



THE GEOLOGICAL NEWSLETTER

"NEWS OF THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY"

VOLUME 79, NUMBER 1
JANUARY/FEBRUARY 2013

The Geological Society of the Oregon Country

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VISITORS WELCOME AT ALL MEETINGS

CALENDAR

JANUARY/FEBRUARY ACTIVITIES

Friday evening talk, January 11, 2013, at 7:30 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University. Speaker Yumei Wang, Geotechnical Engineer and Earthquake Expert at Oregon Department of Geology and Mineral Industries (DOGAMI), will present "Surviving Cascadia Earthquakes: Oregon's Critical Infrastructure".

This talk will cover Oregon's critical infrastructure seismic vulnerabilities including lessons from Japan's 2011 Disaster, efforts led by the Oregon Seismic Safety Policy Advisory Commission (OSSPAC) on Resilience Planning, and the need to build Earthquake Preparedness into our culture. The information for the talk was jointly

prepared by Wang, Chris Goldfinger (OSU), and Kent Yu, (OSSPAC).

Friday evening talk, February 8, 2013, at 7:30 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University. Speaker Casie Davidson, environmental researcher at Pacific Northwest National Laboratory (PNNL), will present "Wind Energy Meets PNW Geology: A Preliminary Look at Compressed Air Energy Storage Opportunities in the Pacific Northwest."

Located in Richland, Washington, PNNL is one among ten U.S. Department of Energy (DOE) national laboratories managed by DOE's Office of Science. They perform research to help find solutions for not only DOE, but for the U.S. Department of Homeland Security, the National Nuclear Security Administration, other government agencies, universities and industry. Their Richland campus includes unique laboratories such as the William R. Wiley Environmental Molecular Sciences Laboratory, a DOE Office of Science national

scientific user facility. In addition to the Richland campus, they operate a marine research facility in Sequim, Washington; and satellite offices in Seattle and Tacoma, Washington; Portland, Oregon; and Washington, D.C.

Join GSOC members at **Pizzicato Pizza, 1708 SW 6th Ave., at 6:00 p.m.** before the lectures for an informal dinner and conversation.

Free parking is available at Portland State University **Friday** nights after 5 p.m. in Parking Structure 2 on Broadway Ave. directly across from Cramer Hall and on level one of Parking Structure 1, bounded by Broadway and 6th Aves. and Harrison and Hall Streets.

FUTURE ACTIVITIES

The Seventy-eighth Annual GSOC Banquet will be Sunday, March 10, 2013, at the Monarch Hotel in Clackamas, Oregon. Speaker Dr. Rob McCaffrey, geophysicist and research scientist with the Dept. of Geology at PSU will present "Velocity Field Mapping for the North American Plate in the Pacific NW".

McCaffrey is a geophysicist with interests in tectonic plate motions, crustal deformation, earthquakes, GPS and seismology. With students and other geophysicists, he is involved in several research projects globally. This talk will focus on determining the tectonic plate motion that will produce future earthquakes.

The registration form for the 78th GSOC Annual Banquet is attached to this newsletter. Please submit your registration by March 3 if you wish to attend.

Check the GSOC website (www.gsoc.org) for updates to the calendar.

BOARD MEETING NOTES

November 10, 2012

The meeting was called to order at the home of Jan Kem by President Jane Walpole. Board members present included Jane, Dawn Juliano, Paul Edison-Lahm, Julia Lanning, Larry Purchase, and Rik Smoody. Also present were Bev Vogt and Richard Bartels. The minutes of the October 13th, 2012 board meeting were approved.

Treasurer's Report: The board reviewed this year's income and expense figures and the results of the September field trip. Treasurer Dawn Juliano will donate \$850 as our annual scholarship to the PSU Geology Department before the end of the year. The Treasurer's Report was approved.

Membership List: The board agreed that a copy of the membership list needs to be kept online. Rik will investigate how we can use Google docs to allow access to a list for board and committee members.

Field Trips and Other Events

Holiday Party: Jan has signed a contract with Aramark Catering for the required alcohol server. Members have donated \$155 to cover the wine and corkage fees. PSU will also need a \$165 check by the time of the party for the Benson House rental. Suggested donations of \$5 are still needed to cover this rental cost.

The rental of the Benson House is from 4:00 p.m. to 10:30 p.m. Jan and Janet will begin the setup around 4:00 p.m. Happy hour will be at 6:00 p.m., followed by the buffet at 6:30 p.m., and the meeting at 7:00 p.m. The bartender will be on duty from 5:30 p.m. to 8:30 p.m., but will only be serving from 6:00 p.m. to 8:00 p.m. Janet will bring coffee. Clean-up will begin at 10:00 p.m.

Upcoming Field Trips: Bev and Bart are looking at the weekend before Memorial Day weekend for their Caldera trip. Paul will look for an available weekend in early July for his Downtown Geology walk. Additional field trips in the planning stages include trips to: Eliot Glacier washout (Rik), Parkdale (Larry), Idaho (Dave Olcott), TBA (John Piccininni), possible one day trip TBA (Jane).

Upcoming Speakers include Yumei Wang in January and Peter McGrail in February.

Banquet Committee: Dawn was appointed Banquet Committee chair (with assistance from Bart). Jane is now looking for a banquet speaker and welcomes suggestions. Janet will create the program. Jane will make place-cards. Jan will run the sales table. Bart

will get the pick engraved. Jane requests that her commemorative gift be a rock hammer.

Old and New Business

Mugs: Bart provided a mug inventory — 263 mugs remain, so assuming that 15 mugs per year are given to speakers and field trip leaders, our supply will only last until 2020. The board voted to drop the price of the mugs to \$5 each.

Newsletter: Jan reminds us that the text of the newsletter needs to be to Carol by the 20th of the month in which the newsletter is due. He also needs mailing labels from Clay by the 25th of that month.

Nominating Committee: Jane has appointed Rik, Janet and Paul to the committee. Janet is making contact with potential nominees for Vice-President and Director. The Treasurer and Secretary have indicated that they will run again for their offices. The committee will confer on their recommendations by email.

Listserv: The board agreed to investigate using a listserv for meeting and field trip announcements. Rik will look for a suitable listserv.

Inventory: Bev is updating her inventory list and will contact people she hasn't yet talked to. Rik will assist Bev in putting the inventory list on up Google docs. Jane appointed Bev as Inventory Chair.

Library: Larry points out that the library needs to be purged of 1940s textbooks, fossil related materials, etc. This would make room for the GSA bulletins now being stored at Bev and Bart's. Some of the purged items could be sold at the banquet sales table. Jane appointed a Library committee with Larry and Bart as co-chairs, and with Diana Gordon and Rosemary Kenney as committee members. The committee will recommend an appointee for librarian.

Next board meeting will be Saturday, January 12th, 2013, 10:00 a.m. at Carol Hasenberg's house, 614 NE 114th Avenue, Portland.

Notes compiled from board meeting minutes submitted by Paul Edison-Lahm, Secretary.

holiday party wrap-up



Yes, another fascinating year was marked at the 4th annual GSOC Holiday Party on December 14. Delicious food, good fellowship, and lovely entertainment was had by all. This year we had plenty of delicious protein dishes, plus veggies and desserts at our potluck. Yum!

Musical entertainment was provided by Dawn Juliano, Barbara Smoody, and David Keyes. Not to mention the many carol-singers, whose names shall remain anonymous. Thanks to you musicians! Also special thanks to Jan Kem, Julia Lanning, Janet Rasmussen, Dave Olcott, Bev Vogt, Bart Bartels and Jane Walpole, without whose efforts we would not have had a party.

Also thanks to the folks who scrambled at the last minute to hire the caterer so that we could enjoy a little cup of holiday cheer!

NOMINATING COMMITTEE RESULTS

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

President **John Piccininni**
Vice President..... **Sheila Alfsen**
Secretary **Paul Edison-Lahm**
Treasurer **Dawn Juliano**
Director, 3 years **Bo Nonn**
Director, 2 years **Janet Rasmussen**
Director, 1 year..... **Julia Lanning**

Nominations will be closed for this year's slate of officers after the January meeting of the society. The slate of officers will be voted on and approved at the February monthly meeting.

The Nominating Committee members were Rik Smoody, Janet Rasmussen and Paul Edison-Lahm. Our thanks to the selected members and members of the Nominating Committee!

Don't forget that annual **DUES PAYMENTS** are due! Think about all those great member benefits for a mere annual fee of \$25 for an individual and \$35 for a family!

PS – If you joined GSOC in September 2012 or later, your 2013 dues are paid, good deal!!!

IRELAND'S GEO-TIMELINE



Synopsis of the November 9, 2012, talk by Dr. Lara O'Dwyer Brown, Curator, Rice Northwest Museum of Rocks and Minerals, Hillsboro, Oregon. Working at the Rice Museum is her dream job!

by Larry Purchase

Lara was raised in Dublin, Ireland. Lara earned her Bachelor's Degree from Trinity College at the University of Dublin, and recently received her PhD from the University of California at Davis, focusing on mineralogy and petrology.

Precambrian (Ended 542 mya)

The two halves of Ireland (NW and SE) are separated by the Iapetus Ocean. Scotland and NW Ireland, on the other hand, are closely situated even this long ago and so have similar geological records. Gneisses and metasedimentary rocks have been formed. Lots of deformation takes place. Ediacaran soft-bodied fossils are preserved.

Cambrian (490 mya)

Transgression (advance of the sea onto land) in NW Ireland is similar to that in Canada. Canada, Greenland, and NW Ireland are all part of the supercontinent Laurentia. Shallow marine rocks evolve in NW Ireland, deep marine rocks evolve in SE Ireland.

Ordovician (443 mya)

A volcanic arc setting for NW Ireland produces sediments and lavas in the rock record. NW Ireland is near the Equator, & SE Ireland is close to ~50-60° south. Graptolite, brachiopod, trilobite and conodont fossils are present. There is evidence for ocean shrinking between NW and SE Ireland.

Silurian (417 mya)

Caledonian Orogeny (mountain building), melting of the Saharan Ice Caps, and the final closure of the Iapetus Ocean, evolve as a minor continent Avalonia (large archipelago) develops, and later becomes Laurasia where Ireland and North America further evolve together.

Devonian (354 mya)

The Munster Basin to the south of the country is formed at this time. Continents come together to form Gondwana land. This is the age of fishes.

Carboniferous (290 mya)

Early Carboniferous produces extensive limestone. Coal is deposited in England and Pennsylvania in North America. A block and basin pattern emerges as transgression erodes. Lead and zinc deposits are plentiful in Ireland, The landscape is severely deformed to the south during the complicated world-wide Variscan Orogeny.

Permian (251 mya)

Rocks of this age in Ireland are not well preserved. Continents come together to form Pangaea, a super continent.

At this time Ireland and the North America are together. At the end of the Permian, 95% of life dies off. Trilobites and brachiopods disappear on a very hot and high carbon dioxide planet.

Mesozoic (66 mya)

Triassic (208 mya), Jurassic (144 mya), and the Cretaceous (66 mya) sees the breakup of Pangaea and basalt is deposited in Ireland. Age of Dinosaurs comes to an end, & Pangaea breaks ups. Sadly neither Oregon nor Ireland has any dinosaur fossils. Only marine fossils such as crinoids (sea lily) are found. A desert environment existed on the New Red Sandstone terrain, and evaporites like gypsum are laid down.

Cenozoic (to present)

The mammals begin to thrive. North America was attached to Ireland, but, by now is moving apart as the Atlantic Ocean begins to form and widen. The southern tip of Ireland has never had an ice sheet, but the rest has been covered during the Quaternary.

GSOC is fortunate to have such a knowledgeable speaker to talk to us about Ireland's geology. Previously Sheila Alfsen enlightened us about the geology of Iceland. We would also be very interested to hear about Greenland's geology from Lara's husband, Dr. Eric Brown, who has traveled & extensively studied the geology there, while earning his PhD.

