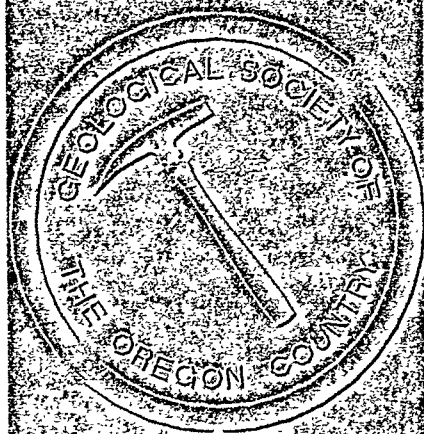


THE GEOLOGICAL NEWSLETTER

43006
JANUARY 2002

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



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ACTIVITIES:

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

FIELD TRIPS: Usually one per month. Fees: Members, \$1.00, Non-members, \$3.00. See calendar next page.

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

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WELCOME

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the Geological Society of the Oregon
Country

Richard Meyer

JANUARY BOOKWORMS



Sitting around while the rain thunders down outside? Feeling like you have the blahs? Check out a couple of new books and look forward to the next GSOC field trip!



EXPLORING THE HIGHEST SIERRA,

by James G. Moore,
2000, Stanford
University Press,
Stanford, CA,

paperback, 427 p. \$17.95. (For a book this size, 8.5x11 inches, it has a poor binding-weak or not enough cement. My copy easily came apart, but I was able to glue it back together.)

Submitted by Paul E. Hammond

This is a terrific, most enjoyable, and interesting book of the history of exploration, mapping, and geology of the high Sierra Nevada in the Sequoia and Kings Canyon National Parks area of California. The author was a major participant in the recent comprehensive geologic mapping of the area by the U.S. Geological Survey. It is very well written, easily readable, and meaningfully illustrated. The terms and concepts are simply

explained, and illustrated. The glossary, 14 pages in length, contains excellent and simple definitions. The book is very informative. The first 170 pages give a most complete explanation of the history of exploration and mapping-the early instrumentation and techniques-leading up to the recent mapping.

The next 178 pages describe the pertinent geologic concepts in understanding the Sierra Nevada, its minerals and rocks, how the mineral content defines the rock, how the mineral composition is related sequentially to the age and location of the various intrusive rocks in the formation of the Sierra Nevada batholith, and subtle overviews of the mineral deposits, younger volcanic rocks, glaciers and glaciation, landslides, and geologic structures. The book should be supplemental reading for geology students. To top this array of information, the author includes 35 descriptive pages of road and trail logs to pertinent features. This section is the most technical of the book and greatly enhances its contribution to understanding the geology of the area. The three road logs could make an exciting and informative 2-3 day field trip for interested GSOC'ers.



TRILOBITE: EYEWITNESS TO EVOLUTION

Richard Fortey,
Author

Copyright 2000, Alfred
A. Knopf, division of
Random House, Inc.,
New York, paperback
price \$14.00. Originally published in hardcover in
Great Britain by Harper-Collins Publishers, London

a book review by Carol Hasenberg

I can see my readers now steeling themselves for endless lists of trilobite species and dates – trilobites are, after all, one of the more prolific species of animals from the Cambrian era to the Permian. Yet, this little gem of a book serves as just an

introduction to the interesting aspects of trilobite study, as well as the studies of trilobites.

We start out on the cliffs above Boscastle in Cornwall (that's in England, for the non-geographers), face to face with a literary trilobite in the Thomas Hardy novel *A Pair of Blue Eyes*. We end face to face with a charming, un-named, trident-sprouting trilobite from the Devonian of Morocco, and a discussion of the image and philosophy of science. Along the journey, we learn about the unique features of the trilobite and how trilobite physiology has been determined from the geologic record while learning something of the history of the scientists who pursued this quest. We are introduced to a number of important and representative trilobite species. Later chapters reveal how the study of trilobite fossils has advanced the understanding of evolutionary mechanisms as well as the drift of earth's continents over time. Each chapter is sprinkled with little illustrative tales of trilobite hunters – their character, their contributions, and occasionally, their tragedies.

For instance, I found one of the most interesting discussions about how the trilobites uniquely possessed eyes composed of rock crystals (calcite). Not only that, but a trilobite genus from the Devonian, *Phacops*, had oversized lenses with a special intralensar surface which corrected spherical aberration. This gave *Phacops* the advantage of being able to focus on objects at varying distances. A scientist from the Smithsonian Institution, Kenneth Towe, took photographs through the phacopid lenses which demonstrated this ability.

Another excellent discussion centers about the Cambrian “explosion” and how views of the rise of the arthropods (jointed-legged animal group to which insects, crustaceans, arachnids and trilobites belong) have changed throughout the twentieth century, along with the sometimes heated debates which accompany change in scientific thought. The author has decided to “try to take the long view through the their (the trilobites’) crystal eyes, indifferent as they are to the splenic explosions of mere humans”.

We also learn a little of the author's adventures as a trilobite specialist with the Natural History Museum in London. Dr. Fortey learned his trade “on the frozen ground of Spitsbergen beyond the Artic Circle”, collecting trilobite specimens for the Sedgwick Museum in Cambridge. He “drove my room-mate John Bursnall mad with my trilobite obsession”. He studied under Harry Whittington at Cambridge, a man he describes as having greatness of spirit as well as being a leading authority on trilobites (but never authoritarian!). In one of the more humorous tales of the book Dr. Fortey describes his debut as a “boffin” in a white lab coat in which he nearly drowns the laboratory floor at the Imperial College of Science and Technology where he is conducting an experiment on the streamlined properties of a trilobite species which he suspects is an accomplished swimmer.

To summarize, I found this book to be an engaging introduction to the world of trilobite study. It contains well written discussions about trilobites on the specific level to the philosophical level, and most importantly, has whetted my appetite to learn more.

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The web is loaded with trilobite sites! You can start with these trilobite links at S. M. Gon III website: <http://www.aloha.net/~smgon/trilobite.htm#links>

Happy Hunting!

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Final Nominations

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

President.....	Tom Gordon
Vice President.....	Evelyn Pratt
Secretary.....	Beverly Vogt
Treasurer.....	Phyllis Thorne
Director, 3 years.....	Sue Ikeda
Director, 2 years.....	John Newhouse
Director, 1 year.....	Taylor Hunt

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

The Nominating Committee members were Beverly Vogt, Chairman, Richard Bartels, and Cecelia Crater. Our thanks to the selected members and members of the Nominating Committee!

Annual Banquet Notice

The Geological Society of the Oregon Country will be having its annual banquet on Sunday, March 10, 2002 (starting at 1:00 pm). The program topic will be "Ancient Oregon", with **Ellen Morris Bishop**, author of **Hiking Oregon's Geology** and the former popular Time Travel column in the Oregonian. Ms. Bishop is also about to publish a new exciting book **Ancient Oregon**.

Location of the banquet will be the McMenamins Grand Lodge in Forest Grove, Oregon. Dinner price and submittal form will be published in next month's newsletter. Make sure to mark the date on your calendar!

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

PS – If you joined GSOC in September or later, your 2002 dues are paid, good deal!!!

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Richard Fortey,
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Final Nominations

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

President.....	Tom Gordon
Vice President.....	Evelyn Pratt
Secretary.....	Beverly Vogt
Treasurer.....	Phyllis Thorne
Director, 3 years.....	Sue Ikeda
Director, 2 years.....	John Newhouse
Director, 1 year.....	Taylor Hunt

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

The Nominating Committee members were Beverly Vogt, Chairman, Richard Bartels, and Cecelia Crater. Our thanks to the selected members and members of the Nominating Committee!

Annual Banquet Notice

The Geological Society of the Oregon Country will be having its annual banquet on Sunday, March 10, 2002 (starting at 1:00 pm). The program topic will be "Ancient Oregon", with **Ellen Morris Bishop**, author of **Hiking Oregon's Geology** and the former popular Time Travel column in the Oregonian. Ms. Bishop is also about to publish a new exciting book **Ancient Oregon**.

Location of the banquet will be the McMenamins Grand Lodge in Forest Grove, Oregon. Dinner price and submittal form will be published in next month's newsletter. Make sure to mark the date on your calendar!

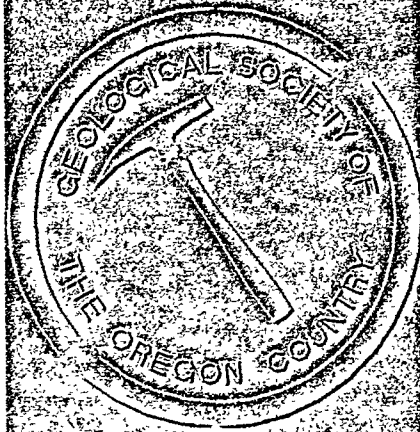
Don't forget that annual **DUES PAYMENTS** are due now! Think about all those great member benefits for a mere annual fee of \$20 (individual)!!!

PS - If you joined GSOC in September or later, your 2002 dues are paid, good deal!!!

THE GEOLOGICAL NEWSLETTER

65006
FEBRUARY 2002

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



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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

2001-2002 ADMINISTRATION

BOARD OF DIRECTORS

President:

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Vice-President:

Tom Gordon – 360/835-7748

Secretary

Beverly Vogt – 503/292-6939

Treasurer

Phyllis Thorne – 503/292-6134

Directors:

John Newhouse (3 years) – 503/224-2156

Taylor Hunt (2 years) – 503/662-4790

Archie Strong (1 year) – 503/244-1488

Immediate Past Presidents:

Ray Crowe – 503/640-6581

Carol Hasenberg - 503/282-0547

THE GEOLOGICAL NEWSLETTER

Editor:

Carol Hasenberg – 503/282-0547

Calendar:

Evelyn Pratt – 503/223-2601

Business Manager:

Rosemary Kenney – 503/892-6514

Assistant Business Manager:

Cecelia Crater – 503/235-5158

ACTIVITIES:

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

FIELD TRIPS: Usually one per month. Fees: Members, \$1.00, Non-members, \$3.00. See calendar next page.

GEOLOGY SEMINAR: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.

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

PROGRAMS: EVENING: Second Friday Evening each month, 8:00 p.m., Rm. 371, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon. NOON: Usually first Friday monthly except June, July, August, and holidays, usually at noon, Multnomah County Library, 801 SW 10th Ave., Portland. Consult current calendar (next page) or verified by phone: 503/235-5158 or 503/892-6514.

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

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

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APPLICATION FOR MEMBERSHIP-

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Geologic Interests and Hobbies _____

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GEOLOGICAL NEWSLETTER

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VISITORS WELCOME AT ALL MEETINGS

VOL. 68, No. 2

INFORMATION: www.gsoc.org or e-mail: gsoc@spiritone.com

FEBRUARY 2002

Sandra Adamson, 503-667-6287 or

Evelyn Pratt, 503-223-2601

FEBRUARY ACTIVITIES

Fri. Feb. 1, 2-3:30 PM: Mars: A New Perspective. Lamont Brock, Rose City Astronomers. Central Library, 801 SW 10th.

Fri. Feb. 8, 8:00 PM: Ancient Lake Chewaucan: Is It The Oregon High Desert's "Rosetta Stone"? Clay Kelleher, past president. Rm. 371 Cramer Hall, PSU.

Seminar Wed., Feb. 20, 8:00 PM: Coastal Dynamics: Waves and Beaches. Evelyn Pratt, past president. Rm. S-17 Cramer Hall, PSU.

Field Trip Sat., Feb. 23: Geologic and Human History of Rocky Butte and the Grotto.

Boring Lava, Bretz floods, a secret cave, and human history – all in one small area.

Taylor Hunt, 503-662-4790. Fee schedule – members free, non-members \$2.50.

Preview of coming attractions:

WEDNESDAY (note day change) Mar. 6, noon-1 PM: Geology of Selected Utah National Parks & Monuments. Taylor Hunt, Field Trip director.

!!

March 10 ANNUAL DINNER features **ELLEN MORRIS BISHOP**, author of soon-to-be-published "Ancient Oregon," at McMenamin's new & highly publicized **Grand Lodge** in Forest Grove. Banquet forms can be found in the attachment at the back of the newsletter – payment **deadline is March 2!!!**

!!

Seminar Wed., March 20, 8:00 PM: Human Impact on Coastlines. Evelyn Pratt, past president. Rm. S-17 Cramer Hall, PSU.

Field Trip Sat., March 23: The Dry Side of the Columbia Gorge – Washington.

Taylor Hunt, 503-662-4790. Fee schedule – members free, non-members \$2.50.

DUES ARE DUE! DUES ARE DUE! DUES ARE DUE!

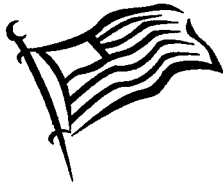
Calendar items must be received by **15TH of preceding month**. Call Evelyn at 503-223-2601, or e-mail folkdans@aol.com.

WELCOME

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

George Hibbs
Yumei Wang
David Buckley
Brian Globerman

Message from the President



For the Year 2001, GSOC experienced a quiet, yet **highly successful year**. Our annual banquet was a great hit with a speaker whose archaeological and forensic expertise included extensive geological knowledge of the Columbia River Basin. He made the bones of Kennewick man come alive. We have had many fascinating speakers throughout the year, along with great field trips and seminars. Our annual picnic was another pleasant Sunday afternoon at the Rice Museum.

The board has begun an ongoing discussion about **GSOC's future** and how we may best serve our membership. We hope that you will make your voice heard about the kind of organization you want and how we may best serve you. Our volunteers and officers give many hours to make our events possible - their service, time, and efforts on our behalf are greatly appreciated.

A special **thank you** goes to each and every one of you--members, volunteers, and officers for your support of GSOC. My very best wishes for a prosperous and wonderful new year.

Sandy Adamson

BOARD MEETING NOTES

Summary of January 12 Board Meeting

The GSOC Board met January 12 at the home of Rosemary Kenney. Minutes of the previous meeting were approved.

Thanks to several GSOC members for their contributions to the club this year:

- **Diana Gordon**, for hospitality after our Friday night meetings. Don't forget to add \$\$ to the cookie pot so we can keep the cookies coming!
- **Evelyn Pratt**, for publicity work which she will be needing to give up so that she can be Vice President this coming year. Anyone interested in volunteering for the publicity post please contact Tom Gordon or Rosemary Kenney, or send an email to gsoc@spiritone.com.
- **Taylor Hunt** for field trips which have been attracting membership to the club as well as providing the members with educational opportunities.
- **Richard Bartels**, who has agreed to be the club's registered agent, as well as the other volunteer work he does for GSOC.

Work is being done to clean out some outdated material and duplicates from the **GSOC library**. Some of the material will be for sale at the annual banquet. Discretion has been granted to the Library Committee to perform this task.

Noon meeting times are more erratic these days because the downtown library is using the US Bank Room more often for their own purposes. Be sure to review the time and date of the noon meeting in the newsletter or on the website each month. Tim Tolle has offered the use of his slide projector to speakers who do not have their own. Also, anyone with suggestions for speakers should give that information to Robert Strebin or Tim Tolle.

Taylor Hunt to lead a three-night, bussed field trip to the Wenatchee, Washington area on **Memorial Day weekend**. Announcement for the trip will appear soon in the newsletter.

President's field trip is being planned to northern California Cascades (Mt. Lassen area) and possibly the Sierra Nevada. Trip may be as short as 3 days or as long as 8 or 9 days. Announcements will appear in the newsletter later this spring.

The board discussed the **field trip fees** in view of the copying expenses and the ways which field trips serve the organization. It was decided that the field trips serve to:

- provide learning opportunities for club members
- attract new members to the club

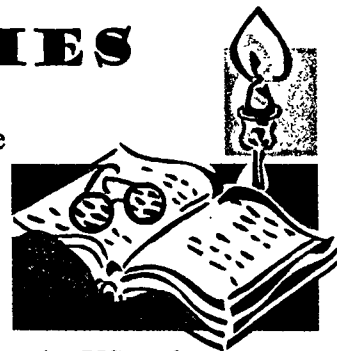
It was decided that the field trip fees should be dropped for the members and set at \$2.50 for non-members. This fee schedule will be reviewed this coming year in view of the copying expenses and adjusted as appropriate.

The board would like to encourage members to make **donations to the PSU Foundation**. The foundation awards a GSOC scholarship each year to a PSU Geology student. Make a note on the check that the money is being donated for the GSOC scholarship fund.

Anyone with **information about meetings and field trips** for other related organizations should send the information to newsletter editor Carol Hasenberg at gsoc@spiritone.com, or mail to Carol's home address in the GSOC directory. Charlene Holzwarth discussed the **Archives**, requesting that members send her labeled and identified photos from the field trips for the archives. Anyone with photos of GSOC events should send them to Charlene.

Next board meeting to be April 6 at Rosemary Kenney's house, 10 am.

HAPPY GEOLOGICAL MEMORIES



This is the story of the life and work of GSOC member Nikolay P. Senchilo, who was born in 1928 in the village of North Kazakhstan in the USSR. Nikolay emigrated to the US and became an American citizen in the year 2000. He left behind his beloved profession of geology, friends and colleagues, and many happy memories in order to live in the US.

Nikolay describes his childhood, memories of his homeland and his life today:

I had lovely and respectful parents, I was an only child and forever I keep them in my heart. In my youth I occupied myself with bicycles and boxing. I took part in city competitions. I like to watch soccer and tennis, and play badminton, billiards, and ice skating. I also like music opera, and ballet. When I was 16 years old I played mimic roles in the theatre. My favorite dances are the Waltz and the Tango. Of all musical instruments, I prefer piano, harp, and guitar. In my childhood I played a little on the balalaika. In the time of World War II in a group of children actors performed amateur productions for wounded soldiers in the hospital.

I love my city Alma-Ata (the former capital of Kazakhstan), where I lived most of my life. It is a beautiful modern town situated at the bottom of a splendid snow-covered mountain Zailiysky Alatau. In the garden grows gigantic Shan's figs and Apert apples. There are huge baths with Russian, Finnish, and Turkish sections. There is a world-famous stadium Medeo and sky area Chimbulak. There is a great Unicum Christian Church built of wood without any iron nails. We often had earthquakes there. Nearby are high mountain Lake Issik-Kul, Lake Balkash, and I often vacationed on the Black Sea.

These days I like to associate with Nature on foot or by bike. I like to gather flowers, medicinal plants, mushrooms, berries, fruits, and certain minerals and rocks. I planted two trees: a nut campra pine in Alma-Ata and a cedar in Vancouver. They will be beautiful things for a long time to come. I also paint with oils on diverse themes, including several spiritual paintings. I am a member of the Society of Washington Artists, and have received awards for my art, the last of which in the US at Exhibition Etsu-Shin.

His geological training and career:

My career began after graduating from the Mining and Metallurgical Institute at Alma-Ata in 1951. As a young engineer-geologist, I was first sent to work from Russia to Bulgaria. Because of my interest in science, in 1957 I worked in the USSR in the Academy of Science of Kazakhstan as a scientific research member and as a Chief of Laboratory during my last years.

In 1963 I supported the dissertation of Candidate Geology-mineralogical sciences; in 1970 I received a certificate of Senior scientific laborer from Supreme Certification Commission of the Soviet Union. I was a temporary substitute Professor and was working to prepare a doctorate dissertation pertaining to metallogeny. I participated in many scientific conferences in the USSR, Kazakhstan, and in six international congresses (Montreal, Canada, 1972; Berlin, Germany, 1974; Varna, Bulgaria, 1974, Carlowary and Prague, Czechoslovakia, 1978, and Washington D. C., U. S. A., 1989). I was a diplomat of the Exhibitions of Achievement National Economy of the USSR and Kazakhstan.

My first geological love was the mineral quartz. My dissertation examined the discrepancies between ore-bearing and barren quartz, comparing color, structure, texture, composition, crystal lattice, dielectric constant, thermo-luminescence, thermometry, etc. My colleagues at the Academy of Science of Kazakhstan and the Ministry of Geology conducted prognostication-metallogenical researches over a huge territory of Kazakhstan (Middle Asia and South Siberia). Some of the

work was done jointly with scientists from Russia and other Soviet Republics. I also took part in elaborate investigations about the development of the Earth's crust (tectonic, magmatism, metamorphism, ore-formation). Every summer I went into the field where I had the following experiences:

- I walked very long distances in Kazakhstan, Russia, and Bulgaria with a geological satchel on my back and compass and hammer in hand. I drew bore-hole diagrams and mapped the geology and mineral resources.
- I visited very diverse landscapes - the great and beautiful Tian-Shan on the border of China working at an altitude of 2390 meters, with glaciers and cliffs, edelweiss flowers, snow-leopards, and mountain eagles; amazing zones of alpine meadow and plains full of grass and wildflowers; bird's bazaars of swans, storks and cranes; sultry rocky or sandy deserts in Betpack-Dala with temperatures up to 130° F; and many others.
- I worked in populated areas and areas where nomadic people live. I always loved to work with people. There were representatives of other nationalities working with me, but we understood each other. I speak my native language Russian, delicate Kazakhstan, excelled in Bulgarian, and studied English.
- Fieldwork began in the early spring and ended with the first snow. We used horses, mules and even camels for transportation. We worked and slept in the tent or under the open sky – on riverbanks or lakeshores, in forests and even beside cracks in the earth.
- Some of the expeditions had dangerous adventures – explosions, snow-leopard encounters, dangerous and frightening climbs, and even a criminal worker mutiny.
- I became the supervisor of big expeditions, with large technical staffs and laborer forces. I am very grateful to all my companions for their attention, for their help and appreciation. And

after being separated from them, I will forever keep this love in my heart.

I had and still have many ideas for additional research projects in ore-concentration and metallogeny in my homeland. I have 87 publications of scientific work, including 8 monographs written alone and with co-authors. It has been a disappointment to me that I can't use my experience and knowledge in my life in the US because of my lack of knowledge of the English language. However, I enjoy being a member of the Geological Society of the Oregon Country and after improving my English I hope to be more active in this work.

by Nikolay Senchilo with introduction and editing by Carol Hasenberg

From the AGI Glossary of Geology, "**Metallogeny**-the study of the genesis of mineral deposits, with emphasis on their relationship in time and space to regional petrographic and tectonic features of the Earth's crust. The term has been used for both metallic and nonmetallic mineral deposits."

Beverly Vogt



Airborne Volcanic Gas Monitoring

a report from the January 11, 2002, GSOC Friday night meeting featuring speaker Ken McGee from the US Geological Survey Cascade Volcano Observatory.

by Carol Hasenberg

Airborne gas monitoring at the Cascade Volcano Observatory (CVO) in Vancouver, Washington has a history of over twenty years. A battery of gas-detecting instruments is mounted on the side of a twin-engine, un-pressurized airplane and gases are measured in parts-per-million (ppm). By making circuits around volcanoes and measuring as often as

possible, gas plumes which are often invisible can be detected and the mass flow of the gas from the volcano can be estimated. The data is digitally recorded and analyzed by computer.

The first airborne gas monitoring by CVO occurred a few months before the May 18, 1980 eruption of Mt. St. Helens and continued for eight years until the volcano became quiescent. A correlation spectrometer (COSPEC) was the instrument used to detect sulfur dioxide (SO₂) gas emissions in the ultraviolet range. An estimated 2 million metric tons of SO₂ was emitted during this period – one million tons is the estimate for the May 18 eruption which was not monitored (for obvious reasons!!)

In quantities of emissions, SO₂ comes behind water (H₂O) and carbon dioxide (CO₂) in the gas mixture emitted by a volcano when it erupts. However, SO₂ is a good active volcano indicator because it is normally not present in either the atmospheric baseline or in the gas plumes emitted by quiescent volcanoes. A model was made by geologists to predict what gases could be detected coming out of volcanoes – SO₂ reacts with water in a dormant volcano so it does not emit the gas normally. In a pre-erupting volcano, a dry zone forms in the vent because the magma is being heated and so SO₂ is able to escape. This makes SO₂ gas an indicator of a volcano which is preparing to erupt. So far SO₂ has not been detected in any of the other Cascade volcanoes.

The more common gases water (H₂O) and carbon dioxide (CO₂) are also being monitored these days in the Cascade. The airborne gas collection system consists of a very sensitive pressure gauge, COSPEC SO₂ monitor, electrochemical SO₂ and H₂S monitors, LICOR CO₂ monitor, temperature gauge, and GPS instrument which precisely locates the positions where the samples are taken.

A recent case study has been done at Mt. Baker in northern Washington state. On September 18, 2000, a monitoring flight was made to collect baseline data for the mountain to compare with future emissions. The gases come out of fumaroles in Sherman crater. In 21 orbits around the mountain, airborne gases above the atmospheric baseline were

detected 17 times. No temperature or pressure variations were found and no SO₂ was found. Steam and carbon dioxide (gases typical for quiescent volcanoes) were measured in the plume, which were then mapped and mass flows of 5.5 tons/day of H₂S and 171 tons/day of CO₂ were calculated. These amounts are comparable to the emissions of a gas-powered power plant.

Airborne gas monitoring has also been done at the South Sister volcano in April 2001, above the uplift radar interferometry anomaly (see the November 2001 issue of the Geological Newsletter – editor). A monitoring flight was flown without the COSPEC instrument because a helicopter was used. A series of traverses at treetop level detected a small CO₂ anomaly. The anomaly measured about 1 km long and 0.2 km wide and was located a little north of the stream which had the chemical anomaly. The anomaly was not detected in a September 2001 flight, but atmospheric conditions were not favorable that day.

Some interesting facts about CO₂ (greenhouse) gases emitted by volcanoes follow:

- Mt Etna is by far the biggest CO₂ emitter on the planet (70,000 tons/day)
- A global estimate of 200 million metric tons per year has been made for volcanic CO₂ emissions.
- Man produces 26,000 million metric tons per year of CO₂ – this amount of CO₂ emission is without precedent for back into Earth's history.

