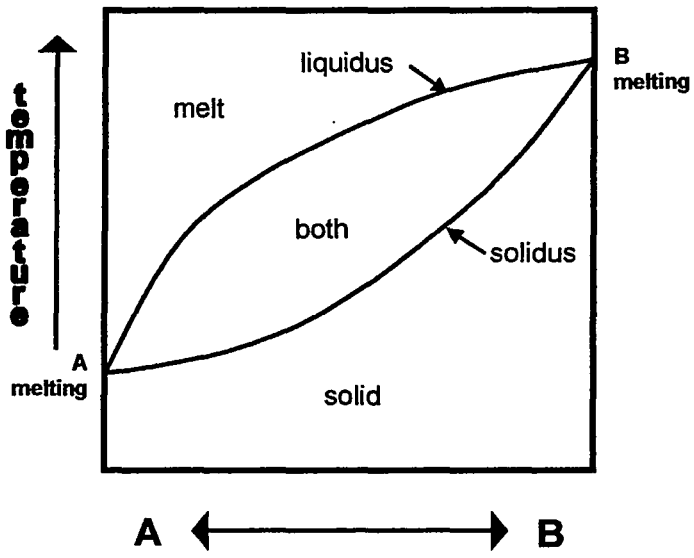
Mineral phase diagrams can be like the above diagram for water, with a single composition at different temperature and pressure; however minerals are generally mixed in the real world and diagrams showing the behavior of mixtures are common. Dr. Fichter's site discusses solid solution and binary eutectic phase diagrams:

"The **solid solution phase diagram**...shows two phases: crystal and melt...one variable - temperature plotted along the vertical axis...Pressure is held constant...complete miscibility (mixability) in both liquid (magma) and crystal phases...demonstrates how the metallic cations in a mineral can be partitioned into fractions. For example, all the ferromagnesium minerals (olivine, pyroxene, amphibole, biotite) are solid solutions of Mg and Fe. High temperature crystallization species are Mg rich, intermediate temperature species mixed Mg and Fe, and low temperature species Fe rich."

" The **binary eutectic phase diagram** explains the chemical behavior of two immiscible (unmixable) crystals from a completely miscible (mixable) melt, such as olivine and pyroxene, or pyroxene and Ca plagioclase. The binary eutectic phase diagram demonstrates how two mixed and unrelated minerals can be fractionated. For example, amphibole and plagioclase are both found in diorite, but can be at least partially separated by fractionation."

Fractionation occurs when early forming minerals have a different composition than the magma. If these are removed from the magma before crystallization is complete, then the magma is changed in composition from the original.

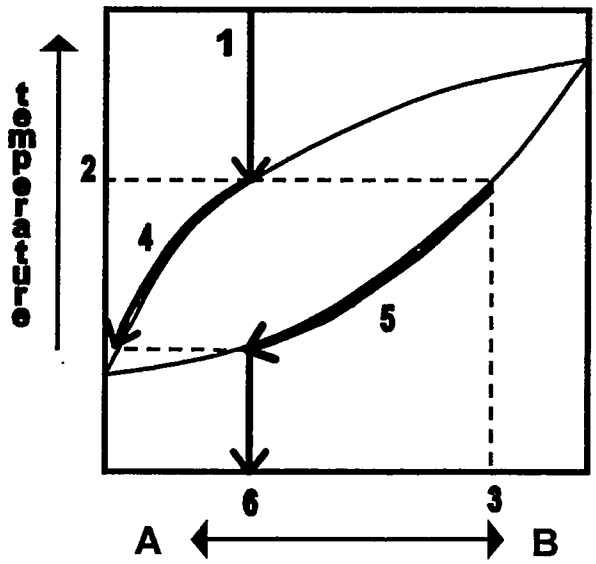
Here we have a very simple example of a solid solution phase diagram. On the website, Dr. Fichter shows the interaction between sodic and calcic plagioclase, rather than mineral A and B.



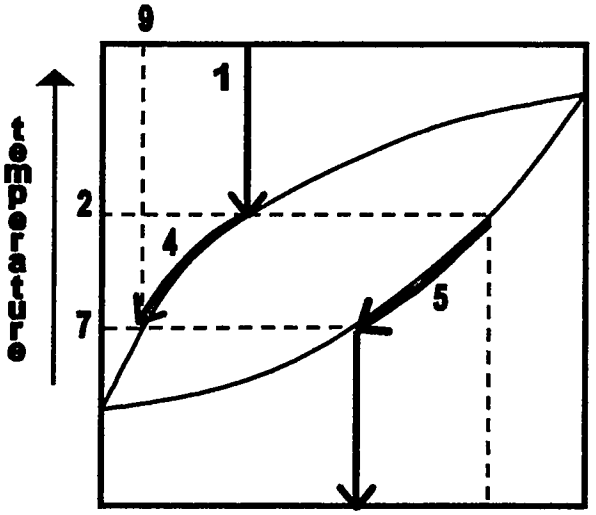
The solid solution diagram shown here describes the interaction between generic minerals A and B. The liquidus line shows the temperature of the first solid crystal of melts of various compositions. The solidus line shows the temperature of the first drop

of melt for a solid crystal solution of various compositions.

Now we can find out what happens to the melt as it cools and solidifies. If the melt starts at 30% composition of B and 70% of A at **1**, the temperature of the first crystal is **2**, and the composition of the first crystal is **3**. As the melt continues to solidify, its composition is given by the liquidus **4**. The crystal composition of the solid solution follows the solidus **5**. If the mixture cools slowly without separation, the final composition of the solid solution will be the same as the original melt **6**.



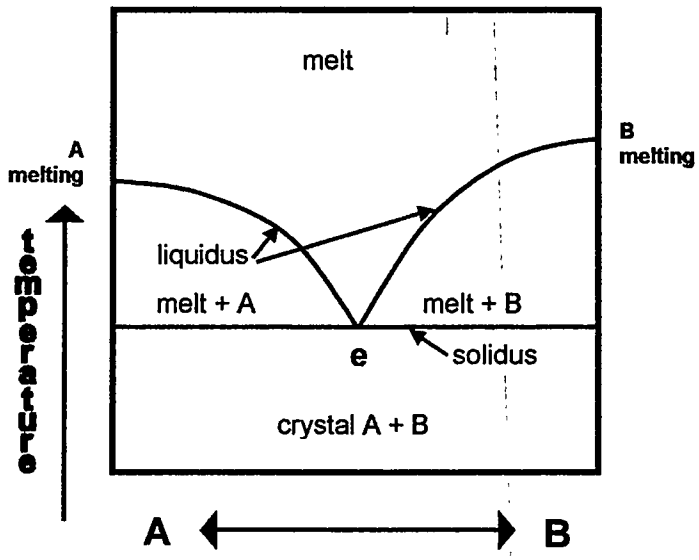
If the process gets interrupted, say for example that the early forming crystals get separated from the melt, then the melt composition will be richer in mineral A and the crystal composition will be richer in mineral B than the original mix.



The final solid solution phase diagram shows a cooling process interrupted at the temperature at **7**; the crystal composition at point **8** and the melt composition at point **9**.

Melting processes can separate minerals in a similar manner when interrupted, as shown on the website.

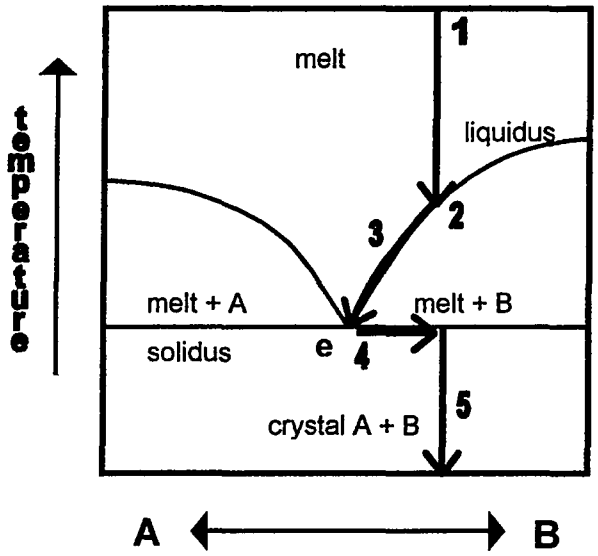
Now we will introduce the binary eutectic phase diagram for two hypothetical substances A and B:



Dr. Fichter's notes on the binary eutectic diagram:

- The liquidus line separates the all melt phase from the melt+crystal phase.
- The solidus line separates the melt+crystal phase from the all crystal phase. NOTE that the solidus and liquidus lines are experimental, they have been determined by melting and cooling many melts at different percent compositions.
- The eutectic (e) is the point at which all three phases can exist simultaneously, A, B, and melt. The eutectic here is 50% B, but can be any percent depending on the minerals involved.
- If we add some B to a melt of A (say 20% B; red arrow) the temperature of melting (crystallization) is lowered. The more B we add the lower the melting temperature becomes; that is, it moves down the liquidus line toward the eutectic. Any mixture of A and B lowers the melting (crystallizing) temperature down the liquidus.

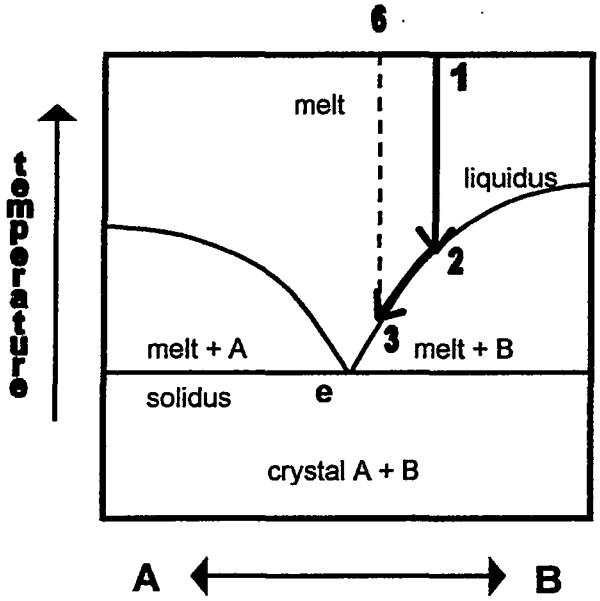
An Example of Equilibrium Crystallization From a Melt With a 50/50 Eutectic:



The First Crystal (numbers on phase diagram correspond with numbers below)

1. Assume a melt composition of 70% B and 30% A.
2. Cool melt to liquidus line along red arrow. Only B crystals form...because we are on the Melt+B liquidus line; no A can crystallize until the eutectic is reached.
3. Removing (crystallizing) B changes the melt composition making in richer in A. Therefore the melt composition begins to migrate to the left, but down the liquidus line toward the eutectic point. The system must stay on the liquidus line since going above it would raise the temperature high enough to melt everything.
4. At the eutectic point, and only at the eutectic point, can A finally begin to crystallize out of the melt, and A and B now crystallize out together at a ratio of 50/50 until all the melt is gone.
5. Finally after all the melt is gone the two crystals A+B can leave the eutectic. Since the original composition of 70% B has not changed we therefore shift the path right to the 70% point, and continue to drop the temperature straight down. This path is the same any time the composition of B is greater than the eutectic value. If the composition is less than the eutectic, the path is similar, but a mirror image.

If this process is interrupted while the melt is solidifying, the melt composition can be read by projecting straight up from the liquidus (6), and the crystal composition will be pure B.



We will conclude next month with a discussion of Bowen's reaction series.

Geological Society of the Oregon Country
PO Box 907
Portland, OR 97207-0907

Field Trip to Southwest Oregon Coast
Official Registration Form

Leader: ..... GSOC President Su Ikeda.

Who May Participate: ..... GSOC members and their families may participate. GSOC membership forms are located in the GSOC newsletter and on the website at http://www.gsoc.org. Cost of membership is $20 for individuals and $30 for families.

Itinerary: ..... Friday, August 29, 2003 – meet in downtown Elkton, Oregon, along Oregon Highway 38. To get to Elkton, head south on I-5 to about 10 miles south of Cottage Grove (south of Eugene), then at the bottom of a long slope take exit 162 to Drain and Highway 38. (What is happening here geologically?) Proceed through Drain and continue on Highway 38 to Elkton, the next town. Travel time at the speed limit is approximately 3 to 3 ¼ hours. We will be spending the night in the Coos Bay area. Saturday, August 30 – meeting place to be announced. We will be exploring the Charleston/Cape Arago area, then drive down to Gold Beach for the night. Sunday, August 31 – meeting place to be announced. We will be exploring the Cape Blanco/Humbug Mountain area and driving back to the Coos Bay area for the night. Monday, September 1 – drive home (4 ½ hours approximately).