Reference and Additional Reading:

As you can tell from the timeline, the geologic history of Ireland is closely related to the shifting continents over the ages of the earth. You can review maps of the earth through the ages on Christopher Scotese's Paleomap Project:

<http://www.scotese.com/>

Wikipedia also has numerous pages related to continental drift and the history of earth's continents. A good place to start is the page on the Iapetus Ocean, which is closely related to the geologic history of Ireland.

WELCOME NEW MEMBERS!

Welcome new members from 2012! May the new year bring lots of great geology!

- | | |
|--------------------------------------|--------------------------|
| Steve and Priscilla Butler | Marjan Rotting |
| Joshua and Jennifer Conley | Bill Stein |
| Rachael Roberts | Robin Calver |
| Charles Belusko | Kathryn Alexander |
| Joel Chua | Connie Battaile |
| Linda Budan | Adam Altson |
| Dennis Chamberlin | Kevin Friscia |
| Bruce Howard | David Sutherland |
| Ken LaCour | Alyssa Kleehammer |
| Jeff Payne & Betsy Julian | Cris Morgante |
| Beth Smith | Jordan Lawrence |

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compiled by Carol Hasenberg

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VISITORS WELCOME AT ALL MEETINGS

CALENDAR

MARCH/APRIL ACTIVITIES

The Seventy-eighth Annual GSOC Banquet will be Sunday, March 10, 2013, at the Monarch Hotel in Clackamas, Oregon. Speaker Dr. Rob McCaffrey, geophysicist and research scientist with the Dept. of Geology at PSU will present "GPS Velocity Field Mapping for Active Tectonics in the Pacific Northwest".

McCaffrey is a geophysicist with interests in tectonic plate motions, crustal deformation, earthquakes, GPS and seismology. With students and other geophysicists, he is involved in several research projects globally. This talk will focus on determining the tectonic plate motion that will produce future earthquakes.

The registration form for the 78th GSOC Annual Banquet was attached to the January/February

2013 edition of The Geological Newsletter, and is also currently available on the website, www.gsoc.org. Please submit your registration by March 3 if you wish to attend.

Friday evening talk, April 9, 2013, at 7:30 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University. Speaker Dr. William Orr, Director, State Museum of Fossils, Eugene, Oregon, will present "The Origin of Life and Early Life on Earth."

The talk will address some of the ideas on first life as well as the likelihood of life out in the cosmos. The fossil record of the earliest life is much better than generally believed and active research on this subject is being pursued in several venues including NASA. Dr. Orr will outline some of his ideas on the rates of evolution and the integrity of the fossil record itself. By examining in detail three very early separate faunas he

will support some of his perspectives on the relationship between tectonics and evolution.

Bill's ideas on paleontology and evolution stem from his 50 years of research and work as museum director and professor at the University of Oregon. Bill did his baccalaureate at the University of Oklahoma, 1961, Masters UC Riverside 1963, and his doctorate at Michigan State in 1966. He has traveled extensively in Africa, the Middle East and did lecture tours in China in the early 1980's. He came to UO in 1967 and retired in 1997. In 1982, he was named director of the state museum of fossils, a position he still holds as a volunteer today.

A centerpiece of Orr's early career was his participation as shipboard scientist aboard GLOMAR CHALLENGER then later in the 1970s and 80's when he managed the program for the National Science Foundation. He is the author of all the standard references in the Pacific NW and Oregon on Geology and Paleontology. In addition, he has written books on Oregon water.

Join GSOC members at **Pizzicato Pizza, 1708 SW 6th Ave.**, at **6:00 p.m.** before the lectures for an informal dinner and conversation.

Free parking is available at Portland State University **Friday** nights after 5 p.m. in Parking Structure 2 on Broadway Ave. directly across from Cramer Hall and on level one of Parking Structure 1, bounded by Broadway and 6th Aves. and Harrison and Hall Streets.

FUTURE ACTIVITIES

GSOC Field Trip, "A Trail of Two Calderas," May 18-19, 2013.

Bart Bartels and Bev Vogt are planning a field trip to the **Crooked River and Wildcat Mountain Calderas** in central Oregon on May 18 and 19. For questions, details, and registration, contact Bart and Bev at 503-292-6939 (bartbartels@comcast.net) or bevvoigt@comcast.net). Deadline for registration is May 6. The registration form is attached to the end of this issue of *The Geological Newsletter*, and is also available on the GSOC website www.gsoc.org. NOTE: This trip is a rescheduling of the trip that was cancelled last September. Registrants for that trip were reimbursed for their paid fees. You must re-register for this trip if you wish to go.

NOTE: You must be a GSOC member or guest of a member to attend GSOC field trips. You may join GSOC at any time, for \$25.

Check the GSOC website (www.gsoc.org) for updates to the calendar.

BOARD MEETING NOTES

January 12, 2013

The meeting was called to order at the home of Carol Hasenberg. Board members present were John Piccininni, Julia Lanning, Janet Rasmussen, Tara Schoffstall, and Larry Purchase, one member short of a quorum. Also present were GSOC members Doug Rasmussen, Bo Nonn, and Sheila Alfsen. Carol took minutes in absence of Secretary Paul Edison-Lahm. The minutes of the November 10th, 2012 board meeting were approved.

Board member nominees Sheila and Bo were welcomed and asked to give a brief synopsis of their lives and what brought them to geology and GSOC. Sheila has been a horse shoer, mom, student, and geologist/teacher. Sheila did her graduate work in Paleontology and is currently working with Paul Hammond as well as her job for the Community Colleges.

Bo hails from the Midwest where he received his bachelor's degree in geology from Wisconsin. He and his wife Ellen spent six years in Africa with the Peace Corps teaching high school, another three years as private volunteers in Kenya in the 1970s, and three more years with the Peace Corps in Botswana in the 1980s. In Portland he has worked at OIT as a mechanical engineer doing projects in medical technology. He also been a Mazama club climb leader and taught basic climbing school classes for twenty years. He retired last year, and is now taking geology classes.

Treasurer's Report:

The Treasurer's Report was approved.

Field Trips and Other Events

Larry is planning a field trip based upon the Lidar image of Mt. Hood in the area of Elliott Creek, also

Bo has done some climbing in the area, and thinks we can get over there with vehicles. Larry is hoping to get someone to lead the trip focusing on the moraine of Elliott glacier.

President's Field Trip: John has experience caving, and group was very enthusiastic about doing a trip focused on caving.

Bev and Bart's trip is scheduled for May 18th and 19th.

Upcoming Speakers:

February speaker will discuss cutting edge research on compressed air storage. Other possible speakers were discussed.

Holiday Party:

Janet's sister lives in a mobile home park that has a community center that is free to use. Board approved investigation of this by both Tara and Janet.

Jan's report on the 2012 Holiday Party at the Benson House was approved.

Annual Banquet:

Banquet plans are on track.

Old and New Business

Tara will investigate links between Twitter and Facebook. She now has web access and will be increasing the networking via Twitter to give us more web cred.

Janet would like a reminder at Friday night meetings to turn off cell phones and computers unless people are taking notes.

Library revitalization project: Larry and Bart are working on this. Larry is providing GSA bulletins. A meeting at the library (Diana, Bart and Larry) is scheduled for January 25th. The plan is to have a show-and-tell for the library. It was suggested that we get a locking bookcases. Tara, Diana, Rosemary, Larry, Tom are on the library committee.

Slide conversion project: Bo would like to work with Clay on this. He has two Epsom scanners that do a good job scanning slides.

Discussion of Google docs and listserv was tabled for next meeting.

The next board meeting and annual business meeting will be held March 9th, 2013, 10:00 a.m. at Rosemary Kenney's house.

Minutes taken by Carol and edited by Paul.

Notes compiled from board meeting minutes submitted by Paul Edison-Lahm, Secretary.

ARE YOU READY?!

Synopsis of the January 11, 2013 Friday night GSOC lecture by Yumei Wang, seismic hazards expert at DOGAMI

by Carol Hasenberg and Yumei Wang

Yumei Wang, seismic hazard expert at DOGAMI and one of GSOC's most prolific speakers over the last couple of decades, gave a talk about preparing for Cascadia Subduction Zone earthquakes in Oregon. Indeed, this topic and identifying and reducing natural hazard risks has been the focus of Yumei's career at DOGAMI.

Wang's talk, prepared with OSU Professor Chris Goldfinger and OSSPAC Chairman Kent Yu, emphasized that the key of preparing for a large earthquake or similar hazard is to define the hazard correctly and then to plan your mitigation strategies. Although Japan is the most earthquake savvy country in the world, they had major problems in the catastrophic Tohoku earthquake because the hazard was underestimated. We should not be complacent in the U.S., either, because only recently have we been able to define the earthquake hazards in our country. Our infrastructure has been aging and decaying with only the most necessary repairs, and it wasn't designed for the real natural hazards to begin with.

We've had some unforgettable disasters in the last several years to show what a subduction zone mega

quake can do in Sumatra and Japan. We can learn from those and other earthquakes to plan our strategies for mitigation and survival of a quake on the Cascadia Subduction Zone.

At this point Wang began to focus on the GSOC audience and each individual's preparations for a major earthquake. She offered prizes to individuals who had bolted their homes to the foundations. She asked the audience what they plan to do if they feel the earth shaking hard. The answers that DOGAMI has been instructing us are to "Drop, Cover, and Hold", and to run to higher ground if you are in a tsunami inundation zone. She asked who in the audience has an emergency preparation kit with 1-2 weeks supply of food and water?

To illustrate why the last question is important Wang showed the audience some slides from her earthquake reconnaissance trip to Japan after the Tohoku Earthquake and its devastating effect on buildings and infrastructure. After the quake power generation was a fraction of normal capacity, bridges and roads were destroyed, ports for shipping in supplies were damaged, the airport was flooded, some coastal towns were completely obliterated. After such major damage to the infrastructure, it may take a community months or even years to restore full services. It may even lead to the economic failure of some communities.

Kent Yu, an engineer who is on the Oregon Seismic Safety Policy Advisory Commission (OSSPAC), has led an effort in developing a seismic preparedness plan for the next fifty years for the state. A "gap analysis" chart was made for lifeline services including water, energy, transportation, and telecommunications. The gaps in the study show how much time each sector estimates they will need to repair their services once the earthquake hits and the damage has been done. The gaps show a breakdown of the tasks into more specific aspects of each of the major services. It also has markers showing target repair gaps for improved seismic performance. Wang felt that the gap analysis might be a bit misleading in that the gap times shown may depend on other services being functional as the repairs are being conducted. For example, you may have difficulty in repairing an electrical transformer

in the gap time shown if the road to it has been washed out.

In the past 20 years or so, Oregon Department of Transportation (ODOT) has made extensive studies of aging bridges, and has used these in determining the seismic preparedness of the major transportation corridors in Oregon, which include the I-5 and I-84 corridors, major routes to the Oregon coast and central Oregon, and US 101 on the coast. Landslides, liquefaction, and lateral spreading (I.e., permanent soil failures) are a concern along these corridors as well as damage from shaking to the bridges.

In the energy sector, energy transmission and storage facilities were studied through a geographic filter of predicted seismic soil failures (i.e., landslides, liquefaction, and lateral spreading) to see where major problems lie. The Bonneville Power Administration (BPA) has done a very robust study of the vulnerabilities of their systems but once again, this is assuming that other systems are running, employees can get to work, etc. There are many endangered high voltage electrical transmission towers situated in river flood plains full of highly liquefiable soils. Also, fuel tank depots along the Willamette River are built on highly liquefiable soil, and there are no backup storage areas. So, in terms of major services, Oregon does not seem to be very prepared for a mega quake. The report is at <http://www.oregon.gov/puc/docs/DOGAMICEIHubreport-8-1-12-R1.pdf>

So that leads us back to individual preparedness in Oregon. HOW MANY OF YOU HAVE EMERGENCY KITS THAT ARE GOING TO LAST YOU A LONG TIME IN A MEGA QUAKE? Remember, there will be no warning for an earthquake, although there is a short gap of warning for a tsunami. So prepare yourself and your family now.