For more information on airborne gas monitoring, you can visit the CVO website at <http://vulcan.wr.usgs.gov>.

Global Climate Change

an OSU Lecture Series

Oregon State University is hosting a series of lectures on the topic of global climate change this winter. Lectures are to be held at 4:00 p.m. Fridays in the Gilfillan Auditorium, and are free to the public. Upcoming dates and speakers include:

- February 1 – "A Neoproterozoic Snowball Earth", by Dan Schrag of Earth and Planetary Sciences
- February 8 – "Holocene Climate Variability: Modes, Mechanisms and Cultural Impacts", by Peter deMenocal of Columbia University
- February 15 – "Climatic Weirdness – The Ice Did It", by Richard Alley of Penn State University
- February 22 – "Tropical Temperatures and Global Climate: Clues from Coral", by Rob Dunbar of Stanford University
- March 1 – "Interhemispheric Paleoclimate Change in the Americas", by Vera Markgraf of University of Colorado

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

PS – If you joined GSOC in September or later, your 2002 dues are paid, good deal!!!

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY SIXTY-SEVENTH ANNUAL BANQUET

Speaker

Ellen Morris Bishop, author of the popular and informative *Hiking Oregon's Geology*, will speak on Ancient Oregon, which is the title of her next book, due out next year. Specializing in igneous petrology and the exotic terrains of eastern Oregon, she received her PhD from Oregon State University in 1982. Among her other accomplishments, she wrote a column, *Timelines*, for the Portland *Oregonian*, and has taught geology at the college level. A fascinating speaker, she will show slides and provide many insights into the tumultuous history of the land we call home.

Where and When

The 2002 Annual Banquet will be held at McMenamins Grand Lodge, 3505 Pacific Avenue (Highway 8), Forest Grove, Oregon. (Tri-Met Bus #57, or to carpool, (360) 835-7748) There, the doors of the Compass Room will open at 1 p.m., on Sunday, March 10, and we will pick up our dinner tickets. Outdated books from the library and rocks will be for sale. Ellen Bishop will identify any disputed specimens, especially the igneous ones.

Menu

Grilled Pork Medallions

With a marion-berry sage reduction and roasted garlic mashed potatoes

Grilled Chicken Breast

With herbed tomato sauce and fettuccine alfredo

Spinach & Wild Mushroom Cannelloni

Baked with herbed tomato sauce and Parmesan cheese

All dinners include a mixed green salad with vinaigrette or a Caesar salad and coffee, decaf, and herbal teas. Desert will be cake from Helen Bernhardt Bakery.

_____ Number of tickets at **\$21.50** each. Please indicate entrée choice. **Make checks out to GSOC.** Also, if you have a table preference; please indicate it on the reservation.

Name/Names _____

Choice of Entree _____

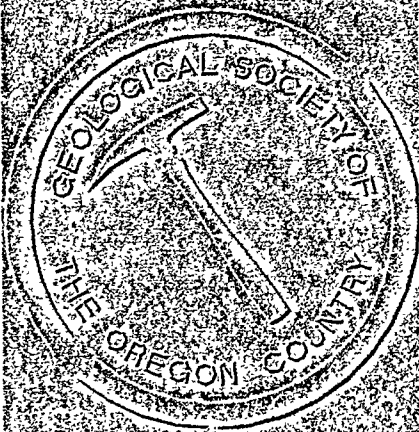
_____ Amount enclosed. (Reservations must be in by March 2, 2002.)

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P.O. Box 907
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THE GEOLOGICAL NEWSLETTER

62006
MARCH 2002

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THE GEOLOGICAL NEWSLETTER

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ACTIVITIES:

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

FIELD TRIPS: Usually one per month. Fees: Members, \$1.00, Non-members, \$3.00. See calendar next page.

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VOL. 68, No. 3

MARCH 2002

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- Taylor Hunt, GSOC leader, also featuring speakers John H. Whitmer and Charles L. Mason
- Leave Friday, May 24, about 2:00p.m. and return Monday, May 27, 2002
- Cost - \$325 for double occupancy, **\$175 down payment is due by March 15!!!**
- tour ancient metamorphic core complex plus Ice Age features
- bus maximum capacity 45 persons from three organizations

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

WELCOME

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

Thomas Owen
Robert Miller

FIELD TRIP RECAP: BALD PEAK, CHEHALEM MOUNTAIN SLIDE AND FAULT TERRAIN

Saturday, January 26, 2002
Taylor Hunt, leader

Taylor led our GSOC field trip from North Plains, where the group examined a large granite erratic boulder recently pulled out of a nearby farmer's field. It was potato-shaped, about 5 feet long and 3 feet wide. Taylor identified the various crystals in it, its plutonic origin, where it came from--probably the Purcell Trench in British Columbia--and how it was rafted here during the Ice Age Floods.

We then headed south across Jackson Bottom and the Tualatin River. The water was high but we could still see where the river was by its overflow banks which over time have raised the riverbed above the adjacent sloughs.

Continuing south to Laurel, we began to see evidence of the faulting caused by the uplift of the Chehalem Mountains. We stopped for a break at Laurel Store, where Taylor explained the tectonics causing the folding, faulting and stretching, and the horst and graben nature of the terrain on our next leg straight up Laurel and Bald Peak Roads, as they rose in a series of undulating stairsteps from Laurel at elevation 194' to the top at 1100' in under three miles.

It was snowing up on the hill when we turned onto Laurelwood Road and cautiously dropped down the scarp side and stopped at the Buffalo Farm about halfway down. It was snowing hard and we could not see the view as planned. Continuing downhill, Taylor indicated a roadcut exposing Oligocene marine sedimentary rock. At Laurelwood we stopped and decided to adjourn and resume the next week, weather permitting.

We met at Laurel the following Saturday morning. This time fog was the problem. At the Buffalo Farm, the fog was burning off and Taylor talked about the massive slides on this side of the mountain and the Gales Creek Fault running through Wapato valley below. He told us to notice the slide evidence as we drove through Laurelwood, especially to the north, as we would next be heading up and along the scarp of that slide. Passing through Laurelwood down to Spring Hill Road, Taylor pointed out signs of Flood scouring on the hill to our right. We turned right on Spring Hill Road and on the west flank of that same hill were a series of large ripple marks. Here we were driving along the Gales Creek Fault, a strike-slip fault with the west side moving northwest, the east side southeast.

We turned right on Dixon Mill Road and headed up the toe of a slide to the scarp on the south side of Iowa Hill, where we saw dramatic slumps and a number of slump ponds. This was the head of the slide we saw at Laurelwood.

At the top we turned down Iowa Hill Road and cut across to Fern Hill Road down by the river bottom. Taking a left, we could see where the Tualatin Valley Water District's huge pipeline project had been interrupted when the excavators ran into an ancient logjam 20 to 30 feet below the riverbed, possibly a result of the Floods. If true, these would be the first trees found beneath Missoula sediments. They are being carbon-dated and mapped with ground penetrating radar.

As we rounded the tip of Fern Hill and headed south on Spring Hill Road past the ripple marks on our left and the flooded Wapato Lake Bed on our right, Taylor told us to notice how the valley was

narrowing as we approached the Chehalem Valley. This was due to slides and is also where the Gales Creek Fault passes through the Yamhill-Bonneville Lineament, another major fault zone.

As we turned up Albertson Road we stopped to see the divide between the Chehalem and Wapato valleys, a field separating Chahalem Creek and Ayers Creek, one flowing south to the Willamette and the other flowing north to the Tualatin. Taylor said the Tualatin used to flow through here to the Willamette before the toe of the Ribbon Ridge slide blocked it at that low divide.

Ascending Albertson Road we stopped at an abandoned quarry to examine the Columbia River Basalt which came down in a slide from the basalt cap on top of Bald Peak 1000' above. We then drove up below the west and northwest sides of the Bald Peak scarp and on to Bald Peak Road to the top, then east along the top of the northwest scarp face, a sheer 400' drop on our right. Below that, the massive slide area another 900' to the valley floor. We turned down Kings Grade to Tykeson Road, riding the hummocky Kings Grade slide down to Dopp Road, then right again to Albertson, completing a circuit around this slide area.

Taking a left on North Valley Road we then circled the Ribbon Ridge slide area and returned via Dopp to Albertson to end our field trip. We thank Taylor for his patience and tireless enthusiasm.

Submitted by George Hibbs

COMPLETELY FRACTURED GEOLOGY

by Ralph & Evelyn Pratt

1. **Foreset bed:** In a literary work, abed referred to on a previous page
2. **Creep recovery:** As in, "After one date with that guy, I'm undergoing creep recovery!"
3. **Anticlinorium:** A hospital facility that treats those who are against everything

4. **Anomalously young:** Refers to any number of Hollywood stars
5. **Anorthosite:** A side of a tree on which moss is said to grow
6. **Argon-argon dating:** One way of avoiding miscegenation
7. **Accretion:** According to the Bible, what God made during the first 6 days
8. **Blowout:** A party favor that uncoils when you blow into it
9. **Broche:** (1) A fancy piece of jewelry (2) A yummy French sweet roll
10. **Corundum:** A riddle involving a pun, such as "What is black and white and red all over?"

See page 15 for the real definitions.

BOOK REVIEW: THE GEOLOGICAL HISTORY OF THE WENATCHEE VALLEY AND ADJACENT VICINITY

Author: Charles L. Mason
Pixie Publishing, P O Box 97, Rock Island, Wa
98850, ISBN # 1-883078-01-6

Submitted by Taylor Hunt, GSOC Field Trip
Coordinator

Prologue: I am particularly grateful to the author, Charles L. Mason, for giving me permission to use his photos to make a slide presentation for use at our meetings, library presentations, etc.

This book of 172 pages has 14 chapters and a one-page conclusion. In chapter one, plate tectonics, continental drift, and Alfred Wagner's thesis are explained. For those of you who know me, you know I am somewhat of a comet/asteroid buff with regard to how some of earth's features came about...I was pleasantly surprised to see Mr Wagner's explanation as to what started the breakup of Pangea as an "impact of a possible comet or meteorite".

Chapters 2 and 3 discuss the formation of Washington state and its rock cycle in an easy-to-read text backed up with excellent graphics. Chapter 4, 5, and 6 discuss local igneous rock structures, the basalt flow of the Columbia Plateau and the effects of volcanoes and earthquakes in this area.

The hardest chapter to comprehend for me was Chapter 7 on consolidated and unconsolidated sedimentary deposits. However, chapter 8 on metamorphic structures really helped clarify in my mind how to distinguish the source of metamorphic rocks - for example, a metamorphic rock from a sedimentary deposit vs. a metamorphic rock with an igneous origin.

After reading this book and having visited the Wenatchee Valley many times, I found chapter 9 on landslide formations really helped me recognize these structures in my travels elsewhere. Chapter 10 on Bretz-Missoula Floods clarified really just what these floods were able to do and not do, and what really was responsible for the formation I was looking at. This idea is expanded upon in chapter 11 on Moses Coulee and Grand Coulee.

Chapter 12 discusses erratics and simplifies the difference between a local erratic and an exotic erratic and the power needed to place them. Chapter 13 discusses the major landslide of the area, the Malaga slide.

The last chapter discusses the varied mineral wealth of the area from coal and oil to gold and silver and all types of mining activities in between.

In conclusion the author states "Many who have spent a lifetime in this valley have not and do not appreciate what natural wonders surround them. In that respect, I trust that this work will influence their desire to seek and examine this bounty afforded us, because this gift of ours is not granted everyone, everywhere."

A particular help when reading this book is to have a local map of the Wenatchee area with Township,

Range, and Section. He refers to all his points of interest in this manner.

In my opinion, this is a "must read" book for any one interested in geology.

ANCIENT LAKE CHEWAUCAN: Is It the Oregon High Desert's "Rosetta Stone"?

a report from the February 8, 2002, GSOC Friday night meeting featuring speaker Clay Kelleher, past GSOC President and a Friend of the Pleistocene.

by Carol Hasenberg

This past September 28-30, the Friends of the Pleistocene, Pacific NW Cell, investigated the sagebrush flats once covered by Lake Chewaucan. Ancient Lake Chewaucan existed in the Pleistocene in the area that is now occupied by Lake Abert and Summer Lake. GSOC member Clay Kelleher attended the event and was impressed by the 28 highly qualified speakers.

Many laypeople think that what is now eastern Oregon was covered by one big lake during the Ice Ages. This was not true. Several lakes existed which were separate from each other, including Lake Chewaucan, Fort Rock Lake in what is now Christmas Valley and Fossil Lake, a lake covering present-day Warner Valley, and a lake in the present basin containing Malheur Lake and Harney Lake. Lake Chewaucan was close, but not connected to, Fort Rock Lake.

Chewaucan, now pronounced shee-WAH-cun, is derived from the Klamath Indian words for wild potato and place, according to Lewis McArthur in Oregon Geographic Names, sixth edition, Oregon Historical Society Press. The word is now used to name Chewaucan Marsh, a series of two smaller basins connecting the two larger lakes (Lake Abert

and Summer Lake). The basins are labeled Upper and Lower Chewaucan Marshes.

Geologically speaking, Chewaucan basin is a pull-apart basin. A normal fault lies at the edge of Lake Abert – it forms the high cliff at the eastern rim of the lake (Abert Rim). Summer Lake is reduced to marshy areas during the summer months. The salty bottom of the lake can be seen below Winter Rim (Winter Ridge) to the west of Summer Lake. It is easy to see wave-cut terraces in the rims that mark the ancient levels of Lake Chewaucan. The major faults that created the basin rims trend to the N-NE and N-NW. Some minor faults are also present in the basin.

For local interest, observe groups of precipitated rocks which can be found in the basin. These rocks formed on the floor of the lake. Some hot springs can also be found in the area. Pack rat middens are used to date archaeology sites in the area, because pack rats always eat fresh pollen. (For more on this subject, see the website about the "Great Basin Truffle Project", by Robert Fogel of the University of Michigan and Jack States of Northern Arizona University, URL's

<http://www.herb.lsa.umich.edu/GBSurvey/>

[Gb_home.htm](#)

and

<http://www.herb.lsa.umich.edu/gbsurvey/>

[glacial.htm](#))

The Chewaucan River flowed northward into Summer Lake during the Ice Age, but over time sediments built up which turned the river south to empty into Lake Abert. The river changed course about 20,000 years ago. Presently the Ana River, which flows south, is the principal source of water for Summer Lake.

What makes Summer Lake especially interesting to geologists is that the lake stratigraphy can be used to correlate volcanic events through the entire Western United States. The stratigraphy can be observed from core drilling and in cut banks along the Ana River. Each layer of sediment represents some geological event – the record is so good because Summer Lake has been without an outlet for a very long time. There are at least 50 layers of

strata, which go back in time almost 200,000 years. One such event is an eruption of Mt. St. Helens which occurred 47,000 years ago. Other eruption records exist for many Cascade peaks. The stratigraphic record ties together strata occurring several states apart.

In analyzing the stratigraphy, layer composition and especially the amounts of trace compounds, are used help to identify the different layers. An example of this is the percentage of the Oxygen-18 isotope in a water molecule, which is dependent on the temperature. Climate cycles have been mapped from the O-18 in the ice layers of the Greenland Ice Sheet, and these are used as a baseline to correlate other climatic records. The temperature variations have been correlated with the concentration of the mineral magnetite in the sediment of pluvial lakes.

For a good reference on Lake Chewaucan, read Ira S. Allison's 1982 book, Geology of Pluvial Lake Chewaucan, Lake County, Oregon, published by the OSU Press.

WEB TEASERS

For more information on Lake Chewaucan and pluvial lakes, try Google web searches for the topics

Lake Chewaucan Pluvial Lakes

All sorts of fascinating sites come up!

Sites with good pluvial lake maps:
Department of Geosciences, The University of Arizona:

<http://www.geo.arizona.edu/palynology/geos462/03pluvial.html>

University of Wisconsin - Green Bay site – great maps for many lakes:

<http://www.uwgb.edu/dutchs/202OVHDS/GLACgeog.HTM>

COMPLETELY FRACTURED GEOLOGY

Correct definitions for COMPLETELY FRACTURED GEOLOGY, adapted from AGI Dictionary of Geological Terms, 3rd Ed., Bates & Jackson, by E. Pratt

1. **Foreset bed:** An inclined layer of a cross-bedded unit, such as on the front slope of a delta or the lee side of a dune
2. **Creep recovery:** The gradual recovery of elastic strain when stress is released; elastic aftereffect
3. **Anticlinorium:** A regional upward fold composed of lesser folds
4. **Anomalous young:** Refers to a geological feature that is unexpectedly younger than its general surroundings
5. **Anorthosite:** A plutonic rock composed almost wholly of plagioclase
6. **Argon-argon dating:** Calculating the age in years for a geologic specimen by using the nuclear decay of an unstable argon isotope into a stable one (EP)
7. **Accretion:** (1) The gradual addition of new land to old by the deposition of stream-borne sediment (2) The addition of fresh material to the outside of an inorganic body (3) A theory of continental growth by adding successive geosynclines to the craton
8. **Blowout:** (1) A saucer- or trough-shaped hollow formed by wind erosion on a dune or

other sand deposit (2) A surface exposure of strongly altered, discolored rock thought to be associated with a mineral deposit (3) Expulsion of drilling fluid from an oil or gas well when the bit unexpectedly meets gas under high pressure

9. **Broche:** A pattern that looks as though it were woven (Random House Dict.)
10. **Corundum:** An extremely tough aluminum oxide with a hardness of 9; found as grains, masses, or as rhombohedral crystals such as ruby and sapphire

Global Climate Change

an OSU Lecture Series

Oregon State University is hosting a series of lectures on the topic of global climate change this winter. Lectures are to be held at 4:00 p.m. Fridays in the Gilfillan Auditorium, and are free to the public. Upcoming dates and speakers include:

- March 1 – "Interhemispheric Paleoclimate Change in the Americas", by Vera Markgraf of University of Colorado
- March 8 – "Paleoclimate Interpretation from Sedimentary Rocks", by Judith Totman Parrish, of University of Arizona
- March 15 – "The Uvic Earth System Climate Model: Model Description, Climatology and Applications to Past, Present and Future Climates", by Andrew Weaver of the University of Victoria

Cordilleran Section of the GSA to meet in Corvallis in May

The Cordilleran Section of the Geological Society of America will be hosted by Department of Geosciences, Oregon State University in Corvallis May 13-15 of this year. The theme of this year's meeting is "Where Plates Collide." The meeting will be held at the LaSells Stewart Center and CH2M Hill Alumni Center, Oregon State University. Thirty-six sessions and symposia plus thirteen field trips have been scheduled.

Preregistration deadline is April 5, 2002; cancellation deadline is April 12, 2002. Registration forms and meeting information are available online at www.geosociety.org, under Section Meetings. Registration questions should be directed to the registration coordinator, Jeff Templeton, 503-838-8858, templej@wou.edu or GSA Member Services, 1-888-443-4478, member@geosociety.org. Details of the meeting are also printed in the February 2002 issue of GSA Today, available at geology libraries. GSOC members who have questions about the meeting and do not have access to the internet can also contact Beverly Vogt, 503-292-6939.

Geological Society of the Oregon Country

PO Box 907
Portland, OR 97207-0907

Field Trip to Wenatchee, Washington
Official Registration Form

Leader:..... Taylor Hunt, GSOC leader, also featuring speakers John H. Whitmer, GSOC member and editor for Northwest Geological Society, and Charles L. Mason, retired professional geologist and author of The Geological History of the Wenatchee Valley and Adjacent Vicinity

Itinerary:..... Friday, travel to Wenatchee; Saturday, western side of the Columbia Valley – metamorphic core complex; Sunday, eastern side of the Columbia Valley and coulees – Ice Age geological features; Monday, return to Portland

Dates for Trip: March 15, 2002 - Registration and \$175 down payment (per participant) DUE – make checks payable to RAZ Transportation, send to GSOC post office box, see header. Include signed waiver form. This early date is important because Wenatchee is celebrating the apple blossom festival on Memorial Day weekend.
May 1, 2002 – Balance payment DUE
May 24, 2002, Friday at approx. 2:00 p.m. – leave for Wenatchee, exact time and place to be announced
May 24-May 26, 2002 - Nights we will be staying in Wenatchee
May 27, 2002 – Return to Portland

Cost for the Trip:..... \$325 for double occupancy, \$475 for single occupancy. Price includes lodging, continental breakfasts, boxed lunches and transportation, including driver gratuity. Price does NOT include dinners.

Lodging:..... Motel lodging in Wenatchee, Washington, to be arranged by RAZ

Refunds: Last date to notify Taylor for a full refund is April 5, 2002. A partial refund can be given prior to May 10, 2002.

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

Name (s) _____


Name (s) _____

Total Number of Persons Registering _____ Total cost of trip _____

Address _____

Phone # _____ email _____

For questions, email Taylor Hunt at hunt6422@msn.com or phone at 503-662-4790.

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

Geological Society of the Oregon Country

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Field Trip to Wenatchee, Washington
Waiver

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

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

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

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

Signed: _____ Dated: _____

Parent or other legal guardian signature _____

MEDICAL INFORMATION

Name _____

Phone # _____ email _____

Name of Physician: _____ Telephone Number: _____

Allergies: _____

Special Medications: _____

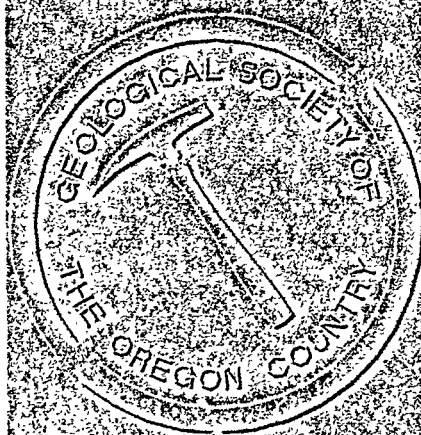
Special Medical Conditions: _____

In Case of an Emergency Call: _____

THE GEOLOGICAL NEWSLETTER

6500
MARCH 2002

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Address _____ City _____ State _____ Zip _____

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Evelyn Pratt, 503-223-2601

VOL. 68, No. 3

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Saturday, January 26, 2002
Taylor Hunt, leader

Taylor led our GSOC field trip from North Plains, where the group examined a large granite erratic boulder recently pulled out of a nearby farmer's field. It was potato-shaped, about 5 feet long and 3 feet wide. Taylor identified the various crystals in it, its plutonic origin, where it came from--probably the Purcell Trench in British Columbia--and how it was rafted here during the Ice Age Floods.

We then headed south across Jackson Bottom and the Tualatin River. The water was high but we could still see where the river was by its overflow banks which over time have raised the riverbed above the adjacent sloughs.

Continuing south to Laurel, we began to see evidence of the faulting caused by the uplift of the Chehalem Mountains. We stopped for a break at Laurel Store, where Taylor explained the tectonics causing the folding, faulting and stretching, and the horst and graben nature of the terrain on our next leg straight up Laurel and Bald Peak Roads, as they rose in a series of undulating stairsteps from Laurel at elevation 194' to the top at 1100' in under three miles.

It was snowing up on the hill when we turned onto Laurelwood Road and cautiously dropped down the scarp side and stopped at the Buffalo Farm about halfway down. It was snowing hard and we could not see the view as planned. Continuing downhill, Taylor indicated a roadcut exposing Oligocene marine sedimentary rock. At Laurelwood we stopped and decided to adjourn and resume the next week, weather permitting.

We met at Laurel the following Saturday morning. This time fog was the problem. At the Buffalo Farm, the fog was burning off and Taylor talked about the massive slides on this side of the mountain and the Gales Creek Fault running through Wapato valley below. He told us to notice the slide evidence as we drove through Laurelwood, especially to the north, as we would next be heading up and along the scarp of that slide. Passing through Laurelwood down to Spring Hill Road, Taylor pointed out signs of Flood scouring on the hill to our right. We turned right on Spring Hill Road and on the west flank of that same hill were a series of large ripple marks. Here we were driving along the Gales Creek Fault, a strike-slip fault with the west side moving northwest, the east side southeast.

We turned right on Dixon Mill Road and headed up the toe of a slide to the scarp on the south side of Iowa Hill, where we saw dramatic slumps and a number of slump ponds. This was the head of the slide we saw at Laurelwood.

At the top we turned down Iowa Hill Road and cut across to Fern Hill Road down by the river bottom. Taking a left, we could see where the Tualatin Valley Water District's huge pipeline project had been interrupted when the excavators ran into an ancient logjam 20 to 30 feet below the riverbed, possibly a result of the Floods. If true, these would be the first trees found beneath Missoula sediments. They are being carbon-dated and mapped with ground penetrating radar.

As we rounded the tip of Fern Hill and headed south on Spring Hill Road past the ripple marks on our left and the flooded Wapato Lake Bed on our right, Taylor told us to notice how the valley was

narrowing as we approached the Chehalem Valley. This was due to slides and is also where the Gales Creek Fault passes through the Yamhill-Bonneville Lineament, another major fault zone.

As we turned up Albertson Road we stopped to see the divide between the Chehalem and Wapato valleys, a field separating Chahalem Creek and Ayers Creek, one flowing south to the Willamette and the other flowing north to the Tualatin. Taylor said the Tualatin used to flow through here to the Willamette before the toe of the Ribbon Ridge slide blocked it at that low divide.

Ascending Albertson Road we stopped at an abandoned quarry to examine the Columbia River Basalt which came down in a slide from the basalt cap on top of Bald Peak 1000' above. We then drove up below the west and northwest sides of the Bald Peak scarp and on to Bald Peak Road to the top, then east along the top of the northwest scarp face, a sheer 400' drop on our right. Below that, the massive slide area another 900' to the valley floor. We turned down Kings Grade to Tykeson Road, riding the hummocky Kings Grade slide down to Dopp Road, then right again to Albertson, completing a circuit around this slide area.

Taking a left on North Valley Road we then circled the Ribbon Ridge slide area and returned via Dopp to Albertson to end our field trip. We thank Taylor for his patience and tireless enthusiasm.