Cost for the Trip: ..... To be announced, not to exceed $50. Costs will be set to reimburse the society for copies made and speaker honoraria, should we secure a speaker. Participants will be expected to pay at the meeting area in Elkton.

Lodging: ..... Lodging, meals, and transportation to be provided by the participants.

Refunds: ..... Since payment is made on the trip, there will be no refunds.

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

Name (s) _____ _____

Name (s) _____ _____

Total Number of Persons Registering_____Total cost of trip _____

Address _____ _____

Phone #_____email _____

For questions, email Su Ikeda at opalsu@comcast.net or phone at 503-246-1385.

IMPORTANT – A waiver/medical information form for each participant must accompany this registration form. See back of this page. →

Geological Society of the Oregon Country
PO Box 907
Portland, OR 97207-0907

Field Trip to Southwest Oregon Coast
Waiver

NOTE: Please fill out a separate waiver form for each person attending.

I understand that the Geological Society of the Oregon Country 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 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 # _____ email _____

Name of Physician: _____ Telephone Number: _____

Allergies: _____ _____

Special Medications: _____ _____

Special Medical Conditions: _____ _____

In Case of an Emergency Call: _____ _____

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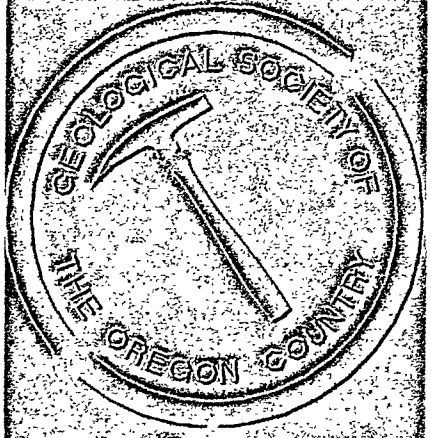
OF THE OREGON
COUNTRY
P. O. BOX 907
PORTLAND, OR 97207



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SEPTEMBER 2003

THE GEOLOGICAL NEWSLETTER

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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THE GEOLOGICAL NEWSLETTER

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Calendar:
Position vacant

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Rosemary Kenney – 503/892-6514
Assistant Business Manager:
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.
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Children under age 18_____

Address _____ **City** _____ **State** ___ **Zip**_____-_____
Phone (____**)**____-_____ **Email address**_____

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GEOLOGICAL NEWSLETTER

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P.O. Box 907, Portland, OR 97207

VISITORS WELCOME AT ALL MEETINGS — VOL. 69, No. 9
INFORMATION: www.gsoc.org or e-mail:gsoc@spiritone.com — September, 2003
Su Ikeda, President, 503-246-1385
Temporary Calendar Editor, Beverly Vogt, 503-292-6939

SEPTEMBER ACTIVITIES

Friday evening talk, Sept. 12, 8:00 p.m.: Pliocene Lake Idaho, Eastern Oregon and Western Idaho: A Cautionary Tale. Margie Jenks, Geologist, Oregon Department of Geology and Mineral Industries will discuss the history of the discovery of Lake Idaho, the struggle for its eventual recognition, and its geology. Room 371, Cramer Hall, Portland State University.

There will be no noon program or Wednesday night seminar in September.

* *

PREVIEW OF COMING EVENTS IN OCTOBER

Noon program, Fri., Oct. 10, 12:00-1:00 p.m.: President's Field Trip, Southwest Oregon Coast. A summary of the trip, with slides, presented by GSOC members who went on the trip. Room 120B (Crooked River Suite), Oregon State Office Building, 800 NE Oregon St. (NE 7th Ave. MAX stop).

Fri. evening talk, Oct. 10, 8:00 p.m.: Active Faults in the Portland Area. Presented by Ian Madin, Section Leader in Geologic Mapping, Oregon Department of Geology and Mineral Industries. Room 371, Cramer Hall, Portland State University.

Seminar, Wed. evening, Oct. 15, 8:00 p.m.: Overview of the Geology of the Pacific Northwest. Evelyn Pratt, Past GSOC President. Room S17, Cramer Hall, Portland State University.

* *

FUTURE FRIDAY NIGHT TALKS, ROOM 371, CRAMER HALL, PSU

Nov. 14, 8:00 p.m.: Lifeline Reconnaissance of the May 2003 Algerian Earthquake. Yumei Wang, Supervisor of Geohazard Mapping, Oregon Department of Geology and Mineral Industries.

Dec. 12, 8:00 p.m.: Prelude to Mars: Preview of the Next Generation of Mars Landers. Ken Cameron, Geologist, Oregon Department of Environmental Quality.

Calendar items must be received by <u>15th of preceding month</u>. Call Beverly Vogt, 503-292-6939.

Welcome

We welcome the following new members to the Geological Society of the Oregon Country

Maura Doherty

VOLUNTEERS NEEDED (1) TO LEAD SEMINARS AND (2) TO PRODUCE MONTHLY CALENDAR OF GSOC EVENTS

Because of health reasons, long-time Wednesday night seminar leader Richard Bartels has resigned. A replacement is needed. Qualifications include knowledge/love of geology, the desire to share your knowledge with other people, and the willingness to be responsible for one Wednesday night seminar per month September through May. The leader can either lead the seminars or make arrangements for someone else to do so.

Another volunteer is needed to produce the monthly calendar. The qualifications include computer skills, including access to email and the internet, and the ability to assemble and print the calendar using a predetermined format each month. Duties include contacting various GSOC activity leaders each month to get information, assembling and printing the calendar, and sending it to the *Oregonian* and the *Newsletter* editor.

Potential volunteers should contact President Su Ikeda or any of the Board members as soon as possible. The energy of volunteers and their willingness to help with activities are necessary to an organization like GSOC. People who want to try these jobs but doubt their abilities should at least ask about the jobs, because a lot of other people in the organization have experience and can help you—and tasks like these are not as difficult as you may think. They require time and the willingness to honor your commitment—but they also offer an opportunity to learn.

Please consider becoming more involved and help keep GSOC the active and vital an organization it has been over the years. □□

OPEN HOUSES FOR WEST SIDE BIG PIPE PROJECT ANNOUNCED

The West Side Big Pipe Project is part of Portland's program to reduce combined sewer overflow (CSO). Sue Bednarz of Parsons, Brinkerhoff, Quade, and Douglas, Inc., presented a Friday night lecture in May on this $1 billion project. The West Side Big Pipe will be a 14-foot in diameter tunnel that parallels the Willamette River for almost four miles and will collect wastewater from existing sewers and take it under the river to the new Swan Island Pump Station. From there the wastewater will be pumped to the Columbia Boulevard Wastewater Treatment Plant. Environmental Services will use two tunnel boring machines for the project. From the Nicolai Shaft site, one machine will bore south to SW Clay Street, and one will bore north under the Willamette River to Swan Island.

Public presentations about the project are scheduled at the construction site office at 2730 NW Front Avenue Presentations will provide an overview of the project, project schedule, and other interesting information about the largest infrastructure project in the history of Portland. The presentations will include slides and a guided view of the main access shaft construction site. Presentation dates include Wed., Sept. 3, 8-9 a.m.; Wed., Sept. 17, 12 noon-1 p.m.; and Tues., Sept. 30, 5:30 p.m.-6:30 p.m. Pre-registration is required. Call Joleen Jensen-Classen to register at (503) 823-2822 or by email to joleen@bes.ci.portland.or.us. □□

STONE QUERIES: Why are there so many names for stone?

By Ron Geitgey, Industrial Minerals Geologist, Oregon Department of Geology and Mineral Industries

(Editor's Note: This article was written by Ron Geitgey for his column for sculptors which appears monthly in the "Newsletter of the Northwest Stone Sculptors Association." It is reprinted here because earlier this year, stonecutter and sculptor Joseph Conrad led a GSOC field trip to see both his stone fabrication shop and the building stones of downtown Portland. During this trip, we heard non-geological names for some of the building stones. Geitgey, who is both an industrial minerals geologist and a sculptor, is familiar with the confusion caused by the different names used by geologists, stone cutters, and sculptors for the same stones. This is how he explains the problem to his fellow sculptors—and to us.)

Two questions commonly asked by sculptors are "Why are there so many different names for stone? Which ones do I have to know?"

The quick and flippant answer is: Because there are so many different kinds of stone. While accurate, it's not particularly helpful, and it's only part of the answer. The other part is that there are so many different uses for stone and different ways of looking at it.

We sort, classify, categorize, and name everything (and everyone) we encounter. It's our way of fitting new things into our existing framework of familiar things. The stonemason sees a "boulder"; the stone sculptor sees a "granite"; the stone dealer sees "Peekskill Pewter"; and the geologist sees a "quartz-bearing hornblende norite"; and all four are looking at the same rock. The stonemason's concern is that the rock is unlike other local stone. Its hardness and rounded shape will require different working techniques, but it will present an interesting appearance in a finished wall. The sculptor notes a stone with pleasing color variations. It isn't sandstone, it's too coarse-grained and too hard to be marble, and it's going to require carbide and diamond tools to execute the intended design. The stone dealer wants an eye-catching, marketable name for a gray stone, a name evoking the Revolutionary War history of the nearby town in the Hudson River Valley and perhaps even hinting of echoing hoofbeats of silversmith Paul Revere (or at least his horse's hoofbeats). The geologist recognizes an intrusive igneous rock of unusual mineralogy which on the one hand grades into a commercial emery deposit and on the other may shed light on the geologic development of the core of an ancient mountain chain.

So which name is correct? That depends on who's speaking and who's listening. Within their respective areas of interest, none of the names each has used is wrong. The name communicates the necessary information to the appropriate specialist. However, cross between specialties and the names may be meaningless at best and completely misleading at worst. "Peekskill Pewter" would mean little to anyone not familiar with the stone fabrication business. "Granite" would convey some idea of hardness and workability to fellow sculptors but used as above the term would baffle a geologist, to whom "granite" means a rock with a very specific range of mineralogical and chemical composition. "Norite" has its own characteristics and mode of origin, and they are not the same as those of "granite" (in the geological sense).

The U. S. Department of Commerce uses only four names in reporting statistics on stone: granite, marble, travertine, and other stone. The stone fabrication and sales industry uses hundreds of names, all as marketing tools of individual companies' own invention and most of which convey little or no information about the stone's character. Geologists have their own huge collection of names based on often subtle composition variations and governed by international committees so that a given name means the same to geologists around the world. But a very large number of those names are useless to the non-geologist looking at a rock in his hand because they cannot be accurately applied without a

detailed laboratory analysis. Even the geologist pronouncing a freshly whacked-off fine-grained black rock to be a basalt may in fact really be saying it looks a lot like other fine-grained black rocks that laboratory work has shown to be basalt, rather than andesite, or andesitic basalt, or basaltic andesite, or....

A well-rounded stone sculptor, or observer of stone sculpture, should become familiar with perhaps a dozen or more stone types and develop an appreciation of the complexity and ambiguity of the many names for those stones, but my tolerance for the arcane may be higher than yours. I suppose a sculptor could, for example, carve Yule [Colorado] marble all of his life and never need any other name.

But don't assume you know a stone's carving characteristics just because you know its name—whose name is it? Use your knife or steel point to test it before you haul it home.□□

FRIENDS OF THE PLEISTOCENE TO HOLD ANNUAL FIELD TRIP SEPTEMBER 26-28, 2003

The Northwest Cell of the Friends of the Pleistocene (FOP) will study Holocene coastal processes in the Columbia River cell of Pacific County, Washington, and Clatsop County, Oregon September 26-28, 2003. Camping has been reserved at Fort Stevens State Park in Clatsop County, Oregon, for September 25, 26, and 27, 2003.

Space for 100 people has been reserved in four group camps @ 25 persons each, and six vehicles per camp are allowed by the park. The camps are in loops E, F, G, and H. Drivers will turn left at the camp entrance.

Cost per night in the group camp is $3 per person per night. A total of 24 vehicles will be allowed at the group camps. Additional vehicles must park offsite at Coffenbury Lake or other lots at a cost of $7 per vehicle per night. Therefore carpooling is encouraged. Anyone who arrives after the group camps are full must pay $17 per night for a tent site or $22 per night for a hookup site. They will be reimbursed later by mail if they paid the group camp fee of $9.

NW CELL FOP REGISTRATION

NAME _____

ADDRESS_____

Staying in Group Campsite Yes___ No___

Expected arrival date_____
time_____

Per person cost:

Registration Fee: $26 per person, includes Field Guide, Tour Illustrations, and other field trip costs.

Camping. (you pay for all 3 nights) $9.

Total: $35.

Please return with a check or money order, no cash please to FRANK RECKENDORF, 950 Market St. NE, Salem, OR 97301.Make checks out to: FRANK RECKENDORF and return payment by September 22, 2003. Last minute: FAX registration to 503 399-9421 with exact payment on site. However, please pay in advance to relieve the need for the registration hassle at the site. Thank you for your consideration.