Wang pointed out that in planning for an emergency, the first hour after an earthquake can be very important. You should have a shutoff wrench to turn off your gas service, and any other fire or hazardous chemical hazards that you have should be

secured. You should have a family communication plan and a plan to meet up after the event. You may be on one side of the river and the rest of your family be on the other side.

After the talk, a few of us were discussing making an emergency preparedness kit and what it might contain. At Fort Lewis the army surplus store has MRE meals that are ready to eat. There are 50 to 80 gallons of water in the typical hot water tank that could be used. You may want to have a camping stove and a camping water filter system on hand.

WELCOME NEW MEMBERS!

We'd like to welcome quite a few new members to GSOC for 2013! Hot-diggity!

Jon & Barbara Stroud

Dr Alyson Lighthart

Glenn Kirkindall

Richard McJunkin

Perry & Terra Crampton

Alex Marrero, D.D.S.

Richard 'Dick' Pugh

Phillip Kaser

Rockne Stephenson

Kyle Dittmer

Mark Meininger

Lyle T. Hubbard Jr.

Carolyn Powers

Kathy Goss



GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

TWO CENTRAL OREGON CALDERAS FIELD TRIP
MAY 18 AND 19, 2013

Past Presidents Richard Bartels and Beverly Vogt will lead a field trip to Crooked River and Wildcat Mountain calderas in central Oregon on May 18 and 19. The Crooked River caldera, called Oregon's Super Volcano by its discoverers Mark Ferns and Jason McClaughry of DOGAMI, is enormous, covering an area approximately 25 by 17 miles and containing Smith Rock State Park on the northwest side, Prineville in the middle, and Prineville Reservoir State Park on the southeast side. Tuff ejected during the eruption that caused the collapse of the caldera has an age of approximately 29.5 Ma. Wildcat Mountain caldera to the northeast of Crooked River caldera is smaller and older, covering 10 by 7 miles. Tuff produced by its catastrophic caldera-producing eruption has an age between 41.5 and 39.35 Ma. Steins Pillar, a famous pioneer landmark located in the caldera, is an erosional remnant of this tuff. This trip will explore features of Crooked River caldera on Saturday, the 18th, and Wildcat Mountain caldera on Sunday, the 19th. The trip will be over no later than 2 p.m. on Sunday.

The trip will start Saturday morning at 9 a.m. at Haystack Reservoir Campground on the east side of Haystack Reservoir, a few miles south of Madras. Participants can camp starting on Friday night at Haystack Reservoir Campground or stay in one of the motels in nearby Madras. Participants are responsible their own lodging, transportation, and food arrangements. Carpooling is recommended. Much of the trip will be on gravel roads, so vehicles with good clearance are preferable. Cost of the trip is \$25, and participation will be limited to the first 25 GSOC members and their guests who have paid for the trip. If you have questions or want to reserve a place on the trip, contact Richard Bartels (bartbartels@comcast.net) or Beverly Vogt (bevvgot@comcast.net), both at 503-292-6939. If the weather is bad or there are fires in the area, the trip will be canceled and your money refunded. More information about specifics will be emailed or sent to participants after the deadline.

Trip Participation Policies: If you plan on participating in this trip, send in your registration form (attached to this newsletter) and \$25 fee by Monday, May 6th. **Each participant must be a GSOC member or guest and should have a separate registration form.** A nonmember may register if he/she includes a membership application form and payment with the registration form and fee. *NOTE: This trip is a rescheduling of the trip that was cancelled last September. Registrants for that trip were reimbursed for their paid fees. You must re-register for this trip if you wish to go.*

Minors must be accompanied by a responsible adult GSOC member parent or guardian. A letter from his or her parent or guardian giving permission for a minor to participate in the field trip with a designated person must be attached to this form. Each participant must also fill out and sign a liability waiver at the meeting place in order to participate. Minor participants must also have the signature of a parent or legal guardian on the liability waiver.

REGISTRATION/MEDICAL INFORMATION FORM
Two Central Oregon Calderas Field Trip – May 18 and 19, 2013

NOTE: Fill out one registration and medical information form for each participant. This application must be accompanied by a membership application and payment if you are not a member or guest of a participating member. The membership application form is located in *The Geological Newsletter* or at www.gsoc.org/membership.html.

REGISTRATION

Participant name _____ Minor (circle one): Yes or No
If participant is not a GSOC member, name of GSOC sponsor _____
If participant is a minor, name of designated GSOC accompanier _____
Parent signature for minor _____ Date _____
Address of participant _____
City _____ State _____ Zip _____ - _____
Phone (____) _____ - _____ Cell Phone (____) _____ - _____ Email address _____

Fee: \$ 25, includes printed materials. All other costs are responsibility of the participants. Send this form and payment to:
GSOC, PO Box 907, Portland, OR 97207-0907, by **May 6, 2013**.

MEDICAL INFORMATION

Name of physician: _____ telephone number: _____
Allergies: _____
Medications (attach list if necessary): _____
Special medical conditions: _____
In case of an emergency call: _____



THE GEOLOGICAL NEWSLETTER

"NEWS OF THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY"

VOLUME 79, NUMBER 3
MAY/JUNE 2013

The Geological Society of the Oregon Country

P.O. Box 907, Portland, OR 97207-0907

www.gsoc.org

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VISITORS WELCOME AT ALL MEETINGS

CALENDAR

MAY/JUNE ACTIVITIES

Friday evening talk, May 10, 2013, at 7:30 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University. Speaker Dr. Eric L. Brown, Portland Community College, will present "A Virtual Tour of the 55ma Skaergaard Intrusion, Central East Greenland."

The Skaergaard intrusion formed during the breakup of Pangea and the opening of the North Atlantic ocean basin ~ 55 Ma, and is perhaps the world's best example of an ancient solidified magma chamber. Eric completed a 1 year post-doc at UC Davis, where he had the opportunity to go to the Skaergaard Intrusion. He will discuss the logistical challenges and isolation while working in East Greenland, and provide a photographic tour of the major features of the intrusion.

Eric received his BS in Geology at the University of the Pacific, an MS in Geology at UC Davis, under Dr. Eldridge Moores, and a PhD in Geology at UC Davis under Dr. Charles Leshner. Currently an instructor at Portland Community College, Eric is also a full-time dad. His research interests include the origin and evolution of basaltic magma systems in different tectono-magmatic environments. He addresses these petrologic problems using thermodynamic modeling and major element, trace element, and radiogenic isotope geochemistry.

Join GSOC members at **Pizzicato Pizza, 1708 SW 6th Ave.**, at **6:00 p.m.** before the lectures for an informal dinner and conversation.

Free parking is available at Portland State University **Friday** nights after 5 p.m. in Parking Structure 2 on Broadway Ave. directly across from Cramer Hall and on

level one of Parking Structure 1, bounded by Broadway and 6th Aves. and Harrison and Hall Streets.

GSOC Field Trip, "A Trail of Two Calderas," May 18-19, 2013.

Bart Bartels and Bev Vogt are planning a field trip to the **Crooked River and Wildcat Mountain Calderas** in central Oregon on May 18 and 19. For questions, details, and registration, contact Bart and Bev at 503-292-6939 (or email to bartbartels@comcast.net or bevvoigt@comcast.net). Deadline for registration is May 6, 2013. The registration form for the trip was attached to the end of the March/April 2013 edition of *The Geological Newsletter*, and is also currently available on the website, www.gsoc.org. Cost of the trip is \$25, and participation will be limited to the first 25 GSOC members and their guests who have paid for the trip. NOTE: This trip is a rescheduling of the trip that was cancelled last September. Registrants for that trip were reimbursed for their paid fees. You must re-register for this trip if you wish to go.

NOTE: You must be a GSOC member or guest of a member to attend GSOC field trips. You may join GSOC at any time, for \$25.

Friday evening talk, June 14, 2013, at 7:30 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University. Speaker Deron Carter, Linn-Benton Community College, will present "Large Pleistocene Outburst Flooding from Lake Alvord into the Owyhee River, Oregon."

Large magnitude floods significantly altered portions of the landscape of western North America during the Pleistocene. The well-known and well-documented Missoula Floods illustrate the impact this scale flooding had by altering the course of major drainages and creating the extensive Channeled Scablands of Eastern Washington. However, other floods, of smaller magnitude, also affected landscapes on a more regional basis.

The Alvord Basin, located in Oregon's remote southeastern corner, once contained a large lake that overflowed at least once about 13,000 years ago into the Crooked Creek drainage of the Owyhee River watershed. This flood altered the regional landscape by leaving behind stripped bedrock surfaces and large flood deposits, some of which are located over 30 meters above the present channel. Come learn about the flood's connection to Lake Alvord, a variety of geologic dating

techniques that were used to establish the age of the flood, and possible impacts on local ecology.

Deron Carter holds an M.S. in geology from Central Washington University and is a faculty member in the Department of Physical Sciences at Linn-Benton Community College in Albany, Oregon.

FUTURE ACTIVITIES

GSOC Field Trip, "Eliot Glacier/Parkdale Lava Flow - Field Trip," tentative dates August 3 and 4, 2013.

Field trip co-leaders Larry Purchase, Bo Nonn, and Rik Smoody are putting an exciting trip together for GSOC. Featuring guest speaker and leader Dr. Andrew Fountain, PSU Dept. of Geology, Glaciologist, and assisted by Cynthia Gardner and Willy Scott, both of USGS, Geologist/Volcanologist.

The anticipated two day event may include the following:

First Day:

1. Visits to washouts and new bridges on the Middle Fork, Hood River, one located above, and the other below the Parkdale Lava Flow. The Middle Fork, Hood River starts at the Eliot Glacier passes the Parkdale Lava Flow adjacent and to the west side, on the way down the mountain.
2. A visit is scheduled to a century old water supply system, beginning at the bottom of the Parkdale Lava Flow and supplying gravity fed water to homes almost to the town of Parkdale.

Second Day:

3. An optional opportunity is being presented to see if there is enough interest in climbing to Eliot Glacier to look at an active glacier. If the climb is a go we will try to schedule Dr. Fountain for a Friday night lecture, just before the trip.

The details on the Eliot Glacier portion of the trip are that we will have to climb from a parking lot near Cloud Cap Inn at 6,000 ft. to about 8,500 ft. up the east side moraine (on a good trail of angular rock) of Eliot Glacier to a point where we will be looking down onto the Glacier. From there we will descend down a steep talus slope of volcanic rock for a short way, then to the ice of the glacier, where we will be led safely to the top of an open crevasse. A lecture may be given as we peer down into the depths of the crevasse. It will be a full day to negotiate the hike up to the glacier and then back down. We can be assisted by board member, Bo Nonn, who has

been a Mazama Climb leader for two decades, knows first aid, and has been on this trip with Dr. Fountain. Another board member, Julia Lanning, is an avid hiker and climber and may be able to assist. If necessary, a conditioning hike up in the gorge, at say, Dog Mountain, could be arranged in advance of the trip, if requested.

The group will be camping overnight on the mountain near Cloud Cap Inn, or near the top of the Parkdale Lava Flow. Participants are also welcome to arrange their own lodging at a motel in Hood River. The trip date is dependent upon the opening of a crevasse which is in turn dependent upon the snow melting rate for this year, so for that reason we will not be able to announce a firm date at this time. Every attempt will be made to determine open weekend dates as soon as possible. Participants will provide their own transportation to and from the mountain and carpooling is encouraged. Participants will also be able to sign up for one or both days of the trip. The trip registration form will be available in the next issue of The Geological Newsletter as well as a completed, detailed itinerary for the trip.

NOTE: You must be a GSOC member or guest of a member to attend GSOC field trips. You may join GSOC at any time, for \$25.

Check the GSOC website (www.gsoc.org) for updates to the calendar.