Submitted by George Hibbs

COMPLETELY FRACTURED GEOLOGY

by Ralph & Evelyn Pratt

1. **Foreset bed:** In a literary work, a bed referred to on a previous page
2. **Creep recovery:** As in, "After one date with that guy, I'm undergoing creep recovery!"
3. **Anticlinorium:** A hospital facility that treats those who are against everything

4. **Anomalous young:** Refers to any number of Hollywood stars
5. **Anorthosite:** A side of a tree on which moss is said to grow
6. **Argon-argon dating:** One way of avoiding miscegenation
7. **Accretion:** According to the Bible, what God made during the first 6 days
8. **Blowout:** A party favor that uncoils when you blow into it
9. **Broche:** (1) A fancy piece of jewelry (2) A yummy French sweet roll
10. **Corundum:** A riddle involving a pun, such as "What is black and white and red all over?"

See page 15 for the real definitions.

BOOK REVIEW: THE GEOLOGICAL HISTORY OF THE WENATCHEE VALLEY AND ADJACENT VICINITY

Author: Charles L. Mason

Pixie Publishing, P O Box 97, Rock Island, Wa 98850, ISBN # 1-883078-01-6

Submitted by Taylor Hunt, GSOC Field Trip Coordinator

Prologue: I am particularly grateful to the author, Charles L. Mason, for giving me permission to use his photos to make a slide presentation for use at our meetings, library presentations, etc.

This book of 172 pages has 14 chapters and a one-page conclusion. In chapter one, plate tectonics, continental drift, and Alfred Wagner's thesis are explained. For those of you who know me, you know I am somewhat of a comet/asteroid buff with regard to how some of earth's features came about...I was pleasantly surprised to see Mr Wagner's explanation as to what started the breakup of Pangea as an "impact of a possible comet or meteorite".

Chapters 2 and 3 discuss the formation of Washington state and its rock cycle in an easy-to-read text backed up with excellent graphics. Chapter 4, 5, and 6 discuss local igneous rock structures, the basalt flow of the Columbia Plateau and the effects of volcanoes and earthquakes in this area.

The hardest chapter to comprehend for me was Chapter 7 on consolidated and unconsolidated sedimentary deposits. However, chapter 8 on metamorphic structures really helped clarify in my mind how to distinguish the source of metamorphic rocks - for example, a metamorphic rock from a sedimentary deposit vs. a metamorphic rock with an igneous origin.

After reading this book and having visited the Wenatchee Valley many times, I found chapter 9 on landslide formations really helped me recognize these structures in my travels elsewhere. Chapter 10 on Bretz-Missoula Floods clarified really just what these floods were able to do and not do, and what really was responsible for the formation I was looking at. This idea is expanded upon in chapter 11 on Moses Coulee and Grand Coulee.

Chapter 12 discusses erratics and simplifies the difference between a local erratic and an exotic erratic and the power needed to place them. Chapter 13 discusses the major landslide of the area, the Malaga slide.

The last chapter discusses the varied mineral wealth of the area from coal and oil to gold and silver and all types of mining activities in between.

In conclusion the author states "Many who have spent a lifetime in this valley have not and do not appreciate what natural wonders surround them. In that respect, I trust that this work will influence their desire to seek and examine this bounty afforded us, because this gift of ours is not granted everyone, everywhere."

A particular help when reading this book is to have a local map of the Wenatchee area with Township,

Range, and Section. He refers to all his points of interest in this manner.

In my opinion, this is a "must read" book for any one interested in geology.

ANCIENT LAKE

CHEWAUCAN: Is It the

Oregon High Desert's

"Rosetta Stone"?

a report from the February 8, 2002, GSOC Friday night meeting featuring speaker **Clay Kelleher**, past GSOC President and a Friend of the Pleistocene.

by Carol Hasenberg

This past September 28-30, the Friends of the Pleistocene, Pacific NW Cell, investigated the sagebrush flats once covered by Lake Chewaucan. Ancient Lake Chewaucan existed in the Pleistocene in the area that is now occupied by Lake Abert and Summer Lake. GSOC member Clay Kelleher attended the event and was impressed by the 28 highly qualified speakers.

Many laypeople think that what is now eastern Oregon was covered by one big lake during the Ice Ages. This was not true. Several lakes existed which were separate from each other, including Lake Chewaucan, Fort Rock Lake in what is now Christmas Valley and Fossil Lake, a lake covering present-day Warner Valley, and a lake in the present basin containing Malheur Lake and Harney Lake. Lake Chewaucan was close, but not connected to, Fort Rock Lake.

Chewaucan, now pronounced shee-WAH-cun, is derived from the Klamath Indian words for wild potato and place, according to Lewis McArthur in Oregon Geographic Names, sixth edition, Oregon Historical Society Press. The word is now used to name Chewaucan Marsh, a series of two smaller basins connecting the two larger lakes (Lake Abert

and Summer Lake). The basins are labeled Upper and Lower Chewaucan Marshes.

Geologically speaking, Chewaucan basin is a pull-apart basin. A normal fault lies at the edge of Lake Abert – it forms the high cliff at the eastern rim of the lake (Abert Rim). Summer Lake is reduced to marshy areas during the summer months. The salty bottom of the lake can be seen below Winter Rim (Winter Ridge) to the west of Summer Lake. It is easy to see wave-cut terraces in the rims that mark the ancient levels of Lake Chewaucan. The major faults that created the basin rims trend to the N-NE and N-NW. Some minor faults are also present in the basin.

For local interest, observe groups of precipitated rocks which can be found in the basin. These rocks formed on the floor of the lake. Some hot springs can also be found in the area. Pack rat middens are used to date archaeology sites in the area, because pack rats always eat fresh pollen. (For more on this subject, see the website about the "Great Basin Truffle Project", by Robert Fogel of the University of Michigan and Jack States of Northern Arizona University, URL's

http://www.herb.lsa.umich.edu/GBSurvey/Gb_home.htm

and

<http://www.herb.lsa.umich.edu/gbsurvey/glacial.htm>)

The Chewaucan River flowed northward into Summer Lake during the Ice Age, but over time sediments built up which turned the river south to empty into Lake Abert. The river changed course about 20,000 years ago. Presently the Ana River, which flows south, is the principal source of water for Summer Lake.

What makes Summer Lake especially interesting to geologists is that the lake stratigraphy can be used to correlate volcanic events through the entire Western United States. The stratigraphy can be observed from core drilling and in cut banks along the Ana River. Each layer of sediment represents some geological event – the record is so good because Summer Lake has been without an outlet for a very long time. There are at least 50 layers of

strata, which go back in time almost 200,000 years. One such event is an eruption of Mt. St. Helens which occurred 47,000 years ago. Other eruption records exist for many Cascade peaks. The stratigraphic record ties together strata occurring several states apart.

In analyzing the stratigraphy, layer composition and especially the amounts of trace compounds, are used help to identify the different layers. An example of this is the percentage of the Oxygen-18 isotope in a water molecule, which is dependent on the temperature. Climate cycles have been mapped from the O-18 in the ice layers of the Greenland Ice Sheet, and these are used as a baseline to correlate other climatic records. The temperature variations have been correlated with the concentration of the mineral magnetite in the sediment of pluvial lakes.

For a good reference on Lake Chewaucan, read Ira S. Allison's 1982 book, Geology of Pluvial Lake Chewaucan, Lake County, Oregon, published by the OSU Press.

WEB TEASERS

For more information on Lake Chewaucan and pluvial lakes, try Google web searches for the topics

Lake Chewaucan Pluvial Lakes

All sorts of fascinating sites come up!

Sites with good pluvial lake maps:
Department of Geosciences, The University of Arizona:

<http://www.geo.arizona.edu/palynology/geos462/03pluvial.html>

University of Wisconsin - Green Bay site – great maps for many lakes:

<http://www.uwgb.edu/dutchs/202OVHDS/GLACgeog.HTM>

COMPLETELY FRACTURED GEOLOGY

Correct definitions for COMPLETELY FRACTURED GEOLOGY, adapted from AGI Dictionary of Geological Terms, 3rd Ed., Bates & Jackson, by E. Pratt

1. **Foreset bed:** An inclined layer of a cross-bedded unit, such as on the front slope of a delta or the lee side of a dune
2. **Creep recovery:** The gradual recovery of elastic strain when stress is released; elastic aftereffect
3. **Anticlinorium:** A regional upward fold composed of lesser folds
4. **Anomalous young:** Refers to a geological feature that is unexpectedly younger than its general surroundings
5. **Anorthosite:** A plutonic rock composed almost wholly of plagioclase
6. **Argon-argon dating:** Calculating the age in years for a geologic specimen by using the nuclear decay of an unstable argon isotope into a stable one (EP)
7. **Accretion:** (1) The gradual addition of new land to old by the deposition of stream-borne sediment (2) The addition of fresh material to the outside of an inorganic body (3) A theory of continental growth by adding successive geosynclines to the craton
8. **Blowout:** (1) A saucer- or trough-shaped hollow formed by wind erosion on a dune or

- other sand deposit (2) A surface exposure of strongly altered, discolored rock thought to be associated with a mineral deposit (3) Expulsion of drilling fluid from an oil or gas well when the bit unexpectedly meets gas under high pressure
9. **Broche:** A pattern that looks as though it were woven (Random House Dict.)
 10. **Corundum:** An extremely tough aluminum oxide with a hardness of 9; found as grains, masses, or as rhombohedral crystals such as ruby and sapphire

Global Climate Change

an OSU Lecture Series

Oregon State University is hosting a series of lectures on the topic of global climate change this winter. Lectures are to be held at 4:00 p.m. Fridays in the Gilfillan Auditorium, and are free to the public. Upcoming dates and speakers include:

- March 1 – "Interhemispheric Paleoclimate Change in the Americas", by Vera Markgraf of University of Colorado
- March 8 – "Paleoclimate Interpretation from Sedimentary Rocks", by Judith Totman Parrish, of University of Arizona
- March 15 – "The Uvic Earth System Climate Model: Model Description, Climatology and Applications to Past, Present and Future Climates", by Andrew Weaver of the University of Victoria

Cordilleran Section of the GSA to meet in Corvallis in May

The Cordilleran Section of the Geological Society of America will be hosted by Department of Geosciences, Oregon State University in Corvallis May 13-15 of this year. The theme of this year's meeting is "**Where Plates Collide.**" The meeting will be held at the LaSells Stewart Center and CH2M Hill Alumni Center, Oregon State University. Thirty-six sessions and symposia plus thirteen field trips have been scheduled.

Preregistration deadline is April 5, 2002; cancellation deadline is April 12, 2002. Registration forms and meeting information are available online at www.geosociety.org, under Section Meetings. Registration questions should be directed to the registration coordinator, Jeff Templeton, 503-838-8858, templej@wou.edu or GSA Member Services, 1-888-443-4478, member@geosociety.org. Details of the meeting are also printed in the February 2002 issue of GSA Today, available at geology libraries. GSOC members who have questions about the meeting and do not have access to the internet can also contact Beverly Vogt, 503-292-6939.

Geological Society of the Oregon Country

PO Box 907
Portland, OR 97207-0907

Field Trip to Wenatchee, Washington
Official Registration Form

Leader:..... Taylor Hunt, GSOC leader, also featuring speakers John H. Whitmer, GSOC member and editor for Northwest Geological Society, and Charles L. Mason, retired professional geologist and author of The Geological History of the Wenatchee Valley and Adjacent Vicinity

Itinerary:..... Friday, travel to Wenatchee; Saturday, western side of the Columbia Valley – metamorphic core complex; Sunday, eastern side of the Columbia Valley and coulees – Ice Age geological features; Monday, return to Portland

Dates for Trip: March 15, 2002 - Registration and \$175 down payment (per participant) DUE – make checks payable to RAZ Transportation, send to GSOC post office box, see header. Include signed waiver form. This early date is important because Wenatchee is celebrating the apple blossom festival on Memorial Day weekend.
May 1, 2002 – Balance payment DUE
May 24, 2002, Friday at approx. 2:00 p.m. – leave for Wenatchee, exact time and place to be announced
May 24-May 26, 2002 - Nights we will be staying in Wenatchee
May 27, 2002 – Return to Portland

Cost for the Trip:..... \$325 for double occupancy, \$475 for single occupancy. Price includes lodging, continental breakfasts, boxed lunches and transportation, including driver gratuity. Price does NOT include dinners.


Lodging:..... Motel lodging in Wenatchee, Washington, to be arranged by RAZ

Refunds: Last date to notify Taylor for a full refund is April 5, 2002. A partial refund can be given prior to May 10, 2002.

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

Name (s) _____
Name (s) _____
Total Number of Persons Registering _____ Total cost of trip _____
Address _____
Phone # _____ email _____

For questions, email Taylor Hunt at hunt6422@msn.com or phone at 503-662-4790.

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

Geological Society of the Oregon Country

PO Box 907

Portland, OR 97207-0907

Field Trip to Wenatchee, Washington

Waiver

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

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

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

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

Signed: _____ Dated: _____

Parent or other legal guardian signature _____

MEDICAL INFORMATION

Name _____

Phone # _____ email _____

Name of Physician: _____ Telephone Number: _____

Allergies: _____

Special Medications: _____

Special Medical Conditions: _____

In Case of an Emergency Call: _____

THE GEOLOGICAL NEWSLETTER

62000
FEBRUARY 2002

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



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THE GEOLOGICAL NEWSLETTER

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Calendar:

Evelyn Pratt – 503/223-2601

Business Manager:

Rosemary Kenney – 503/892-6514

Assistant Business Manager:

Cecelia Crater – 503/235-5158

ACTIVITIES:

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

FIELD TRIPS: Usually one per month. Fees: Members, \$1.00, Non-members, \$3.00. See calendar next page.

GEOLOGY SEMINAR: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.

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

PROGRAMS: EVENING: Second Friday Evening each month, 8:00 p.m., Rm. 371, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon. NOON: Usually first Friday monthly except June, July, August, and holidays, usually at noon, Multnomah County Library, 801 SW 10th Ave., Portland. Consult current calendar (next page) or verified by phone: 503/235-5158 or 503/892-6514.

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

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

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

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

WEBSITE: www.gsoc.org. Email address: gsoc@spiritone.com.

APPLICATION FOR MEMBERSHIP- THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Name _____ Spouse _____
Children under age 18 _____

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

Geologic Interests and Hobbies _____

Please indicate Membership type and include check for appropriate amount:

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

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

GEOLOGICAL NEWSLETTER

THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

P.O. BOX 907, PORTLAND, OR 97207

VISITORS WELCOME AT ALL MEETINGS

VOL. 68, No. 2

INFORMATION: www.gsoc.org or e-mail: gsoc@spiritone.com

FEBRUARY 2002

Sandra Adamson, 503-667-6287 or

Evelyn Pratt, 503-223-2601

FEBRUARY ACTIVITIES

Fri. Feb. 1, 2-3:30 PM: Mars: A New Perspective. Lamont Brock, Rose City Astronomers. Central Library, 801 SW 10th.

Fri. Feb. 8, 8:00 PM: Ancient Lake Chewaucan: Is It The Oregon High Desert's "Rosetta Stone"? Clay Kelleher, past president. Rm. 371 Cramer Hall, PSU.

Seminar Wed., Feb. 20, 8:00 PM: Coastal Dynamics: Waves and Beaches. Evelyn Pratt, past president. Rm. S-17 Cramer Hall, PSU.

Field Trip Sat., Feb. 23: Geologic and Human History of Rocky Butte and the Grotto.

Boring Lava, Bretz floods, a secret cave, and human history – all in one small area.

Taylor Hunt, 503-662-4790. Fee schedule – members free, non-members \$2.50.

Preview of coming attractions:

WEDNESDAY (note day change) Mar. 6, noon-1 PM: Geology of Selected Utah National Parks & Monuments. Taylor Hunt, Field Trip director.

!!

March 10 ANNUAL DINNER features **ELLEN MORRIS BISHOP**, author of soon-to-be-published "Ancient Oregon," at McMenamin's new & highly publicized **Grand Lodge** in Forest Grove. Banquet forms can be found in the attachment at the back of the newsletter – payment **deadline is March 2!!!**

!!

Seminar Wed., March 20, 8:00 PM: Human Impact on Coastlines. Evelyn Pratt, past president. Rm. S-17 Cramer Hall, PSU.

Field Trip Sat., March 23: The Dry Side of the Columbia Gorge – Washington.

Taylor Hunt, 503-662-4790. Fee schedule – members free, non-members \$2.50.

DUES ARE DUE! DUES ARE DUE! DUES ARE DUE!

Calendar items must be received by **15TH of preceding month**. Call Evelyn at 503-223-2601, or e-mail folkdans@aol.com.

WELCOME

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

George Hibbs
Yumei Wang
David Buckley
Brian Globerman

Message from the President



For the Year 2001, GSOC experienced a quiet, yet **highly successful year**. Our annual banquet was a great hit with a speaker whose archaeological and forensic expertise included extensive geological knowledge of the Columbia River Basin. He made the bones of Kennewick man come alive. We have had many fascinating speakers throughout the year, along with great field trips and seminars. Our annual picnic was another pleasant Sunday afternoon at the Rice Museum.

The board has begun an ongoing discussion about **GSOC's future** and how we may best serve our membership. We hope that you will make your voice heard about the kind of organization you want and how we may best serve you. Our volunteers and officers give many hours to make our events possible - their service, time, and efforts on our behalf are greatly appreciated.

A special **thank you** goes to each and every one of you--members, volunteers, and officers for your support of GSOC. My very best wishes for a prosperous and wonderful new year.

Sandy Adamson

BOARD MEETING NOTES

Summary of January 12 Board Meeting

The GSOC Board met January 12 at the home of Rosemary Kenney. Minutes of the previous meeting were approved.

Thanks to several GSOC members for their contributions to the club this year:

- **Diana Gordon**, for hospitality after our Friday night meetings. Don't forget to add \$\$ to the cookie pot so we can keep the cookies coming!
- **Evelyn Pratt**, for publicity work which she will be needing to give up so that she can be Vice President this coming year. Anyone interested in volunteering for the publicity post please contact Tom Gordon or Rosemary Kenney, or send an email to gsoc@spiritone.com.
- **Taylor Hunt** for field trips which have been attracting membership to the club as well as providing the members with educational opportunities.
- **Richard Bartels**, who has agreed to be the club's registered agent, as well as the other volunteer work he does for GSOC.

Work is being done to clean out some outdated material and duplicates from the **GSOC library**. Some of the material will be for sale at the annual banquet. Discretion has been granted to the Library Committee to perform this task.

Noon meeting times are more erratic these days because the downtown library is using the US Bank Room more often for their own purposes. Be sure to review the time and date of the noon meeting in the newsletter or on the website each month. Tim Tolle has offered the use of his slide projector to speakers who do not have their own. Also, anyone with suggestions for speakers should give that information to Robert Strebin or Tim Tolle.

Taylor Hunt to lead a three-night, bussed field trip to the Wenatchee, Washington area on **Memorial Day weekend**. Announcement for the trip will appear soon in the newsletter.

President's field trip is being planned to northern California Cascades (Mt. Lassen area) and possibly the Sierra Nevada. Trip may be as short as 3 days or as long as 8 or 9 days. Announcements will appear in the newsletter later this spring.

The board discussed the **field trip fees** in view of the copying expenses and the ways which field trips serve the organization. It was decided that the field trips serve to:

- provide learning opportunities for club members
- attract new members to the club

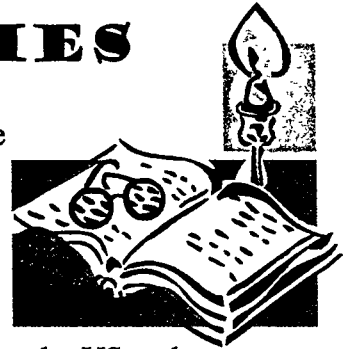
It was decided that the field trip fees should be dropped for the members and set at \$2.50 for non-members. This fee schedule will be reviewed this coming year in view of the copying expenses and adjusted as appropriate.

The board would like to encourage members to make **donations to the PSU Foundation**. The foundation awards a GSOC scholarship each year to a PSU Geology student. Make a note on the check that the money is being donated for the GSOC scholarship fund.

Anyone with **information about meetings and field trips** for other related organizations should send the information to newsletter editor Carol Hasenberg at gsoc@spiritone.com, or mail to Carol's home address in the GSOC directory. Charlene Holzwarth discussed the **Archives**, requesting that members send her labeled and identified photos from the field trips for the archives. Anyone with photos of GSOC events should send them to Charlene.

Next board meeting to be April 6 at Rosemary Kenney's house, 10 am.

HAPPY GEOLOGICAL MEMORIES



This is the story of the life and work of GSOC member Nikolay P. Senchilo, who was born in 1928 in the village of North Kazakhstan in the USSR. Nikolay emigrated to the US and became an American citizen in the year 2000. He left behind his beloved profession of geology, friends and colleagues, and many happy memories in order to live in the US.

Nikolay describes his childhood, memories of his homeland and his life today:

I had lovely and respectful parents, I was an only child and forever I keep them in my heart. In my youth I occupied myself with bicycles and boxing. I took part in city competitions. I like to watch soccer and tennis, and play badminton, billiards, and ice skating. I also like music opera, and ballet. When I was 16 years old I played mimic roles in the theatre. My favorite dances are the Waltz and the Tango. Of all musical instruments, I prefer piano, harp, and guitar. In my childhood I played a little on the balalaika. In the time of World War II in a group of children actors performed amateur productions for wounded soldiers in the hospital.

I love my city Alma-Ata (the former capital of Kazakhstan), where I lived most of my life. It is a beautiful modern town situated at the bottom of a splendid snow-covered mountain Zailyisky Alatau. In the garden grows gigantic Shan's figs and Aport apples. There are huge baths with Russian, Finnish, and Turkish sections. There is a world-famous stadium Medeo and sky area Chimbulak. There is a great Unicum Christian Church built of wood without any iron nails. We often had earthquakes there. Nearby are high mountain Lake Issik-Kul, Lake Balkash, and I often vacationed on the Black Sea.

These days I like to associate with Nature on foot or by bike. I like to gather flowers, medicinal plants, mushrooms, berries, fruits, and certain minerals and rocks. I planted two trees: a nut campra pine in Alma-Ata and a cedar in Vancouver. They will be beautiful things for a long time to come. I also paint with oils on diverse themes, including several spiritual paintings. I am a member of the Society of Washington Artists, and have received awards for my art, the last of which in the US at Exhibition Etsu-Shin.

His geological training and career:

My career began after graduating from the Mining and Metallurgical Institute at Alma-Ata in 1951. As a young engineer-geologist, I was first sent to work from Russia to Bulgaria. Because of my interest in science, in 1957 I worked in the USSR in the Academy of Science of Kazakhstan as a scientific research member and as a Chief of Laboratory during my last years.

In 1963 I supported the dissertation of Candidate Geology-mineralogical sciences; in 1970 I received a certificate of Senior scientific laborer from Supreme Certification Commission of the Soviet Union. I was a temporary substitute Professor and was working to prepare a doctorate dissertation pertaining to metallogeny. I participated in many scientific conferences in the USSR, Kazakhstan, and in six international congresses (Montreal, Canada, 1972; Berlin, Germany, 1974; Varna, Bulgaria, 1974, Carlowary and Prague, Czechoslovakia, 1978, and Washington D. C., U. S. A., 1989). I was a diplomat of the Exhibitions of Achievement National Economy of the USSR and Kazakhstan.

My first geological love was the mineral quartz. My dissertation examined the discrepancies between ore-bearing and barren quartz, comparing color, structure, texture, composition, crystal lattice, dielectric constant, thermo-luminescence, thermometry, etc. My colleagues at the Academy of Science of Kazakhstan and the Ministry of Geology conducted prognostication-metallogenical researches over a huge territory of Kazakhstan (Middle Asia and South Siberia). Some of the

work was done jointly with scientists from Russia and other Soviet Republics. I also took part in elaborate investigations about the development of the Earth's crust (tectonic, magmatism, metamorphism, ore-formation). Every summer I went into the field where I had the following experiences:

- I walked very long distances in Kazakhstan, Russia, and Bulgaria with a geological satchel on my back and compass and hammer in hand. I drew bore-hole diagrams and mapped the geology and mineral resources.
- I visited very diverse landscapes - the great and beautiful Tian-Shan on the border of China working at an altitude of 2390 meters, with glaciers and cliffs, edelweiss flowers, snow-leopards, and mountain eagles; amazing zones of alpine meadow and plains full of grass and wildflowers; bird's bazaars of swans, storks and cranes; sultry rocky or sandy deserts in Betpack-Dala with temperatures up to 130° F; and many others.
- I worked in populated areas and areas where nomadic people live. I always loved to work with people. There were representatives of other nationalities working with me, but we understood each other. I speak my native language Russian, delicate Kazakhstan, excelled in Bulgarian, and studied English.
- Fieldwork began in the early spring and ended with the first snow. We used horses, mules and even camels for transportation. We worked and slept in the tent or under the open sky – on riverbanks or lakeshores, in forests and even beside cracks in the earth.
- Some of the expeditions had dangerous adventures – explosions, snow-leopard encounters, dangerous and frightening climbs, and even a criminal worker mutiny.
- I became the supervisor of big expeditions, with large technical staffs and laborer forces. I am very grateful to all my companions for their attention, for their help and appreciation. And

after being separated from them, I will forever keep this love in my heart.

I had and still have many ideas for additional research projects in ore-concentration and metallogeny in my homeland. I have 87 publications of scientific work, including 8 monographs written alone and with co-authors. It has been a disappointment to me that I can't use my experience and knowledge in my life in the US because of my lack of knowledge of the English language. However, I enjoy being a member of the Geological Society of the Oregon Country and after improving my English I hope to be more active in this work.

by Nikolay Senchilo with introduction and editing by Carol Hasenberg

From the AGI Glossary of Geology, "**Metallogeny**-the study of the genesis of mineral deposits, with emphasis on their relationship in time and space to regional petrographic and tectonic features of the Earth's crust. The term has been used for both metallic and nonmetallic mineral deposits."