Registration for camp area and FOP Guidebooks will start at 5 p.m. on Sept. 25 and continue until about 11 p.m. Registration will start again at 7 a.m. on Sept. 26 at the Group Site.

OTHER INFORMATION

The closest hotels are the Shilo Inn, 1609 East Harbor Dr., Warrenton, OR, phone 1-800-222-2244; and South Jetty Inn, 984 Pacific Dr., Hammond, OR, phone 1-503-861-2500. There is an Officers Inn Bed and Breakfast at 540 Russell Place Hammond, OR, phone 1-800-377-2524.

DIRECTIONS

To Fort Stevens State Park: From the NORTH go south of Astoria on Highway 101 and cross the bridge (over Young's Bay) toward Warrenton. Turn right on East Harbor Drive. There is a Denny's Restaurant on the SW Corner. Drive toward Warrenton and Hammond. Continue west where road changes names to North Main Drive and then to Pacific Drive in Hammond. Turn left at Hammond Store (Sign to Fort Stevens). This is Ridge Road. Turn right at Overnight Camping Entrance at Fort Stevens State Park.

From the SOUTH on Highway 101: turn left, west, on next main road after you pass Camp Rilea. This road is about 1 mile north of the main entrance to Camp Rilea. There is a sign on to road to Fort Stevens and Columbia Beach Lane. Turn left in about 1/3 mile on Delavara Beach Road. There are some buildings at the intersection and a sign to Fort Stevens State Park. Go about 1/3 mile to the junction with Ridge Road. Turn right on Ridge Road and travel about 2.7 miles to Fort Stevens main camping entrance on the left, west. There is a KOA campground on the right. Get directions at the camp entrance gate as where to go to find group camp check in for FOP.

TENTATIVE SCHEDULE

Friday, September 26th, 08:00 to 17:00: Overview of Columbia River watershed, estuary, and offshore deposits. Proceed to toll bridge (you pay your own toll cost) and cross the Columbia River. Travel up Long Beach to Willapa Bay view site. Review sediment history of Willapa Bay and discussion. Travel back to a view beaches and dunes along two transects. Review offshore, beach and dune sedimentation as well as erosion history.

Saturday, September 27th, 08:00 to 17:00: Overview of the Clatsop County dunes landscape at the group campground. Travel to Camp Rilea to discuss dune sequence, shoreline changes, and sedimentation and erosion history. There will be a Ground Penetration Radar "Demonstration" and a "Demonstration" of use of the Australian sand auger. We will look at a dune sequence from modern to pre-jetty to about 2,000 yrs BP. We will return to Fort Stevens State Park and proceed to Parking Lot A along the foredune. We will do a dune transect with discussion at Parking Lot A and at Battery Russell. There will be an evening session at a shelter along Coffenbury Lake starting about 19:00.

Sunday, September 28th, 08:00 to 12:00: We will travel to Warrenton to visit the site of the deepest bore hole to the Pleistocene on the West Coast and also discuss the stratigraphy of the Holocene. We will also visit a marsh site and view virbracore locations and cores along the Columbia River that reflect Holocene stratigraphy. □□

NOTES FROM SAUVIE ISLAND FIELD TRIP

By Carol Hasenberg, GSOC member and Newsletter editor

This trip was led by Peter Patterson, U.S. Forest Service, retired, on August 2, 2003.

First stop of trip: End of the access bridge to Sauvie Island in the parking area, which has a map of the island. Patterson introduced himself and described the overall geomorphology of Sauvie Island. The Columbia River basin is in a graben, or down-dropped block of land, with the Portland Hills Fault as the break zone between the basin and the Tualatin Mountains (Portland Hills) to the west. The island is based upon sedimentary deposits which came down the Columbia River since the flood basalts in the Miocene. The first of these deposits is the Troutdale Formation, or ancestral Columbia River sediments. The second of these are deposits of sand, gravel, and boulders carried by the Ice Age floods into the Columbia River basin. At the end of the Ice Age, eolian deposits of sand produced sand dunes in areas on the southwest side of the island. Since then normal river flooding has contributed to the evolution of the island.

A levee was built around the southern section of the island between 1939 and 1941. Much of the land we identify as part of the island was wetlands before the construction of the levee. The water is drained from the island by a series of zero-grade ditches, which can be utilized for irrigation in the dry summer months by allowing river water in.

Second stop of trip: Milepost 16 on U.S. 30 (St. Helens Road) – Weigh station area. Across the road from the weigh station (the southeast bank of the road) is a contact between the Columbia River Basalt Group rock above and the soil of the Scappoose Formation below. The Portland and Scappoose areas were covered by a shallow sea in the Oligocene and were gradually filled by sediments eroding from mountains to the east. In the Miocene these shallows and lowlands were flooded with Columbia River flood basalts.

Third stop of trip: Milepost 17 on U.S. 30 – turn left onto Rocky Point Road, go 2.6 miles on this road to overlook. This stop provides an overview of Sauvie Island, plus a view of a large ancient landslide in the Portland Hills west of the island. This landslide occurred along the slip plane between the Scappoose Formation and the Columbia River basalt. At the time of its occurrence, the river level was much lower and the Columbia River canyon was much steeper. The river level throughout time is related to the level of the ocean. During the time of maximum glaciation (about 17,000 years ago), the level was 200 feet lower than at the present. At the time of the Mt. Mazama eruption (about 6000 years ago) the level was 120 feet below the present level.

Fourth stop of trip: Grocery store near stop one. More facts about Sauvie Island were explained by Patterson. He discussed the flow volumes of wells on Sauvie Island, which are used to irrigate the agricultural crops grown here. The wells are often not very strong, because the soils are finer in character than the Troutdale gravels which are found in other areas of the Portland basin. The gravels have eroded away in much of Sauvie Island. Gravel areas are exposed at the shore of Sturgeon Lake at Oak Island, which is part of the tour.

Fifth stop of trip: 4.2 miles north of the intersection of Sauvie Island Road and Reeder Road on Sauvie Island Road. The bank to the west of the road is comprised of very fine-grained sand, and is part of the sand dune system on the island.

Sixth stop of trip – 3.6 miles north of the intersection of Oak Island Road and Reeder Road on Oak Island Road. The road crosses the levee en route to the shore of Sturgeon Lake. Patterson pointed out a curve in the levee, which had to be moved from the gravelly soils near the lake. A high flood soon after the levee construction produced sand boils in this area which necessitated the move. Gravels, cobbles, and boulders line the shore of the lake. Patterson pointed out a glacial erratic, or ice-carried boulder, on the shore of Sturgeon Lake. Its angular shape is strikingly different from the rounded, waterborne boulders around it. This was also the lunch stop.

Last stop of trip: Parking lot near the mouth of the Gilbert River. After taking us about 150 paces along the path to the picnic area, Patterson showed us rhythmically bedded red and gray sediments in the steep bank of the Multnomah Channel at the mouth of the Gilbert River. He asked our opinion on the cause of the sediments and said his best theory as to their origin was that they were recent island building sediments related to recent flooding events. That was the end of the trip. □□

GEOLOGICAL SOCIETY
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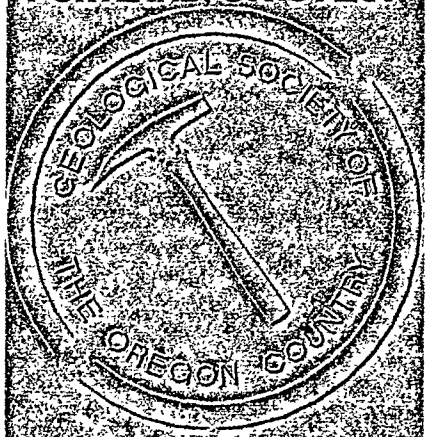

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OCTOBER 2003

THE GEOLOGICAL NEWSLETTER

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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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: 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.
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Address _____ **City** _____ **State** ___ **Zip**_____-_____
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Geologic Interests and Hobbies_____
_____

Please indicate Membership type and include check for appropriate amount:
Individual $20.00 _____ **Family $30.00** _____ **Student $10.00** _____

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VISITORS WELCOME AT ALL MEETINGS
INFORMATION: www.gsoc.org
Su Ikeda, President, 503-246-1385
Calendar Editor, John Teskey, 503-641-7746

VOL. 69, No. 10
October, 2003

OCTOBER ACTIVITIES

Noon program, Friday, October 10, 12:00-1:00 p.m.: President's Field Trip, Southwest Oregon Coast. A summary of the trip, with slides, presented by GSOC members who went on the trip. Room 120B (Crooked River Suite), Oregon State Office Building, 800 NE Oregon St. (NE 7th Ave. MAX stop).

Friday evening talk, October 10, 8:00 p.m.: Active Faults in the Portland Area. Presented by Ian Madin, Section Leader in Geologic Mapping, Oregon Department of Geology and Mineral Industries. Room 371, Cramer Hall, Portland State University .

The October Wednesday evening seminar has been canceled. The November seminar will be held as usual on the third Wednesday evening, November 19.

* *

PREVIEW OF COMING FRIDAY NIGHT TALKS IN NOVEMBER-DECEMBER

Nov. 14, 8:00 p.m.: Lifeline Reconnaissance of the May 2003 Algerian Earthquake. Yumei Wang, Supervisor of Geohazard Mapping, Oregon Department of Geology and Mineral Industries. Room 371, Cramer Hall, PSU.

Dec. 12, 8:00 p.m.: Prelude to Mars: Preview of the Next Generation of Mars Landers. Ken Cameron, Geologist, Oregon Department of Environmental Quality. Room 371, Cramer Hall, PSU.

Calendar items must be received by 15th of preceding month. Call John Teskey, 503-641-7746..

WELCOME

We welcome the following new members to the Geological Society of the Oregon Country

Mark Gawecki
Marj Mountainsong
Sue Cousineau

BOARD MEETING NOTES

SUMMARY OF SEPTEMBER 6 GSOC BOARD MEETING

The GCOC Board met Saturday morning, September 6, 2003, at Rosemary Kenney's house. Beverly Vogt gave a brief summary of the President's Field Trip led by Carol Hasenberg over the Labor Day weekend. Thirteen people attended the trip, which started in Elkton, Oregon, and continued on to the southern Oregon coast, going as far south as Gold Beach. This year, attendees drove their own vehicles and made their own lodging arrangements, meeting at pre-designated locations each day. The Board wants to thank Carol for all her hard work in making the trip a success. Pictures from the trip will be shown at the Friday Noon Program, October 10, 12:00 to 1:00 p.m., in Room 120B (Crooked River Suite), State Office Building, 800 NE Oregon Street, in Portland.

Beverly Vogt presented a brief summary of the year's field trips. This year, 111 people attended the four field trips and/or the president's field trip. Some of the costs for expenses for the trips were donated by GSOC members, but if they had been charged to GSOC, the program would have lost money. Beverly suggested that next year, the cost of the regular field trips be raised, so that no one has to donate money to cover expenses and so that the program can pay for itself. She will present a final report of the ad hoc Field Trip Committee at the next Board meeting and turn over all the field trip equipment and a floppy disk with all the forms to the Society. GSOC will have to find a new Field Trip Committee Chair for next year.

Since no one has volunteered to lead the Wednesday night seminars, the Board voted to discontinue them. However, since Board meeting, a new member, Tara Schoffstall, has indicated an interest in leading the seminars. She will try the November one to see how she likes doing it. The Board thanked Richard Bartels, who led the seminars for several years, and wished him a speedy recovery from his illness. John Teskey has agreed to serve as the new Calendar Editor. Replacements are still needed for Field Trip Committee Chair and Friday night projectionist. Evelyn Pratt volunteered to contact members by phone, especially new members, to look for projectionist, Field Trip Chair, and people to help with the annual banquet (see below). Anyone who is interested in filling any of these positions should contact Evelyn or any other Board member as soon as possible.

Formation of the nominating committee was discussed. Members of the Nominating Committee will be contacting GSOC members who will be willing to serve as officers next year. Remember, this is your organization, and participation on the Board or as an officer will give you a chance to help shape GSOC into the kind of organization you would like it to be. The committee will report its nominations to the board at the November meeting.

Rosemary Kenney and Phyllis Thorne agreed to co-chair next year's annual banquet, which will be held Sunday afternoon, March 14, 2004. Mark the date on your calendar. Rosemary and Phyllis will be looking for help from other members, so here is another opportunity to call them and offer your help.

The next meeting will be 10:00 a.m., Saturday morning, November 1, at Rosemary Kenney's house. Board meetings are open to all GSOC members, so if you want to attend, call Rosemary (503-892-6514) to let her know you will be there and to get her address.