BOARD MEETING NOTES

March 9, 2013

The meeting was called to order at the home of Rosemary Kenney. Board members in attendance were Jane Walpole, John Piccininni, Dawn Juliano, Paul Edison-Lahm, Janet Rasmussen, and Larry Purchase. Quorum was present. (Board members-elect present were John, Sheila Alfsen, Dawn, Paul, Janet, and Jane.) Also in attendance were GSOC members Bev Vogt, Richard Bartels, Dave Olcott, Jan Kem, Peregrine Edison-Lahm and Rosemary. The minutes of the January 12th, 2013 board meeting were approved.

Election results:

The board took notice of the results of the election on February 8th, 2013 of the following new board members:

President: John Piccininni

Vice-President: Sheila Alfsen
Treasurer: Dawn Juliano
Secretary: Paul Edison-Lahm
Director (1-year): Julia Lanning
Director (2-year): Janet Rasmussen
Director (3-year): Bo Nonn

The Treasurer's Report was approved.

Dawn notified us that our post office box has been moved to the location at S.W. 1st and Madison.

Field Trips and Other Events

Annual Banquet: Fifty-nine people are signed up for the annual banquet. Rosemary will be bringing the free field guides. John will bring other stuff, including free literature. Jan will staff the sales table. The spiffy banquet programs created by Janet were appreciated.

Fellows Certificates: Bart explained the process whereby the President and VP automatically become fellows and some active members who have "made significant contribution" can become fellows by unanimous board vote.

Upcoming Speakers: Sheila announced that she has scheduled the following speakers: Bill Orr will speak in April on the origins of life; Eric Brown (research assistant for Paul Hammond) will speak in May on the Greenland mafic intrusion; Deron Carter (Linn-Benton Community College Geology Dept.) will speak in June on pluvial Lake Alvord; Paul Hammond will speak in September on the possible connection of the Western US to the Pacific Plate. Other possible topics include: wells and groundwater, coastal turbidites, Sandy river lahars, and South Sister inflation.

The board discussed speaker honoraria and providing speakers with an honorary membership for the remainder of the year and the following year.

Carol [maintains a spreadsheet of past speakers starting in 1998]. Our VP will need this list. The list might also be put on the public website.

Upcoming Field Trips/Events

Possibilities for John's President's Field Trip include: Lava Beds National Monument, with the option of some of the group going into the caves. Safety concerns were discussed. Equipment, such as headlamps, would be needed and members of the local caving associations might be invited also for the caving expertise. Another field trip possibility might be going to Southwestern Idaho/Northwest Nevada at the headwaters of one fork of Owyhee. Further possibilities include the Mt. Hood glacier caves or the City of Rocks in Idaho.

Bo and Larry are exploring a possible field trip to the Parkdale Lava flow with a guest speaker on glaciology. Sheila may plan a field trip to the Mollala River. Dave and Paul are passing on planning a field trip this year. The club really appreciates their efforts over the past several years.

Janet was exploring the prospect of a Canadian Rockies trip, but rooms have filled up fast for this year, so she may plan in few years out.

Old and New Business

Library committee: Larry and Bart report that the library committee has removed three boxes of fossil books from the library. Larry suggests giving them to NARG. He will swap for some geology books with NARG and then see if GSOC wants these books. Rosemary suggests reminding people of the existence of the library.

A lock box is needed for valuable books. John suggests using the COHA open source application to keep track of books. The committee will continue discussion.

Janet suggests using a listserv for meeting announcements. Rik and Paul were to research using Google docs and setting up a listserv, but this was tabled until the next meeting.

Rik's proposal of GSOC sponsorship at the Intel NW Science Expo was tabled until the next meeting.

Paul recommended that board members read *A Guide to Nonprofit Board Service in Oregon* which he passed out.

The next board meeting will be held Saturday, May 11th, 2013, 10:00 a.m. at Rosemary Kenney's house.

Notes compiled from board meeting minutes submitted by Paul Edison-Lahm, Secretary.

PACIFIC NORTHWEST TECTONIC MOTION: FROM TINY MEASUREMENTS TO THE **BIG** **PICTURE**

Synopsis of the Seventy-Eighth GSOC Annual Banquet lecture by Dr. Rob McCaffrey, geophysicist and research scientist with the Dept. of Geology at PSU by Carol Hasenberg

Dr. Rob McCaffrey, a geophysicist and research faculty member of Portland State University's Department of Geology, has interests in tectonic plate motions, crustal deformation, earthquakes, GPS and seismology. While on a sabbatical trip from Rensselaer Polytechnic Institute in 1995, his heart was captured by the Pacific Northwest. The His subsequent move west 15 years later west has meshed perfectly with his interest in measuring and analyzing the rates of motion of the earth's crust.

Before plunging the GSOC crowd into the thick of his research in plate tectonics, McCaffrey gave special thanks to the work done by Tony Qamar, a Washington state seismologist who was killed doing GPS field work but whose data provided the foundation for the long-term GPS database that McCaffrey and other earth scientists use today. He also gave thanks to his colleagues Suzette Payne from the Idaho National Laboratory and Robert King from MIT.

Since the late 1980's earth scientists have had the high precision GPS system for measuring movements in the earth's crust. McCaffrey explained how the 24-plus satellite system is used by the GPS receiver in your car to obtain your position accurately enough for you to drive about. The high precision GPS instruments used by

geophysicists are a bit more accurate. The measuring array uses antennae that determine the phase of the waves broadcast by multiple satellites, then process these in a complex program to correct errors so that the measurement accuracy is within 2mm. The analysis required for this method sacrifices the ability to obtain real-time observations at that level of accuracy, however.

Prior to this technological breakthrough, earth scientists had been trying to estimate the deformation of the earth's crust by measuring slippage caused by earthquakes, which proved to be very unreliable as it did not get the whole picture. In the last twenty-some years, measurements have been made of many points on the earth's crust using GPS and this information has given a much clearer picture of the processes of crustal plate movements. For his research in the northwestern section of the North American Plate, McCaffrey has obtained information about the rates of subduction, continental deformation, seismic hazards, and transient deformations.

In order to study local plate movement, a network of measuring stations must be developed and monitored. McCaffrey gets measurements from a network of about 1000 continuously monitored stations with permanent measurement arrays, and also takes periodic measurements on geodetic markers and unobtrusive bolts inset in rock in a number of locations. Taking these periodic field measurements can consume a lot of time, so he is always welcome to having volunteers for this duty. The movement data obtained is also being archived for future studies, because the longer the time span in the data, the more one can observe the long term trends.

McCaffrey showed an example graph from GPS data obtained on Vancouver Island which demonstrated a long term trend as well as episodic trends with a periodic correction, these episodes occurring over periods of a year or so. This phenomenon was an unexpected "slow slip" aseismic process that has been studied in the last few years. It is believed that this is a frictional process characteristic of the seismic boundary. The physics of the process is still under study.

The plate motion research process has been fairly well developed over the last couple of decades, and similar studies are being done in Japan and New Zealand. McCaffrey is using the data gathered in the Pacific Northwest to determine subduction rates, crustal deformation and strain, define plate sub-boundaries and the earthquake hazards they generate, and obtain an overall view of the deformation trends of the North American plate and its driving forces.

In determining all these motion trends, one must study a vast field of motion vectors generated by the field measurements. The motion trends must be decoupled mathematically to reveal crustal squeezing, stretching, and shearing, or strains in the fabric of the crust, as well as overall translation and rotation motions of the plates and sub-plates. This all sounds pretty complicated, but the overall trends can be picked out visually by viewing a slide of the motion vectors.

For the western section of the North American plate, two trends are very obvious to the eye. In the northern section, motion is dominated by rotation with the axis of rotation located in the northeastern corner of Oregon. In the southern section, straight-line motion is dominant towards the northwest. McCaffrey explained these overall motion trends with the following model: The Rocky Mountains are being pulled down by gravity. This mass of material moves westward since it is buttressed toward the east. Since the California plate boundary, a nearly vertical slip-strike fault, is much stronger in comparison to the weaker thrust fault in the Pacific NW, the mass is being squeezed out through the northwest. The rotation is likely caused by the thick "root" of the Idaho batholith acting as an anchor.

Because the Pacific Northwest is moving in rotation relative to the rest of the North American plate, its boundaries are sites of faulting and earthquakes. The boundaries include the Snake River Plain in Idaho, Yellowstone National Park, the Wasatch Front in Utah, and the Walker Lane fault zone northeast of the Sierra Nevada. This rotation has been fairly constant for at least the last 15 million

years, because the rates of rotation observed in the GPS measurements coincide with the rotation rates gleaned from studying the direction of magnetization in Columbia River Basalt formations. McCaffrey joked that the Pacific Northwest is actually seceding from the US, physically if not politically.

The big picture of motion is not the only thing gotten from the study of plate motion measurements. Geophysicists are working to build a kinematic block model of the Western US, which will help in developing future seismic hazard maps. A USGS seismic hazards map is due out in 2014 which will include this information. Strain models are also being developed for the Cascadia Subduction Zone plate boundary. By the pattern of strain they see on the surface, geophysicists can build another model of what the strain is like at depth in the locked zone. This has been corroborated by data from the Sumatra and Tohoku earthquakes, where similar models have been built. Changing assumptions about material properties can alter this type of model from a smoother continuum to a more patchy pattern.

GSOC would like to thank Dr. McCaffrey for a very knowledgeable glimpse into the work being done by geophysicists to understand our earth and prepare for its hazards.

DISCOVERING ORIGINS OF MULTICELLULAR LIFE

synopsis of GSOC Friday night lecture, April 12, 2013, "Perspectives on Earth's Earliest Life" by Dr. William Orr, professor emeritus, University of Oregon. The author has also filled in the details of some of the Hadean and Archean evolution with information that has been presented in the recent Nova program, "Australia's First Four Billion Years: Episode 1, Awakening" on OPB.

Dr. Orr began his informative lecture on the origins of multicellular life with a brief look at the origin of life on earth and concepts we have come to understand about life's origin. But to understand anything about the origins of life, you must first

have some basic understanding about how scientists find out how life originated on earth. The earth is about 4.5 billion years old, and it developed continents, oceanic crust, and an ocean of water early in its history. The continents, being composed of less dense rock than the oceanic crust, are thicker and ride higher on the earth's surface. The oceanic crust is thinner and denser than the continents. Oceanic crust is recycled "like newspaper" back into the molten core of the earth so the really old rocks remain on the original pieces of the continents. Therefore, any old fossils containing an early record of life on earth will have to be found in the rock on the oldest sections of the continents.

Scientists did not realize until the middle of the 20th century that the continents and oceanic crust are constantly in motion on the surface of the earth. This concept is referred to as "**plate tectonics**" or "continental drift" and probably most of you have heard about it by now. Although on a simplistic level the concept explains "sea floor spreading", the ramifications of the theory have influenced every aspect of the natural history of the earth. Scientists have examined fossil and other clues to piece together maps of the locations of the continents back through the last two "Wilson cycles", where continents in their movements drift apart and then come back together into supercontinents, or one big continental mass. Not only can they tell the relative positions of the continents with each other but also with the approximate latitudes they occupy.

Orr presented some correlations between earth's tectonic and **paleobiological** history in the lecture. Researchers have been comparing the plate tectonics record to that of species biodiversity and biomass as determined from fossil beds. There is a rough correlation in these biological indicators with periods of relative continental stability and continental breakup and reassembly. A large amount of species evolution occurs near a shoreline, so periods of continental breakup and reassembly tend to have the greatest biodiversity and biomass. The leanest times for biodiversity and biomass tend to be when supercontinents are assembled and relatively stable. Of course there are other factors at play, such as the chemical composition of the atmosphere.