Beverly Vogt



Airborne Volcanic Gas Monitoring

a report from the January 11, 2002, GSOC Friday night meeting featuring speaker Ken McGee from the US Geological Survey Cascade Volcano Observatory.

by Carol Hasenberg

Airborne gas monitoring at the Cascade Volcano Observatory (CVO) in Vancouver, Washington has a history of over twenty years. A battery of gas-detecting instruments is mounted on the side of a twin-engine, un-pressurized airplane and gases are measured in parts-per-million (ppm). By making circuits around volcanoes and measuring as often as

possible, gas plumes which are often invisible can be detected and the mass flow of the gas from the volcano can be estimated. The data is digitally recorded and analyzed by computer.

The first airborne gas monitoring by CVO occurred a few months before the May 18, 1980 eruption of Mt. St. Helens and continued for eight years until the volcano became quiescent. A correlation spectrometer (COSPEC) was the instrument used to detect sulfur dioxide (SO₂) gas emissions in the ultraviolet range. An estimated 2 million metric tons of SO₂ was emitted during this period – one million tons is the estimate for the May 18 eruption which was not monitored (for obvious reasons!!)

In quantities of emissions, SO₂ comes behind water (H₂O) and carbon dioxide (CO₂) in the gas mixture emitted by a volcano when it erupts. However, SO₂ is a good active volcano indicator because it is normally not present in either the atmospheric baseline or in the gas plumes emitted by quiescent volcanoes. A model was made by geologists to predict what gases could be detected coming out of volcanoes – SO₂ reacts with water in a dormant volcano so it does not emit the gas normally. In a pre-erupting volcano, a dry zone forms in the vent because the magma is being heated and so SO₂ is able to escape. This makes SO₂ gas an indicator of a volcano which is preparing to erupt. So far SO₂ has not been detected in any of the other Cascade volcanoes.

The more common gases water (H₂O) and carbon dioxide (CO₂) are also being monitored these days in the Cascade. The airborne gas collection system consists of a very sensitive pressure gauge, COSPEC SO₂ monitor, electrochemical SO₂ and H₂S monitors, LICOR CO₂ monitor, temperature gauge, and GPS instrument which precisely locates the positions where the samples are taken.

A recent case study has been done at Mt. Baker in northern Washington state. On September 18, 2000, a monitoring flight was made to collect baseline data for the mountain to compare with future emissions. The gases come out of fumaroles in Sherman crater. In 21 orbits around the mountain, airborne gases above the atmospheric baseline were

detected 17 times. No temperature or pressure variations were found and no SO₂ was found. Steam and carbon dioxide (gases typical for quiescent volcanoes) were measured in the plume, which were then mapped and mass flows of 5.5 tons/day of H₂S and 171 tons/day of CO₂ were calculated. These amounts are comparable to the emissions of a gas-powered power plant.

Airborne gas monitoring has also been done at the South Sister volcano in April 2001, above the uplift radar interferometry anomaly (see the November 2001 issue of the Geological Newsletter – editor). A monitoring flight was flown without the COSPEC instrument because a helicopter was used. A series of traverses at treetop level detected a small CO₂ anomaly. The anomaly measured about 1 km long and 0.2 km wide and was located a little north of the stream which had the chemical anomaly. The anomaly was not detected in a September 2001 flight, but atmospheric conditions were not favorable that day.

Some interesting facts about CO₂ (greenhouse) gases emitted by volcanoes follow:

- Mt Etna is by far the biggest CO₂ emitter on the planet (70,000 tons/day)
- A global estimate of 200 million metric tons per year has been made for volcanic CO₂ emissions.
- Man produces 26,000 million metric tons per year of CO₂ – this amount of CO₂ emission is without precedent for back into Earth's history.

For more information on airborne gas monitoring, you can visit the CVO website at <http://vulcan.wr.usgs.gov>.

Global Climate Change

an OSU Lecture Series

Oregon State University is hosting a series of lectures on the topic of global climate change this winter. Lectures are to be held at 4:00 p.m. Fridays in the Gilfillan Auditorium, and are free to the public. Upcoming dates and speakers include:

- February 1 – "A Neoproterozoic Snowball Earth", by Dan Schrag of Earth and Planetary Sciences
- February 8 – "Holocene Climate Variability: Modes, Mechanisms and Cultural Impacts", by Peter deMenocal of Columbia University
- February 15 – "Climatic Weirdness – The Ice Did It", by Richard Alley of Penn State University
- February 22 – "Tropical Temperatures and Global Climate: Clues from Coral", by Rob Dunbar of Stanford University
- March 1 – "Interhemispheric Paleoclimate Change in the Americas", by Vera Markgraf of University of Colorado

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

PS – If you joined GSOC in September or later, your 2002 dues are paid, good deal!!!

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY SIXTY-SEVENTH ANNUAL BANQUET

Speaker

Ellen Morris Bishop, author of the popular and informative *Hiking Oregon's Geology*, will speak on Ancient Oregon, which is the title of her next book, due out next year. Specializing in igneous petrology and the exotic terrains of eastern Oregon, she received her PhD from Oregon State University in 1982. Among her other accomplishments, she wrote a column, *Timelines*, for the Portland *Oregonian*, and has taught geology at the college level. A fascinating speaker, she will show slides and provide many insights into the tumultuous history of the land we call home.

Where and When

The 2002 Annual Banquet will be held at McMenamins Grand Lodge, 3505 Pacific Avenue (Highway 8), Forest Grove, Oregon. (Tri-Met Bus #57, or to carpool, (360) 835-7748) There, the doors of the Compass Room will open at 1 p.m., on Sunday, March 10, and we will pick up our dinner tickets. Outdated books from the library and rocks will be for sale. Ellen Bishop will identify any disputed specimens, especially the igneous ones.

Menu

Grilled Pork Medallions

With a marion-berry sage reduction and roasted garlic mashed potatoes

Grilled Chicken Breast

With herbed tomato sauce and fettuccine alfredo

Spinach & Wild Mushroom Cannelloni

Baked with herbed tomato sauce and Parmesan cheese

All dinners include a mixed green salad with vinaigrette or a Caesar salad and coffee, decaf, and herbal teas. Desert will be cake from Helen Bernhardt Bakery.

_____ Number of tickets at **\$21.50** each. Please indicate entrée choice. **Make checks out to GSOC.** Also, if you have a table preference; please indicate it on the reservation.

Name/Names _____

Choice of Entree _____

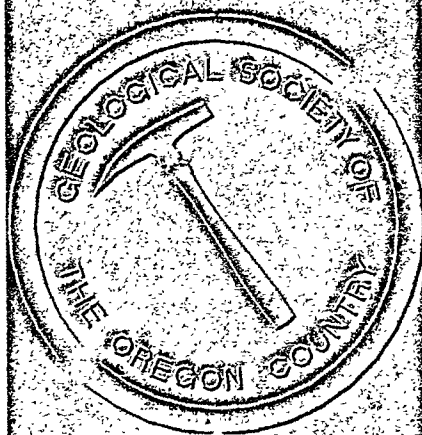
_____ Amount enclosed. (Reservations must be in by March 2, 2002.)

Send to: The Geological Society of the Oregon Country
P.O. Box 907
Portland, Oregon 97207

THE GEOLOGICAL NEWSLETTER

42006
APRIL 2002

**GEOLOGICAL SOCIETY
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ACTIVITIES:

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

FIELD TRIPS: Usually one per month. Fees: Members, \$1.00, Non-members, \$3.00. See calendar next page.

GEOLOGY SEMINAR: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.

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

PROGRAMS: EVENING: Second Friday Evening each month, 8:00 p.m., Rm. 371, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon. NOON: Usually first Friday monthly except June, July, August, and holidays, usually at noon, Multnomah County Library, 801 SW 10th Ave., Portland. Consult current calendar (next page) or verified by phone: 503/235-5158 or 503/892-6514.

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

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GEOLOGICAL NEWSLETTER

The Geological Society of the Oregon Country
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VISITORS WELCOME AT ALL MEETINGS
INFORMATION: www.gsoc.org or e-mail: gsoc@spiritone.com
Tom Gordon, 360/835-7748
Ted Walling, 503/598-8067

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APRIL ACTIVITIES

FRIDAY, APRIL 12 (Note date change) noon – 1:30 PM: Spring in the Northern Mojave Desert. Don Barr, past president. Central Library, 801 SW 10th.

Fri. April 12, 8:00 PM: Seaside Tsunami of 1964. Tom Horning, Horning Consultants. Rm 371 Cramer Hall, PSU.

Seminar, Wed. April 17, 8:00 PM: Metamorphism and Metamorphic Rocks. Richard Bartels, past president. Rm. S-17 Cramer Hall, PSU.

Field Trip Sat. April 20: Waterfall Wonderland – the Oregon Side of the Columbia Gorge. Taylor Hunt, 503-662-4790. Fee Schedule – members free, non-members \$2.50.

PREVIEW OF COMING ATTRACTIONS:

Fri. May 10, 8:00 PM: They May Dissolve in the Rain – Unusual Building Stones of the American West and Architectural Implications from Historic Structures. Dave Knoblach, NW Geological Society, Seattle. Rm 371 Cramer Hall, PSU.

Seminar, Wed. May 15, 8:00 PM: Geologic Features Around Wenatchee, Wa., Taylor Hunt, Rm S17, Cramer Hall, PSU.

May Noon Meeting: TBA

Memorial Day 3-Day Field Trip to Wenatchee, Washington. This is a bussed trip and reservations are required. Space is still available. You can sign up now with full payment. Call Taylor Hunt, 503-662-4790 for details.

- Taylor Hunt, GSOC leader, also featuring speakers John H Whitmer and Charles L. Mason.
- Leave Friday May 24, about 2:00 PM and return Monday, May 27, 2002
- Cost \$325 for double occupancy; \$470 single.
- Tour ancient metamorphic core complex plus Ice Age features
- Bus maximum capacity 45 persons from three organizations.

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

WELCOME

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

Paulette Meyer

Chris Dwyer

Pat Snyder

Mark Landis

Duane and Edie Schambron

Keith and Carol Dickson

GROTTO/ROCKY BUTTE FIELD TRIP

recap of the GSOC field trip, Saturday, February
23, 2002 – Taylor Hunt, leader

by Carol Hasenberg

This field trip explored the interesting landforms created by the Boring lava which came from the vent located on Rocky Butte in the Northeast part of Portland. For GSOC readers unfamiliar with this area of Portland, Rocky Butte is a prominent landscape feature on the northeast side of Portland just south of the Portland airport and near the I-84 and I-205 interchange. Rocky Butte was also the site of the Multnomah County jail until I-205 was opened in the 1980's.

The field trip began at the Grotto, a property owned by the Roman Catholic church. The Grotto is located off NE Sandy Boulevard, just east of the intersection with 82nd Avenue. The site was used as a quarry by the Union Pacific Railroad from the late 1800's until it was purchased by Father Ambrose Mayer in 1923. The property was dedicated the following year as The National Sanctuary of our Sorrowful Mother by Portland Archbishop Alexander Christie.

The Grotto is hewn from the base of the Boring lava basalt cliff, which exceeds 100 feet and divides the property. The Grotto shrine is a statuary carved in Italy from pristine white Carrara marble. The shrine stands in sharp contrast to the gray, moss covered, dripping basalt in which it is framed.

At the base of the cliff near the Grotto are also a collection of buildings including a very fine sanctuary, faced in Boring lava. Imported stone also lines the doorways and the sanctuary interior. An elevator transported the group to the top of the cliff, which contained a very fine strolling garden and inspiring meditation chapel poised at the brink of the cliff with a breathtaking view to the north.

The group then visited the quarry site itself, just to the east of the sanctuary. Taylor pointed out the possible position of a lava tube in the side of the cliff.

The group next drove to the cliff top on the way up the northern approach of Rocky Butte, and looked down on the quarry site. The cliff appears so much taller when one is standing on the brink! The group passed the old Military school on the way up the hill, which was founded in 1878 by J. W. Hill. He and his students persuaded Multnomah County to construct the road to the top which has a fabulous 270 degree view of the area.

On the way up the hill the group also observed rounded boulders which were probably brought by the Ice Age Floods. Some shaped stonework also lines the road, and the viewpoint at the top is a veritable fortress of stonework, built by the WPA in the 1930's.

Barbara Hawxhurst, President of the Rocky Butte Preservation Society, addressed the field trip group at the windy summit. The Preservation Society is responsible for restoration efforts which have greatly enhanced the park in recent years. The light fixtures one sees on the pilasters are recent additions by the Preservation Society – they have been specially designed to match the period of the stonework.

The field trip departed the summit by the western route (with the hairpin tunnel!) and visited the huge depression on the western flank which Taylor theorizes is a plunge pool from the Ice Age Floods.

For more information on Boring Lava, refer to the December 2000 issue of the Geological Newsletter, "The Not-So-Boring Volcanics", or refer to these pages of the USGS/Cascades Volcano Observatory website:

http://vulcan.wr.usgs.gov/Volcanoes/Oregon/BoringLavaField/description_boring_lava.html

GSOC SIXTY-SEVENTH ANNUAL BANQUET

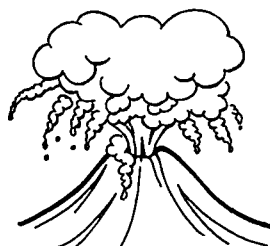
GSOC celebrated its sixty-seventh year with a banquet on March 10, 2002, at McMenam's Grand Lodge in Forest Grove. Eighty people attended the banquet, which featured Dr. Ellen Morris Bishop as the speaker.

At the meeting the new GSOC president Tom Gordon gave a very entertaining view of the type of person liable to join the Society. Richard Bartels, the Master of Ceremonies, presented Tom with the GSOC gavel and pickaxe. He then led the banquet in a moment of silence for the GSOC members who passed away this past year. Beverly Vogt read a farewell message sent to her by Past President Sandra Adamson, who has moved to Hawaii and was unable to attend the banquet.

Dr. Bishop's talk was focused on the work she has been doing in preparing her soon to be released book, *Ancient Oregon*. Dr. Bishop took us on a trip from the Devonian to recent times, and at each stop along the journey of time, she illustrated what the world was like at that time with pictures of the continental positions and descriptions of climatic conditions and flora/fauna of the period. Sea currents, continental groupings and latitudes of the continents had great effects on the climates of each of the ages.

At each of these stops, Dr. Bishop had slides showing the geologic formations in or near Oregon

which came from that period of time. It was enlightening to view these formations with respect to the context of the world in which they originated.



Glossary of Volcano and Related Terminology

From the USGS Cascades Volcano Observatory website:

<http://vulcan.wr.usgs.gov>

Lateral blast:

A sideways-directed explosion from the side or summit of a volcano. (Teacher's Packet)

An explosive event in which energy is directed horizontally instead of vertically as in an eruption column. (Gardner, et.al., 1995)

Lava:

The term used for magma once it has erupted onto the Earth's surface. (Teacher's Packet)

Molten rock that erupts from a vent or fissure. (Gardner, et.al., 1995)

See also: Magma

Lava flow:

Stream of molten rock that erupts relatively non-explosively from a volcano and moves slowly downslope. (Miller, 1989)

An outpouring of lava onto the land surface from a vent or fissure. Also, a solidified tongue-like or sheet-like body formed by outpouring lava. (Foxworthy and Hill, 1982)

Lava lake:

Another common lava product is the ponded flow or lava lake. The surface of lava that is ponded is smooth, broken only by polygonal cooling cracks, formed in much the same way as shrinkage cracks in mud that has been dried by the sun. ... The formation of the lava lake's solid crust by cooling can be compared to the formation of a sheet of ice

on top of a body of water during a winter freeze. (Tilling, Heliker, and Wright, 1987)

Lava tube:

During long-lived eruptions, lava flows tend to become "channeled" into a few main streams. Overflows of lava from these streams solidify quickly and plaster on to the channel walls, building natural levees or ramparts that allow the level of the lava to be raised. Lava streams that flow steadily in a confined channel for many hours to days may develop a solid crust or roof and thus change gradually into streams within lava tubes. Because the walls and roofs of such tubes are good thermal insulators, lava flowing through them can remain hot and fluid much longer than surface flows. Tube-fed lava can be transported for great distances from the eruption sites. (Tilling, Heliker, and Wright, 1987)

Lithic (volcanic):

Pertains to pyroclastic deposits that contain abundant fragments of previously-formed rocks and/or dense fragments.

Lithospheric Plates:

A series of rigid slabs (16 major ones at present) that make up the Earth's outer shell. These plates float on top of a softer, more plastic layer in the Earth's mantle. (Teacher's Packet)
Also called: Tectonic Plates.

Loess:

A well-sorted deposit of windblown silt-sized particles that forms a blanket over the landscape.

Maars:

Also called "tuff cones", maars are shallow, flat-floored craters formed above diatremes as a result of a violent expansion of magmatic gas or steam. Maars range in size from 200 to 6,500 feet across and from 30 to 650 feet deep, and most are commonly filled with water to form natural lakes.

Mafic:

Term used to describe volcanic rock or magma composed chiefly of dark-colored, iron- and magnesium-rich minerals. (Miller, 1989)

Magma:

Molten rock containing liquids, crystals, and dissolved gases that forms within the upper part of the Earth's mantle and crust. When erupted onto the Earth's surface, it is called lava. (Teacher's Packet)
Molten rock that contains dissolved gas and minerals. When magma reaches the surface it is called lava. (Gardner, et.al., 1995)

Magnetic polarity:

Direction of magnetic poles (either normal or reversed) preserved in igneous rocks after they cool through their Curie temperatures.

Magnitude:

A numerical expression of the amount of energy released by an earthquake, determined by measuring earthquake waves on standardized recording instruments (seismographs). The number scale for magnitudes is logarithmic rather than arithmetic; therefore, deflections on a seismograph for a magnitude 5 earthquake, for example, are 10 times greater than those for a magnitude 4 earthquake, 100 times greater than for a magnitude 3 earthquake, and so on. (Foxworthy and Hill, 1982)

Mantle:

A zone in the Earth's interior between the crust and the core that is 2,900 kilometers (1,740 miles) thick. (The lithosphere is composed of the topmost 65-70 kilometers (39-42 miles) of mantle and the crust). (Teacher's Packet)

Metamorphic rocks:

Sometimes sedimentary and igneous rocks are subject to pressures so intense or heat so high that they are completely changed. They become metamorphic rocks, which form while buried within the Earth's crust. The process of metamorphism does not melt the rocks, but instead transforms them into denser, more compact rocks. (Barker, 1997)

Monogenetic volcano:

Monogenetic volcanoes typically erupt for only brief time intervals -- weeks to perhaps centuries -- and generally display a narrower range (as compared to composite volcanoes) in eruptive

behavior. Most monogenetic volcanoes are basaltic in composition. (Walder, et.al., 1999)

Mudflow:

The flowing mixture of water and debris (intermediate between a volcanic avalanche and a water flood) that forms on the slopes of a volcano. Sometimes called a debris flow or lahar, a term from Indonesia where volcanic mudflows are a major hazard. (Teacher's Packet)
A flowage of water-saturated earth material possessing a high degree of fluidity during movement. A less-saturated flowing mass is often called a debris flow. A mudflow originating on the flank of a volcano is properly called a lahar. (Foxworthy and Hill, 1982)
See: Lahar.

"Oceanic" Volcanoes:

In a typical "oceanic" environment, volcanoes are aligned along the crest of a broad ridge that marks an active fracture system in the oceanic crust. Basaltic magmas, generated in the upper mantle beneath the ridge, rise along fractures through the basaltic layer. Because the granitic crustal layer is absent, the magmas are not appreciably modified or changed in composition and they erupt on the surface to form basaltic volcanoes. (Tilling, 1985)

Pahoehoe:

Pahoehoe (pronounced "pah-hoy-hoy" - a Hawaiian term), is lava that in solidified form is characterized by a smooth, billowy, or ropy surface. (Tilling, Heliker, and Wright, 1987)

Pelean eruption:

In a "Pelean" or "Nuee Ardent" (glowing cloud) eruption, such as occurred on the Mayan Volcano in the Philippines in 1968, a large quantity of gas, dust, ash, and incandescent lava fragments are blown out of a central crater, fall back, and form tongue-like, glowing avalanches that move down-slope at velocities as great as 100 miles per hour. Such eruptive activity can cause great destruction and loss of life if it occurs in populated areas, as demonstrated by the devastation of St. Pierre during

the 1902 eruption of Mount Pelee on Martinique, West Indies. (Tilling, 1985)

Phreatic eruption:

An explosion of steam, water, mud, and other material. May result from heating of groundwater by magma, and may generate base surges. (Miller, 1989)

A type of volcanic explosion that occurs when water comes in contact with hot rocks or ash near a volcanic vent, causing steam explosions. (Brantley, 1994)

An explosive volcanic eruption caused when water and heated volcanic rocks interact to produce a violent expulsion of steam and pulverized rocks. Magma is not involved. (Foxworthy and Hill, 1982)

Phreatomagmatic eruption:

An explosion composed of magmatic gases and steam derived from groundwater or surface water, combined with lava and other debris. (Miller, 1989)

Pillow Lava:

Fluid lava erupted or flowing under water may form a special structure called pillow lava. Such structures form when molten lava breaks through the thin walls of underwater tubes, squeezes out like toothpaste, and quickly solidifies as irregular, tongue-like protrusions. This process is repeated countless times, and the resulting protrusions stack one upon another as the lava flow advances underwater. The term pillow comes from the observation that these stacked protrusions are sack- or pillow-shaped in cross section. Typically ranging from less than a foot to several feet in diameter, each pillow has a glassy outer skin formed by the rapid cooling of the lava by water. Much pillow lava is erupted under relatively high pressure created by the weight of the overlying water; there is little or no explosive interaction between hot lava and cold water. The bulk of the submarine part of a Hawaiian volcano is composed of pillow lavas. (Tilling, Heliker, and Wright, 1987)

GEOLOGICAL TIME CHART

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

Phanerozoic Eon (544 ma to present)

Cenozoic Era (65 ma to present)

Quaternary Period (1.8 ma to present)

Holocene Epoch (8,000 years ago to present)

Pleistocene Epoch (1.8 ma to 8,000 years ago)

Tertiary Period (65 to 1.8 ma)

Pliocene Epoch (5.3 to 1.8 ma)

Miocene Epoch (23.8 to 5.3 ma)

Oligocene Epoch (33.7 to 23.8 ma)

Eocene Epoch (55.5 to 33.7 ma)

Paleocene Epoch (65 to 55.5 ma)

Mesozoic Era (248 to 65 ma)

Cretaceous Period (145 to 65 ma)

Jurassic Period (213 to 145 ma)

Triassic Period (248 to 213 ma)

Paleozoic Era (544 to 248 ma)

Permian Period (286 to 248 ma)

Carboniferous Period (360 to 286 ma)

Pennsylvanian Period (325 to 286 ma)

Mississippian Period (360 to 325 ma)

Devonian Period (410 to 360 ma)

Silurian Period (440 to 410 ma)

Ordovician Period (505 to 440 ma)

Cambrian Period (544 to 505 ma)

Precambrian Time (4500 to 544 ma)

Proterozoic Era (2500 to 544 ma)

Vendian Period (544 to 650 ma)

Archaean Era (3800 to 2500 ma)

Hadean Time (4500 to 3800 ma)

For more info on geological time, visit the USGS web site at:

<http://geology.er.usgs.gov/paleo/geotime.shtml>

<http://pubs.usgs.gov/gip/geotime/>

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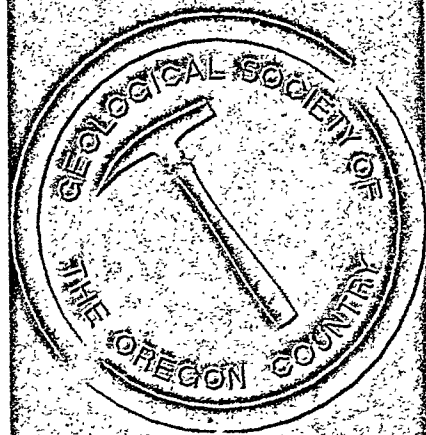
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THE GEOLOGICAL NEWSLETTER

42006
APRIL 2002

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



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Tom Gordon, 360/835-7748
Ted Walling, 503/598-8067

VOL. 68, No. 4
APRIL 2002

APRIL ACTIVITIES

FRIDAY, APRIL 12 (Note date change) noon – 1:30 PM: Spring in the Northern Mojave Desert. Don Barr, past president. Central Library, 801 SW 10th.

Fri. April 12, 8:00 PM: Seaside Tsunami of 1964. Tom Horning, Horning Consultants. Rm 371 Cramer Hall, PSU.

Seminar, Wed. April 17, 8:00 PM: Metamorphism and Metamorphic Rocks. Richard Bartels, past president. Rm. S-17 Cramer Hall, PSU.

Field Trip Sat. April 20: Waterfall Wonderland – the Oregon Side of the Columbia Gorge. Taylor Hunt, 503-662-4790. Fee Schedule – members free, non-members \$2.50.

PREVIEW OF COMING ATTRACTIONS:

Fri. May 10, 8:00 PM: They May Dissolve in the Rain – Unusual Building Stones of the American West and Architectural Implications from Historic Structures. Dave Knoblach, NW Geological Society, Seattle. Rm 371 Cramer Hall, PSU.

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May Noon Meeting: TBA

Memorial Day 3-Day Field Trip to Wenatchee, Washington. This is a bussed trip and reservations are required. Space is still available. You can sign up now with full payment. Call Taylor Hunt, 503-662-4790 for details.