PRESIDENT'S FIELD TRIP RECAP

This year the President's field trip toured the southern Oregon coast. Thirteen GSOC members attended, and all had a delightful time. Although we were not able to obtain professional speakers for the trip, we were able to get information on the area from Gerald Black, geologist retired from the Oregon State Department of Geology and Mineral Industries, and Ron Metzger, geology instructor at Southwestern Oregon Community College in Coos Bay, Oregon. We also had a number of excellent field trip guides to follow.

A slide show from the trip will be the focus of our first GSOC noon meeting this October 10. Refer to the calendar for details. There will be a limited number of field guides for sale from the trip – cost for these is $8.00 apiece.

Here is the log for the trip's first day:

Friday, August 29, 2003

Met in Elkton, Oregon. The following information on the Tyee Formation comes from Gerry Black, former geologist for the Oregon State Department of Geology and Mineral Industries (DOGAMI). Several years ago, Gerry was sent to the Umpqua Basin to clarify some of the geological mapping in this region. Any errors the reader may attribute to my incomplete understanding and memory – csh. Gerry was unable to make the trip as he had planned.

The Tyee Formation consists of 3 units: Lower Tyee is a shallow Marine sedimentary deposit, consisting of sandstone and mudstone. It was deposited as turbidite flows which have amalgamated together in the southern parts of the formation. As one heads north towards Eugene, the individual turbidite layers can be distinguished as they are thicker, and formed in deeper water (recall that this region has undergone clockwise rotation). One can see these layers in the road cut on top of the hill on State Route 38 (SR 38) just east of Elkton.

The Middle Tyee consists of the Hubbard Creek Mudstone which is visible in the Umpqua River in Elkton. When the Tyee beds dip steeply, the Upper unit is prone to slip on the mudstone layer causing landslides and debris flows. This was a severe problem in the wet seasons about 5 years ago. Notice all the riprap that has been installed along SR 38 as you drive along. You may also see large boulders in the river that are a result of these debris flows.

The Upper Tyee is similar in appearance to the Lower Tyee, but of a fluvial origin. It is difficult to distinguish from the Lower Tyee, but for the Middle layer and the fact that the Lower unit may contain concretions.

There is another Eocene formation, the Elkton Siltstone, on the hills above Elkton. One must travel up logging roads to the tops of the hills to see this formation, it does not outcrop along SR 38. This rock also outcrops along the base of the cliffs at Cape Arago. Refer to the Armentrout field guide in the recommended reading.

Stop 1: Bridge just south of Elkton on the road to Sutherlin. Here is a great view of the Hubbard Creek Mudstone layers in the Umpqua River bed. According to Gerry, there is a syncline in the Tyee with a north-south axis through Elkton, so that east of Elkton, the layers dip (or slope downward) to the west. You can see the dip in the river bedrock.

Stop 2: Head east on SR 38 to the road cut at the top of the hill above Elkton, to observe the turbidite layers in the Lower Tyee.

Next proceed west on SR 38. A few miles past Elkton the highway makes a large U-turn, then passes a boat ramp turnout for Bunch Bar. Just past this turnout, look for a rock outcrop on the right side of the road which is prone to landslides (there is a concrete barrier along the road here). This is a mudstone channel in the Lower Tyee. Samples of this rock will be available for your perusal at the

October noon meeting. Stops are not recommended here due to the highway dangers.

Continue west on SR 38 past the town of Scottsburg, the site of another syncline with a north-south axis. The rock just west of Scottsburg dips steeply to the east, and is responsible for numerous landslides.

Stop 3: Loon Lake Turnoff. Continue west on SR 38 to the turnoff for Loon Lake. Park on the east side of the turnoff on the road shoulder. The massive sandstone cliffs here are the Lower Tyee. Note the abundant mica crystals in the Tyee rock.

Stop 4: Loon Lake outlet. Drive up the road to the bridge overlooking the outlet to the lake (about 7 miles). Loon Lake was caused by a landslide in the Tyee formation. Observe the large boulders in the landslide which dam the lake.

Stop 5: Elk observation area. Proceed west on SR 38 to the elk observation area in the Umpqua floodplain.

Stop 6: Umpqua Dunes Trail. Note there is a $5.00 fee for parking here. Take SR 38 into Reedsport and turn south on US 101. About 10 miles south of Reedsport is the community of Lakeside. Just past the entrance to Lakeside turn right into the Umpqua Dunes train parking lot (past the Eel Creek campground). There is a short (1/2) mile hike through the forest to the dunes. This is a great place to observe the dunes without the ATV's encountered in many parts of the Oregon dunes. Refer to the Ore Bin and Retallack dunes articles in the recommended reading.

Saturday, August 30, 2003

Stop 1: Stinky Cove/Fossil Point. Armentrout stop 12. Go left on the beach around the point to the terrace bedrock at low tide. Go here at low tide only! Wear boots or other sturdy footwear that you don't mind getting wet and "gunky". Observe the fossils found on the wave-cut terrace in the Miocene Empire Formation. Do not use rock hammers to harm the fossils and because of legal dispute over who owns the land between high and low tide.

Bev Vogt and I were fortunate to meet Ron Metzger here from SWOCC on the reconnaissance trip. Most of the information presented is from our notes from that trip with some Armentrout info added.

Features of this site incluce fossil pecten and bioturbation. Note log with teredo clam (also known as "shipworms" in the larval state) burrows. Clam fossils are razor clams. Concretions are present at this site as well. Concretions are nodule which tend to form around small fossils, and grow to a variety of sizes. Some are as large as 3' diameter on today's trip. In front of wood house with pointed roof and lots of windows, observe holes drilled by modern clams (Pittock Clams, perhaps). See also the long fat tubes that are burrows filled with mud. Be sure to look for the late Miocene whale fossil. The fossiliferous conglomerate near (or at, not sure) at Fossil Point is called Coos Conglomerate and grades upward into the Empire Formation (according to Armentrout).

On the field trip the group was fortunate to have a knowledgeable participant, Guy Di Torrice, Oregon's "Fossil Guy" (see his website at http://www.oregonfossilguy.com/). Guy pointed out the difference between the teredo clam larva burrows in the fossil wood (these were pencil thin and closely packed) and the Pittock clam burrows. He also showed the group how fossil bone pieces collect in the troughs of the terrace. We noted a fossil fish vertebra embedded in the rock.

Stop 2: Sunset Bay. Armentrout stop 6. Go at low tide to observe some of the features near the base of the cliffs. Eocene Middle and Lower Coaledo formations can be observed here. On the left (southwest) side in the sand, look for submerged stumps (c. 1200 A.D.), a relic of prehistoric earthquake damage. On the right, find a well defined fault with offset layers. The fault appears as a trough in the floor of the bay. Also observe cross bed sets in the buff-colored sandstone along the northeast cliff, coaly layers, and fossiliferous layers. Beware of the mud towards the northeast side!

Refer to p. 68-75 of Ehlen in the recommended reading ("Geology of State Parks near Cape Arago, Coos County, Oregon" in the Ore Bin). Ehlen has lots of pictures that are helpful. Here Ron says he emphasizes stumps, faults visible in floor and side of bay, and small concretions. Lower and Middle Coaledo. Also submerged logs from tsunami inundation visible at low tide in SW corner of bay. In north wall of bay note sedimentary structures, coal layers (or at least layers rich in organic matter), faults that are offset somewhere near slide area. Floor of bay visible at low tide has lots of fault offset. See Ehlen for pictures of the fault in the bay floor. Floor of bay at low tide is good place to explain dip and strike, with the dip shown by beds in the walls of the bay, and strike (intersection of a horizontal line [bay floor eroded flat by ocean] with a dipping plane).

Stop 3: Sea Lion Point/Simpson's Reef. Armentrout stop 4. Lower Coaledo formation with Elkton Siltstone at the base of the cliff. The rocks are folded in a vertical S-shaped curve from the cliffs through the furthest reef. Harbor and Elephant seals, California and Stellar sea lions can be found on the reef.

Stop 4: Cape Arago Turnaround. Armentrout stops 1-3. Coaledo Formation above Elkton Siltstone. Take the path down to the South Cove and review Armentrout notes about the features of this area. There is no flagpole anymore, just the platform on which it stood. The stone with the plaque is fine-grained blueschist with some serpentinite on it. Here Ron talked about the trail to South Cove, which is in lower Coaledo Fm. South Cove is tide dependent . Ron says it has good tide pools. South Cove Overlook is Stop 2 of Armentrout. Ehlen discusses Cape Arago and the three coves in detail starting on p. 77.

Stop 5: Shore Acres State Park. Note there is a $3.00 fee for parking here. Armentrout stop 5. Park at the overlook. Lower Coaledo Formation and Whiskey Run Terrace above. This classic Oregon photo spot showcases the dipping layers of sandstone in the Lower Coaledo. Concretions are plentiful. Observe the horizontal terrace layers lying horizontal above the dipping Coaledo beds. The red in the surface of terrace is lichen. Below the flat terrace deposits you see dipping beds of the lower Coaledo in an angular unconformity.

Native Americans frequented this area. Shells from the midden were used for lime in the concrete for the tennis court from the Simpson estate. Midden shells were also used for lime in the garden. With current antiquities laws, this is not possible today. Coast is eroding back, so corner of tennis court sticks out in to thin air. All the embayments along here are fault controlled. See both Ehlen and Armentrout for faults. Ron recommends visiting the gardens and also do the view from the observation point.

Stop 6: Bastendorff Beach Cave. Armentrout stop 9. Continue north on Cape Arago highway to the road to Bastendorff Beach State Park. Go past the park to a parking turnout at the beach (there is an outhouse here). Assemble and take the path across the road along the base of the bluff to the cave. Go away from the ocean across the road, cross the railing, and walk across the grassy area, eventually heading to the cliffs on the right to Tunnel Point Cave. Tunnel Point cave is in the Tunnel Point Fm, which according to Armentrout is late Eocene. 40 or 50 years ago the cave entrance was hit by waves at high tide. The coastline has built out since then, probably because the jetty interfered with longshore transport of sand, etc.

Return to US 101 by way of Seven Devils Road. Go south towards Bandon.

Stop 7: Bandon Marsh. Take the first road to the right (Riverside Drive) after the Coquille River Bridge (you can see the old lighthouse if you stop by Bullards Beach SP). Park at the Bandon Marsh turnout and take the boardwalk to the marsh. Observe the stumps to the right. Walk out on boardwalk and observe tree stumps from tsunami, maybe the 1700 one.

Stop 8: Bandon Jetty. Continue on this road through Bandon old town, following the water's edge around to the jetty. When you pass Heritage Place on the left, that is where Tupper Rock (Ron also called it Grandmother's rock) used to be before

it was quarried out for the jetty. Ron said the Indians used to light signal fires on high points like Tupper Rock to send messages. Park at the jetty, and have fun collecting.

Blueschist is high-pressure, low-temperature metamorphic rock formed in a subduction zone. We were told in school that after formation, big lumps of blueschist called "knockers" surrounded by serpentinite were squeezed up rapidly like watermelon seeds to the earth's surface. Most blueschist is pretty fine grained and not very beautiful. These, however, are wonderfully coarse grained. .Some of the minerals are a white mica, garnet, some kind of sulfide—perhaps pyrite, and a blue amphibole, probably glaucophane (there is an amphibole series called the glaucophane-riebeckite series, with compositional variations).

Ron had suggested that you could continue on the beach road to Face Rock, a good photo stop. This is one place where there was an Indian legend about an earthquake on a winter evening followed by a big wave, probably the result of the 1700 Cascadia subduction zone earthquake...

...next month...the end of this article!!!

Recommended Reading for South Oregon coast

Most of the papers are available from the DOGAMI library.

General

Elizabeth and William Orr, and Ewert Baldwin, Geology of Oregon, Fourth Edition, Kendall/Hunt Publishing Company, 1992, pages 74-75 173-175, 180-181.

Tyee Formation:

G.L. Black, In-Chang Ryu, A.R. Niem, and R.E. Wells , "Revised Eocene Stratigraphy of the Southern Tyee Basin, Southern Oregon Coast Range"

In-Chang Rye, Alan Niem, and Wendy Niem, "Schematic Fence Diagram of the Southern Tyee Basin, Oregon Coast Range", DOGAMI Oil and Gas Investigation 18, 1992.

Oregon Dunes:

Ernest Lund, "Oregon Coastal Dunes Between Coos Bay and Sea Lion Point", The Ore Bin, Volume 35, No. 5, May 1973.

Coos Bay/Empire/Cape Arago

Ellen Moore, Fossil Shells from Western Oregon, a Guide to Identification, Chimtimini Press, 2000.

Elizabeth and William Orr, Oregon Fossils, Kendall/Hunt Publishing Company, 1999.