The earliest known fossils date back to about 3.5 billion years, and are single-celled forms. Trace fossils go back to about 4 billion years. For a long time life existed as single-celled biota that lived individually or in mats or other groupings. Nevertheless, some profound changes to earth's environment occurred during this time, due to the influence of this biota. The first cells were formed in anaerobic conditions, i.e., without atmospheric oxygen. Scientists have been working on experiments to simulate or re-create the beginnings of life for quite a number of years now. It is actually quite easy to synthesize amino acids from the inorganic chemicals that existed in earth's early atmosphere, and this exercise, called the **Miller experiment**, was first done in 1953 by Stan Miller, a graduate student of Dr. Harold Urey of the University of Chicago. Orr and others have speculated that simple forms of life have been initiated many times and in many places throughout the universe. Orr joked that most of this life would resemble Precambrian biota rather than more complex forms (and here he showed the audience a picture of ALIEN).

During the long reign of single-celled biota, **cyanobacteria**, or "blue-green algae" developed (at least 2.7 billion years ago), which could perform photosynthesis and produce oxygen. Similar forms of these exist today in mat forms called stromatolites, found on the western shores of Australia in high salinity bays which discourage predators. These were successful because they could synthesize power directly from sunlight, and did not have to rely on volcanism to heat the water which contained it. They also produced an overabundance of oxygen, which first precipitated out the iron in the oceans, then converted atmospheric methane to carbon dioxide and oxygen. This poisoned most of the anaerobic forms and our atmosphere has contained a large percentage of oxygen ever since. Orr mentioned a couple of the research scientists who have contributed our knowledge to this part of the history of life on earth: Elso Barghoorn, who interpreted cyanobacterial fossils in Gunflint chert in the Lake Superior region found in 1953, about 2 billion years old, and William Schopf from UCLA, who has fleshed out

the paleobiological history from fossils back to about 3.5 billion years.

For many years scientists did not find evidence of multicellular forms of life until the beginning of the Cambrian Period of geologic time. Or life forms in general, for that matter. Orr remarked that the principal was a backwards take on the old adage "seeing is believing". Scientists tend not to see things that they are not looking for. Therefore in science, "**I wouldn't have seen it if I didn't believe it**" applies. This is true in the finding of Ediacaran fossils as well as tiny indicator fossils which we will cover a bit later. Trace fossils such as tracks made by worms were also ignored until the 1970's.

So now the fossil records show **metazoans**, or multicellular life forms, appearing about 600 million years ago. This is the Ediacaran biota, first discovered in Australia by Martin Glaessner, an oil micropaleontologist. Ediacaran forms were soft bodied, segmented, most were vagrant (i.e., travelled about), not sessile or sedentary. Adolph Seilacher was mentioned by Orr as being the paleontologist that interpreted most Ediacaran forms as having a hydro-skeleton, like a quilted membrane filled with seawater. Dickinsonia, of dinner plate dimensions, was a typical Ediacaran life form. Xenusion is the only one known with spines or other means of defense. As soft-bodied forms, Ediacaran life was quite edible, and thus they disappeared as soon as jaws were developed. Spriggina, an important Ediacaran find, sports a notochord and head-like area and is a transitional form to animals with brains. Holothurians, or sea cucumbers, as modern creatures resembling Ediacaran life, now have evolved chemical means of protecting themselves.

Orr had finally arrived at the **Cambrian Explosion** of life, which began about 540 million years ago, and he took a look at both large and small fossils which scientists are using to study life at this point. Fossils can be both taxial or parataxial, that is, they can represent the whole individual or a piece of that individual. This can confuse the picture quite a lot, and scientists have to be careful that they don't make limiting assumptions about a particular kind

of fossil until good examples are found. It is also important to find fossils which have recorded the soft tissue of the specimen. This underlines the importance of the Burgess Shale, a 530 million year old outcrop in the Canadian Rockies discovered by Charles Walcott in 1909. This was scientists' first good look at the soft tissues of Cambrian fauna. A population was preserved on soft shale showing very complex forms, arthropods of several types, Anomalocaris, who was a large predator, mollusk Hyolithids, which survived for 300 million years, and primitive vertebrate animals.

Trilobites characterize the Cambrian, and some species were used as **guide fossils** in piecing together fossil ages and continental drift positions. Olenellus is an American Cambrian guide fossil. Paradoxides was another trilobite found in Europe in the Cambrian and much bigger than Olenellus. These trilobites were useful in some circumstances (such as continental drift assemblages), but for being a guide fossil they had some strikes against them. They were facies fossils, that is, they preserved well in shales and limestones but not in sandstones. They were provincial, not cosmopolitan, in their distribution. They were also hard to identify from fragments.

So scientists have turned more and more to tiny, ubiquitous, hard mineralized fauna to use as guide fossils. Better guide fossils for the Cambrian are the oldest shelled metazoans, **Tommotian microfossils**. They are very tiny, but much better than trilobites. They are now being used by researchers analyzing stratigraphy for relative dating. Their shells are made of aragonite and calcite. They come in many shapes -tubes, horns, clams, snails, spaceship-looking spikes, ridged scales- which are characteristic of their era.

Radiolarian microfossils are also now commonly used in dating stratigraphy. These protozoa contain opaline skeletons in a variety of characteristic shapes for particular eras of time. They are present in seawater as zooplankton and so are found in all oceanic sediments from Cambrian time forward. Orr showed the audience pictures of a particular species group that he uses in classifying strata from

10 million years to the present, and how this population has evolved in shape over that time.

Which brings us to the penultimate topic that Orr covered, that of **transitional species**. Scientists like to neatly classify types of organisms into certain groups, but all life on earth has evolved from one form to another throughout its history. Just looking at chordates, there have been fish that evolved into amphibians, who evolved into reptiles and mammals, dinosaurs, and birds. Some species along this evolutionary path represent transitional forms between these classifications, say therapsid reptiles that have mammal-like characteristics such as dental specialization. Likewise there are mammals such as opossums that retain some reptile-like qualities. There are examples like these throughout the fossil record as well as living specimens.

Orr's lecture ended at the place where most life forms have begun, the **continental margins**. Most oceanic species evolve on or near the beach, and as time passes they are displaced farther and farther offshore down the continental shelf. When they reach the continental shelf, they die out completely. This concept ties us back to the plate tectonic biodiversity model explored at the beginning of the article, and why the breakup or reassemblage of continents, which produces a lot of shallow water is so important to the evolution of life on earth. It is a long, slow dance between earth's geology and its life.

ADDITIONAL READING

University of California Museum of Paleontology:
<http://www.ucmp.berkeley.edu/index.php> and subpages
The Geologic Time Scale
<http://www.ucmp.berkeley.edu/help/timeform.php>
and The Tommotian Age
<http://www.ucmp.berkeley.edu/cambrian/tommotian.html>

Wikipedia: Cambrian Explosion:
http://en.wikipedia.org/wiki/Cambrian_explosion
contains many of the concepts from the lecture, with links to many others.

Wikipedia: Small Shelly Fauna:
http://en.wikipedia.org/wiki/Small_shelly_fauna has
some pictures of Tommotian fauna

Wikipedia: Burgess Shale:
http://en.wikipedia.org/wiki/Burgess_Shale

Wikipedia: Gunflint Chert:
http://en.wikipedia.org/wiki/Gunflint_chert

Wikipedia: Radiolaria:
<http://en.wikipedia.org/wiki/Radiolaria>

Paleomap Project: <http://www.scotese.com/>
Wikipedia: Plate Tectonics:
http://en.wikipedia.org/wiki/Plate_Tectonics

The Wilson Cycle, part of the Department of
Geology and Environmental Science, James

Madison University, Geologic Web Sites:
<http://csmres.jmu.edu/geollab/fichter/Wilson/Wilson.html>

Some additional background info from the Hadean,
Archean, and Proterozoic Eons can be gleaned from
these Wikipedia pages:

Wikipedia: The Great Oxygenation Event:
http://en.wikipedia.org/wiki/Oxygen_catastrophe

Wikipedia: Snowball Earth:
http://en.wikipedia.org/wiki/Snowball_Earth

Missed the NOVA “Australia’s First Four Billion
Years: Episode 1, Awakening” show? Watch the
video at <http://video.pbs.org/video/2364992087/>

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY ACTIVITIES:

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

FIELD TRIPS: About 4 per year. Fees: see field trip announcements on the calendar next page.

GSOC LIBRARY: Rm. 69, Cramer Hall, Portland State University. Open 7:00 p.m. prior to meetings.

PROGRAMS: Second Friday evening most months, 7:30 p.m., Rm. S17, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon.

MEMBERSHIP: Per year from January 1: Individual--\$25, Family--\$35, Junior (under 18)/Student--\$15. Membership applications are available on the website www.gsoc.org.

PUBLICATIONS: **THE GEOLOGICAL NEWSLETTER** (ISSN 0270 5451), published bimonthly and mailed to each member. Subscriptions available to libraries and organizations only at \$20.00 per year. Single Copies are available at \$2.00 each. 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.

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 \$25.00 _____ Family \$35.00 _____ Student \$15.00 _____

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



THE GEOLOGICAL NEWSLETTER

"NEWS OF THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY"

VOLUME 79, NUMBER 4
JULY/AUGUST 2013

The Geological Society of the Oregon Country

P.O. Box 907, Portland, OR 97207-0907

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VISITORS WELCOME AT ALL MEETINGS

CALENDAR

JULY/AUGUST ACTIVITIES

There will be no GSOC Friday night meeting in July.

GSOC Field Trip, "Fluvial Features and Basalt of the Molalla River," Friday, July 19, 2013.

GSOC Vice President Sheila Alfsen and Past President Jane Walpole are planning a half-day trip to the Molalla River Corridor, upstream from the town of Molalla in the Western Cascades. This stretch of the river is being considered in Congress for a Wild and Scenic status, and it certainly deserves the moniker. Columbia River Basalts and other lava flows intermingle with fluvial features of the river. A trip through the Corridor is trip back through time; a glimpse of Oregon's ancient history as displayed in the rocks, and its present condition due to the erosive power of the river.

We will meet at 10:00 a.m. at the Molalla High School parking lot. For questions, details, and registration, contact Jane 503/590-7501 (or email antjane@aol.com). Participants need to be prepared to pay the fee and sign the liability waiver at the meeting area. GSOC fee for the trip will be \$10. Participants will be responsible for providing their own transportation and bag lunch. Participation will be limited to 18 people and 5 vehicles, so contact Jane to reserve your name on the list of participants. Registration will be done onsite at the meeting area. Jane can also help facilitate carpooling. Each participant must be a GSOC member or guest of a member. A nonmember may register for membership at the meeting area. The membership registration form is included in this newsletter. Since there aren't any picnic tables along the route, you are encouraged to bring your own chairs for lunch. Last minute announcements will be found on the calendar page of the GSOC website, www.gsoc.org.

Minors must be accompanied by a responsible adult GSOC member, parent or legal guardian. A letter from his or her parent or legal guardian giving permission for a minor to participate in the field trip with a designated person must be submitted at the registration. Each participant must also fill out and sign a liability waiver at the meeting area in order to participate. Minor participants must also have the signature of a parent or legal guardian on the GSOC liability waiver.

NOTE: You must be a GSOC member or guest of a member to attend GSOC field trips. You may join GSOC at any time, for \$25.

GSOC Annual Picnic, Sunday, August 4, 2013:

This year's annual picnic will be held at [Guy W. Talbot State Park](#), which is located west of Bridal Veil State Park and east of Vista House on the Historic Columbia River Highway in the Columbia River Gorge. At this year's annual picnic, we plan to gather at the shelter in the park at noon. Take the Bridal Veil #28 exit off east-bound I-84, and go west on the Historic Columbia River Highway about 2 miles to the park.

GSOC will supply the paper plates, napkins, paper cups, and utensils. The format for the picnic will be a potluck meal. Attendees bring their own beverages. If your last name begins with A through G bring a side dish or salad; H through P bring a dessert; Q through Z bring a main dish.

After the picnic the participants may wish to take the short walk to Latourell Falls, or drive to the trailhead near the freeway exit and hike up to Angel's Rest. Participants are encouraged to look for last-minute announcements on the calendar page of the GSOC website, www.gsoc.org.

Friday evening talk, August 16, 2013, at 7:30 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University. Speaker Dr. Andrew Fountain, Portland State University Department of Geology, will present "A Primer on Eliot Glacier."