- Taylor Hunt, GSOC leader, also featuring speakers John H Whitmer and Charles L. Mason.
- Leave Friday May 24, about 2:00 PM and return Monday, May 27, 2002
- Cost \$325 for double occupancy; \$470 single.
- Tour ancient metamorphic core complex plus Ice Age features
- Bus maximum capacity 45 persons from three organizations.

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

WELCOME

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

Paulette Meyer

Chris Dwyer

Pat Snyder

Mark Landis

Duane and Edie Schambron

Keith and Carol Dickson

GROTTO/ROCKY BUTTE FIELD TRIP

recap of the GSOC field trip, Saturday, February 23, 2002 – Taylor Hunt, leader

by Carol Hasenberg

This field trip explored the interesting landforms created by the Boring lava which came from the vent located on Rocky Butte in the Northeast part of Portland. For GSOC readers unfamiliar with this area of Portland, Rocky Butte is a prominent landscape feature on the northeast side of Portland just south of the Portland airport and near the I-84 and I-205 interchange. Rocky Butte was also the site of the Multnomah County jail until I-205 was opened in the 1980's.

The field trip began at the Grotto, a property owned by the Roman Catholic church. The Grotto is located off NE Sandy Boulevard, just east of the intersection with 82nd Avenue. The site was used as a quarry by the Union Pacific Railroad from the late 1800's until it was purchased by Father Ambrose Mayer in 1923. The property was dedicated the following year as The National Sanctuary of our Sorrowful Mother by Portland Archbishop Alexander Christie.

The Grotto is hewn from the base of the Boring lava basalt cliff, which exceeds 100 feet and divides the property. The Grotto shrine is a statuary carved in Italy from pristine white Carrara marble. The shrine stands in sharp contrast to the gray, moss covered, dripping basalt in which it is framed.

At the base of the cliff near the Grotto are also a collection of buildings including a very fine sanctuary, faced in Boring lava. Imported stone also lines the doorways and the sanctuary interior. An elevator transported the group to the top of the cliff, which contained a very fine strolling garden and inspiring meditation chapel poised at the brink of the cliff with a breathtaking view to the north.

The group then visited the quarry site itself, just to the east of the sanctuary. Taylor pointed out the possible position of a lava tube in the side of the cliff.

The group next drove to the cliff top on the way up the northern approach of Rocky Butte, and looked down on the quarry site. The cliff appears so much taller when one is standing on the brink! The group passed the old Military school on the way up the hill, which was founded in 1878 by J. W. Hill. He and his students persuaded Multnomah County to construct the road to the top which has a fabulous 270 degree view of the area.

On the way up the hill the group also observed rounded boulders which were probably brought by the Ice Age Floods. Some shaped stonework also lines the road, and the viewpoint at the top is a veritable fortress of stonework, built by the WPA in the 1930's.

Barbara Hawxhurst, President of the Rocky Butte Preservation Society, addressed the field trip group at the windy summit. The Preservation Society is responsible for restoration efforts which have greatly enhanced the park in recent years. The light fixtures one sees on the pilasters are recent additions by the Preservation Society – they have been specially designed to match the period of the stonework.

The field trip departed the summit by the western route (with the hairpin tunnel!) and visited the huge depression on the western flank which Taylor theorizes is a plunge pool from the Ice Age Floods.

For more information on Boring Lava, refer to the December 2000 issue of the Geological Newsletter, "The Not-So-Boring Volcanics", or refer to these pages of the USGS/Cascades Volcano Observatory website:

http://vulcan.wr.usgs.gov/Volcanoes/Oregon/BoringLavaField/description_boring_lava.html

GSOC SIXTY-SEVENTH ANNUAL BANQUET

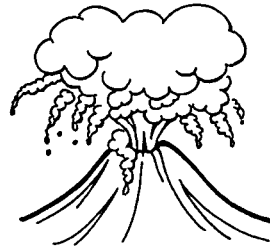
GSOC celebrated its sixty-seventh year with a banquet on March 10, 2002, at McMenam's Grand Lodge in Forest Grove. Eighty people attended the banquet, which featured Dr. Ellen Morris Bishop as the speaker.

At the meeting the new GSOC president Tom Gordon gave a very entertaining view of the type of person liable to join the Society. Richard Bartels, the Master of Ceremonies, presented Tom with the GSOC gavel and pickaxe. He then led the banquet in a moment of silence for the GSOC members who passed away this past year. Beverly Vogt read a farewell message sent to her by Past President Sandra Adamson, who has moved to Hawaii and was unable to attend the banquet.

Dr. Bishop's talk was focused on the work she has been doing in preparing her soon to be released book, Ancient Oregon. Dr. Bishop took us on a trip from the Devonian to recent times, and at each stop along the journey of time, she illustrated what the world was like at that time with pictures of the continental positions and descriptions of climatic conditions and flora/fauna of the period. Sea currents, continental groupings and latitudes of the continents had great effects on the climates of each of the ages.

At each of these stops, Dr. Bishop had slides showing the geologic formations in or near Oregon

which came from that period of time. It was enlightening to view these formations with respect to the context of the world in which they originated.



Glossary of Volcano and Related Terminology

From the USGS Cascades Volcano Observatory website:

<http://vulcan.wr.usgs.gov>

Lateral blast:

A sideways-directed explosion from the side or summit of a volcano. (Teacher's Packet)

An explosive event in which energy is directed horizontally instead of vertically as in an eruption column. (Gardner, et.al., 1995)

Lava:

The term used for magma once it has erupted onto the Earth's surface. (Teacher's Packet)

Molten rock that erupts from a vent or fissure. (Gardner, et.al., 1995)

See also: Magma

Lava flow:

Stream of molten rock that erupts relatively non-explosively from a volcano and moves slowly downslope. (Miller, 1989)

An outpouring of lava onto the land surface from a vent or fissure. Also, a solidified tongue-like or sheet-like body formed by outpouring lava.

(Foxworthy and Hill, 1982)

Lava lake:

Another common lava product is the ponded flow or lava lake. The surface of lava that is ponded is smooth, broken only by polygonal cooling cracks, formed in much the same way as shrinkage cracks in mud that has been dried by the sun. ... The formation of the lava lake's solid crust by cooling can be compared to the formation of a sheet of ice

on top of a body of water during a winter freeze. (Tilling, Heliker, and Wright, 1987)

Lava tube:

During long-lived eruptions, lava flows tend to become "channeled" into a few main streams. Overflows of lava from these streams solidify quickly and plaster on to the channel walls, building natural levees or ramparts that allow the level of the lava to be raised. Lava streams that flow steadily in a confined channel for many hours to days may develop a solid crust or roof and thus change gradually into streams within lava tubes. Because the walls and roofs of such tubes are good thermal insulators, lava flowing through them can remain hot and fluid much longer than surface flows. Tube-fed lava can be transported for great distances from the eruption sites. (Tilling, Heliker, and Wright, 1987)

Lithic (volcanic):

Pertains to pyroclastic deposits that contain abundant fragments of previously-formed rocks and/or dense fragments.

Lithospheric Plates:

A series of rigid slabs (16 major ones at present) that make up the Earth's outer shell. These plates float on top of a softer, more plastic layer in the Earth's mantle. (Teacher's Packet)

Also called: Tectonic Plates.

Loess:

A well-sorted deposit of windblown silt-sized particles that forms a blanket over the landscape.

Maars:

Also called "tuff cones", maars are shallow, flat-floored craters formed above diatremes as a result of a violent expansion of magmatic gas or steam. Maars range in size from 200 to 6,500 feet across and from 30 to 650 feet deep, and most are commonly filled with water to form natural lakes.

Mafic:

Term used to describe volcanic rock or magma composed chiefly of dark-colored, iron- and magnesium-rich minerals. (Miller, 1989)

Magma:

Molten rock containing liquids, crystals, and dissolved gases that forms within the upper part of the Earth's mantle and crust. When erupted onto the Earth's surface, it is called lava. (Teacher's Packet)
Molten rock that contains dissolved gas and minerals. When magma reaches the surface it is called lava. (Gardner, et.al., 1995)

Magnetic polarity:

Direction of magnetic poles (either normal or reversed) preserved in igneous rocks after they cool through their Curie temperatures.

Magnitude:

A numerical expression of the amount of energy released by an earthquake, determined by measuring earthquake waves on standardized recording instruments (seismographs). The number scale for magnitudes is logarithmic rather than arithmetic; therefore, deflections on a seismograph for a magnitude 5 earthquake, for example, are 10 times greater than those for a magnitude 4 earthquake, 100 times greater than for a magnitude 3 earthquake, and so on. (Foxworthy and Hill, 1982)

Mantle:

A zone in the Earth's interior between the crust and the core that is 2,900 kilometers (1,740 miles) thick. (The lithosphere is composed of the topmost 65-70 kilometers (39-42 miles) of mantle and the crust). (Teacher's Packet)

Metamorphic rocks:

Sometimes sedimentary and igneous rocks are subject to pressures so intense or heat so high that they are completely changed. They become metamorphic rocks, which form while buried within the Earth's crust. The process of metamorphism does not melt the rocks, but instead transforms them into denser, more compact rocks. (Barker, 1997)

Monogenetic volcano:

Monogenetic volcanoes typically erupt for only brief time intervals -- weeks to perhaps centuries -- and generally display a narrower range (as compared to composite volcanoes) in eruptive

behavior. Most monogenetic volcanoes are basaltic in composition. (Walder, et.al., 1999)

Mudflow:

The flowing mixture of water and debris (intermediate between a volcanic avalanche and a water flood) that forms on the slopes of a volcano. Sometimes called a debris flow or lahar, a term from Indonesia where volcanic mudflows are a major hazard. (Teacher's Packet)

A flowage of water-saturated earth material possessing a high degree of fluidity during movement. A less-saturated flowing mass is often called a debris flow. A mudflow originating on the flank of a volcano is properly called a lahar. (Foxworthy and Hill, 1982)

See: Lahar.

"Oceanic" Volcanoes:

In a typical "oceanic" environment, volcanoes are aligned along the crest of a broad ridge that marks an active fracture system in the oceanic crust. Basaltic magmas, generated in the upper mantle beneath the ridge, rise along fractures through the basaltic layer. Because the granitic crustal layer is absent, the magmas are not appreciably modified or changed in composition and they erupt on the surface to form basaltic volcanoes. (Tilling, 1985)

Pahoehoe:

Pahoehoe (pronounced "pah-hoy-hoy" - a Hawaiian term), is lava that in solidified form is characterized by a smooth, billowy, or ropy surface. (Tilling, Heliker, and Wright, 1987)

Pelean eruption:

In a "Pelean" or "Nuee Ardent" (glowing cloud) eruption, such as occurred on the Mayan Volcano in the Philippines in 1968, a large quantity of gas, dust, ash, and incandescent lava fragments are blown out of a central crater, fall back, and form tongue-like, glowing avalanches that move down-slope at velocities as great as 100 miles per hour. Such eruptive activity can cause great destruction and loss of life if it occurs in populated areas, as demonstrated by the devastation of St. Pierre during

the 1902 eruption of Mount Pelee on Martinique, West Indies. (Tilling, 1985)

Phreatic eruption:

An explosion of steam, water, mud, and other material. May result from heating of groundwater by magma, and may generate base surges. (Miller, 1989)

A type of volcanic explosion that occurs when water comes in contact with hot rocks or ash near a volcanic vent, causing steam explosions. (Brantley, 1994)

An explosive volcanic eruption caused when water and heated volcanic rocks interact to produce a violent expulsion of steam and pulverized rocks. Magma is not involved. (Foxworthy and Hill, 1982)

Phreatomagmatic eruption:

An explosion composed of magmatic gases and steam derived from groundwater or surface water, combined with lava and other debris. (Miller, 1989)

Pillow Lava:

Fluid lava erupted or flowing under water may form a special structure called pillow lava. Such structures form when molten lava breaks through the thin walls of underwater tubes, squeezes out like toothpaste, and quickly solidifies as irregular, tongue-like protrusions. This process is repeated countless times, and the resulting protrusions stack one upon another as the lava flow advances underwater. The term pillow comes from the observation that these stacked protrusions are sack- or pillow-shaped in cross section. Typically ranging from less than a foot to several feet in diameter, each pillow has a glassy outer skin formed by the rapid cooling of the lava by water. Much pillow lava is erupted under relatively high pressure created by the weight of the overlying water; there is little or no explosive interaction between hot lava and cold water. The bulk of the submarine part of a Hawaiian volcano is composed of pillow lavas. (Tilling, Heliker, and Wright, 1987)

GEOLOGICAL TIME CHART

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

Phanerozoic Eon (544 ma to present)

Cenozoic Era (65 ma to present)

Quaternary Period (1.8 ma to present)

Holocene Epoch (8,000 years ago to present)

Pleistocene Epoch (1.8 ma to 8,000 years ago)

Tertiary Period (65 to 1.8 ma)

Pliocene Epoch (5.3 to 1.8 ma)

Miocene Epoch (23.8 to 5.3 ma)

Oligocene Epoch (33.7 to 23.8 ma)

Eocene Epoch (55.5 to 33.7 ma)

Paleocene Epoch (65 to 55.5 ma)

Mesozoic Era (248 to 65 ma)

Cretaceous Period (145 to 65 ma)

Jurassic Period (213 to 145 ma)

Triassic Period (248 to 213 ma)

Paleozoic Era (544 to 248 ma)

Permian Period (286 to 248 ma)

Carboniferous Period (360 to 286 ma)

Pennsylvanian Period (325 to 286 ma)

Mississippian Period (360 to 325 ma)

Devonian Period (410 to 360 ma)

Silurian Period (440 to 410 ma)

Ordovician Period (505 to 440 ma)

Cambrian Period (544 to 505 ma)

Precambrian Time (4500 to 544 ma)

Proterozoic Era (2500 to 544 ma)

Vendian Period (544 to 650 ma)

Archaean Era (3800 to 2500 ma)

Hadean Time (4500 to 3800 ma)

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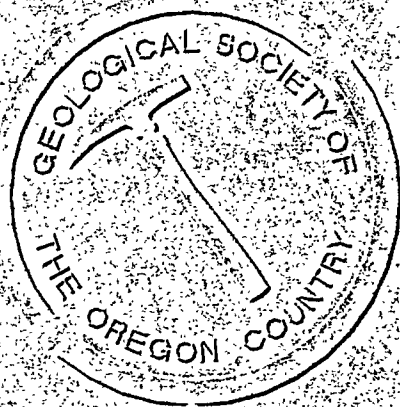
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Name _____ Spouse _____
Children under age 18 _____

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

Geologic Interests and Hobbies _____

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

Make Check Payable to: **The Geological Society of the Oregon Country**
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P.O. Box 907, Portland, OR 97207

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VOL. 68, No. 5

MAY 2002

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 - Cost \$325 for double occupancy; \$470 single.
 - Tour ancient metamorphic core complex plus Ice Age features.
-

PREVIEW OF COMING ATTRACTIONS:

Fri. June 14, 8:00 PM: The Alaska Orocline Revisited: Paleomagnetic Evidence From Bristol Bay, SW Alaska. Brian Globerman, Environmental Geologist and software test engineer. Rm 371 Cramer Hall, PSU.

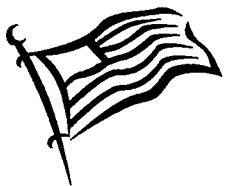
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WELCOME

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

Kenneth Sutton
Anita Alexander
Garth Edwards



THE PRESIDENT'S CORNER

Hi Everyone!

Taylor Hunt will lead the trip to Wenatchee on the Memorial Day weekend, as you know.

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Also, we will have great speakers, lined up by our Vice-President, Evelyn Pratt. Our next speaker will be from Seattle, talking about the materials we build with, including the pluses and the minuses of those rock types.

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Taylor will continue to lead outstanding field trips, as he has done in the past!

And you don't have to take any of this with a grain of basalt!

This is high-grade!

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FRACTURED

by Ralph & Evelyn Pratt

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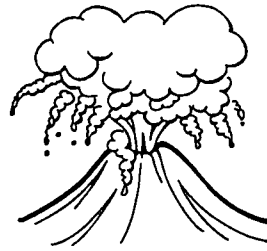
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Pertaining to igneous rock bodies that form at great depth.

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A light-colored, frothy volcanic rock, usually of dacite or rhyolite composition, formed by the expansion of gas in erupting lava. Commonly perceived as lumps or fragments of pea size and larger but can also occur abundantly as ash-size particles. (Foxworthy and Hill, 1982)

Because of its numerous gas bubbles, pumice commonly floats on water.

Pyroclastic:

Pertaining to fragmented (clastic) rock material formed by a volcanic explosion or ejection from a volcanic vent. (Foxworthy and Hill, 1982)

Pyroclastic flow:

A hot, fast-moving and high-density mixture of fine and coarse particles and gas formed during explosive eruptions or from the collapse of a lava dome. (Gardner, et.al., 1995)

Lateral flowage of a turbulent mixture of hot gases and unsorted pyroclastic material (volcanic fragments, crystals, ash, pumice, and glass shards) that can move at speed (50 to 100 miles an hour). The term also can refer to the deposit so formed. (Foxworthy and Hill, 1982)

A hot (300-800 degrees C (570-1470 degrees F)), dry, fast-moving (10 to more than 100 meters per second (20 to more than 200 miles per hour)) and high-density mixture of ash, pumice, rock fragments, and gas formed during explosive

eruptions or from the collapse of a lava dome. Moves away from a volcano at high speeds.

Pyroclastic surge:

Similar to a pyroclastic flow but of much lower density (higher gas to rock ratio). (Gardner, et.al., 1995)

Turbulent, low-density cloud of hot rock debris and gases that moves over the ground surface at high speed.

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FIELD TRIP RECAP

Taylor Hunt led GSOC members on a wonderful day of exploration from Vancouver to Hood River and back. We left the parking lot at the Red Lion in Vancouver and headed for our first stop in Camas...the ladies room and gas station. From here we headed for Cape Horn. The view of the

Columbia Gorge from here was magnificent, but we were focused on the flow of the ancient Columbia River. I'd always heard that there was a place on the Washington side from which you could see where the Columbia used to flow and there it was...hidden between Bridal Veil Falls and Coopers Falls is a "V" which has since filled with lava flows and sediments. Taylor explained how the Columbia used to meander north and south across its current path. In this spot the Columbia would have been flowing towards us. It is hard to imagine but during this time the entire area was a tidal flat.

Beacon rock was our second stop. We examined the north face from the parking lot. The columnar basalt appeared to be horizontal, or coming at us. Taylor explained that the lava flowed up and curved toward the edge. If we saw the core the columnar basalt would be vertical. We gathered our gear and lunch and headed for the top. As we climbed we noticed many fractures in the rock. Beacon Rock is a volcanic neck in a volcanic fissure and part of a fault which runs about 2 miles roughly north and south. Taylor explained that the fractures are due to the fault movements. Once on top we admired the view and the beautiful day, ate our lunch, and then it was time to descend. On the way down we saw the continuation of the fault to the north and tried to find the continuation of the fault to the south and across the Columbia.

On to Stop #3. We arrived at the west abutment of the mouth of the White Salmon River and viewed a roadside cliffwall along Highway 14 just west of the river. This is an amazing stratification of water-laid sediments. We initially viewed the wall from the opposite side of the road. The bedding was quite distinct. Taylor explained that the finer sediments were deposited when the water was not moving very fast (Troutdale Formation) and that the larger gravels were deposited in fast moving water. Also we saw mud lenses. We determined that the water would have been moving toward or away from us. It was also obvious that some tilting had occurred. We crossed the road and examine the Troutdale formation closely. Taylor explained that these gravels come from as far as Canada. He whacked a few pieces of gravel to reveal the beautiful interiors

of some granite, gneiss and quartzites. Some of the gravel is held together with arkose (a type of sandstone). He also pointed out some pillow basalts. They were washed along with the flow that created this wall of sediments.

We had great day. We thanked Taylor for his willingness to share his wealth of information and headed for home. I was lucky enough to be riding with Taylor and he pointed out more geology as we went. I never heard of a war bonnet (a lava tube later filled with lava that hardens in a radiating pattern) but got to see two along the way.

Submitted by Chris Dwyer

COMPLETELY FRACTURED GEOLOGY

Correct definitions for COMPLETELY FRACTURED GEOLOGY, adapted from AGI Dictionary of Geological Terms, 3rd Ed., Bates & Jackson, by E. Pratt

1. **Taxon:** a named group of organisms of any rank, such as a species, a family, or a class
2. **Tillite:** a sedimentary rock formed of glacial till which has become solidified
3. **Electrum:** a natural alloy of gold and silver
4. **Diatreme:** a breccia-filled volcanic pipe that was formed by a gaseous explosion
5. **Tor:** a high, isolated, rocky peak
6. **Turnover:** a time in fall or spring when surface water sinks and mixes with bottom water
7. **Conoscope:** a microscope that shines polarized light through a crystal, producing a pattern which can be used to classify the crystal

8. **T-chert:** a hard, dense form of quartz with invisible crystals – T-chert is that formed by weathering
9. **Vadose:** refers to water located above the watertable
10. **Permeability:** the ability of a porous rock or soil to transmit a fluid

Cordilleran Section of the GSA to meet in Corvallis in May

The Cordilleran Section of the Geological Society of America will be hosted by Department of Geosciences, Oregon State University in Corvallis May 13-15 of this year. The theme of this year's meeting is "Where Plates Collide." The meeting will be held at the LaSells Stewart Center and CH2M Hill Alumni Center, Oregon State University. Thirty-six sessions and symposia plus thirteen field trips have been scheduled.

Preregistration deadline is April 5, 2002; cancellation deadline is April 12, 2002. Registration forms and meeting information are available online at www.geosociety.org, under Section Meetings. Registration questions should be directed to the registration coordinator, Jeff Templeton, 503-838-8858, templej@wou.edu or GSA Member Services, 1-888-443-4478, member@geosociety.org. Details of the meeting are also printed in the February 2002 issue of GSA Today, available at geology libraries. GSOC members who have questions about the meeting and do not have access to the internet can also contact Beverly Vogt, 503-292-6939.

2002 GSOC ROSTER ANNOUNCEMENT



Here's the GSOC ROSTER NEWS!!

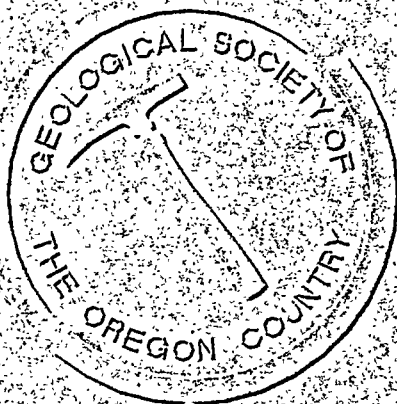


2002 GSOC Rosters are available starting in May! The roster lists the names, addresses, and phone numbers for our 140 members. This is a handy way to communicate with your fellow GSOC'ers. Please pick your roster up at any of the GSOC functions this month and next month!!! Pick up a roster for a GSOC friend, too!!

THE GEOLOGICAL NEWSLETTER

4500
MAY 2002

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



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2002-2003 ADMINISTRATION
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Vice-President:
Evelyn Pratt – 503/223-2601
Secretary
Beverly Vogt – 503/292-6939
Treasurer
Phyllis Thorne – 503/292-6134

Directors:
Su Ikeda (3 years) – 503/246-1385
John Newhouse (2 years) – 503/224-2156
Taylor Hunt (1 years) – 503/662-4790

Immediate Past Presidents:
Sandra Adamson
Ray Crowe – 503/640-6581

THE GEOLOGICAL NEWSLETTER

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

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

ACTIVITIES:

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

FIELD TRIPS: Usually one per month. Fees: Members, \$1.00, Non-members, \$3.00. See calendar next page.

GEOLOGY SEMINAR: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.

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

PROGRAMS: EVENING: Second Friday Evening each month, 8:00 p.m., Rm. 371, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon. **NOON:** Usually first Friday monthly except June, July, August, and holidays, usually at noon, Multnomah County Library, 801 SW 10th Ave., Portland. Consult current calendar (next page) or verified by phone: 503/235-5158 or 503/892-6514.

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

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

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

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

WEBSITE: www.gsoc.org. Email address: gsoc@spiritone.com.

APPLICATION FOR MEMBERSHIP-
THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Name _____ Spouse _____
Children under age 18 _____

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

Geologic Interests and Hobbies _____

Please indicate Membership type and include check for appropriate amount:

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Make Check Payable to: The Geological Society of the Oregon Country
PO Box 907
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Geological Newsletter

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VISITORS WELCOME AT ALL MEETINGS

INFORMATION: www.gsoc.org or e-mail: gsoc@spiritone.com

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VOL. 68, No. 5

MAY 2002

MAY ACTIVITIES

Fri. May 10, 8:00 PM: They May Dissolve in the Rain – Unusual Building Stones of the American West and Architectural Implications from Historic Structures. Dave Knoblach, NW Geological Society, Seattle. Rm 371 Cramer Hall, PSU.

Seminar, Wed. May 15, 8:00 PM: Geologic Features Around Wenatchee, Wa., Taylor Hunt, Rm 317, Cramer Hall, PSU. This seminar will be helpful in preparing for the May 24 Field Trip to Wenatchee.

Noon Meeting: No meeting in May. Noon meetings will start again in September.

Field Trip, Leaving May 24. Memorial Day 3-Day Field Trip to Wenatchee, Washington. If you have not signed up, call Taylor Hunt, 503-662-4790 for details.

- Taylor Hunt, GSOC leader, also featuring speakers John H. Whitmer and Charles L. Mason.
 - Leave Friday May 24, about 2:00 PM and return Monday, May 27, 2002.
 - Cost \$325 for double occupancy; \$470 single.
 - Tour ancient metamorphic core complex plus Ice Age features.
-

PREVIEW OF COMING ATTRACTIONS:

Fri. June 14, 8:00 PM: The Alaska Orocline Revisited: Paleomagnetic Evidence From Bristol Bay, SW Alaska. Brian Globerman, Environmental Geologist and software test engineer. Rm 371 Cramer Hall, PSU.