Judi Ehlen, "Geology of State Parks Near Cape Arago, Coos County, Oregon", The Ore Bin, Volume 29, No. 4, April 1967.

Ernest Lund, "Landforms Along the Coast of Southern Coos County, Oregon", The Ore Bin, Volume 35, No. 12, December 1973.

John Armentrout, "Field Trip Road Log for the Cenozoic Stratigraphy of Coos Bay and Cape Blanco, Southwestern Oregon", published in Oles, K.F., Johnson, J.G.. Niem, A.R., and Niem, W.A., eds., 1980, Geologic Field Trips in Western Oregon and Southwestern Washington: Oregon Department of Geology and Mineral Industries, Bulletin 101, Field Trip No. 9, p. 175-216.

Cape Blanco and Curry County:

John Armentrout, "Field Trip Road Log for the Cenozoic Stratigraphy of Coos Bay and Cape Blanco, Southwestern Oregon", published in Oles, K.F., Johnson, J.G.. Niem, A.R., and Niem, W.A., eds., 1980, Geologic Field Trips in Western Oregon and Southwestern Washington: Oregon Department of Geology and Mineral Industries, Bulletin 101, Field Trip No. 9, p. 175-216.

Ernest Lund, "Landforms Along the Coast of Curry County, Oregon", The Ore Bin, Volume 37, No. 4, April 1975.

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SEPTEMBER 2003

THE GEOLOGICAL NEWSLETTER

GEOLOGICAL NEWSLETTER

The Geological Society of the Oregon Country
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Su Ikeda, President, 503-246-1385
Temporary Calendar Editor, Beverly Vogt, 503-292-6939

VOL. 69, No. 9
September, 2003

SEPTEMBER ACTIVITIES

Friday evening talk, Sept. 12, 8:00 p.m.: Pliocene Lake Idaho, Eastern Oregon and Western Idaho: A Cautionary Tale. Margie Jenks, Geologist, Oregon Department of Geology and Mineral Industries will discuss the history of the discovery of Lake Idaho, the struggle for its eventual recognition, and its geology. Room 371, Cramer Hall, Portland State University.

There will be no noon program or Wednesday night seminar in September.

* *

PREVIEW OF COMING EVENTS IN OCTOBER

Noon program, Fri., Oct. 10, 12:00-1:00 p.m.: President's Field Trip, Southwest Oregon Coast. A summary of the trip, with slides, presented by GSOC members who went on the trip. Room 120B (Crooked River Suite), Oregon State Office Building, 800 NE Oregon St. (NE 7th Ave. MAX stop).

Fri. evening talk, Oct. 10, 8:00 p.m.: Active Faults in the Portland Area. Presented by Ian Madin, Section Leader in Geologic Mapping, Oregon Department of Geology and Mineral Industries. Room 371, Cramer Hall, Portland State University.

Seminar, Wed. evening, Oct. 15, 8:00 p.m.: Overview of the Geology of the Pacific Northwest. Evelyn Pratt, Past GSOC President. Room S17, Cramer Hall, Portland State University.

* *

FUTURE FRIDAY NIGHT TALKS, ROOM 371, CRAMER HALL, PSU

Nov. 14, 8:00 p.m.: Lifeline Reconnaissance of the May 2003 Algerian Earthquake. Yumei Wang, Supervisor of Geohazard Mapping, Oregon Department of Geology and Mineral Industries.

Dec. 12, 8:00 p.m.: Prelude to Mars: Preview of the Next Generation of Mars Landers. Ken Cameron, Geologist, Oregon Department of Environmental Quality.

Calendar items must be received by 15th of preceding month. Call Beverly Vogt, 503-292-6939.

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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: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.
GSOC LIBRARY: Rm. S7, Open 7:30 p.m. prior to meetings.
PROGRAMS: EVENING: Second Friday Evening each month, 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.
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WEBSITE: www.gsoc.org. Email address: gsoc@spiritone.com.

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_____

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

We welcome the following new members to the Geological Society of the Oregon Country

Maura Doherty

VOLUNTEERS NEEDED (1) TO LEAD SEMINARS AND (2) TO PRODUCE MONTHLY CALENDAR OF GSOC EVENTS

Because of health reasons, long-time Wednesday night seminar leader Richard Bartels has resigned. A replacement is needed. Qualifications include knowledge/love of geology, the desire to share your knowledge with other people, and the willingness to be responsible for one Wednesday night seminar per month September through May. The leader can either lead the seminars or make arrangements for someone else to do so.

Another volunteer is needed to produce the monthly calendar. The qualifications include computer skills, including access to email and the internet, and the ability to assemble and print the calendar using a predetermined format each month. Duties include contacting various GSOC activity leaders each month to get information, assembling and printing the calendar, and sending it to the *Oregonian* and the *Newsletter* editor.

Potential volunteers should contact President Su Ikeda or any of the Board members as soon as possible. The energy of volunteers and their willingness to help with activities are necessary to an organization like GSOC. People who want to try these jobs but doubt their abilities should at least ask about the jobs, because a lot of other people in the organization have experience and can help you—and tasks like these are not as difficult as you may think. They require time and the willingness to honor your commitment—but they also offer an opportunity to learn.

Please consider becoming more involved and help keep GSOC the active and vital an organization it has been over the years. □□

OPEN HOUSES FOR WEST SIDE BIG PIPE PROJECT ANNOUNCED

The West Side Big Pipe Project is part of Portland's program to reduce combined sewer overflow (CSO). Sue Bednarz of Parsons, Brinkerhoff, Quade, and Douglas, Inc., presented a Friday night lecture in May on this $1 billion project. The West Side Big Pipe will be a 14-foot in diameter tunnel that parallels the Willamette River for almost four miles and will collect wastewater from existing sewers and take it under the river to the new Swan Island Pump Station. From there the wastewater will be pumped to the Columbia Boulevard Wastewater Treatment Plant. Environmental Services will use two tunnel boring machines for the project. From the Nicolai Shaft site, one machine will bore south to SW Clay Street, and one will bore north under the Willamette River to Swan Island.

Public presentations about the project are scheduled at the construction site office at 2730 NW Front Avenue Presentations will provide an overview of the project, project schedule, and other interesting information about the largest infrastructure project in the history of Portland. The presentations will include slides and a guided view of the main access shaft construction site. Presentation dates include Wed., Sept. 3, 8-9 a.m.; Wed., Sept. 17, 12 noon-1 p.m.; and Tues., Sept. 30, 5:30 p.m.-6:30 p.m. Pre-registration is required. Call Joleen Jensen-Classen to register at (503) 823-2822 or by email to joleen@bes.ci.portland.or.us. □□

STONE QUERIES: Why are there so many names for stone?

By Ron Geitgey, Industrial Minerals Geologist, Oregon Department of Geology and Mineral Industries

(Editor's Note: This article was written by Ron Geitgey for his column for sculptors which appears monthly in the "Newsletter of the Northwest Stone Sculptors Association." It is reprinted here because earlier this year, stonecutter and sculptor Joseph Conrad led a GSOC field trip to see both his stone fabrication shop and the building stones of downtown Portland. During this trip, we heard non-geological names for some of the building stones. Geitgey, who is both an industrial minerals geologist and a sculptor, is familiar with the confusion caused by the different names used by geologists, stone cutters, and sculptors for the same stones. This is how he explains the problem to his fellow sculptors—and to us.)

Two questions commonly asked by sculptors are "Why are there so many different names for stone? Which ones do I have to know?"

The quick and flippant answer is: Because there are so many different kinds of stone. While accurate, it's not particularly helpful, and it's only part of the answer. The other part is that there are so many different uses for stone and different ways of looking at it.

We sort, classify, categorize, and name everything (and everyone) we encounter. It's our way of fitting new things into our existing framework of familiar things. The stonemason sees a "boulder"; the stone sculptor sees a "granite"; the stone dealer sees "Peekskill Pewter"; and the geologist sees a "quartz-bearing hornblende norite"; and all four are looking at the same rock. The stonemason's concern is that the rock is unlike other local stone. Its hardness and rounded shape will require different working techniques, but it will present an interesting appearance in a finished wall. The sculptor notes a stone with pleasing color variations. It isn't sandstone, it's too coarse-grained and too hard to be marble, and it's going to require carbide and diamond tools to execute the intended design. The stone dealer wants an eye-catching, marketable name for a gray stone, a name evoking the Revolutionary War history of the nearby town in the Hudson River Valley and perhaps even hinting of echoing hoofbeats of silversmith Paul Revere (or at least his horse's hoofbeats). The geologist recognizes an intrusive igneous rock of unusual mineralogy which on the one hand grades into a commercial emery deposit and on the other may shed light on the geologic development of the core of an ancient mountain chain.

So which name is correct? That depends on who's speaking and who's listening. Within their respective areas of interest, none of the names each has used is wrong. The name communicates the necessary information to the appropriate specialist. However, cross between specialties and the names may be meaningless at best and completely misleading at worst. "Peekskill Pewter" would mean little to anyone not familiar with the stone fabrication business. "Granite" would convey some idea of hardness and workability to fellow sculptors but used as above the term would baffle a geologist, to whom "granite" means a rock with a very specific range of mineralogical and chemical composition. "Norite" has its own characteristics and mode of origin, and they are not the same as those of "granite" (in the geological sense).

The U. S. Department of Commerce uses only four names in reporting statistics on stone: granite, marble, travertine, and other stone. The stone fabrication and sales industry uses hundreds of names, all as marketing tools of individual companies' own invention and most of which convey little or no information about the stone's character. Geologists have their own huge collection of names based on often subtle composition variations and governed by international committees so that a given name means the same to geologists around the world. But a very large number of those names are useless to the non-geologist looking at a rock in his hand because they cannot be accurately applied without a

detailed laboratory analysis. Even the geologist pronouncing a freshly whacked-off fine-grained black rock to be a basalt may in fact really be saying it looks a lot like other fine-grained black rocks that laboratory work has shown to be basalt, rather than andesite, or andesitic basalt, or basaltic andesite, or....

A well-rounded stone sculptor, or observer of stone sculpture, should become familiar with perhaps a dozen or more stone types and develop an appreciation of the complexity and ambiguity of the many names for those stones, but my tolerance for the arcane may be higher than yours. I suppose a sculptor could, for example, carve Yule [Colorado] marble all of his life and never need any other name.

But don't assume you know a stone's carving characteristics just because you know its name—whose name is it? Use your knife or steel point to test it before you haul it home.□□

FRIENDS OF THE PLEISTOCENE TO HOLD ANNUAL FIELD TRIP SEPTEMBER 26-28, 2003

The Northwest Cell of the Friends of the Pleistocene (FOP) will study Holocene coastal processes in the Columbia River cell of Pacific County, Washington, and Clatsop County, Oregon September 26-28, 2003. Camping has been reserved at Fort Stevens State Park in Clatsop County, Oregon, for September 25, 26, and 27, 2003.

Space for 100 people has been reserved in four group camps @ 25 persons each, and six vehicles per camp are allowed by the park. The camps are in loops E, F, G, and H. Drivers will turn left at the camp entrance.

Cost per night in the group camp is $3 per person per night. A total of 24 vehicles will be allowed at the group camps. Additional vehicles must park offsite at Coffenbury Lake or other lots at a cost of $7 per vehicle per night. Therefore carpooling is encouraged. Anyone who arrives after the group camps are full must pay $17 per night for a tent site or $22 per night for a hookup site. They will be reimbursed later by mail if they paid the group camp fee of $9.

NW CELL FOP REGISTRATION

NAME _____

ADDRESS _____

Staying in Group Campsite Yes___ No___

Expected arrival date _____
time _____

Per person cost:

Registration Fee: $26 per person, includes Field Guide, Tour Illustrations, and other field trip costs.

Camping. (you pay for all 3 nights) $9.

Total: $35.

Please return with a check or money order, no cash please to FRANK RECKENDORF, 950 Market St. NE, Salem, OR 97301.Make checks out to: FRANK RECKENDORF and return payment by September 22, 2003. Last minute: FAX registration to 503 399-9421 with exact payment on site. However, please pay in advance to relieve the need for the registration hassle at the site. Thank you for your consideration.

Registration for camp area and FOP Guidebooks will start at 5 p.m. on Sept. 25 and continue until about 11 p.m. Registration will start again at 7 a.m. on Sept. 26 at the Group Site.

OTHER INFORMATION

The closest hotels are the Shilo Inn, 1609 East Harbor Dr., Warrenton, OR, phone 1-800-222-2244; and South Jetty Inn, 984 Pacific Dr., Hammond, OR, phone 1-503-861-2500. There is an Officers Inn Bed and Breakfast at 540 Russell Place Hammond, OR, phone 1-800-377-2524.