This talk will help acquaint those interested in the Eliot Glacier field trip with Oregon's largest ice stream, located on Mt. Hood. The talk is open to the public, not just the field trip participants.

Join GSOC members at **Pizzicato Pizza, 1708 SW 6th Ave.**, at **6:00 p.m.** before the lectures for an informal dinner and conversation.

Free parking is available at Portland State University **Friday** nights after 5 p.m. in Parking Structure 2 on Broadway Ave. directly across from Cramer Hall and on level one of Parking Structure 1, bounded by Broadway and 6th Aves. and Harrison and Hall Streets.

GSOC Field Trip, "Eliot Glacier/Parkdale Lava Flow," August 17-18, 2013.

GSOC Past President Larry Purchase, Director Bo Nonn, and Past President Rik Smoody are planning a trip to Eliot Glacier and Parkdale Lava Field on August 17 and 18. For questions, details, and registration, contact Larry at 360-254-5635 (or email lkpurchase@q.com). Deadline for registration is August 12, 2013. The description flyer and registration form for the trip are attached to the end of this edition of *The Geological Newsletter*, and are also currently available on the website, www.gsoc.org. Cost of the trip is \$25 or \$40, depending on how many days you wish to participate, and participation for Day 2 (the hike to Eliot Glacier) will be limited to the first 22 GSOC members and their guests who have paid for the trip.

NOTE: You must be a GSOC member or guest of a member to attend GSOC field trips. You may join GSOC at any time, for \$25.

FUTURE ACTIVITIES

Check the GSOC website (www.gsoc.org) for updates to the calendar.

BOARD MEETING NOTES

May 11, 2013

The meeting was called to order at the home of Rosemary Kenney. Board members in attendance were John Piccininni, Sheila Alfsen, Dawn Juliano, Paul Edison-Lahm, Julia Lanning, Janet Rasmussen, and Jane Walpole. Quorum was present. Also in attendance were GSOC members Bev Vogt, Richard Bartels, Dave Olcott, and Jan Kem. Delicious cake was served in honor of Rosemary's birthday. The minutes of the March 13th, 2013, board meeting were approved.

Treasurer's Report: The Treasurer's oral report was approved.

Events

Annual Banquet (recap): Dawn reports that there was a small net income on this year's banquet. One of the comments about the banquet was that the vegetarian entrees were poorly prepared. The board referred this to the banquet committee to investigate either working further with the Monarch Hotel staff or investigating other venue options (tabled for committee until Fall).

Upcoming Speakers: (Sheila) Larry would like Andrew Fountain to give a talk prior to Larry and Bo's Parkdale Lava Flow/Elliott Glacier trip. Sheila will arrange this for a Friday meeting the second Friday in July [*editor's note- this talk has been rescheduled for August*]. Paul Hammond will speak on the North American and Pacific Plates in September. October and November are still open.

Room keys need to be transferred to Sheila. Sheila will investigate room options with the university when greater attendance is expected. Julia will investigate getting the necessary computer, cords, and adapters to ensure that we have AV backup for speakers. A motion was made to inventory all keys and an inventory sheet was passed around.

Annual Picnic: The Picnic Committee (Dawn, Jane and Carol) will investigate finding a venue and date. The committee was given full authority by the board to arrange all necessary details.

Upcoming Field Trips

President's Field Trip: (John) Destination and date TBA.

Caldera Trip: (Bev & Bart) Trip is full and everything handled!

Parkdale Lava Flow: Responding to emails from Larry and Carol, the board suggested that the charge for the trip be at least \$10/day plus printing costs. Janet will follow up with Larry concerning costs and liability issues.

Molalla River: (Sheila) Friday, July 19th, 2013 was chosen as the date for Sheila's trip.

John noted that Bo has donated two scanners and that he (John) may be using these to digitize old GSOC photos and newsletters.

Old and New Business

Newsletter: Jan reports that 206 newsletters were mailed out last week, of which 38 were stamped with a notice of expired membership.

The board approved the motion that the emcee of the annual banquet be automatically given an honorary membership.

Library committee: (Bart) No report from the committee. John raised the issue of cataloguing software and this was left to the committee for further investigation.

Listserv & Google Drive committee: (Rik, Paul, and Dawn) Paul argued that the need is growing for a listserv for event notifications and other member communication, but apologized for stalling out on this project. Dawn has joined the committee and will do some additional research.

GSOC sponsorship at Intel NW Science Expo (Rik): This was tabled until the board can discuss with Rik present.

Holiday Party: Janet announced that because of tightening rules that the community center she suggested is not available after all as a venue for the holiday party.

Membership cards/nametags: Because Pizzacato is now offering a discount on meals for GSOC members at the Friday meetings, Janet had the idea of making nametags/member cards for this and other events. She will beta-test the idea of printed nametags at the next Friday meeting.

Next board meeting: July 13th, 2013, 10:00 a.m. at Rosemary's house.

Notes compiled from board meeting minutes submitted by Paul Edison-Lahm, Secretary.

A TRAIL OF TWO CALDERAS

One participant's take on the GSOC field trip, May 18 and 19, 2013

by Carol Hasenberg

It all began with water in Central Oregon. One location was the best place to find ground water; another, the worst place to find it. Bend and its northern neighbors along the Deschutes River had abundance; nearby Prineville along the Crooked River had scarcity. And so DOGAMI geologists were charged with the task of finding out why. Their work led them to discover massive volcanic calderas that were sources for much of two of the most abundant Tertiary volcanic formations in eastern Oregon.

Two calderas from two distinctly different tectonic settings. A massive caldera just a shade smaller than Yellowstone and probably produced by the same hotspot plume, as evidenced by the magma geochemistry as well as the trace of volcanics over the landscape to the present-day Yellowstone. A smaller caldera to the northeast produced by subduction arc melting before and during the docking of the Siletzia terrane along the western margin of the Pacific Northwest, and about 10 million years older than its larger neighbor. The massive, younger Crooked River Caldera contains the town of Prineville and wide, sweeping countryside. Smaller, older Wildcat Mountain Caldera to the northeast is more rugged and accessible through a sparse network of Forest Service byways.

The GSOC trip to explore the two calderas was planned by Past Presidents Beverly Vogt and Richard Bartels to visit most of the stops published in the 2009 Oregon Geology field trip guides by McClaughry, Ferns, Gordon, and Patridge. As is usual with a trip planned by Bev and Bart, mileages were logged, maps made, and a detailed field trip guide was produced.

Since the group was studying volcanic calderas on this trip, Bart reviewed some key concepts about eruptions of this sort the night before the trip began. These volcanoes contained rhyolitic magma, which

is viscous and tends to erupt explosively. A caldera eruption is a cataclysmic event which produces a cloud of ash which drifts on the wind and rains down, and also pyroclastic flows which settle and weld into glassy tuff. A massive amount of tuff was produced in the caldera eruption of the Crooked River Caldera, it is estimated to exceed 580 cubic kilometers. Some of the tuff produced by the eruption falls back into the caldera and that is referred to as the intracaldera tuff, and the material that is deposited outside the boundary of the caldera is the outflow facies. The field trip stops were designed so that both of these could be observed.

Some other interesting things are also going on at the edges of the calderas. In the Crooked River Caldera edges, blocks of pre-caldera stratigraphy have tilted and fallen toward the caldera during the main caldera eruption. After the main eruption, both calderas experienced resurgent eruptions fed through the faults at their margins.

Day 1 of the trip the group explored the Crooked River Caldera, which stretches from Smith Rock and Gray Butte in the northwest to the Prineville Reservoir in the southeast. The main caldera eruption 29.55 million years ago produced the Tuff of Smith Rock, which is 1000 feet thick within the caldera. The first stop of the day featured the outflow facies of the Tuff of Smith Rock. From the repeated patterns of sediment, ash-fall deposits, and ash-flow tuff in the sequence it is clear that the caldera eruption was not a single event but several events relatively close in time. At the second stop at Peter Skene Ogden State Park, pre-caldera stratigraphy on nearby buttes dipped towards the caldera and dammed a thick sequence of Tuff of Smith Rock.

The group then proceeded to Smith Rock State Park, and contemplated the thick intracaldera tuff there while lunching. Next the caravan climbed up onto Grizzly Mountain, a ring fracture rhyolite dome which erupted long after the main caldera. Most of the Crooked River Caldera can be viewed from this high point. The easternmost portion of the caldera was then viewed from Ochoco Wayside State Park on a bluff above the town of Prineville. Lastly the group went southeast from Prineville to

the boat ramp of Prineville Reservoir, to observe the stratigraphy at the southeast caldera edge and the outflow facies of Tuff of Smith Rock beyond.

As the day went along field trip co-leaders Bev and Bart also explained that the Crooked River Caldera was one of the sources for the late Eocene to Oligocene John Day Formation, and prior to the discovery of the caldera, no sources had been known for this formation. The formation and thickness of the tuff at Smith Rock had also long been a puzzle to geologists, and that had also been explained by the caldera. The dense and glassy ash flow tuff also explained why groundwater was difficult to find around Prineville. Bart included a chart of the stratigraphy of the John Day Formation in the field guide and explained which units in the chart corresponded to the ash flows and other features observed by the group. Unit A, the oldest unit of the John Day Formation, is the outflow facies of the older Wildcat Mountain Caldera, and Unit G is the Tuff of Smith Rock.

Day 2 was dedicated to exploring Wildcat Mountain Caldera to the north and east of Prineville. the caravan headed past the Ochoco Reservoir to the east of Prineville, then north in the Mill Creek Valley to the caldera. At the first stop the group observed a dacite dike cutting through a brecciated mass of precaldera andesite. Nearby Mahogany

Butte is the product of post-caldera rhyolite flows from feeder dikes which trend toward the northeast. Up the road a bit from stop one the group stopped briefly at a flow-foliated rhyolite mass which marks the edge of the caldera. Shortly afterward Steins Pillar came onto view, and the GSOCers stopped to admire this remnant of the main caldera eruption. The Tuff of Steins Pillar has not been dated, but bracketing stratigraphy indicates that it is about 40 million years old. This date and the geochemistry of the magma indicates that this caldera was one of the later sources for the Clarno Formation, formed by the melting of the subducting Farallon Plate.

One reason that the terrain in Wildcat Mountain Caldera is so rugged is that a post-caldera eruption of rhyolite created a plateau of rhyolite in the northern portion, and then Mill Creek eroded the plateau to its present condition. The caravan climbed the north rim of the caldera to the last stop of the day at Hash Rock. The Rhyolite of Hash Rock created the plateau, which can be seen at this viewpoint, as well as its source conduit in the distance, Twin Pillars. After admiring the view and observing the interesting flow-banded rhyolite in the outcrop, the tour was over and the group left for home. I am sure all the participants thought that this field trip was a far, far better thing to do than any of them could have done elsewhere. Thanks to Bev and Bart for making it memorable.



GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

ELIOT GLACIER/PARKDALE LAVA FLOW FIELD TRIP
AUGUST 17 AND 18, 2013

Past Presidents Larry Purchase and Rik Smoody, plus Director Bo Nonn, will lead a field trip to the Cloud Cap area on Mt. Hood to access the Parkdale Lava Field and Eliot Glacier. Eliot Glacier, Oregon's largest ice stream, feeds the Parkdale Lava Flow below it, which in turn feeds a residential water supply field. The trip will be organized in two-parts. Day 1, Saturday, August 17, guest speaker **Dr. Cynthia Gardner**, USGS, geologist and volcanologist, will accompany the group to view various portions of the Parkdale Lava Flow. Day 2, Sunday, August 18, guest leader **Dr. Andrew Fountain**, glacier specialist at PSU Department of Geology, and Bo Nonn, an experienced Mazama climber and leader, will take two groups up to Eliot Glacier where Dr. Fountain will interpret the glacier and its crevasses. The two hiking groups for Day 2 will be limited in number to eleven participants plus the leader for each, because of NFS Wilderness Area rules for the Mt. Hood Wilderness area ([wilderness rules link](#)).