Field Trip Sat. June 22: Landscape By God. A Geologic Visit to Lake Grove and the Tualatin-Sherwood Channel. Taylor Hunt, 503-662-4790. Fee Schedule-members free, non-members \$2.50.

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

WELCOME

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

Kenneth Sutton
Anita Alexander
Garth Edwards



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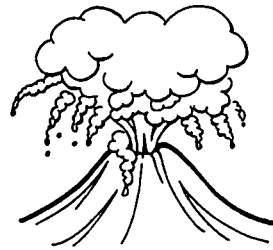
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Columbia Gorge from here was magnificent, but we were focused on the flow of the ancient Columbia River. I'd always heard that there was a place on the Washington side from which you could see where the Columbia used to flow and there it was...hidden between Bridal Veil Falls and Coopers Falls is a "V" which has since filled with lava flows and sediments. Taylor explained how the Columbia used to meander north and south across its current path. In this spot the Columbia would have been flowing towards us. It is hard to imagine but during this time the entire area was a tidal flat.

Beacon rock was our second stop. We examined the north face from the parking lot. The columnar basalt appeared to be horizontal, or coming at us. Taylor explained that the lava flowed up and curved toward the edge. If we saw the core the columnar basalt would be vertical. We gathered our gear and lunch and headed for the top. As we climbed we noticed many fractures in the rock. Beacon Rock is a volcanic neck in a volcanic fissure and part of a fault which runs about 2 miles roughly north and south. Taylor explained that the fractures are due to the fault movements. Once on top we admired the view and the beautiful day, ate our lunch, and then it was time to descend. On the way down we saw the continuation of the fault to the north and tried to find the continuation of the fault to the south and across the Columbia.

On to Stop #3. We arrived at the west abutment of the mouth of the White Salmon River and viewed a roadside cliffwall along Highway 14 just west of the river. This is an amazing stratification of water-laid sediments. We initially viewed the wall from the opposite side of the road. The bedding was quite distinct. Taylor explained that the finer sediments were deposited when the water was not moving very fast (Troutdale Formation) and that the larger gravels were deposited in fast moving water. Also we saw mud lenses. We determined that the water would have been moving toward or away from us. It was also obvious that some tilting had occurred. We crossed the road and examine the Troutdale formation closely. Taylor explained that these gravels come from as far as Canada. He whacked a few pieces of gravel to reveal the beautiful interiors

of some granite, gneiss and quartzites. Some of the gravel is held together with arkose (a type of sandstone). He also pointed out some pillow basalts. They were washed along with the flow that created this wall of sediments.

We had great day. We thanked Taylor for his willingness to share his wealth of information and headed for home. I was lucky enough to be riding with Taylor and he pointed out more geology as we went. I never heard of a war bonnet (a lava tube later filled with lava that hardens in a radiating pattern) but got to see two along the way.

Submitted by Chris Dwyer

COMPLETELY
FRACTURED
GEOLOGY

Correct definitions for COMPLETELY FRACTURED GEOLOGY, adapted from AGI Dictionary of Geological Terms, 3rd Ed., Bates & Jackson, by E. Pratt

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9. **Vadose:** refers to water located above the watertable
10. **Permeability:** the ability of a porous rock or soil to transmit a fluid

Cordilleran Section of the GSA to meet in Corvallis in May

The Cordilleran Section of the Geological Society of America will be hosted by Department of Geosciences, Oregon State University in Corvallis May 13-15 of this year. The theme of this year's meeting is "Where Plates Collide." The meeting will be held at the LaSells Stewart Center and CH2M Hill Alumni Center, Oregon State University. Thirty-six sessions and symposia plus thirteen field trips have been scheduled.

Preregistration deadline is April 5, 2002; cancellation deadline is April 12, 2002. Registration forms and meeting information are available online at www.geosociety.org, under Section Meetings. Registration questions should be directed to the registration coordinator, Jeff Templeton, 503-838-8858, templej@wou.edu or GSA Member Services, 1-888-443-4478, member@geosociety.org. Details of the meeting are also printed in the February 2002 issue of GSA Today, available at geology libraries. GSOC members who have questions about the meeting and do not have access to the internet can also contact Beverly Vogt, 503-292-6939.

2002 GSOC ROSTER ANNOUNCEMENT

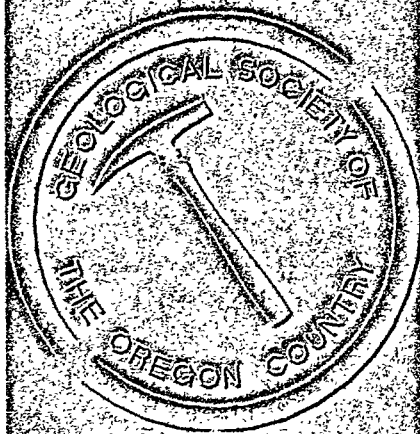
☺☺☺☺☺☺☺☺ Here's the GSOC ROSTER NEWS!! ☺☺☺☺☺☺☺☺

2002 GSOC Rosters are available starting in May! The roster lists the names, addresses, and phone numbers for our 140 members. This is a handy way to communicate with your fellow GSOC'ers. Please pick your roster up at any of the GSOC functions this month and next month!!! Pick up a roster for a GSOC friend, too!!

THE GEOLOGICAL NEWSLETTER

GSSG
JUNE 2002

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



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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

2002-2003 ADMINISTRATION

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Business Manager:

Rosemary Kenney – 503/892-6514

Assistant Business Manager:

Cecelia Crater – 503/235-5158

ACTIVITIES:

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

FIELD TRIPS: Usually one per month. Fees: Members, \$1.00, Non-members, \$3.00. See calendar next page.

GEOLOGY SEMINAR: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.

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

PROGRAMS: EVENING: Second Friday Evening each month, 8:00 p.m., Rm. 371, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon. NOON: Usually first Friday monthly except June, July, August, and holidays, usually at noon, Multnomah County Library, 801 SW 10th Ave., Portland. Consult current calendar (next page) or verified by phone: 503/235-5158 or 503/892-6514.

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

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

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Address _____ City _____ State _____ Zip _____ - _____
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Geologic Interests and Hobbies _____

Please indicate Membership type and include check for appropriate amount:

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

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GEOLOGICAL NEWSLETTER

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Tom Gordon, President, 360/835-7748

Ted Walling, Calendar Editor, 503/598-8067

VOL. 68, No. 6

JUNE 2002

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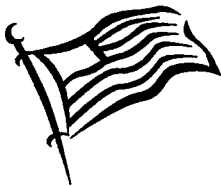
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WELCOME

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

Rebecca Halley
James W. Hyatt
Srirama Chandra
Deepika Chandra



THE PRESIDENT'S CORNER

Hi Everyone!

The President's Field Trip is **NOT** in July as announced at the meeting in May. Due to scheduling conflicts, the trip had to be moved.

The trip will leave on September 7 or 8 and get back on either September 12 or 13. We will have a six day trip.

We will be going to Lassen Peak (<http://www.nps.gov/lavo/>, http://vulcan.wr.usgs.gov/Volcanoes/Lassen/frame_work.html) and explore the geological wonders of northern California and southern Oregon.

- Day 1: Leave Portland and go to McKenzie Pass and explore. Stay at Klamath Falls.
- Day 2: Go through the Lava Beds National Monument. Stay at Redding.
- Day 3: Go to Lassen Peak and tour. Stay at Redding.
- Day 4: Explore the surrounding area. Stay at Redding.
- Day 5: Head north and explore the mineral rich area west of I-5. Stay in Medford.

- Day 6: Return to Portland.

Estimated cost is \$500 per person. Details are still being worked on and the next newsletter will have more information. Those interested, please email me, Tom Gordon, at tndgardens@attbi.com or call (360) 835-7748.

Tom Gordon, President

Meeting Time?

Would you like to have the Friday evening meeting time changed? Would you like to meet at 7:00 PM or at 7:30 PM?

Let us know! Email me at tndgardens@attbi.com or call someone on the Board of Directors.

COMPLETELY GEOLOGY

FRACTURED

by Ralph & Evelyn Pratt

1. **Taxon**: as in, "I'll stop picking up rocks when they start collecting a taxon 'em!"
2. **Tillite**: a farmer's advice to his son on how to break up soil
3. **Electrum**: as in, "What lousy politicians! Why did we ever electrum?"
4. **Diatreme**: what you go on when you're REALLY trying to lose weight
5. **Tor**: as in, "When I stepped on the hem of my skirt, I tor it."
6. **Turnover**: a delicious pastry that Grandma used to make, now sold in Fred Meyers, Safeway, et al
7. **Conoscope**: an instrument for finding out what swindlers are up to
8. **T-chert**: as in, "I went to a big geology conference and all I got was this lousy T-chert!"
9. **Vadose**: foreigner's remark about our customs: "Vell, dat's just duh vadose nutty Americans do tings."
10. **Permeability**: It's according to how well I can do it.

See page 30 for the correct definitions.

IN MEMORIAM

The Geological Society of the Oregon Country regrets to announce the passing of one of our most enthusiastic members, Dr. Duane Diller. Dr. Diller died at the age of 63 on April 23, 2002. Duane was an ophthalmologist who moved to Portland in 1970 after obtaining a medical degree from the Medical College of Virginia. He was born on July 24, 1938, in Chambersburg, Pennsylvania.

Duane is survived by his wife and GSOC member Dana Diller. Remembrances can be sent to Clackamas Community College.

NORTHWEST EARTH SCIENCE EXPLORERS

The Northwest Earth Science Explorers (NESE) is an activity and education-based youth group led by earth science professionals and outdoor enthusiasts. NESE welcomes members of all ages who wish to learn about the earth sciences, ecology, and geology. NESE activities include a monthly 2 hour presentation on a Tuesday evening followed by a field trip the following weekend.

This year's remaining presentations include:

June 2002 – Central Oregon Geology
Presentation: June 11, 7-9 pm

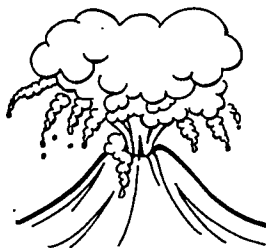
July 2002 – Opal Creek Environmental Clean-up
Presentation: June 9, 7-9 pm
Field Trip: July 13-14 – Overnight Field Trip to Opal Creek Resource and Education Center

There is a fee for the Opal Creek Field Trip.

All meetings are held at the USGS Cascade Volcano Observatory in Vancouver, Washington. New address for the CVO is 1300 SE Cardinal Court, Building 10, Suite 100, Vancouver, WA.

NESE is also looking for **volunteers** to lead field trips and/or give presentations. **GSOC members** who are interested should contact Craig Rankine.

For more information, contact Craig Rankine at 360-695-6056.



Glossary of Volcano and Related Terminology

From the USGS Cascades Volcano Observatory website:

<http://vulcan.wr.usgs.gov>

Reticulite:

During the exceptionally high fountaining episodes of some eruptions, an extremely vesicular, feathery light pumice, called reticulite or thread-lace scoria, can form and be carried many miles downwind from the high lava fountains. Even though reticulite is the least dense kind of tephra, it does not float on water, because its vesicles are open and interconnected. Consequently, when it falls on water, it becomes easily waterlogged and sinks. (Tilling, Heliker, and Wright, 1987)

Rhyolite:

Volcanic rock (or lava) that characteristically is light in color, contains 69 percent silica or more, and is rich in potassium and sodium. (Foxworthy and Hill, 1982)

Typically a light-colored crystalline or black glassy volcanic rock or magma, containing more than 68 percent silica with a very high viscosity when in a molten state.

Satellite vent:

A secondary vent of flank vent at a volcanic center.

Scoria:

Scoria forms when blobs of gas-charged lava are thrown into the air during an eruption and cool in flight, falling as dark volcanic rock containing

cavities created by trapped gas bubbles. (Clynne, et.al., 1998)

Seismicity:

Pertaining to earthquakes or earth vibration.

Seismograph:

A scientific instrument that detects and records vibrations (seismic waves) produced by earthquakes.

Shield volcano:

A volcano that resembles an inverted warrior's shield. It has long gentle slopes produced by multiple eruptions of fluid lava flows.

A volcano shaped like an inverted warrior's shield with long gentle slopes produced by eruptions of low-viscosity basaltic lava. (Brantley, 1994)

Silica:

The molecule formed of silicon and oxygen (SiO₂) that is the basic building block of volcanic rocks and the most important factor controlling the fluidity of magma. The higher a magma's silica content, the greater its viscosity or "stickiness." (Brantley, 1994)

Silicic:

Term used to describe silica-rich volcanic rock or magma. (Miller, 1989)

Spreading Ridges:

Places on the ocean floor where lithospheric plates separate and magma erupts. About 80 percent of the Earth's volcanic activity occurs on the ocean floor.

Stratovolcano:

See Composite volcano.

Strombolian eruption:

In a "Strombolian"-type eruption observed during the 1965 activity of Irazu Volcano in Costa Rica, huge clots of molten lava burst from the summit crater to form luminous arcs through the sky. Collecting on the flanks of the cone, lava clots combined to stream down the slopes in fiery rivulets. (Tilling, 1985)

COMPUTERS FOR THE MERCY CORPS

Rosemary Kenney, upon talking with her Mercy Corps contact, has discovered that they do not want the old textbooks. What they can use is old computer software or hardware. Contact Alder at 503.796.6835 at the Mercy Corps for information about how you can make a donation.

To find out more about the Mercy Corps, check out their website:

(<http://www.mercycorps.org>).

WANTED: SLIDE PROGRAMS

This is a reminder for GSOC members to bring their cameras on vacation with them! If there is some interested geology, shoot a roll of slides, because we can always use a presentation for the GSOC noon meeting. Other GSOC members can assist with researching the geology and helping with your presentation, so don't let a little bit of inexperience stop you. We can all benefit!!!

WANTED: SLIDE PROJECTOR

If anyone has a slide projector in good working order which they would like to donate to GSOC, please contact Robert Strebin (503/665-2756).

FOP FIELD TRIP!

This year's Friends of the Pleistocene field trip has been scheduled:

- Date: 16-18 August 2002
- Topic: Eolian Deposits and Megaflood Features, Columbia Plateau, Washington.
- For more info, visit the website:

http://www4.nau.edu/amqua/v31n2/friends_of_the_pleistocene.htm

SEASIDE TSUNAMI OF 1964

GSOC Friday night meeting, April 12, 2002 featuring Tom Horning, Horning Consultants, as guest speaker. Tom is an expert on Geological Hazards

Tom has been speaking to coastal groups about emergency preparedness for future tsunami hazards for the last several years.

Many of the tsunamis that the Oregon coast has experienced came from earthquakes in Alaska – a brief history of the Alaskan earthquakes was reviewed:

- 1899 – Yakutat Bay
- 1946 – tsunami in Hilo, HI (see the website <http://wcatwc.arh.noaa.gov/frequently.htm>)
- 1964 – Prince William Sound Earthquake – a very large earthquake which caused much damage in Alaska – uplift, landslides, tsunamis, lateral spreading

Timeline for the 1964 earthquake:

- 6:36 pm PST(?) – earthquake shaking begins with a duration of 3-4 minutes (editor's note: the earthquake record began at March 27, 1964, at 5:36 PM local time according to the internet sources; the PST time was computed from this figure)
- 7:33 pm PST - reports of tsunamis in Hawaii
- 10:37 – tsunami warning issued for Oregon
- 11:35 – tsunami wave in seaside

Tom slept through the tsunami of 1964 and he's been making up for it ever since. There was a depth of 3.5 feet of water in his backyard. Tom lived in a neighborhood called Venice Park, near the mouth of the Necanicum River. He was just a boy when the tsunami struck, and his mother had put the children to bed before tsunami occurred.

Tom and his brother spent the day following the tsunami selling candy bars to spectators. Tom has made up for his cavalier behavior by spending some of his professional life researching the event. Tom has collected data for university researchers George

Priest and Kurt Peterson, who study earthquakes and tsunamis at the coast.

During the Seaside tsunami, one house was knocked off its foundations by logs, and it filled up to about 7 foot depth. Several other buildings were knocked off their foundations. Some of the downtown area of Seaside was also flooded (8.5' wave). A bridge (4th Ave.) was swept off its foundation and came to rest against another bridge, blocking the Necanicum River and causing some additional flooding.

For the most part, the tsunami waves flooded Seaside as surges of water with foam riding on top. There were no breaking waves. Even with this relatively gentle action and a maximum surge height of about 8 feet, a few buildings and bridges were swept off their supports by the inexorable force of the water. Surge waves continued coming into the river until about noon the next day.

Since Tom was a native of the town of Seaside, he was able to collect many photos and stories of the tsunami from his neighbors and acquaintances in Seaside. He had many interesting anecdotes of how people behaved during the crisis. Some people behaved courageously and others did not. Some were calm and others were not.

The point of Tom's stories of this tsunami is that the Oregon coast is vulnerable to such events, and the tsunamis which could be generated by a local Cascadia Subduction Zone earthquake won't be so benign. They will arrive sooner and crest at heights which would cover a two story house at the shoreline.

How much time will people have to evacuate Seaside for a Cascadia Subduction Zone event? Tom has used data from George Priest's numerical model to estimate an evacuation time of 25 minutes. Some citizens of Seaside might find it difficult to reach safety in that period. Tom thinks more things should be done to insure a safe evacuation, including bridge retrofits and a possible vertical safety tower or building for the infirm.

COMPLETELY FRACTURED GEOLOGY

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I received a postcard from George Moore with the following correction to my last Completely Fractured Geology true definitions:

“T-chert (from Tectonic) is microcrystalline quartz in veins, formed by high temperature water. W-chert (from Weathering) is low temperature chert, formed as nodules in soil.”

I'd like to add, “Thank you, George Moore, for keeping me on the straight and narrow!”

Evelyn Pratt

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Here's the **GSOC ROSTER NEWS!!**



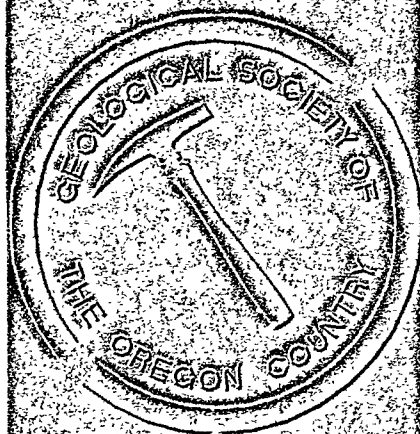
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Also, if you need your roster mailed to you please contact Rosemary Kenney (503/892-6514) or Phyllis Thorne (503/292-6134), preferably before June 30, when the postal rates increase. You must place a request to have a roster mailed to you, it will not be done automatically.

THE GEOLOGICAL NEWSLETTER

65006
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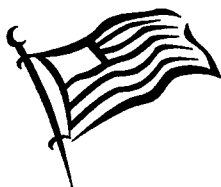
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Tom Gordon, President

Meeting Time?

Would you like to have the Friday evening meeting time changed? Would you like to meet at 7:00 PM or at 7:30 PM?

Let us know! Email me at tndgardens@attbi.com or call someone on the Board of Directors.

COMPLETELY GEOLOGY

FRACTURED

by Ralph & Evelyn Pratt

1. **Taxon**: as in, "I'll stop picking up rocks when they start collecting a taxon 'em!"
2. **Tillite**: a farmer's advice to his son on how to break up soil
3. **Electrum**: as in, "What lousy politicians! Why did we ever electrum?"
4. **Diatreme**: what you go on when you're REALLY trying to lose weight
5. **Tor**: as in, "When I stepped on the hem of my skirt, I tor it."
6. **Turnover**: a delicious pastry that Grandma used to make, now sold in Fred Meyers, Safeway, et al
7. **Conoscope**: an instrument for finding out what swindlers are up to
8. **T-chert**: as in, "I went to a big geology conference and all I got was this lousy T-chert!"
9. **Vadose**: foreigner's remark about our customs: "Vell, dat's just duh vadose nutty Americans do tings."
10. **Permeability**: It's according to how well I can do it.

See page 30 for the correct definitions.

IN MEMORIAM

The Geological Society of the Oregon Country regrets to announce the passing of one of our most enthusiastic members, Dr. Duane Diller. Dr. Diller died at the age of 63 on April 23, 2002. Duane was an ophthalmologist who moved to Portland in 1970 after obtaining a medical degree from the Medical College of Virginia. He was born on July 24, 1938, in Chambersburg, Pennsylvania.

Duane is survived by his wife and GSOC member Dana Diller. Remembrances can be sent to Clackamas Community College.

NORTHWEST EARTH SCIENCE EXPLORERS

The Northwest Earth Science Explorers (NESE) is an activity and education-based youth group led by earth science professionals and outdoor enthusiasts. NESE welcomes members of all ages who wish to learn about the earth sciences, ecology, and geology. NESE activities include a monthly 2 hour presentation on a Tuesday evening followed by a field trip the following weekend.

This year's remaining presentations include:

June 2002 – Central Oregon Geology
Presentation: June 11, 7-9 pm

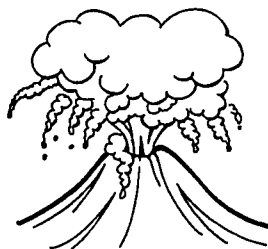
July 2002 – Opal Creek Environmental Clean-up
Presentation: June 9, 7-9 pm
Field Trip: July 13-14 – Overnight Field Trip to Opal Creek Resource and Education Center

There is a fee for the Opal Creek Field Trip.

All meetings are held at the USGS Cascade Volcano Observatory in Vancouver, Washington. New address for the CVO is 1300 SE Cardinal Court, Building 10, Suite 100, Vancouver, WA.

NESE is also looking for **volunteers** to lead field trips and/or give presentations. **GSOC members** who are interested should contact Craig Rankine.

For more information, contact Craig Rankine at 360-695-6056.



Glossary of Volcano and Related Terminology

From the USGS Cascades Volcano Observatory website:

<http://vulcan.wr.usgs.gov>

Reticulite:

During the exceptionally high fountaining episodes of some eruptions, an extremely vesicular, feathery light pumice, called reticulite or thread-lace scoria, can form and be carried many miles downwind from the high lava fountains. Even though reticulite is the least dense kind of tephra, it does not float on water, because its vesicles are open and interconnected. Consequently, when it falls on water, it becomes easily waterlogged and sinks. (Tilling, Heliker, and Wright, 1987)

Rhyolite:

Volcanic rock (or lava) that characteristically is light in color, contains 69 percent silica or more, and is rich in potassium and sodium. (Foxworthy and Hill, 1982)

Typically a light-colored crystalline or black glassy volcanic rock or magma, containing more than 68 percent silica with a very high viscosity when in a molten state.

Satellite vent:

A secondary vent of flank vent at a volcanic center.

Scoria:

Scoria forms when blobs of gas-charged lava are thrown into the air during an eruption and cool in flight, falling as dark volcanic rock containing

cavities created by trapped gas bubbles. (Clynne, et.al., 1998)

Seismicity:

Pertaining to earthquakes or earth vibration.

Seismograph:

A scientific instrument that detects and records vibrations (seismic waves) produced by earthquakes.

Shield volcano:

A volcano that resembles an inverted warrior's shield. It has long gentle slopes produced by multiple eruptions of fluid lava flows.

A volcano shaped like an inverted warrior's shield with long gentle slopes produced by eruptions of low-viscosity basaltic lava. (Brantley, 1994)

Silica:

The molecule formed of silicon and oxygen (SiO₂) that is the basic building block of volcanic rocks and the most important factor controlling the fluidity of magma. The higher a magma's silica content, the greater its viscosity or "stickiness." (Brantley, 1994)

Silicic:

Term used to describe silica-rich volcanic rock or magma. (Miller, 1989)

Spreading Ridges:

Places on the ocean floor where lithospheric plates separate and magma erupts. About 80 percent of the Earth's volcanic activity occurs on the ocean floor.

Stratovolcano:

See Composite volcano.

Strombolian eruption:

In a "Strombolian"-type eruption observed during the 1965 activity of Irazu Volcano in Costa Rica, huge clots of molten lava burst from the summit crater to form luminous arcs through the sky. Collecting on the flanks of the cone, lava clots combined to stream down the slopes in fiery rivulets. (Tilling, 1985)

COMPUTERS FOR THE MERCY CORPS

Rosemary Kenney, upon talking with her Mercy Corps contact, has discovered that they do not want the old textbooks. What they can use is old computer software or hardware. Contact Alder at 503.796.6835 at the Mercy Corps for information about how you can make a donation.

To find out more about the Mercy Corps, check out their website:

(<http://www.mercycorps.org>).

WANTED: SLIDE PROGRAMS

This is a reminder for GSOC members to bring their cameras on vacation with them! If there is some interested geology, shoot a roll of slides, because we can always use a presentation for the GSOC noon meeting. Other GSOC members can assist with researching the geology and helping with your presentation, so don't let a little bit of inexperience stop you. We can all benefit!!!

WANTED: SLIDE PROJECTOR

If anyone has a slide projector in good working order which they would like to donate to GSOC, please contact Robert Strebin (503/665-2756).

FOP FIELD TRIP!

This year's Friends of the Pleistocene field trip has been scheduled:

- Date: 16-18 August 2002
- Topic: Eolian Deposits and Megaflood Features, Columbia Plateau, Washington.
- For more info, visit the website:

http://www4.nau.edu/amqua/v31n2/friends_of_the_pleistocene.htm

SEASIDE TSUNAMI OF 1964

GSOC Friday night meeting, April 12, 2002 featuring Tom Horning, Horning Consultants, as guest speaker. Tom is an expert on Geological Hazards

Tom has been speaking to coastal groups about emergency preparedness for future tsunami hazards for the last several years.