DIRECTIONS

To Fort Stevens State Park: From the NORTH go south of Astoria on Highway 101 and cross the bridge (over Young's Bay) toward Warrenton. Turn right on East Harbor Drive. There is a Denny's Restaurant on the SW Corner. Drive toward Warrenton and Hammond. Continue west where road changes names to North Main Drive and then to Pacific Drive in Hammond. Turn left at Hammond Store (Sign to Fort Stevens). This is Ridge Road. Turn right at Overnight Camping Entrance at Fort Stevens State Park.

From the SOUTH on Highway 101: turn left, west, on next main road after you pass Camp Rilea. This road is about 1 mile north of the main entrance to Camp Rilea. There is a sign on to road to Fort Stevens and Columbia Beach Lane. Turn left in about 1/3 mile on Delavara Beach Road. There are some buildings at the intersection and a sign to Fort Stevens State Park. Go about 1/3 mile to the junction with Ridge Road. Turn right on Ridge Road and travel about 2.7 miles to Fort Stevens main camping entrance on the left, west. There is a KOA campground on the right. Get directions at the camp entrance gate as where to go to find group camp check in for FOP.

TENTATIVE SCHEDULE

Friday, September 26th, 08:00 to 17:00: Overview of Columbia River watershed, estuary, and offshore deposits. Proceed to toll bridge (you pay your own toll cost) and cross the Columbia River. Travel up Long Beach to Willapa Bay view site. Review sediment history of Willapa Bay and discussion. Travel back to a view beaches and dunes along two transects. Review offshore, beach and dune sedimentation as well as erosion history.

Saturday, September 27th, 08:00 to 17:00: Overview of the Clatsop County dunes landscape at the group campground. Travel to Camp Rilea to discuss dune sequence, shoreline changes, and sedimentation and erosion history. There will be a Ground Penetration Radar "Demonstration" and a "Demonstration" of use of the Australian sand auger. We will look at a dune sequence from modern to pre-jetty to about 2,000 yrs BP. We will return to Fort Stevens State Park and proceed to Parking Lot A along the foredune. We will do a dune transect with discussion at Parking Lot A and at Battery Russell. There will be an evening session at a shelter along Coffenbury Lake starting about 19:00.

Sunday, September 28th, 08:00 to 12:00: We will travel to Warrenton to visit the site of the deepest bore hole to the Pleistocene on the West Coast and also discuss the stratigraphy of the Holocene. We will also visit a marsh site and view virbracore locations and cores along the Columbia River that reflect Holocene stratigraphy. □□

NOTES FROM SAUVIE ISLAND FIELD TRIP

By Carol Hasenberg, GSOC member and Newsletter editor

This trip was led by Peter Patterson, U.S. Forest Service, retired, on August 2, 2003.

First stop of trip: End of the access bridge to Sauvie Island in the parking area, which has a map of the island. Patterson introduced himself and described the overall geomorphology of Sauvie Island. The Columbia River basin is in a graben, or down-dropped block of land, with the Portland Hills Fault as the break zone between the basin and the Tualatin Mountains (Portland Hills) to the west. The island is based upon sedimentary deposits which came down the Columbia River since the flood basalts in the Miocene. The first of these deposits is the Troutdale Formation, or ancestral Columbia River sediments. The second of these are deposits of sand, gravel, and boulders carried by the Ice Age floods into the Columbia River basin. At the end of the Ice Age, eolian deposits of sand produced sand dunes in areas on the southwest side of the island. Since then normal river flooding has contributed to the evolution of the island.

A levee was built around the southern section of the island between 1939 and 1941. Much of the land we identify as part of the island was wetlands before the construction of the levee. The water is drained from the island by a series of zero-grade ditches, which can be utilized for irrigation in the dry summer months by allowing river water in.

Second stop of trip: Milepost 16 on U.S. 30 (St. Helens Road) – Weigh station area. Across the road from the weigh station (the southeast bank of the road) is a contact between the Columbia River Basalt Group rock above and the soil of the Scappoose Formation below. The Portland and Scappoose areas were covered by a shallow sea in the Oligocene and were gradually filled by sediments eroding from mountains to the east. In the Miocene these shallows and lowlands were flooded with Columbia River flood basalts.

Third stop of trip: Milepost 17 on U.S. 30 – turn left onto Rocky Point Road, go 2.6 miles on this road to overlook. This stop provides an overview of Sauvie Island, plus a view of a large ancient landslide in the Portland Hills west of the island. This landslide occurred along the slip plane between the Scappoose Formation and the Columbia River basalt. At the time of its occurrence, the river level was much lower and the Columbia River canyon was much steeper. The river level throughout time is related to the level of the ocean. During the time of maximum glaciation (about 17,000 years ago), the level was 200 feet lower than at the present. At the time of the Mt. Mazama eruption (about 6000 years ago) the level was 120 feet below the present level.

Fourth stop of trip: Grocery store near stop one. More facts about Sauvie Island were explained by Patterson. He discussed the flow volumes of wells on Sauvie Island, which are used to irrigate the agricultural crops grown here. The wells are often not very strong, because the soils are finer in character than the Troutdale gravels which are found in other areas of the Portland basin. The gravels have eroded away in much of Sauvie Island. Gravel areas are exposed at the shore of Sturgeon Lake at Oak Island, which is part of the tour.

Fifth stop of trip: 4.2 miles north of the intersection of Sauvie Island Road and Reeder Road on Sauvie Island Road. The bank to the west of the road is comprised of very fine-grained sand, and is part of the sand dune system on the island.

Sixth stop of trip – 3.6 miles north of the intersection of Oak Island Road and Reeder Road on Oak Island Road. The road crosses the levee en route to the shore of Sturgeon Lake. Patterson pointed out a curve in the levee, which had to be moved from the gravelly soils near the lake. A high flood soon after the levee construction produced sand boils in this area which necessitated the move. Gravels, cobbles, and boulders line the shore of the lake. Patterson pointed out a glacial erratic, or ice-carried boulder, on the shore of Sturgeon Lake. Its angular shape is strikingly different from the rounded, waterborne boulders around it. This was also the lunch stop.

Last stop of trip: Parking lot near the mouth of the Gilbert River. After taking us about 150 paces along the path to the picnic area, Patterson showed us rhythmically bedded red and gray sediments in the steep bank of the Multnomah Channel at the mouth of the Gilbert River. He asked our opinion on the cause of the sediments and said his best theory as to their origin was that they were recent island building sediments related to recent flooding events. That was the end of the trip. □□

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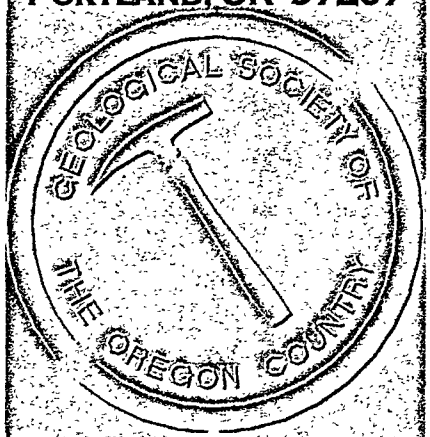

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NOVEMBER 2003

THE GEOLOGICAL NEWSLETTER

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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: 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.
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GEOLOGICAL NEWSLETTER

The Geological Society of the Oregon Country
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VISITORS WELCOME AT ALL MEETINGS — VOL. 69, No. 11
INFORMATION: www.gsoc.org — November, 2003

Su Ikeda, President, 503-246-1385
Calendar Editor, John Teskey, 503-641-7746, Lawlib@Teleport.com

NOVEMBER ACTIVITIES

No Friday Noon programs scheduled for November or December.

Friday evening talk, November 14, 8:00 p.m.: New Geologic Mapping in the North-Central Willamette Valley--New Insights into the Geologic History, Tectonics, and Groundwater Resources of This Region. Presented by Terry Tolan, Associate Scientist, Kennedy/Jenks Consultants, Kennewick WA. Room 371, Cramer Hall, Portland State University.

Seminar, Wed. evening, Nov 19, 8:00 p.m.: Overview of the Geology of the Pacific Northwest. Tara Schoffstall, GSOC Member. Room S17, Cramer Hall, Portland State University.

* *

PREVIEW OF COMING FRIDAY NIGHT TALKS IN DECEMBER

Dec. 12, 8:00 p.m.: Prelude to Mars: Preview of the Next Generation of Mars Landers. Ken Cameron, Geologist, Oregon Department of Environmental Quality. Room 371, Cramer Hall, PSU.

Calendar items must be received by 15th of preceding month. Call John Teskey, 503-641-7746
Lawlib@Teleport.com

WELCOME

We welcome the following new members to the Geological Society of the Oregon Country

Greg Jenks

OPPORTUNITIES TO GET INVOLVED WITH GSOC

GSOC will need field trip committee members for next year. If you are interested in helping to plan and implement field trips, this is a great way to be involved. It does not take a vast amount of technical expertise, just a measure of enthusiasm!

Replacements are still needed for Field Trip Committee Chair and Friday night projectionist. Evelyn Pratt volunteered to contact members by phone, especially new members, to look for projectionist, Field Trip Chair, and people to help with the annual banquet (see below). Anyone who is interested in filling any of these positions should contact Evelyn or any other Board member as soon as possible.

Formation of the nominating committee was discussed. Members of the Nominating Committee will be contacting GSOC members who will be willing to serve as officers next year. Remember, this is your organization, and participation on the Board or as an officer will give you a chance to help shape GSOC into the kind of organization you would like it to be. The committee will report its nominations to the board at the November meeting.

Rosemary Kenney and Phyllis Thorne agreed to co-chair next year's annual banquet, which will be held Sunday afternoon, March 14, 2004. Mark the date on your calendar. Rosemary and Phyllis will be looking for help from other members, so here is another opportunity to call them and offer your help.

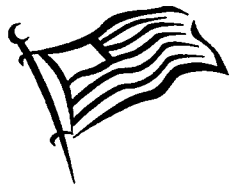
The next GSOC board meeting will be 10:00 a.m., Saturday morning, November 1, at Rosemary Kenney's house. Board meetings are open to all GSOC members, so if you want to attend, call Rosemary (503-892-6514) to let her know you will be there and to get her address.

GSOC SEMINARS

A new GSOC member, Tara Schoffstall, has volunteered to lead the Wednesday night seminars. The first seminar will be held November 19. Refer to the GSOC calendar.

The GSOC Board thanks Richard Bartels, who led the seminars for several years, and wishes him a speedy recovery from his illness.

PRESIDENT'S FIELD TRIP RECAP



This year the President's field trip toured the southern Oregon coast. Thirteen GSOC members attended, and all had a delightful time. Although we were not able to obtain professional speakers for the trip, we were able to get information on the area from Gerald Black, geologist retired from the Oregon State Department of Geology and Mineral Industries, and Ron Metzger, geology instructor at Southwestern Oregon Community College in Coos Bay, Oregon. We also had a number of excellent field trip guides to follow.

A slide show from the trip was the focus of our first GSOC noon meeting this October 10. Thanks to all the participants who contributed to this! There are still a few field guides for sale from the trip – cost for these is $8.00 apiece. Contact Rosemary Kenney.

Sunday, August 31, 2003

Stop 1: Mack Arch viewpoint (about 10 mil south of Gold Beach in the northernmost section of Boardman SP). Proceed south on US 101 to the turnout at Mack Arch. Mack reef is Jurassic Otter Point formation, a lightly metamorphosed melange. Ore Bin Curry County article in recommended reading identifies the rock as Otter Point conglomerates and basalts.

There is a good low lying turnout halfway between this viewpoint and Cape Sebastian. Looking toward Cape Sebastian one can view the sandstone crossbedding there. Just south of this viewpoint, at Myers Creek, an outcrop of serpentenite glitters green in the sunshine on the east bank of the road.

Stop 2: Cape Sebastian viewpoint. Proceed north on US 101 to a viewpoint overlooking Cape Sebastian. Refer to page 71 of Ore Bin article. Cape Sebastian may be very windy! The rock here is late (Upper) Cretaceous Cape Sebastian sandstone, marine shelf and deep marine deposits. Refer to the Hunter/Clifton article.

Stop 3: Humbug Mountain Campground. Proceed to a parking area near the campground. Ron Metzger recommends hiking under the US 101 bridge to observe the Lower Cretaceous Humbug Mountain conglomerate.

Stop 4: Port Orford – Battle Rock City Park. This is Otter Point basalt according to the Ore Bin article.

Stop 5: Port of Port Orford. Proceed down nearby road to the port. Park out of the way. The dramatic heads and stacks here are Otter Point sedimentary rock according to the Ore Bin article.

Stop 6: Otter Point outcrop on the road to Cape Blanco. Continue north on US 101 to Cape Blanco Road. Refer to the Cape Blanco segment of the Armentrout field guide. Also refer to Geology of Oregon (Orr, Orr and Baldwin) page 181 for Quaternary marine terraces in this area. After ¾ mile, observe the mounds to the left and right of the highway. These were sea stacks of the Otter Point formation. At about 4 ½ miles stop at the Otter Point outcrop. heading up the hill.