Day 1: The trip will start Saturday morning at 9 a.m. at the Kinnickinnik Campground on Laurance Lake north of Mt. Hood. To get there from Portland, take I-84 to Hood River, go south on Oregon 35 to Parkdale, take spur road into the town of Parkdale, at the center of town head south on Clear Creek Road for 2-1/2 miles, then take a right on Laurance Lake Road (NF 2810) to the Kinnickinnik Campground on Laurance Lake. Activities will include driving to and hiking on portions of the Parkdale Lava Flow. Participants are responsible for all transportation, parking/access fees and meals on the trip. Participants wanting to camp overnight can do so at the [Kinnickinnik Campground](#), or [Tilly Jane Camp Site](#) or [Cloud Cap Saddle Camp Site](#). Campers are responsible for making all camping arrangements and fees. **GSOC trip fee for Day 1 only will be \$25.**

Day 2: The hike up to Eliot glacier will set off from the parking lot at Cloud Cap Inn promptly at 9:00 a.m. To get there, take Oregon 35 south from Hood River (or north from Hwy 26 if you're driving from Sandy, Oregon) to the Cooper Spur Ski Area exit (several miles south of Parkdale), go about 1 mile to the Cooper Spur Ski Area, then take Cloud Cap Inn Road (NF- 3512) about 10 miles to historic Cloud Cap Inn. The road is a real doozy so make sure your vehicle is high clearance and four wheel drive. Participants are responsible for all transportation, parking/access fees and meals. Participants should also have a walking stick or sticks, sturdy ankle-supporting boots, warm clothes, and plan to pack a lunch. The hike up to the glacier will be strenuous, and participants will not be allowed to wander from the group on side trips. **GSOC trip fee for Day 2 only will be \$25.**

GSOC trip fee for both days will be \$40. Participation for Day 2 will be limited to the first 22 GSOC members and their guests who have paid for the trip. If you have questions contact Larry Purchase at 360-254-5635 (or email lkpurchase@q.com). If the weather forecast for the weekend looks bad, the trip may be postponed until the following weekend. Announcements will be made on the GSOC website, www.gsoc.org, so please review the website prior to the trip date.

Trip Participation Policies: If you plan on participating in this trip, send in your registration form (attached to this newsletter) and appropriate fee by Monday, August 12, 2013. **Each participant must be a GSOC member or guest and should have a separate registration form.** A non-member may register only if he/she includes a membership application form and payment with the registration form and fee.

Minors must be accompanied by a responsible adult parent or legal guardian who is also a member of GSOC. No minors under 16 years of age will be allowed to register for Day 2. Each participant must also fill out and sign a liability waiver at the meeting place in order to participate. Minor participants must also have the signature of a parent or legal guardian on the liability waiver.

REGISTRATION/MEDICAL INFORMATION FORM
Eliot Glacier/Parkdale Lava Flow Field Trip – August 17 and 18, 2013

NOTE: Fill out one registration and medical information form for each participant. This application must be accompanied by a membership application and payment if you are not a member or guest of a participating member. The membership application form is located in *The Geological Newsletter* or at www.gsoc.org/membership.html.

REGISTRATION

Participant name _____ Minor (circle one): Yes or No

If participant is not a GSOC member, name of GSOC sponsor _____

If participant is a minor, age of participant _____

Address of participant _____

City _____ State _____ Zip _____ - _____

Phone (____) _____ - _____ Cell Phone (____) _____ - _____ Email address _____

Participating in (circle one) **Day1 only Fee \$25** **Day 2 only Fee \$25** **Both days Fee \$40**

Fee: circle appropriate fee above, includes printed materials. All other costs are responsibility of the participants. Send this form and payment to:
GSOC, PO Box 907, Portland, OR 97207-0907, by **August 12, 2013**.

MEDICAL INFORMATION

Name of physician: _____ telephone number: _____

Allergies: _____

Medications (attach list if necessary): _____

Special medical conditions: _____

In case of an emergency call: _____



THE GEOLOGICAL NEWSLETTER

"NEWS OF THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY"

VOLUME 79, NUMBER 5
SEPTEMBER/OCTOBER 2013

The Geological Society of the Oregon Country

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VISITORS WELCOME AT ALL MEETINGS

CALENDAR

SEPTEMBER/OCTOBER ACTIVITIES

Friday evening talk, September 13, 2013, at 7:30 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University. Speaker Sheila Alfsen, MAT, GIT, Oregon Community College Instructor and Consultant will present "The 1980 Eruption of Mt. St. Helens."

Besides being the Vice President of GSOC, Sheila Alfsen is a community college instructor and course developer who teaches both face-to-face and online courses in geology. In addition, she is working towards geologic registration in Oregon and has worked as a consultant for various construction projects in the western United States.

Join GSOC members at **Pizzicato Pizza, 1708 SW 6th Ave.**, at **6:00 p.m.** before the lectures for an informal dinner and conversation.

Free parking is available at Portland State University **Friday** nights after 5 p.m. in Parking Structure 2 on Broadway Ave. directly across from Cramer Hall and on level one of Parking Structure 1, bounded by Broadway and 6th Aves. and Harrison and Hall Streets.

Friday evening talk, October 11, 2013, at 7:30 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University. Speaker Dr. Vicki McConnell, Oregon State Geologist, will present "Everything You Always Wanted To Know About State Geologic Surveys."

Dr. McConnell will give an overview of the state of State Geologic Surveys across the country. She will also give an update on the recent programs, projects and accomplishments at DOGAMI. What are the successes

for DOGAMI? And where are the challenges? What is next?

Dr. McConnell's geologic career spans three decades of study of volcanoes and volcanic hazards. From her first helicopter landing on the dome of Mt. St. Helen's in 1983 she has been fascinated by the power of geologic processes and how humans respond to those processes. Dr. McConnell received her Ph.D. from the University of Alaska Fairbanks where her studies took her to the Aleutian Islands and Long Valley Caldera in California.

FUTURE ACTIVITIES

GSOC 5th Annual Holiday Party – Planned for Friday, December 13, 2013. The party will be held in lieu of the December Friday night meeting and attendance will be limited to GSOC members and their guests. The location is tentatively scheduled at the Simon Benson House on the Portland State University campus. The program will include slide shows of this year's field trips, food dishes-to-share as provided by the attending members, and music. Donations to help cover the venue rental are being accepted by GSOC Treasurer Dawn Juliano. More details will be posted in the Nov/Dec issue of *The Geological Newsletter* and on the GSOC website.

Check the GSOC website (www.gsoc.org) for updates to the calendar.

BOARD MEETING NOTES

July 13, 2013

The meeting was called to order at the home of Rosemary Kenney. Board members in attendance were John Piccininni, Dawn Juliano, Paul Edison-Lahm, Janet Rasmussen, Bo Nonn, and Rik Smoody. Quorum was present. Also in attendance were GSOC members Larry Purchase, Dave Olcott, Jan Kem, and Tara Schoffstall. The minutes of the May 11th, 2013, board meeting were approved with minor correction.

Treasurer's Report: The Treasurer's report was approved with a minor correction to the current date.

Events

Upcoming Speakers: (from Sheila's email) Vicki McConnell will speak on news items from DOGAMI including LIDAR in October.

Nametags: Janet has produced prototype member nametags that can be worn on a lanyard or kept in a wallet. The cost for making them for all members would be 5 to 10 cents each, although members would need to provide their own lanyards. Janet is investigating whether Pizzacato will give a discount to members who show a GSOC nametag. The motion to have Janet make nametags was approved.

Cables, computers, and adapters: This discussion was tabled until Julia is present at the next meeting.

Annual Picnic: John has paid the \$50 reservation fee for August 4th at Guy Talbot Park. Instructions for what to bring are in the last newsletter and directions are on the website. The picnic will start at noon, but there will be no board meeting this year.

Upcoming Field Trips

The *President's Field Trip* will be merged with the *Boring Lava* field trip below.

Mt. Hood/Parkdale Lava Flow field trip is cancelled due to the danger of trees falling on the road. Rik will organize a work party to hike up and investigate whether this field trip can be done next year.

Larry suggests instead that a one-day *Boring Lava* field trip be planned for Saturday, August 17th beginning at Rocky Butte and ending in Oregon City. A \$10 fee was suggested. Andrew Fountain may still be able to give his lecture on glaciers Friday, August 16th.

Molalla River: (from emails from Jane and Sheila) Jane reports that thirteen people have signed up. Sheila will keep registration open until full. There will be a \$10 fee.

Old and New Business

Library committee: Larry and Bart will report next time.

Electronic Mailing List & Documents committee: (Rik, Paul, and Dawn)

Various Listserv-type electronic mailing lists were discussed, however the committee still needs additional information. Paul will get more info from Larry, Bo and Tara about other mailing lists. Rik will draft an explanation on how the List Serve works, but the board may still vote down the whole List Serve idea.

GSOC sponsorship at Intel NW Science Expo (Rik): This is now moot, since the Expo was back in February.

Newsletter scanning: Jan has boxes of newsletters back to 1935. Tara plans to start scanning them using the scanners donated by Bo and his hard drive. Larry will bring Bo's scanner for Tara's use.

Next board meeting: Sept. 14th, 2013, 10:00 a.m. at Paul's house.

Notes compiled from board meeting minutes submitted by Paul Edison-Lahm, Secretary.



THE GEOLOGICAL NEWSLETTER

"NEWS OF THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY"

VOLUME 79, NUMBER 6
NOVEMBER/DECEMBER 2013

The Geological Society of the Oregon Country

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www.gsoc.org

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VISITORS WELCOME AT ALL MEETINGS

CALENDAR

NOVEMBER/DECEMBER ACTIVITIES

Friday evening talk, November 8, 2013, at 7:30 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University. Speaker Dr. William Orr, Paleontologist and Director of the Condon Collection, University of Oregon, will present "After 150 Years, Conodonts Solved."

Conodont microfossils were first described in 1830, and soon became indispensable tools for dating Paleozoic rocks. Whether these fossils originated from a snail, squid, worm, or fish, however, remained a mystery until quite recently. Our speaker will relate a series of discoveries that eventually led to a carbon impression of

the creature. For more, please click on the link to this talk for a poster with more information.

Join GSOC members at **Pizzicato Pizza, 1708 SW 6th Ave.**, at **6:00 p.m.** before the lectures for an informal dinner and conversation.

Free parking is available at Portland State University **Friday** nights after 5 p.m. in Parking Structure 2 on Broadway Ave. directly across from Cramer Hall and on level one of Parking Structure 1, bounded by Broadway and 6th Aves. and Harrison and Hall Streets.

GSOC 5th Annual Holiday Party – GSOC Members and their guests are invited to the 5th GSOC Annual Holiday Party and field trip slideshow, Friday December 13th, 2013 at 2211 NW Front Avenue. GSOC Board Members will provide main dishes with protein of various sorts. Other members please bring vegetable, side dishes or desserts for 6 to share. Those interested in bringing drinks or table ware please contact Jan Kem,

Beverly Vogt, Richard Bartels or Julia Lanning. Music will be organized by Dawn Juliano.

Schedule of Christmas Party activities:

- 5:30 pm: Set-up
- 6:30 pm: Dinner buffet
- 7:15 pm: Welcome presentation
- 7:30 pm: Nominations for GSOC Board members for the 2013-2014 year will be open, followed by "Year in Review" program.
- This year's GSOC field trip leaders will present brief slide show summaries of their trips.
 - Bart Bartels and Bev Vogt, "A Tale of Two Calderas," May 18-19, 2013.
 - Sheila Alfsen and Jane Walpole: "Fluvial Features and Basalt of the Molalla River" July 19, 2013.
 - John Piccininni, Larry Purchase and Bo Nonn: "Boring Lava" August 18, 2013.
- 8:30 pm: Dessert and musical entertainment
- 9:30 pm: Clean-up

Donations will be accepted for party supplies. Send donations to Dawn Juliano at the GSOC mailing address or give them to her in person at the event.