Many of the tsunamis that the Oregon coast has experienced came from earthquakes in Alaska – a brief history of the Alaskan earthquakes was reviewed:

- 1899 – Yakutat Bay
- 1946 – tsunami in Hilo, HI (see the website <http://wcatwc.arh.noaa.gov/frequently.htm>)
- 1964 – Prince William Sound Earthquake – a very large earthquake which caused much damage in Alaska – uplift, landslides, tsunamis, lateral spreading

Timeline for the 1964 earthquake:

- 6:36 pm PST(?) – earthquake shaking begins with a duration of 3-4 minutes (editor's note: the earthquake record began at March 27, 1964, at 5:36 PM local time according to the internet sources; the PST time was computed from this figure)
- 7:33 pm PST - reports of tsunamis in Hawaii
- 10:37 – tsunami warning issued for Oregon
- 11:35 – tsunami wave in seaside

Tom slept through the tsunami of 1964 and he's been making up for it ever since. There was a depth of 3.5 feet of water in his backyard. Tom lived in a neighborhood called Venice Park, near the mouth of the Necanicum River. He was just a boy when the tsunami struck, and his mother had put the children to bed before tsunami occurred.

Tom and his brother spent the day following the tsunami selling candy bars to spectators. Tom has made up for his cavalier behavior by spending some of his professional life researching the event. Tom has collected data for university researchers George

Priest and Kurt Peterson, who study earthquakes and tsunamis at the coast.

During the Seaside tsunami, one house was knocked off its foundations by logs, and it filled up to about 7 foot depth. Several other buildings were knocked off their foundations. Some of the downtown area of Seaside was also flooded (8.5' wave). A bridge (4th Ave.) was swept off its foundation and came to rest against another bridge, blocking the Necanicum River and causing some additional flooding.

For the most part, the tsunami waves flooded Seaside as surges of water with foam riding on top. There were no breaking waves. Even with this relatively gentle action and a maximum surge height of about 8 feet, a few buildings and bridges were swept off their supports by the inexorable force of the water. Surge waves continued coming into the river until about noon the next day.

Since Tom was a native of the town of Seaside, he was able to collect many photos and stories of the tsunami from his neighbors and acquaintances in Seaside. He had many interesting anecdotes of how people behaved during the crisis. Some people behaved courageously and others did not. Some were calm and others were not.

The point of Tom's stories of this tsunami is that the Oregon coast is vulnerable to such events, and the tsunamis which could be generated by a local Cascadia Subduction Zone earthquake won't be so benign. They will arrive sooner and crest at heights which would cover a two story house at the shoreline.

How much time will people have to evacuate Seaside for a Cascadia Subduction Zone event? Tom has used data from George Priest's numerical model to estimate an evacuation time of 25 minutes. Some citizens of Seaside might find it difficult to reach safety in that period. Tom thinks more things should be done to insure a safe evacuation, including bridge retrofits and a possible vertical safety tower or building for the infirm.

COMPLETELY FRACTURED GEOLOGY

Correct definitions for COMPLETELY FRACTURED GEOLOGY, adapted from AGI Dictionary of Geological Terms, 3rd Ed., Bates & Jackson, by E. Pratt

1. **Taxon:** a named group of organisms of any rank, such as a species, a family, or a class
2. **Tillite:** a sedimentary rock formed of glacial till which has become solidified
3. **Electrum:** a natural alloy of gold and silver
4. **Diatreme:** a breccia-filled volcanic pipe that was formed by a gaseous explosion
5. **Tor:** a high, isolated, rocky peak
6. **Turnover:** a time in fall or spring when surface water sinks and mixes with bottom water
7. **Conoscope:** a microscope that shines polarized light through a crystal, producing a pattern which can be used to classify the crystal

8. **T-chert:** a hard, dense form of quartz with invisible crystals – T-chert is that formed by weathering
9. **Vadose:** refers to water located above the watertable
10. **Permeability:** the ability of a porous rock or soil to transmit a fluid

I received a postcard from George Moore with the following correction to my last Completely Fractured Geology true definitions:

“T-chert (from Tectonic) is microcrystalline quartz in veins, formed by high temperature water. W-chert (from Weathering) is low temperature chert, formed as nodules in soil.”

I'd like to add, “Thank you, George Moore, for keeping me on the straight and narrow!”

Evelyn Pratt

2002 GSOC ROSTER ANNOUNCEMENT



Here's the GSOC ROSTER NEWS!!



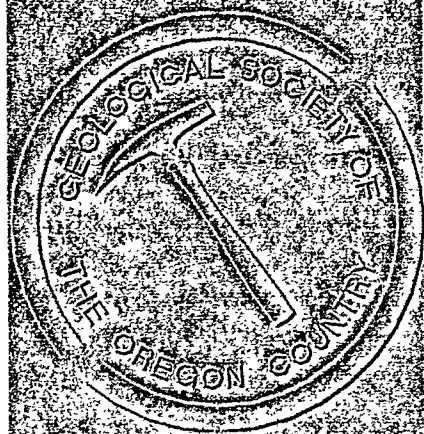
2002 GSOC Rosters were available starting in May! The roster lists the names, addresses, and phone numbers for our 140 members. This is a handy way to communicate with your fellow GSOC'ers. Please pick your roster up at any of the GSOC functions in June if you have not done so!!! Pick up a roster for a GSOC friend, too!!

Also, if you need your roster mailed to you please contact Rosemary Kenney (503/892-6514) or Phyllis Thorne (503/292-6134), preferably before June 30, when the postal rates increase. You must place a request to have a roster mailed to you, it will not be done automatically.

THE GEOLOGICAL NEWSLETTER

6500
JULY 2002

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



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THE GEOLOGICAL NEWSLETTER

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Calendar:

Ted Walling – 503/598-8067

Business Manager:

Rosemary Kenney – 503/892-6514

Assistant Business Manager:

Cecelia Crater – 503/235-5158

ACTIVITIES:

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

FIELD TRIPS: Usually one per month. Fees: Members, \$1.00, Non-members, \$3.00. See calendar next page.

GEOLOGY SEMINAR: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.

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

PROGRAMS: EVENING: Second Friday Evening each month, 8:00 p.m., Rm. 371, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon. NOON: Usually first Friday monthly except June, July, August, and holidays, usually at noon, Multnomah County Library, 801 SW 10th Ave., Portland. Consult current calendar (next page) or verified by phone: 503/235-5158 or 503/892-6514.

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

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

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

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

WEBSITE: www.gsoc.org. Email address: gsoc@spiritone.com.

APPLICATION FOR MEMBERSHIP-

THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Name _____ Spouse _____
Children under age 18 _____

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

Geologic Interests and Hobbies _____

Please indicate Membership type and include check for appropriate amount:

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Make Check Payable to: The Geological Society of the Oregon Country
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GEOLOGICAL NEWSLETTER

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

VISITORS WELCOME AT ALL MEETINGS
INFORMATION: www.gsoc.org or e-mail: gsoc@spiritone.com
Tom Gordon, President, 360/835-7748
Ted Walling, Calendar Editor, 503/598-8067

VOL. 68, No. 7
JULY 2002

JULY ACTIVITIES

Fri. July 12, 8:00 PM: Recent Debris Flows on Mount Hood. Tom Deroo, Geologist, US Forest Service. Rm 371, Cramer Hall, PSU

Field Trip Sat. July 27: Exploring The Bonneville/Yamhill Lineament. Meet at 8:45 AM at Fred Meyer parking lot in Newberg, intersection of Hwy 99 and Springbrook Rd. Taylor Hunt 503-662-4790. Fee Schedule: members free, non-members \$2.50.

PREVIEW OF COMING ATTRACTIONS

NOTE: There will be no Friday Meeting in August, and no seminars in July or August.

Field Trip Sat. August 24: A Cool Beach Excursion. Exploring geology along Hwy 101 from Nehalem to Astoria/Ilwaco, then to Longview. Meet at 7:45 AM at North Plains Exit 57 off Hwy 26. Taylor Hunt 503-662-4790. Fee Schedule: members free, non-members \$2.50.

ANNUAL PICNIC

The picnic will be **Sunday, August 11, 11:00 AM –3:00 PM** at The Rice Museum. (Go out Hwy 26, take the Helvetia Exit and follow the signs.) Coffee, tea and soda pop will be provided. The picnic is potluck. \$4 donation is required on arrival, and admittance to the museum is free. If possible, e-mail Taylor Hunt at hunt6422@msn.com, or call 503-662-4790 to let him know how many will be there. **COME ONE, COME ALL! WE'RE GOING TO HAVE A GREAT TIME!**

PRESIDENT'S FIELD TRIP will be a tour of Mammoth Lakes, Mono Lake, and Yosemite, California, September 8 to September 13, 2002. Cost will be: members: \$700 for double occupancy, \$800 for single occupancy. Add \$20 each for non-members. Payment is due July 23. See the last three pages of this Newsletter (July) for further information; or contact Tom Gordon, tel. 360-835-7748 or e-mail at TNDGARDENS@ATTBI.COM for more details.

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

WELCOME

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

James A. Smith
Phyllis Bottomly
Shed Sweigert

COMPLETELY GEOLOGY

FRACTURED

by Ralph & Evelyn Pratt

Many thanks to Bob Strebin, Jim Smith, Rosemary Kenney, Carol Hasenberg, & Ted Walling!

1. **Drumlin:** a small percussion instrument that kids get for Christmas
2. **Kame:** (1) a synonym for "arrived" or "got there" (2) what Caesar said: "I kame, I saw, I conquered."
3. **Tonalite:** (1) a big shopping basket full of diet food (2) a huge rock that can be lifted by hot air (3) a new beer sold in large quantities
4. **Gabbro:** (1) name of a rock band composed of talkative male siblings (2) the seats immediately behind me at every movie
5. **Horst:** (1) as in, "The kids horst around a lot." (2) a sausage made of horse meat
6. **Graben:** (1) what the cops shouted after Ben stole a horst (2) the art of helping oneself at a boarding house dinner
7. **Migmatite:** (1) a collection of very small persons in a very close group (2) Mig's mother had too much to drink
8. **Glacial erratic:** (1) spilled cocktail ice (2) a senior citizen driving after 9 PM on a Saturday night in January
9. **Entablature:** the act of creating literature on a packet of blank lined pages

10. **Collonade:** (1) a cool drink made of collard greens (2) the Secretary of State's speech writer
11. **Rheomorphism:** (1) evolution of the family of birds consisting of emus, ostriches, cassowaries, and rheas (2) the form – all that's left – of a very old truck model (3) refers to raising or lowering the electrical charge in a rock

See page 35 for the correct definitions.

BOARD MEETING NOTES

Saturday, June 1, 2001

Rosemary Kenney has some bound newsletters from Archie Strong's collection she would like to give away. GSOC members may call her if they are interested.

Old business

This year, rosters for in-town people to be mailed only upon request.

New business

Thanks to Ted Walling, Tom Gordon, and Diana Gordon for working on the PSU Geology float.

Dave Percy has suggested that a group of PSU graduate students present their work at a GSOC Friday night meeting. Ted Walling reported that Evelyn has contacted a number of speakers for Friday night meetings (enough for December).

The GSOC Presidents field trip will be scheduled from Sept 7 or 8 through Sept 12 or 13. Tom Gordon and Taylor Hunt are planning to meet with Ellen Bishop to work out the details of the trip. Itinerary will include McKenzie Pass, Lava Beds NM, and Lassen Peak.

GSOC Picnic will be held in August this year, and will consist of a potluck dinner. GSOC members are to bring dishes and utensils; coffee and tea will be provided. Picnic will be held at the Rice museum, members to pay entrance fee at the picnic. Picnic

date to be arranged by Taylor Hunt (preferably second Sunday in August).

Next meeting, Saturday August 3, 2002.

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NESE is also looking for **volunteers** to lead field trips and/or give presentations. **GSOC members** who are interested should contact Craig Rankine.

For more information, contact Craig Rankine at 360-695-6056.

MEMORIAL DAY FIELD TRIP TO WENATCHEE

Taylor Hunt, GSOC field trip director
John Whitmer, M.D., GSOC trip speaker
Charles Mason, guest speaker

May 24, 2002

Twenty six GSOC members and associates of John Whitmer participated in the Wenatchee field trip on Memorial Day weekend, 2002. The bussed trip started in Portland and headed north on Interstate 5 to pick up the remainder of the participants near Seattle.

On the way north the group stopped off at Littlerock, Washington to visit the Mima mounds, or mounded prairie, situated in the glacial outwash plain between Centralia and Olympia. These curious lumps in the prairie, about 6 feet high and 30 feet in diameter, completely cover the landscape in this area. **ALTHOUGH THERE ARE SEVERAL INTERESTING THEORIES ABOUT THEIR ORIGIN, THEY WERE PROBABLY formed by the erosion of sediment over partially melted terrain at the end of the LAST ice age. They are related to features found in regions of permafrost.**

The group then headed up to Issaquah to pick up John Whitmer's group. The pickup site was at an overlook for Lake Sammamish, just east of Lake Washington. Mt. Baker was barely visible **TO THE NORTH**, down the axis of the lake. The group proceeded east on Interstate 90 through the Cascade Mountains, in this region composed of amélange of accreted terrain and intrusive rocks. The road climbed a glacial embankment created by a south-surging glacier, which headed down Puget Sound at the end of the ice ages, and backed up into previously glaciated valleys.

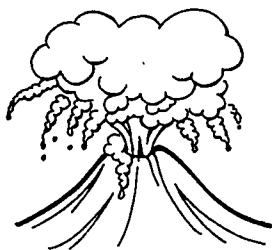
The contrast between this part of the Cascade range and the Cascades of Oregon is marked. This difference is caused by the presence of glaciation in Washington. A large part of the trip was driven in valleys filled with glacial till. Moraines were common. The Cascades **HERE ARE** much steeper and **MORE** rugged than in Oregon.

The group made one more stop, near dusk, on US 97 just north of Swauk Pass. A roadcut here contains **serpentinite**, the green, greasy rock which forms from **peridotite** when it reacts with water. The **peridotite** is part of an **ophiolite**, a section of

old oceanic crust. This section is part of the Ingalls Metamorphic Complex, according to Roadside Geology of Washington. This area is dotted with the remains of gold mining operations.

Carol Hasenberg

Next month's issue will contain more notes from the Wenatchee trip. Also, there will be a noon meeting featuring the pictures taken on the trip. If any participants would like to include their pictures in the presentation, please contact Carol Hasenberg.



Glossary of Volcano and Related Terminology

From the USGS Cascades Volcano Observatory website:

<http://vulcan.wr.usgs.gov>

Subduction Zone:

The place where two lithosphere plates come together, one riding over the other. Most volcanoes on land occur parallel to and inland from the boundary between the two plates.

Tectonic:

Pertaining to the forces involved in the deformation of the Earth's crust, or the structures or features produced by such deformation.

Tephra:

Solid material of all sizes explosively ejected from a volcano into the atmosphere.

Tephra is the general term now used by volcanologists for airborne volcanic ejecta of any size. Historically, however, various terms have been used to describe ejecta of different sizes. Fragmental volcanic products between 0.1 to about 2.5 inches in diameter are called lapilli; material finer than 0.1 inch is called ash. Fragments larger than about 2.5 inches are called blocks if they were

ejected in a solid state and volcanic bombs if ejected in semi-solid, or plastic, condition. (Tilling, Heliker, and Wright, 1987)

See: Ash, Lapilli, Blocks, Bombs.

Thread-lace scoria:

See: Reticulite.

Tuff:

Used loosely as a collective term for all consolidated pyroclastic rocks.

Tuff Cones:

See: Maars.

Tuya:

A volcano that erupted under a glacier. (British Columbia Ministry of Environment, Lands & Parks, 2000)

WANTED: SLIDE PROGRAMS

This is a reminder for GSOC members to bring their cameras on vacation with them! If there is some interested geology, shoot a roll of slides, because we can always use a presentation for the GSOC noon meeting. Other GSOC members can assist with researching the geology and helping with your presentation, so don't let a little bit of inexperience stop you. We can all benefit!!!

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- Date: 16-18 August 2002
- Topic: Eolian Deposits and Megaflood Features, Columbia Plateau, Washington.

- For more info, visit the website:
http://www4.nau.edu/amqua/v31n2/friends_of_the_pleistocene.htm

Some more info:

We are pleased to announce the Pacific Northwest Cell Friends of the Pleistocene 2002 Field Trip. This year's trip is titled "Paired Eolian Deposits and Megaflood Features, Columbia Plateau, Washington" and will take place 16-18 August 2002. Complete details and registration information is available here: <http://css.wsu.edu/FOP.htm>

Please note the trip is limited to 80 participants, so please register early.

The Alaska Orocline

For more information, refer to these studies on the University of California Santa Cruz/Earth Sciences website:

<http://www.es.ucsc.edu/grad/research/groups/paleomag/akzoom.html>

Report from the Cordilleran Section Meeting of the GSA

The Cordilleran Section of the Geological Society of America (GSA) met May 13-15, 2002, at Oregon State University (OSU) in Corvallis. With over 900 geoscientists attending, the theme of the meeting was "Where Plates Collide." The technical program featured 38 oral and 12 poster sessions on traditional geologic mapping, plate tectonics, the Tertiary stratigraphy and structure of the Pacific Northwest and its implications for hydrocarbon occurrences and underground gas storage, geologic hazards, engineering geology, paleontology, mining, and education.

Field trips held before, during, and after the technical sessions included trips to observe the fluvial record of plate-boundary deformation in the Olympic Mountains; geology and geomorphology of the lower Deschutes River Canyon;

hydrogeology of the upper Deschutes Basin; the north-central Oregon Cascade margin; Paleocene and Holocene dunal landscapes of the central Oregon coast; landslides at Kelso, Washington, and Portland, Oregon; Miocene molluscan fossils and stratigraphy at Newport, Oregon; geomorphology at the H.J Andrews Experimental Forest, Blue River, Oregon; paleobotanical record of the Eocene-Oligocene climate and vegetation change near Eugene, Oregon; geology of vineyards in the Willamette Valley; bimodal volcanism and tectonism of the High Lava Plains; Josephine and Coast Range ophiolites, Oregon and California; and the Columbia River Gorge landslides.

Persons honored during the meeting included Al and Wendy Niem for their contributions to understanding the Tertiary stratigraphy and structure of western Oregon and Washington, Joseph Vance for his work on Washington geology, Othmar Tobisch for work on magmatic arcs, George Walker for mapping and unraveling the geology of Oregon, Ellen Moore for her work on invertebrate paleontology of the Pacific Northwest, Rowland Tabor for his contributions to the geology of Washington, and Klaus Neuendorf for editing Oregon Geology and facilitating publication of many geologic maps and publications for the Oregon Department of Geology and Mineral Industries.

Beverly Vogt

COMPLETELY FRACTURED GEOLOGY

Correct definitions for COMPLETELY FRACTURED GEOLOGY, adapted from AGI Dictionary of Geological Terms, 3rd Ed., Bates & Jackson, by E. Pratt

1. **Drumlin:** a long low hill made of glacial till shaped by the flow of ice, with a blunt nose in the direction from which the ice came, and a gently tapering slope in the other direction
2. **Kame:** a mound or short ridge made of stratified sand and gravel. It is deposited as a delta by a stream under a melting glacier
3. **Tonalite:** quartz diorite. Diorite is the intrusive equivalent of andesite; tonalite has more quartz than standard diorite.
4. **Gabbro:** the deep-underground equivalent of basalt, with crystals large enough to see

5. **Horst:** a long uplifted crustal block bounded by faults on its long sides
6. **Graben:** a long dropped-down crustal block with faults on its long sides; German for trench
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8. **Glacial erratic:** a rock fragment which has been carried by glacial ice and deposited some distance from the outcrop from which it came – usually on a different kind of bedrock
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2002 GSOC ROSTER ANNOUNCEMENT



Here’s the **GSOC ROSTER NEWS!!**



2002 GSOC Rosters were available starting in **May!** The roster lists the names, addresses, and phone numbers for our 140 members. This is a handy way to communicate with your fellow GSOC’ers. Please pick your roster up at any of the GSOC functions in June if you have not done so!!! Pick up a roster for a GSOC friend, too!!

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September 8 to September 13, 2002

Itinerary

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“And now my comrades are gone;
Naught remains to toast.
They have left me here in my misery,
Like some wandering ghost.” *Bodie State Historic Park*

Return to motel.

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September 13: Return to Sacramento. Leave for Portland at 3:55 pm. Arrive home at 5:15 pm.

Includes: Air fare, bus fare, driver gratuity, motel room, continental breakfast. Other meals up to each person. Restaurants will be close by. There will be a cooler on the bus for our lunches.

Presidents Field Trip

Cost for Trip: Members: \$700 for double occupancy \$800 for single occupancy
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\$820 (includes club membership) single occupancy

Checks made payable to "Tom Gordon-Field Trip"

Must be paid by July 23, 2002. Also last day for a full refund.

Mail to:

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Washougal, Washington
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Name (s) _____

Name (s) _____

Total Number of Persons Registering _____ **Total Cost of Trip** _____

Address _____

Telephone _____ **Email** _____

For questions, call Tom Gordon at (360) 835-7748 or email at TNDGARDENS@ATTBI.COM.

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

Geological Society of the Oregon Country

PO Box 907

Portland, OR 97207-0907

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

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

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

Signed: _____ Dated: _____

Parent or other legal guardian signature _____

MEDICAL INFORMATION

Name _____

Phone # _____ email _____

Name of Physician: _____ Telephone Number: _____

Allergies: _____

Special Medications: _____

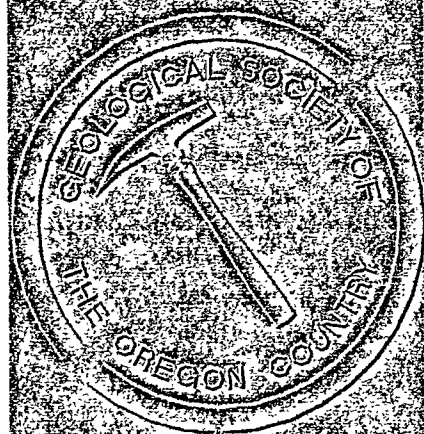
Special Medical Conditions: _____

In Case of an Emergency Call: _____

THE GEOLOGICAL NEWSLETTER

6500
JULY 2002

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



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Vice-President:

Evelyn Pratt – 503/223-2601

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Su Ikeda (3 years) – 503/246-1385

John Newhouse (2 years) – 503/224-2156

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Immediate Past Presidents:

Sandra Adamson

Ray Crowe – 503/640-6581

THE GEOLOGICAL NEWSLETTER

Editor:

Carol Hasenberg – 503/282-0547

Calendar:

Ted Walling – 503/598-8067

Business Manager:

Rosemary Kenney – 503/892-6514

Assistant Business Manager:

Cecelia Crater – 503/235-5158

ACTIVITIES:

ANNUAL EVENTS: President's Field Trip—Summer or Fall; Banquet—March; Annual Business Meeting—February.**FIELD TRIPS:** Usually one per month. Fees: Members, \$1.00, Non-members, \$3.00. See calendar next page.**GEOLOGY SEMINAR:** Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.**GSOC LIBRARY:** Rm. S7, Open 7:30 p.m. prior to meetings.**PROGRAMS: EVENING:** Second Friday Evening each month, 8:00 p.m., Rm. 371, Cramer Hall, PSU, SW Broadway at SW Mill St., Portland, Oregon. **NOON:** Usually first Friday monthly except June, July, August, and holidays, usually at noon, Multnomah County Library, 801 SW 10th Ave., Portland. Consult current calendar (next page) or verified by phone: 503/235-5158 or 503/892-6514.**MEMBERSHIP:** Per year from January 1: Individual--\$20.00, Family--\$30.00, Junior (under 18)/Student--\$10.00.**PUBLICATIONS: THE GEOLOGICAL NEWSLETTER (ISSN 0270 5451),** published monthly and mailed to each member. Subscriptions available to libraries and organizations at \$15.00 per year. Individual Subscriptions \$13.00 per year. Single Copies: \$1.00. Order from:

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

TRIP LOGS: Write to the same address for names and price list.**WEBSITE:** www.gsoc.org. Email address: gsoc@spiritone.com.

APPLICATION FOR MEMBERSHIP-

THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Name _____ Spouse _____
Children under age 18 _____Address _____ City _____ State _____ Zip _____ - _____
Phone (____) _____ - _____ Email address _____Geologic Interests and Hobbies _____

Please indicate Membership type and include check for appropriate amount:

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

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

GEOLOGICAL NEWSLETTER

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

VISITORS WELCOME AT ALL MEETINGS
INFORMATION: www.gsoc.org or e-mail: gsoc@spiritone.com
Tom Gordon, President, 360/835-7748
Ted Walling, Calendar Editor, 503/598-8067

VOL. 68, No. 7
JULY 2002

JULY ACTIVITIES

Fri. July 12, 8:00 PM: Recent Debris Flows on Mount Hood. Tom Deroo, Geologist, US Forest Service. Rm 371, Cramer Hall, PSU

Field Trip Sat. July 27: Exploring The Bonneville/Yamhill Lineament. Meet at 8:45 AM at Fred Meyer parking lot in Newberg, intersection of Hwy 99 and Springbrook Rd. Taylor Hunt 503-662-4790. Fee Schedule: members free, non-members \$2.50.

PREVIEW OF COMING ATTRACTIONS

NOTE: There will be no Friday Meeting in August, and no seminars in July or August.

Field Trip Sat. August 24: A Cool Beach Excursion. Exploring geology along Hwy 101 from Nehalem to Astoria/Ilwaco, then to Longview. Meet at 7:45 AM at North Plains Exit 57 off Hwy 26. Taylor Hunt 503-662-4790. Fee Schedule: members free, non-members \$2.50.

ANNUAL PICNIC

The picnic will be **Sunday, August 11, 11:00 AM – 3:00 PM** at The Rice Museum. (Go out Hwy 26, take the Helvetia Exit and follow the signs.) Coffee, tea and soda pop will be provided. The picnic is potluck. \$4 donation is required on arrival, and admittance to the museum is free. If possible, e-mail Taylor Hunt at hunt6422@msn.com, or call 503-662-4790 to let him know how many will be there.
COME ONE, COME ALL! WE'RE GOING TO HAVE A GREAT TIME!