Stop 7: Cape Blanco overlook. Proceed to the end of the road. Observe the neck shale landslides, shell layer, fin rock and unconformities in the cliff faces according to the Armentrout field guide.

Stop 8: Beach access below Cape Blanco Campground. Proceed back to the campground to the road to the small parking lot. Hike down to the beach to observe the features in the bluffs per the Armentrout field guide. The parking lot is in "Goldwasher's Gully" as labeled in the Armentrout schematic. Have some fun trying to identify the layers described in the field guide. You may discover some prizes about halfway between the gully and the neck of the cape.

Recommended Reading for South Oregon coast

Most of the papers are available from the DOGAMI library.

General

Elizabeth and William Orr, and Ewert Baldwin, Geology of Oregon, Fourth Edition, Kendall/Hunt Publishing Company, 1992, pages 74-75 173-175, 180-181.

Tyee Formation:

G.L. Black, In-Chang Ryu, A.R. Niem, and R.E. Wells , "Revised Eocene Stratigraphy of the Southern Tyee Basin, Southern Oregon Coast Range"

In-Chang Rye, Alan Niem, and Wendy Niem, "Schematic Fence Diagram of the Southern Tyee Basin, Oregon Coast Range", DOGAMI Oil and Gas Investigation 18, 1992.

Oregon Dunes:

Ernest Lund, "Oregon Coastal Dunes Between Coos Bay and Sea Lion Point", The Ore Bin, Volume 35, No. 5, May 1973.

Coos Bay/Empire/Cape Arago

Ellen Moore, Fossil Shells from Western Oregon, a Guide to Identification, Chimtimini Press, 2000.

Elizabeth and William Orr, Oregon Fossils, Kendall/Hunt Publishing Company, 1999.

Judi Ehlen, "Geology of State Parks Near Cape Arago, Coos County, Oregon", The Ore Bin, Volume 29, No. 4, April 1967.

Ernest Lund, "Landforms Along the Coast of Southern Coos County, Oregon", The Ore Bin, Volume 35, No. 12, December 1973.

John Armentrout, "Field Trip Road Log for the Cenozoic Stratigraphy of Coos Bay and Cape Blanco, Southwestern Oregon", published in Oles, K.F., Johnson, J.G.. Niem, A.R., and Niem, W.A., eds., 1980, Geologic Field Trips in Western Oregon and Southwestern Washington: Oregon Department of Geology and Mineral Industries, Bulletin 101, Field Trip No. 9, p. 175-216.

Cape Blanco and Curry County:

John Armentrout, "Field Trip Road Log for the Cenozoic Stratigraphy of Coos Bay and Cape Blanco, Southwestern Oregon", published in Oles, K.F., Johnson, J.G.. Niem, A.R., and Niem, W.A., eds., 1980, Geologic Field Trips in Western Oregon and Southwestern Washington: Oregon Department of Geology and Mineral Industries, Bulletin 101, Field Trip No. 9, p. 175-216.

Ernest Lund, "Landforms Along the Coast of Curry County, Oregon", The Ore Bin, Volume 37, No. 4, April 1975.

PLIOCENE LAKE IDAHO Eastern Oregon and Western Idaho: A Cautionary Tale

September 12, 2003 GSOC Evening Meeting speaker Margi Jenks, Geologist, Oregon Department of Geology and Mineral Industries

Margi gave this talk 15 years ago after working for the Idaho state geology department and repeated it for the September GSOC lecture. Margi submitted this little tale to us as a reminder that geologists, being human, tend to envision the answers to geological puzzlers in the context of the popular theories of the day. Also, geologists tend to examine facts which align with their own specialty areas and ignore facts from other specialties.

The tale takes place in the western Snake river plain (SRP) – the SRP is a vee-shaped plain with the right or eastern side of the vee being the trail of a volcanic "hot spot". The left or western side of the vee is the western SRP graben.

An ancient lake filled the graben from 8 to 2 million years ago – from the age of the lake sediments, this lake did not exist during the Ice Age. The remains of Lake Idaho consist of thousands of feet of featureless, structure-less white silt sediments sprinkled over its former extent.

The Lake Idaho area was first surveyed in the 1867-1878 expeditions of Ferdinand V. Hayden, head of the U.S. Geological Survey of the Territories, and J. S. Newberry, paleontologist of what is now Columbia University. The expedition discovered mammalian remains, plus birds and fish – indicative of a region which had abundant water (lakes). Edward Drinker Cope, the vertebrate paleontologist on Hayden's expedition, indicated the presence of a late Tertiary lake in this area – this lake is separate from all the others (Ice Age lakes) but with an earlier age.

Clarence King also surveyed the area under his own project, the United States Geological Exploration of the 40th Parallel from 1867 to 1878. A side trip to western snake river plain revealed the remains of a Cretaceous and Tertiary large freshwater lake – with fossils of lake and lake border life. Fielding Meek of the Smithsonian, who was the fossil expert on the King expedition, found Tertiary fossils from the Owyhee freshwater lacustrine deposit.

It is important to note that these men were influenced by other lake discoveries, such as Lake

Bonneville, so they were predisposed to seeing the presence of lake fossils in the fossil record.

Israel C. Russell, who explored the entire SRP for the USGS in the early part of the 20th century, mapped the extent of Lake Idaho. His map is essentially the same as that mapped in the 1980's.

However, in the 1920's new theories of the area became popular due to the influence of popular geological theories. Another influence in the revision of the theories was the geological specialties of the persons involved in the studies.

Enter a new crop of geologists specializing in oil exploration into the SRP. H.E. Malde of U.C. Berkeley and J.P. Buwalda of Caltech abandoned the concept of Lake Idaho – they claimed that the sediments were due to a river floodplain and were only lake beds in places. Their views were similar to those of a colleague Virgil Kirkham, who distinguished earlier lake from the later lake sediments but visualized shallow temporary lakes rather than a large continuous lake.

During the late 1920's another individual, Harold T. Stearns, who was a USGS groundwater survey geologist, surveyed the SRP, Hawaii Volcanoes, and the Pacific Islands for the US army in WWII. In 1928 to 1929 he surveyed the SRP from Twin Falls to Idaho Falls, named Craters of the Moon and made other discoveries. Hagerman lake beds was his name for Lake Idaho. He looked at the volcanic stratigraphy in the area and decided that there was a persistent large lake, but his work was largely overlooked.

Later geologists kept the explanation of the western SRP sediments as being the result of seasonal floods, temporary lakes, or river sediments; and yet were confused by the fact that the sediments were so wide spread and the fact that there was so much of the sediment (thousands of feet thick).

Margi and others worked in the area in the 1980's and gradually came to the conclusion that the original geological assessments were the correct ones. The evidence which supported their views were:

- shield volcanoes produced pillow deltas which form when lava flows into water on a steep beach (see third layer down at Multnomah Falls)
- "basalt sand beds", which occur when hot lava flows into water and steams for a time, changing to palagonite mineral (red sediments from baking the material at the bottom of the lake – a mixture of volcanic glasses, iron oxides, smectite clays, and other minerals) – these occur at an elevation of 3600 feet. which they maintain was the level of the ancient lake.
- a very extensive freshwater sponge reef in lake Idaho – lots of snail shells, beach deposits, and "blue sand" loaded with fish fossils
- Table Rock, a prominent feature in the Boise area, was a beach deposit of Lake Idaho which solidified from silica deposits from a fault

Now it is recognized that Lake Idaho lasted for at least 8 million years, was 700 feet deep and contained 3 foot long salmon. At the end of its long life, the ancient lake drained out through the Grand Ronde area as new drainage channels were opened.

The main theme of the talk was the perpetuity of scientific misconceptions. It is important to remember that new ideas are not always right, and people look at things in the context of the times. Also, influential people and publications can bend thought their way.

In the case of Lake Idaho, it is now believed that the original reviewers were right, and that later researchers had a narrower focus of research and were more isolated from one another. They concentrated on the sediments only and not the volcanic evidence for the lake. The paleontologists had never wavered on their belief that the lake was there because they knew the fossil record which were the inhabitants of a large lake.

Carol S Hasenberg

The Search for New Zealand Tsunami Deposits

October 10, 2003 GSOC Evening Meeting
speaker Charles Carter, GSOC member

Charles Carter, an original graduate from the Portland State University geology department, graciously agreed to give this talk to GSOC at the last minute. Charles is a retired geologist who received his M.S. at San Jose State University, and his Ph.D. at John Hopkins University. He spent his professional career as a professor at a state university in Ohio.

This interesting talk was about a grant he received a few years ago to search for evidence of tsunamis on the coasts of New Zealand. Dr. Carter has an interest in coastal geology and catastrophic events, and felt that New Zealand would be a very good place to look for tsunami evidence. New Zealand has a very high level of seismicity, as it is straddling the border between the Australian plate and the Pacific plate. The Tonga trench runs right alongside the landmass, which broke off from the Gondwanaland super-continent during the Late Cretaceous. New Zealand has had many major earthquakes in recorded history and a number of tsunamis recorded in the years 1900-1983.
(for more info on New Zealand earthquakes, refer to this website:
http://neic.usgs.gov/neis/bulletin/neic_xtat.html)

In looking for tsunami evidence on the shores of the North Island of New Zealand, Dr. Carter's team used the same technique as Brian Atwater and Curt Peterson, namely, they took estuary core samples to see what the sequence of deposition looked like in a saltwater marsh on the coast. The result of Dr. Carter's efforts using this technique was that the team did not find any deposits in marshes that were similar to those on the Pacific coast. However, the team did find two interesting deposits that were either the result of large storms or tsunamis - one was on the western side and another on a small island off the Pacific or eastern side of the island.

The western site, with basalt flows, resembles the Oregon coast (except for the saltwater crocs and poisonous snakes). The team investigated an area behind a barrier spit at this site. They found a layer of basalt boulders that had been deposited on the shore, overlying a sand deposit of a couple of feet thick, above the basalt bedrock. Above the boulders was a cobble lens with fine sands above it. The two leading hypotheses for the deposition of these layers were either a large storm or a tsunami wave. Supporting the hypotheses were these observations:

- the boulder deposits were dipping slightly seaward
- the lack of stratification and uniform size of the deposit
- the sand above the deposit was not from the tsunami but indicated dune growth after the boulder deposition event
- sand between the base rock basalt and the boulder deposit was not eroded away

The second interesting deposit was found on the east side of the North Island on an offshore island. A gravel deposit extends from the shoreline to about 15 meters above sea level on the inner, western side of the offshore island. Modern dunes are starting to grow above the gravel, which is varied in the size the of pieces that are uniformly distributed on top of the sand. It is believed that waves refracting around the island and focusing at this site created the deposit. The deposit is premised to have been around 1500-1600 A.D., from nearby disturbances in Maori midden sites.

Carol S Hasenberg

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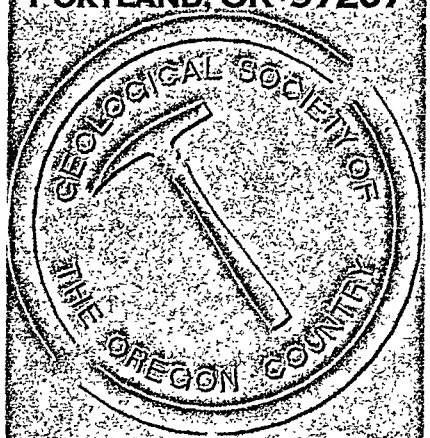

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Please indicate Membership type and include check for appropriate amount:
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VOL. 70, No. 12
December, 2003

Su Ikeda, President, 503-246-1385
Calendar Editor, John Teskey, 503-641-7746, Lawlib@Teleport.com

DECEMBER ACTIVITIES

No Friday Noon programs scheduled for December.

Friday evening talk, December 12, 8:00 p.m.: Prelude to Mars: Preview of the Next Generation of Mars Landers, Ken Cameron, Geologist, Oregon Department of Environmental Quality, Room 371, Cramer Hall, Portland State University.

Seminar, Wed. evening, December 17, 8:00 p.m.: How Do We Know When it Happened? Dating Events in the Geologic Record, Tara Schoffstall, GSOC Member. Room S17, Cramer Hall, Portland State University.

* *

PREVIEW OF COMING TALKS IN JANUARY & FEBRUARY

Friday evening talk, January 9, 2004, 8:00 p.m.: Lessons Learned from Landslides. Presented by Dr. Scott Burns, Professor of Geology, Portland State University. Room 371, Cramer Hall, Portland State University, Room 371, Cramer Hall, PSU.