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

If you would like to come but are not yet a member of GSOC, you may join now and receive membership benefits throughout 2013.

FUTURE ACTIVITIES

Friday evening talk, January 10, 2014, at 7:30 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University. Speaker Tom Pierson, a hydrologist with Cascade Volcano Observatory, will present a talk about the Lascar Volcano in Chile. Details to follow.

Friday evening talk, February 14, 2014, at 7:30 p.m., in Room S17, Cramer Hall, 1721 SW Broadway Ave. (between Montgomery and Mill Sts.), Portland State University. Speaker Dr. Stephen Taylor, Western Oregon University Professor of Geology, will present "Morphology and Spatial Distribution of Cinder Cones at Newberry Volcano, Oregon: Implications for Relative Ages and Structural Control on Eruptive Processes."

Newberry Volcano in Central Oregon is associated with over 350 basaltic cinder cones, located in a complex,

extensional tectonic setting. Digital mapping of cinder cones and spatial analyses of vents were used to learn more about the eruptive history of this fascinating area. Click on [this link](#) for a poster with more information. The project website is available from [this link](#).

Check the GSOC website (www.gsoc.org) for updates to the calendar.

BOARD MEETING NOTES

September 14, 2013

The meeting was called to order at the home of Paul Edison-Lahm. Board members in attendance were John Piccininni, Sheila Alfsen, Dawn Juliano, Paul, Julia Lanning, Janet Rasmussen, Bo Nonn, and Jane Walpole. Quorum was present. Also in attendance were GSOC members Larry Purchase, Jan Kem, Carol Hasenberg, and Doug Rasmussen. The minutes of the July 13th, 2013, board meeting were approved.

Treasurer's Report:

The Treasurer's report was approved.

Events

The Holiday Party is planned for December 13th, however the Benson House is booked. Dawn will get us on the waiting list in case there is a cancellation and will also look into other venues such as churches, restaurants, and office spaces. This committee will include Carol (chair), Dawn, Julia, Bart, and Bev.

Upcoming Speakers (Sheila): Scheduled speakers and topics are: *October* — Vicki McConnell (DOGAMI) LIDAR; *November* — Steve Taylor, Newberry Volcano cinder cones; *January* — Jon Major (USGS) Chaitén volcano lahar mitigation. Posters for the Friday night speakers are now linked on the GSOC website. Sheila is still looking for a speaker for February and John is looking for a speaker for the March banquet.

Cables, computers, and adapters: Julia will investigate our cabling needs and report back.

Annual Picnic recap: The Latourelle Falls/Guy Talbot State Park location was acclaimed as best

picnic site ever with easy access to hiking and other picnic amenities. A total of \$55 was collected to cover costs of \$58.

Field Trips recaps:

Molalla River: Participants enjoyed good weather and the nice pace of the trip. Bringing lawn chairs was a good idea.

Boring Lavas/President's Field Trip: Larry has extra copies of the field trip guides which could be sold at the banquet.

Old and New Business

The Nominating committee was appointed composed of John, Janet, and Jane.

PSU Computer Access: a backup account is needed when Sheila, who is an adjunct professor, is not available. [See discussion of building security below.] Sponsored accounts are no longer available because of PSU's concerns about security. Also, for backup purposes, the projector could be kept in the locked cabinet in the library.

Newsletters: Jan mailed out 200 newsletters to members, 28 of whom had not paid. He also brought in three boxes of newsletters from 1935 to the present for scanning. Carol will take the 1935 volume for scanning and the remaining volumes will be stored temporarily with Paul.

The board approved a motion that, beginning in 2014, board meetings revert to even months of the year so as to coordinate with the timing of the newsletter (so the first board meeting of 2014 will be in February).

Library committee: Larry brought several volumes of biography and photos of past GSOC presidents. There was interest in eventually scanning the photos and perhaps producing a booklet.

Electronic Mailing List and Documents committee: the board approved use of a simple "bcc" email list for occasional distribution of GSOC announcements, newsletters, and dues reminders. Paul will maintain the list. Members can be asked to update their emails at Friday meetings. The board also approved putting the master membership list (which contains the most current emails) on Google

Drive with secure access to appropriate board members and officers.

PSU Building Security: PSU has been locking down Cramer Hall at 6:00 p.m. on Fridays because of security concerns. Sheila will investigate getting an access card as an adjunct faculty member for building access and computer access [see above] and will also investigate whether there are other ways that GSOC can get access to the building. For Friday meetings, security will need to be contacted and we need to be on the list maintained by Nancy in the Geology Dept. We will also need to have both a doorman to let people in and a sign on the door with a phone number for late arrivals.

The next board meeting will be Nov. 9th, 2013, 10:00 a.m. at Rosemary's house (pending approval by Rosemary).

Notes compiled from board meeting minutes submitted by Paul Edison-Lahm, Secretary.

New Electronic Mailing List for GSOC Members

GSOC will send electronic newsletters every two months to members. The mailing list will also provide a means to send occasional messages in case of unexpected changes or cancellations of GSOC events, such as lectures or field trips. Members will still receive the paper newsletter in the mail. If you believe that we don't have your email address, and would like to be included in this list, please send an email to Paul Edison-Lahm at edisonlahm@comcast.net with "subscribe" in the subject line.

Likewise, if you prefer NOT to receive the newsletter and messages electronically, please send an email with your name and "unsubscribe" in the subject line.

Doin's at DOGAMI, the State Department of Geology and Mineral Industries

Synopsis of the October 11, 2013, talk by Dr. Vicki McConnell, Oregon State Geologist
by Carol Hasenberg

Dr. McConnell began the discussion about DOGAMI's work by describing the climate in which her department and other state geologic surveys are working. State funding for geologic surveys has been getting squeezed and other sources of funding, including federal and industry have had to be pursued with differing levels of success. Publications sales, once an important revenue for the department, have been steadily dwindling since the mid 2000's with the rise of the internet. Federal dollars are doled out to states who have experienced geologically based natural disasters or are working on large projects such as carbon dioxide sequestering in Illinois.

McConnell described DOGAMI as serving the State of Oregon in several different ways:

Earth Science Data Collection – DOGAMI does both traditional stratigraphic mapping and LIDAR surface mapping. LIDAR (LIght + raDAR), is a recent method of getting highly accurate images of the earth's surface by saturated bombardment of the surface with small laser bursts from a flying LIDAR unit. It has many applications for both industry and geologic assessment such as forest inventory, building inventory, emergency preparedness assessment, fish, wetlands, road, and wildfire assessment, plus landslide inventory, earthquake, tsunami, flood, channel migration, and coastal change. DOGAMI has gotten very involved with this technology and its applications.

Resource Assessment – Oregon has not had a large amount of resource assessment for industrial use, such as the energy sector. The main energy resource at this time is geothermal energy, and this industry has made a modest start in Oregon. This first commercial geothermal plant is in Vale serving eastern Oregon.

Natural Hazards Assessment – The DOGAMI earthquake and tsunami assessment projects have had a lot of development since the research of the

Cascadia Subduction Zone, and the combined effects of the Loma Prieta, Scotts Mills and Klamath valley earthquakes over 1989 to 1994. The latest item of interest is that DOGAMI has a new mobile app out called [TsunamiEvac – NW](#) for tsunami evacuation routes along the Pacific Northwest coast. In addition to earthquake and tsunami hazards, the department also assesses hazards from coastal change, river flood and river channel change, landslide and debris flows and volcanic lahars.

Education and Outreach – DOGAMI personnel regularly speak to private groups like ourselves, have press releases, host open houses and other informative events. A calendar of such events is available on the DOGAMI website. Also, DOGAMI still puts out publications on a print-to-order basis, as well as digital releases.

Resource Management – DOGAMI manages state permitting for uses such as geothermal energy, oil and gas, and surface reclamation projects for extraction of rock and minerals. The state has had some coal and gold extraction projects in the past.

Dr. McConnell ended the talk with a discussion of the challenges the department is having. The big question in view of the economic climate is whether DOGAMI can survive as an independent agency. Ohio, Iowa, Colorado have been decimated in their state geologic surveys in the last few years, and these states have huge oil and gas resources. Some relevant policy issues that DOGAMI could continue to evaluate are climate change adaptation, mineral resources, restoration and ecosystems.

THE PEAKS DISTRICT, BLUE JOHN AND THE DEVIL'S ARSE

by Carol S. Hasenberg

My husband John and I took a little trip to England and Scotland this past August to commemorate our 30th anniversary. We did a lot of fun things, so the focus of the trip was not geology. But we did take a little side trip to the town of Castleton nestled in the Peaks District National Park, and explored some of the rich geology there. We went there to meet up with an old friend of mine, a native Sheffielder who

now lives on Vancouver Island and has a friend in Castleton running a bed and breakfast place.

The little town of Castleton, which originally housed miners and farmers, was built by the Normans. It is strategically and dramatically placed at the foot of a hill on which a Norman garrison was built in the 12th Century. Peverel Castle is also situated on a limestone hill overlooking a cleft which holds a large cavern which has been known for centuries as the "Devil's Arse." A few other caves and mines dot the hillside to the west of Castleton.

The entire area was formed between 350 and 300 million years ago, when a shallow sea producing limestone was covered with mud and then sand from an encroaching river delta system. The geological period of formation is the Carboniferous. Between the formation of the rocks and now the area was deeply submerged and overlain by rock. Minerals, especially lead, were deposited in cracks in the limestone. Eventually the land was uplifted and eroded into the landscape seen today. The town site at the head of the Hope Valley, is situated on a bedrock of shale overlain by alluvial gravels. The limestone hill sits atop the shale to the south of the town, and to the north of and west the valley walls are composed of Millstone Grit, a sandstone formed from the large river delta system.

The limestone hill to the south of town continues to the west to terminate into the Mam Tor, a large hill which is the terminus of the Millstone Grit. Along the base of the limestone hill can be seen several buildings which sit at the entrance of several caves and mines. These were the sites of several lead mining operations for a number of centuries. In the more recent centuries a banded fluorite called Blue John has also been mined in several of the sites for ornamental stone carving and jewelry. Blue John is very attractive with light purple, deep purple and yellow bands of color. Rope making for the miners was done in the Devil's Arse cavern. And since the 1700's tourists began visiting this and several of the other caves.

Our little party toured the Devil's Arse, now officially known as the Peak Cavern, while visiting

Castleton. The tour began with a demonstration of rope making done in the traditional fashion. The rope is made using a manual winding device and a heavy cart which is used to keep the strands of hemp taut. The work is done in the cave due to its favorable humidity for keeping the fibers pliant. Since this cave did not have lead veins it was used by the rope makers.

When tourists started coming people started exploring farther into the cave although to get to some of the inner chambers it was necessary to crawl or be pushed through a narrow passage on a small boat. This changed in the 19th century when the young Queen Victoria toured the cave. A new larger passage was made since it was undignified for royalty to enter this way.

The reason Peak Cavern was known as the Devil's Arse is that it floods yearly. When the floodwaters recede they get sucked through the passages with an incredible gurgling sound. Early peoples associated underground places with the devil; so, to them it was the sound of the Devil cutting wind!

Another thing our little group did was to hike up the limestone hill and cut across country to Mam Tor. This hill was the site of a bronze age village, and its name means "Mother Hill". En route we passed across fields filled with sheep. The stone walls enclosing the fields were full of fossils. We noted some nice crinoid stems in one of the stone stiles we climbed over. We climbed up to the hill above the village through a cleft called Cave Dale which was loaded with small caves and shafts into the deeper Peak Cavern. When we arrived at Mam Tor we observed how the eastern face of the hill is one large slide scarp. A road below the hill had to be abandoned about 40 years ago because of constant slumping of the slide. Some of the layers in the Millstone Grit are quite crumbly claystones.

We had to leave Castleton after only two days but thoroughly enjoyed our stay in this little corner of England. We hope that other GSOC travelers to this corner of the world might pause to enjoy the interesting geology there.