Friday Noon Program, January 9, 2004, 12:00-1:00 p.m.: Slideshow; Madagascar, The Big Red Island, Rosemary Kenney, GSOC Member, Room 120B, Oregon State Office Building, 800 NE Oregon St. (NE 7th Ave. MAX stop).

Friday Noon Program, February 6, 2004, 12:00-1:00 p.m.: Slideshow; Topic to be announced, Evelyn Pratt, GSOC Member, Room 120C, Oregon State Office Building, 800 NE Oregon St. (NE 7th Ave. MAX stop).

Calendar items must be received by <u>15th of preceding month</u>. Call John Teskey, 503-641-7746
Lawlib@Teleport.com

WELCOME

We welcome the following new members to the Geological Society of the Oregon Country

Antonia Mayer
Gary Ballou

BOARD MEETING NOTES

GSOC Board hears reports of Nominating Committee, Field Trip Committee, Banquet Committee, and Margaret Steere Endowment at November meeting; Board looking for Field Trip Committee members and Friday night projectionist!

The Board of the Geological Society of the Oregon Country (GSOC) met Saturday, November 1, 2003, at the home of Rosemary Kenney.

The minutes of Secretary Beverly Vogt and report of Treasurer Phyllis Thorne were approved. The treasurer presented the annual report from OMSI about the **Margaret Steere Endowment**. Margaret Steere was a geologist with the Oregon Department of Geology and Mineral Industries for many years, a long-time GSOC member, and an avid paleontologist. Her endowment fund was established upon her death and currently has a balance of $26,281. It is a part of OMSI's Camp Hancock Scholarship Fund, which last year awarded 20 scholarships to 17 students attending OMSI's science classes.

The Board discussed ways to find GSOC members to serve on the **Field Trip Committee** and as the Friday night **projectionist**. These are important positions to keep the activities of the Society alive.

Beverly Vogt presented the final report from the ad hoc Field Trip Committee. Four field trips and the President's trip were held during the summer, with a total of 111 people participating. The committee developed forms and procedures that were designed to ensure safety and fiscal responsibility for the program and recommended that the responsibility for planning the logistics of the President's Field Trip be given to the Field Trip Committee. The program did not lose money this year because the expenses of this summer's trips were covered partly by payments of participants and partly by donations of members. The committee therefore recommended that more money be charged for the trips to cover the costs of the field trips and that extra money left from the President's Trip be returned to the GSOC treasury. All equipment and a computer disk with the forms and duties are with Beverly Vogt ready to be turned over to the new chair, whenever he or she is found. Evelyn Pratt and John Teskey volunteered to serve on the Field Trip Committee for next year. Clay Kelleher as Vice President is also a member of the committee.

The **Annual GSOC Banquet** will be on Sunday afternoon, March 14, 2004. **Dr. Marvin Beeson**, retired Portland State University geology professor, will present a program on the geology of Portland, a subject he knows well. This should be an excellent program, and GSOC members and friends are urged to reserve this date and make reservations as soon as they can be made.

Rosemary Kenney as Chair gave the report of the **Nominating Committee**. Other members of the committee were Beverly Vogt and John Newhouse. The slate of candidates is as follows: Vice President—Charles Carter, Treasurer—Marvel Gillespie, Board Member—Kehrnan Shaw. The announcement of the candidates will be made at the November Friday night meeting, and nominations may be accepted from the floor at both the November and December Friday night meetings. Nominations will be closed after that time, the candidates announced in the January Newsletter, and election held at the February Friday night meeting.

The **noon programs** will resume next year. The January program will be the second Friday of the month; February and March noon meetings will be on the first Fridays.

Past President Sandra Adamson has moved to Hawaii and cannot come to the Board meetings. In order to make it possible to meet the constitutional requirement of six board members for a quorum, Rosemary Kenney, who is also a past president, agreed to fill Sandra's vacant position until March of next year.

The next Board meeting will be10:00 a.m., Saturday morning, January 3, 2004, at Rosemary Kenney's house.

Beverly Vogt, Secretary

HOLOCENE COASTAL PROCESSES IN THE COLUMBIA RIVER CELL

Friends of the Pleistocene, Pacific Cell Field Trip, Day 1 – September 28, 2003
Drs. Frank Reckendorf & Curt Peterson, co-leaders, and associates

Synopsis of Day 1 - Astoria, OR north to Peninsula Port (Oysterville) WA, on the east side of Long Beach Peninsula by Willapa Bay.

The Columbia River has drained a Texas-sized area of 226,000 sq. mi. for the last 8000 or 9000 years. Its tremendous load of sediment has impacted bays, beaches, and the inner shelf from Seaside, OR, to Point Grenville west of Seattle – the Columbia River Littoral (intertidal) Cell. How much sediment is deposited, where has it been eroded away and by what, and how much goes out to sea?

A. Stop 1: Astor Column on Coxcom Hill, Astoria. At low tide a sandbar perhaps a km long extended under 4-mile-long Astoria Bridge on the Oregon side. The ship channel at the Columbia River mouth is 2640' wide. A 2000' wide north channel is dredged to 55' below mean low low water (MLLW) for cargo-loaded ships. Empty vessels use the south 640' channel, 48' below MLLW.

B. Stop 2: Long Beach Arch, "World's Longest Beach Drive" (Really?)

Before jetties were built north and south of the Columbia River mouth, this part of the coast accumulated ½ meter of sand yearly. In the early 1900's the beach began where the arch is now. Post-jetty, the accumulation rate has been 5-10 meters/year. As a result the beach is about 500 meters wider than it was 100 years ago. (I noticed that it's a lot longer walk to the beach now than it was in the 1960's when our kids were little.)

An active foredune is a growing barrier ridge of sand immediately above the high tide line and paralleling the beach. Shore face accretion began here about 5000 years ago. One of James Phipps' maps outlines former north-south foredunes that are now ridges paralleling old shorelines. Shallow peat bogs lie between them. The bogs record various old tsunami sand deposits and three obvious scarps caused by past Cascadia earthquakes.

C. Stop 3: Cranberry Research Center
Ground Penetrating Radar (GPR) logs show dark low-angle lines of compacted winter sand and lighter less-compacted summer lines. Jagged vertical breaks indicate scarps made during Cascadia earthquakes as land subsided ½ to 1½ meters and the beach retreated an estimated 200-400 meters. One of Phipps' maps outlines Long Beach Peninsula's lower zones in red. When a tsunami hits, to quote Gary Carver of Humboldt State U., "the red zone is where you drown."

D. Stop 4: Peninsula Port (Oysterville) by Willapa Bay, about halfway up the peninsula
Bays, beaches, and inner shelf of the Columbia River littoral cell have collected Columbia River sediment throughout the Holocene. Ordinarily wind waves and tides bring sand into the bays. During an earthquake the bays suck in large amounts of sand, the sand swirls around, much of it sinks, and some gets swept back out to sea.

Willapa Bay's tidal basin is protected from the Pacific by the Long Beach barrier spit, some 31 km long by 2-4 km wide. Exposed banks of tidal marshes along the bay's east side contain many

buried wetlands. So do the edges of tidal flats. Willapa Bay bottom cores bring up a lot of mud interspersed with occasional layers of peaty mud or sand – evidence of land subsiding 1-2 meters and pulses of sand pouring into the bay on top of the wetlands. Subsequently the land rebounded.

Does tidally-dominated Willapa Bay collect more sand than it loses? A sediment sample brought up by a 20-foot long Australian sand auger records how, in the roughly 100-year period since the jetties were built, Willapa Bay has been inundated by a thick sheet of sand. This fast influx of sand has likely influenced oyster growing and Spartina (cord grass) invasion in the bay.

One method of determining the composition of sediment is by vibracoring. This works well on quiet beaches and bays away from surf. 2-5 meter deep vibracores were taken from tide flat and channel-margin deposits. Cores were sampled for the size of sand grains at 50-cm. intervals, for mud-to-sand ratios, and for density and radiocarbon. The cores show that 1-3 cu. meters of sediment come in annually from the Columbia River. One core taken near the bay's entrance brought up more than 2 meters of sand on top of earlier mud and tsunami-indicating peaty muds.

E. Stops 5, 6: Joe Johns Road transect (Sand Ridge Road), 2 km E to W; 7, Loomis Lk.
About 5000 years ago Long Beach Peninsula began to accrete many long parallel north-south foredunes. Now trees grow on the dune ridges, and lakes and bogs fill the inter-dunes. Driving 2 km from the east side of the peninsula to the west is similar to riding a low-angle rollercoaster.

A transect done with ground-penetrating radar (GPR) gives a record of how the Long Beach Peninsula built out westward into the ocean (prograded) during the late Holocene. Catastrophic retreat features from Cascadia earthquakes appear as high amplitude reflections in GPR profiles and as thick placer (heavy mineral) deposits in vibracores. Brian Atwater's seven subsidence events during the last 5000 years, recorded in 2000, are evident as retreat scarps. Scarp sizes correlate with earthquake severities; three main ones appear from west to east at 300, 1200, and 2500 years before present.

F. Stop 8: Fort Canby, Benson Beach at the Columbia River mouth.

It is hard to make precise statements about how much sand is where. When winter storms hit from the southwest, sand is swept off West Coast beaches and builds sandbars offshore. Gentler northwest summer winds bring sand back to cover up rocks and create beaches anew. Every few years El Ninos & La Ninas influence the process.

Different interest groups use different statistics. A USGS map of historical shore-lines at Fort Canby St. Pk. shows considerable beach buildup on the north side of North Jetty between 1869 and 1951. Fig. 49 (source?) in our guidebook indicates that since 1880 Long Beach Peninsula has eroded at the north end and increased westward everywhere else. We stood on sand at Benson Beach that probably wasn't there in 1880.

The Army Corps of Engineers sent out a raw new guide to answer professional geologists' questions. Each year the Corps dredges about 4.2 million cubic yards of sand from the Columbia channel's 5-mile long mouth. These dredgings need to be put somewhere. The Corps states that Peacock Spit just north of the Columbia mouth experienced erosion during 1995-1999. Part of this may have been caused by a 1998-1999 La Nina. Since the mid-1990's "state and local interests asked the Corps to put dredged material from the Columbia River Channel onto Benson Beach." Dr. Peterson asked twice about a proposed open-water dumpsite 6 miles out, but the guide hadn't heard of it.

During this first day we learned a lot about the Columbia River's influence on Washington's coast. After the last stop we sat on the jetty, basked in the sun, watched a couple of sea otters swim by, and wondered if North Jetty rocks were Boring Lava. (They are.) A calm, sunny day at the mouth of the Columbia was a much-appreciated gift!

Evelyn Pratt

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.

SILLY SCIENCE JOKES

(Editor's note: These jokes are located on at least 1390 websites, I'm not sure who gets the credit at this point!!!)

- Ratio of an igloo's circumference to its diameter? = Eskimo Pi
- 2000 pounds of Chinese soup? = Won ton
- 1 millionth of a mouthwash? =1 microscope
- Time between slipping on a peel and smacking the pavement? = 1 bananosecond
- Weight an evangelist carries with God? = 1 billigram
- Time it takes to sail 220 yards at 1 nautical mile per hour? = Knot furlong
- 16.5 feet in the Twilight Zone? = 1 Rod Serling
- Half of a large intestine? = 1 semicolon
- 1,000,000 aches? = 1 megahurtz
- Basic unit of laryngitis? = 1 hoarsepower
- Shortest distance between two jokes? = A straight line
- 453.6 graham crackers? = 1 pound cake
- 1 million-million microphones? = 1 megaphone
- 1 million bicycles? = 2 megacycles.
- 365.25 days? = 1 unicycle
- 2000 mockingbirds? = 2 kilomockingbirds
- 10 cards? = 1 decacards
- 1 kilogram of falling figs? = 1 Fig Newton
- 1000 milliliters of wet socks? = 1 literhosen..
- 1 millionth of a fish? = 1 microfiche
- 1 trillion pins? = 1 terrapin
- 10 rations? = 1 decoration
- 100 rations? = 1 C-ration
- 2 monograms? = 1 diagram
- 8 nickels? = 2 paradigms
- 2.4 statute miles of intravenous surgical tubing at Yale University Hospital? = 1 I.V. League
- 100 Senators? = Not 1 decision

Nominating Committee Results

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

President ..... Clay Kelleher
Vice President ..... Charles Carter
Secretary ..... Beverly Vogt
Treasurer ..... Marvel Gillespie
Director, 3 years ..... Kehrnan Shaw
Director, 2 years ..... Richard Meyer
Director, 1 year ..... Evelyn Pratt

Nominations will also be open at the December club meeting on Friday, December 12, 2003. 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 include Rosemary Kenney, Chair; Bev Vogt; and John Newhouse. 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 2003 dues are paid, good deal!!!