PRESIDENT'S FIELD TRIP will be a tour of Mammoth Lakes, Mono Lake, and Yosemite, California, September 8 to September 13, 2002. Cost will be: members: \$700 for double occupancy, \$800 for single occupancy. Add \$20 each for non-members. Payment is due July 23. See the last three pages of this Newsletter (July) for further information; or contact Tom Gordon, tel. 360-835-7748 or e-mail at TNDGARDENS@ATTBI.COM for more details.

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

WELCOME

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

James A. Smith
Phyllis Bottomly
Shed Sweigert

COMPLETELY GEOLOGY

FRACTURED

by Ralph & Evelyn Pratt

Many thanks to Bob Strebin, Jim Smith, Rosemary Kenney, Carol Hasenberg, & Ted Walling!

1. **Drumlin:** a small percussion instrument that kids get for Christmas
2. **Kame:** (1) a synonym for "arrived" or "got there" (2) what Caesar said: "I kame, I saw, I conquered."
3. **Tonalite:** (1) a big shopping basket full of diet food (2) a huge rock that can be lifted by hot air (3) a new beer sold in large quantities
4. **Gabbro:** (1) name of a rock band composed of talkative male siblings (2) the seats immediately behind me at every movie
5. **Horst:** (1) as in, "The kids horst around a lot." (2) a sausage made of horse meat
6. **Graben:** (1) what the cops shouted after Ben stole a horst (2) the art of helping oneself at a boarding house dinner
7. **Migmatite:** (1) a collection of very small persons in a very close group (2) Mig's mother had too much to drink
8. **Glacial erratic:** (1) spilled cocktail ice (2) a senior citizen driving after 9 PM on a Saturday night in January
9. **Entablature:** the act of creating literature on a packet of blank lined pages

10. **Collonade:** (1) a cool drink made of collard greens (2) the Secretary of State's speech writer
11. **Rheomorphism:** (1) evolution of the family of birds consisting of emus, ostriches, cassowaries, and rheas (2) the form – all that's left – of a very old truck model (3) refers to raising or lowering the electrical charge in a rock

See page 35 for the correct definitions.

BOARD MEETING NOTES

Saturday, June 1, 2001

Rosemary Kenney has some bound newsletters from Archie Strong's collection she would like to give away. GSOC members may call her if they are interested.

Old business

This year, rosters for in-town people to be mailed only upon request.

New business

Thanks to Ted Walling, Tom Gordon, and Diana Gordon for working on the PSU Geology float.

Dave Percy has suggested that a group of PSU graduate students present their work at a GSOC Friday night meeting. Ted Walling reported that Evelyn has contacted a number of speakers for Friday night meetings (enough for December).

The GSOC Presidents field trip will be scheduled from Sept 7 or 8 through Sept 12 or 13. Tom Gordon and Taylor Hunt are planning to meet with Ellen Bishop to work out the details of the trip. Itinerary will include McKenzie Pass, Lava Beds NM, and Lassen Peak.

GSOC Picnic will be held in August this year, and will consist of a potluck dinner. GSOC members are to bring dishes and utensils; coffee and tea will be provided. Picnic will be held at the Rice museum, members to pay entrance fee at the picnic. Picnic

date to be arranged by Taylor Hunt (preferably second Sunday in August).

Next meeting, Saturday August 3, 2002.

NORTHWEST EARTH SCIENCE EXPLORERS

The Northwest Earth Science Explorers (NESE) is an activity and education-based youth group led by earth science professionals and outdoor enthusiasts. NESE welcomes members of all ages who wish to learn about the earth sciences, ecology, and geology. NESE activities include a monthly 2 hour presentation on a Tuesday evening followed by a field trip the following weekend.

This year's remaining presentations include:

July 2002 – Opal Creek Environmental Clean-up

Presentation: June 9, 7-9 pm

Field Trip: July 13-14 – Overnight Field Trip to Opal Creek Resource and Education Center

There is a fee for the Opal Creek Field Trip.

All meetings are held at the USGS Cascade Volcano Observatory in Vancouver, Washington. New address for the CVO is 1300 SE Cardinal Court, Building 10, Suite 100, Vancouver, WA.

NESE is also looking for **volunteers** to lead field trips and/or give presentations. **GSOC members** who are interested should contact Craig Rankine.

For more information, contact Craig Rankine at 360-695-6056.

MEMORIAL DAY FIELD TRIP TO WENATCHEE

Taylor Hunt, GSOC field trip director
John Whitmer, M.D., GSOC trip speaker
Charles Mason, guest speaker

May 24, 2002

Twenty six GSOC members and associates of John Whitmer participated in the Wenatchee field trip on Memorial Day weekend, 2002. The bussed trip started in Portland and headed north on Interstate 5 to pick up the remainder of the participants near Seattle.

On the way north the group stopped off at Littlerock, Washington to visit the Mima mounds, or mounded prairie, situated in the glacial outwash plain between Centralia and Olympia. These curious lumps in the prairie, about 6 feet high and 30 feet in diameter, completely cover the landscape in this area. **ALTHOUGH THERE ARE SEVERAL INTERESTING THEORIES ABOUT THEIR ORIGIN, THEY WERE PROBABLY formed by the erosion of sediment over partially melted terrain at the end of the LAST ice age. They are related to features found in regions of permafrost.**

The group then headed up to Issaquah to pick up John Whitmer's group. The pickup site was at an overlook for Lake Sammamish, just east of Lake Washington. Mt. Baker was barely visible TO THE NORTH, down the axis of the lake. The group proceeded east on Interstate 90 through the Cascade Mountains, in this region composed of amélange of accreted terrain and intrusive rocks. The road climbed a glacial embankment created by a south-surfing glacier, which headed down Puget Sound at the end of the ice ages, and backed up into previously glaciated valleys.

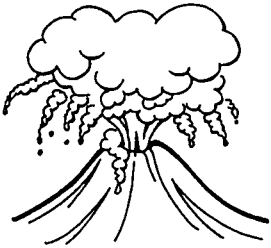
The contrast between this part of the Cascade range and the Cascades of Oregon is marked. This difference is caused by the presence of glaciation in Washington. A large part of the trip was driven in valleys filled with glacial till. Moraines were common. The Cascades **HERE ARE** much steeper and **MORE** rugged than in Oregon.

The group made one more stop, near dusk, on US 97 just north of Swauk Pass. A roadcut here contains **serpentinite**, the green, greasy rock which forms from **peridotite** when it reacts with water. The **peridotite** is part of an **ophiolite**, a section of

old oceanic crust. This section is part of the Ingalls Metamorphic Complex, according to Roadside Geology of Washington. This area is dotted with the remains of gold mining operations.

Carol Hasenberg

Next month's issue will contain more notes from the Wenatchee trip. Also, there will be a noon meeting featuring the pictures taken on the trip. If any participants would like to include their pictures in the presentation, please contact Carol Hasenberg.



Glossary of Volcano and Related Terminology

From the USGS Cascades Volcano Observatory website:

<http://vulcan.wr.usgs.gov>

Subduction Zone:

The place where two lithosphere plates come together, one riding over the other. Most volcanoes on land occur

parallel to and inland from the boundary between the two plates.

Tectonic:

Pertaining to the forces involved in the deformation of the Earth's crust, or the structures or features produced by such deformation.

Tephra:

Solid material of all sizes explosively ejected from a volcano into the atmosphere.

Tephra is the general term now used by volcanologists for airborne volcanic ejecta of any size. Historically, however, various terms have been used to describe ejecta of different sizes. Fragmental volcanic products between 0.1 to about 2.5 inches in diameter are called lapilli; material finer than 0.1 inch is called ash. Fragments larger than about 2.5 inches are called blocks if they were

ejected in a solid state and volcanic bombs if ejected in semi-solid, or plastic, condition. (Tilling, Heliker, and Wright, 1987)

See: Ash, Lapilli, Blocks, Bombs.

Thread-lace scoria:

See: Reticulite.

Tuff:

Used loosely as a collective term for all consolidated pyroclastic rocks.

Tuff Cones:

See: Maars.

Tuya:

A volcano that erupted under a glacier. (British Columbia Ministry of Environment, Lands & Parks, 2000)

WANTED: SLIDE PROGRAMS

This is a reminder for GSOC members to bring their cameras on vacation with them! If there is some interested geology, shoot a roll of slides, because we can always use a presentation for the GSOC noon meeting. Other GSOC members can assist with researching the geology and helping with your presentation, so don't let a little bit of inexperience stop you. We can all benefit!!!

WANTED: SLIDE PROJECTOR

If anyone has a slide projector in good working order which they would like to donate to GSOC, please contact Robert Strebin (503/665-2756).

FOP FIELD TRIP!

This year's Friends of the Pleistocene field trip has been scheduled:

- Date: 16-18 August 2002
- Topic: Eolian Deposits and Megaflood Features, Columbia Plateau, Washington.

- For more info, visit the website:
http://www4.nau.edu/amqua/v31n2/friends_of_the_pleistocene.htm

Some more info:

We are pleased to announce the Pacific Northwest Cell Friends of the Pleistocene 2002 Field Trip. This year's trip is titled "Paired Eolian Deposits and Megaflood Features, Columbia Plateau, Washington" and will take place 16-18 August 2002. Complete details and registration information is available here: <http://css.wsu.edu/FOP.htm>

Please note the trip is limited to 80 participants, so please register early.

The Alaska Orocline

For more information, refer to these studies on the University of California Santa Cruz/Earth Sciences website:

<http://www.es.ucsc.edu/grad/research/groups/paleomag/akzoom.html>

Report from the Cordilleran Section Meeting of the GSA

The Cordilleran Section of the Geological Society of America (GSA) met May 13-15, 2002, at Oregon State University (OSU) in Corvallis. With over 900 geoscientists attending, the theme of the meeting was "Where Plates Collide." The technical program featured 38 oral and 12 poster sessions on traditional geologic mapping, plate tectonics, the Tertiary stratigraphy and structure of the Pacific Northwest and its implications for hydrocarbon occurrences and underground gas storage, geologic hazards, engineering geology, paleontology, mining, and education.

Field trips held before, during, and after the technical sessions included trips to observe the fluvial record of plate-boundary deformation in the Olympic Mountains; geology and geomorphology of the lower Deschutes River Canyon;

hydrogeology of the upper Deschutes Basin; the north-central Oregon Cascade margin; Paleocene and Holocene dunal landscapes of the central Oregon coast; landslides at Kelso, Washington, and Portland, Oregon; Miocene molluscan fossils and stratigraphy at Newport, Oregon; geomorphology at the H.J Andrews Experimental Forest, Blue River, Oregon; paleobotanical record of the Eocene-Oligocene climate and vegetation change near Eugene, Oregon; geology of vineyards in the Willamette Valley; bimodal volcanism and tectonism of the High Lava Plains; Josephine and Coast Range ophiolites, Oregon and California; and the Columbia River Gorge landslides.

Persons honored during the meeting included Al and Wendy Niem for their contributions to understanding the Tertiary stratigraphy and structure of western Oregon and Washington, Joseph Vance for his work on Washington geology, Othmar Tobisch for work on magmatic arcs, George Walker for mapping and unraveling the geology of Oregon, Ellen Moore for her work on invertebrate paleontology of the Pacific Northwest, Rowland Tabor for his contributions to the geology of Washington, and Klaus Neuendorf for editing Oregon Geology and facilitating publication of many geologic maps and publications for the Oregon Department of Geology and Mineral Industries.

Beverly Vogt

COMPLETELY FRACTURED GEOLOGY

Correct definitions for COMPLETELY FRACTURED GEOLOGY, adapted from AGI Dictionary of Geological Terms, 3rd Ed., Bates & Jackson, by E. Pratt

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2. **Kame:** a mound or short ridge made of stratified sand and gravel. It is deposited as a delta by a stream under a melting glacier
3. **Tonalite:** quartz diorite. Diorite is the intrusive equivalent of andesite; tonalite has more quartz than standard diorite.
4. **Gabbro:** the deep-underground equivalent of basalt, with crystals large enough to see
5. **Horst:** a long uplifted crustal block bounded by faults on its long sides
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Checks made payable to "Tom Gordon-Field Trip"

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Mail to:

Tom Gordon
642 I Street
Washougal, Washington
98671

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

Name (s) _____

Name (s) _____

Total Number of Persons Registering _____ **Total Cost of Trip** _____

Address _____

Telephone _____ **Email** _____

For questions, call Tom Gordon at (360) 835-7748 or email at
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Important: A waiver/medical form for each participant must accompany this registration form. See next page.

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

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

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

Signed: _____ Dated: _____

Parent or other legal guardian signature _____

MEDICAL INFORMATION

Name _____

Phone # _____ email _____

Name of Physician: _____ Telephone Number: _____

Allergies: _____

Special Medications: _____

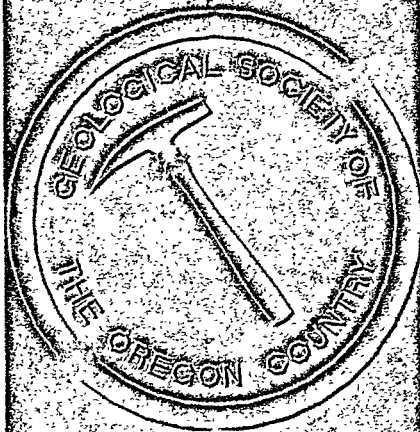
Special Medical Conditions: _____

In Case of an Emergency Call: _____

THE GEOLOGICAL NEWSLETTER

6500
AUGUST 2002

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FIELD TRIPS: Usually one per month. Fees: Members, \$1.00, Non-members, \$3.00. See calendar next page.

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VOL. 68, No. 8
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COME ONE, COME ALL! WE'RE GOING TO HAVE A GREAT TIME!

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Carol Keule

MEMORIAL DAY FIELD TRIP TO WENATCHEE

Taylor Hunt, GSOC field trip director
John Whitmer, M.D., GSOC trip speaker
Charles Mason, guest speaker

Saturday, May 25, 2002

The route for Saturday included heading north on US 97 along the Columbia River basin, then north on WR 971 to Lake Chelan, east across the Columbia River on the Beebe Bridge, across the Withrow moraine and plain on WR 172 and WR 174 to Grand Coulee, south through the Grand Coulee to Dry Falls, west on US 2 to Moses Coulee, down the Moses Coulee to the Columbia River and west to Wenatchee along the river. John Whitmer was the GSOC field trip leader for this trip, as well as Sunday afternoon and Monday.

The cliffs along the west side of the river heading north from Wenatchee are composed of Swakane biotite gneiss. Roadside geology of Oregon states that the gneiss may be metamorphosed at about 100 Ma. The gneiss has milky felsic intrusions throughout the mass. Further up the road the cliffs change in composition to an intrusion of granite. This is a large pluton which continues past Lake Chelan. Migmatites are also located around the shores of Lake Chelan, and may or may not be related to the granitic intrusion. The migmatites are much finer in grain than the granite, and are

metamorphic in character, with both felsic and mafic (light- and dark-colored) intrusions.

The GSOC group rested at Beebe Bridge Park on the east bank of the Columbia at Chelan Falls, then climbed east atop the Withrow moraine, which was the terminus for the Okanogan glacier in the last ice age. The moraine continues northward as the glacier slowly retreated. It is characterized by high, hummocky terrain. The Ice Age Floods did not cover this country.

A very interesting feature of the glacial moraine was the presence of "haystack rocks" which were enormous blocks of basalt dotting the landscape. The GSOC group left the main road in an area which contained many of these rocks, with good views to the farmlands to the north toward the Okanogan highlands.

Eventually the plain was interrupted once more by the Columbia River Valley at Grand Coulee, the site of the Grand Coulee dam. The dam is sited upon metamorphic core rock at the base of the valley. The group traveled down the Grand Coulee, past Steamboat Rock and Banks Lake (reservoir). According to Charles Mason on Sunday's trip, the Grand Coulee was cut by the Ice Age Floods. Then the group stopped at Dry Falls, an enormous complex of cliff faces which is capped by the entablature of one of the Columbia River Basalt flows. The cliffs that form the falls are 400 feet in height according to Roadside Geology of Washington.

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Moses Coulee continues past the farming community of Palisades, which sits on the flood deposits at the bottom of the coulee. It is just a

short trip west from the mouth of Moses Coulee to the town of Wenatchee.

Sunday, May 26, 2002

Sunday morning Charles Mason showed the GSOC group around the Wenatchee Valley. Wenatchee sits at the convergence of the Wenatchee River with the Columbia River. The Columbia River gets very broad at this point, which makes a very good site for a town. According to Charles, twenty-five percent of the first (and highest) Ice Age Flood traveled down the Columbia River Valley. All subsequent floods were blocked by the Okanogan glacier, so the floods could not reach the Wenatchee area. Still, this one flood wreaked many changes on the valley.

Because the Columbia River Valley widens at Wenatchee, the flood waters slowed down here and dropped a huge load of sediment. What remains of this forms the Pangborn Bar, a high terrace on the east side of the valley. The Pangborn Bar is located on the inside of a gentle bend in the Columbia River here. Just southeast of the bar is an oxbow lake, an abandoned river channel which was interrupted by the Pangborn Bar. Erratics can be found on the top of the bar at an elevation of 1400 feet. The river elevation at the time of the flood was about 600 feet. So the flood depth at this time was at least 800 feet! Plus, the first Ice Age Flood carried the greatest load of sediment, since it stripped enormous amounts of the wind-blown loess from the eastern Washington plains with it.

Charles Mason led the group up a steep incline cut into the Columbia River basalt cliffs which form the boundaries of the valley. The depth of the valley is from uplift of the Columbia River plateau. From the vantage of the cliff the group could see the enormous gravel bar and oxbow lake below, and appreciate the scale of the floods. In addition to these effects, the Ice Age Floods also caused an enormous landslide along the west bank, where sections of the basalt cliffs slumped into the river. Huge blocks of basalt dot the river near this landslide.

In the town of East Wenatchee, the group stood next to the Columbia River bank observing large angular blocks of the Swakane gneiss which the flood had torn from upriver and deposited in the valley. Looking across the river an intrusion of andesitic material (Charles dubbed it Igneous Rhyodacite Porphyry) forms the Wenatchee dome. This is a remnant of earlier volcanoes at the tectonic plate boundary.

Behind the Wenatchee dome and Eagle Creek Fault upon which it lies the hills are composed of material of the Chumstick Formation, an Eocene formation which is largely sedimentary and contains much sandstone. Gold and silver have been found in this area in the contact zones between volcanic intrusions and the sedimentary rocks.

Looking further down the Columbia River south of Wenatchee, Charles Mason pointed out the enormous gravel delta at the mouth of Moses Coulee. This was the course of the Ice Age Floods about seven times after the first flood. This delta blocked the Columbia River, which rose and created a lake which lasted several hundred years. After these seven floods the Okanogan glacier pushed further south, necessitating the cutting of the Grand Coulee.

The afternoon drive consisted of driving west on US 2 through the town of Waterville, then south through the upper Moses Coulee to Ephrata, then east to Trinidad and back up the Columbia River valley to Wenatchee. This route crosses the Withrow moraine, the Palouse plain to the coulee, then crosses the Quincy Basin from Ephrata to Trinidad. The Ice Age Floods impounded in the basin, which deepened the soil in this area.

Trinidad was an impressive site. From an overlook north of the Columbia River, enormous basalt cliffs rose to the east side of the valley at a bend in which the Columbia turns south. The inside of the bend contained an enormous gravel bar with scalloping typical of flood ripples. The first Lake Missoula flood came down the Columbia River valley through Wenatchee, then slammed into the cliff here and dumped an enormous amount of sediment on the inside bend. Subsequent floods, which came

down Moses Coulee and finally Grand Coulee, entered the river here from the north through an eroded canyon and passed the high cliff face.

Monday, May 27, 2002

Before leaving the area and heading home through the Cascades, the GSOC tour headed down to the southern end of the Quincy Basin for some last views of Ice Age Flood and flood basalt features. The southern end of the Quincy Basin is bounded by the Frenchman Hills, which impounded Ice Age Flood waters until they could drain through the Columbia River valley or the Drumheller and Othello channels to the east.

Beyond the Frenchman hills is the small stream valley of Lower Crab Creek, then another set of hills called the Saddle Mountains. John Whitmer attributed these two sets of hills to compression between the Basin and Range province and Washington.

The way through the Frenchman Hills on Interstate 90 leads toward the town of Vantage, on the other side of the Columbia River. Before reaching Vantage, the group turned off the highway at the Old Vantage Road and headed down a hill, with spectacular views across a huge canyon to the north. Capping the cliffs across the canyon was a layer of white diatomaceous earth, which the group later explored. At the bottom of the hill the road ended at the Columbia River, with a fair prospect toward the town of Vantage, the I-90 bridge across the Columbia River, and the Sentinel Gap beyond, which allows the Columbia River to flow through the Saddle Mountains.

On the way back up the Old Vantage Highway the group stopped at a curious ring of basalt columns which form a ring-shaped bowl. This is a popular climbing spot. Our bus driver, Bill Clements, pointed out a fold in the cooling basalt beyond the ring which was similar to the formation observed in Moses Coulee.

In Vantage the group stopped one last time for lunch at the Ginkgo Petrified Forest State Park. The ginkgo logs were created by the flood basalts by

being trapped in the mud at the bottom of a basalt-covered lake. The logs are remarkably well preserved and contain many of the growth rings and features of the wood.

Reluctantly the GSOC trip turned homeward from this point.

Carol Hasenberg

Suggested Reading/Roadguides:

David Alt, Glacial Lake Missoula and Its Humongous Floods, Mountain Press Publishing Company, Missoula, Montana, 2001

David Alt and Donald Hyndman, Roadside Geology of Washington, Mountain Press Publishing Company, Missoula, Montana, 1984

Charles L. Mason, The Geological History of the Wenatchee Valley and Adjacent Vicinity, Pixie Publishing, P O Box 97, Rock Island, Wa 98850, ISBN # 1-883078-01-6

Mark Amara and George Neff, Geologic Road Trips in Grant County, Washington, Adam East Museum and Art Center, Moses Lake, Washington, 98837, 1996

There will be a noon meeting featuring the pictures taken on the trip. If any participants would like to include their pictures in the presentation, please contact Carol Hasenberg.

WEB TEASERS

Here are some interesting websites for the editor's home state, West Virginia.

Fun Facts:

- Geology plays a big part of the economy of West Virginia, one of the biggest coal producers in the US.
- There aren't any dinosaur fossils in West Virginia, the rocks are all Paleozoic (pre-dinosaur). Most of the state is overlain by rocks from the Permian and Pennsylvanian Periods.

Older rocks are exposed in folded belts on the eastern edge of the state.

- West Virginia was not covered by the continental ice sheets during the Pleistocene.

US Coal Fields Map:

<http://energy.er.usgs.gov/products/openfile/of96-92/map.htm>

USGS links to Mid Atlantic States:

http://geology.er.usgs.gov/states/mid_atl.html

USGS – West Virginia:

<http://biology.usgs.gov/state.partners/wv.html>

NOAA Satellite Image of West Virginia:

http://fermi.jhuapl.edu/states/avhrr/WV_213.n14.96_sep20_1819.html

USGS Fact Sheets by State:

<http://water.usgs.gov/wid/index-state.html>

West Virginia Geological and Economic Survey (WVGES) Welcome Page:

<http://www.wvgs.wvnet.edu/>

WVGES West Virginia Geology:

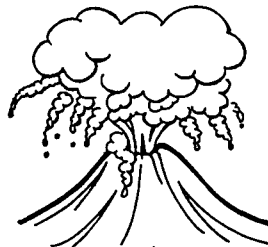
<http://www.wvgs.wvnet.edu/www/geology/geology.htm>

WVGES Frequently Asked Questions:

<http://www.wvgs.wvnet.edu/www/faq/faq.htm#GeoFacts>

Friends of the Pleistocene, Southeast Cell, 4-6 October, 2002, Greenbrier County, West Virginia

http://www4.nau.edu/amqua/v31n2/friends_of_the_pleistocene.htm



Glossary of Volcano and Related Terminology

From the USGS Cascades Volcano Observatory website:

<http://vulcan.wr.usgs.gov>

Vent:

The opening at the Earth's surface through which volcanic materials (lava, tephra, and gases) erupt. Vents can be at a volcano's summit or on its slopes; they can be circular (craters) or linear (fissures).

An opening in the Earth's surface through which volcanic materials (magma and gas) escape. (Gardner, et.al., 1995)

Vesuvian eruption:

In a "Vesuvian" eruption, as typified by the eruption of Mount Vesuvius in Italy in A.D.79, great quantities of ash-laden gas are violently discharged to form a cauliflower-shaped cloud high above the volcano. (Tilling, 1985)

Viscosity:

Measure of the fluidity of a substance. Taffy and molasses are very viscous; water has low viscosity.

Basalt is less viscous than dacite.

Volcano:

A vent (opening) in the surface of the Earth through which magma erupts; it is also the landform that is constructed by the erupted material.

Volcanic cone or edifice:

Used to describe the uppermost slopes and summit area of a volcano. (Gardner, et.al., 1995)

Volcanic landslide:

The downslope movement of soil, rock debris, and sometimes glacial ice, with or without water, from the flank of a volcano. (Brantley, 1994)

See: Debris Avalanche.

Vulcanian eruption:

The eruptive activity of Paricutin Volcano in 1947 demonstrated a "Vulcanian"-type eruption, in which a dense cloud of ash-laden gas explodes from the crater and rises high above the peak. Steaming ash forms a whitish cloud near the upper level of the cone. (Tilling, 1985)

WANTED: SLIDE PROGRAMS

This is a reminder for GSOC members to bring their cameras on vacation with them! If there is some interested geology, shoot a roll of slides, because we can always use a presentation for the GSOC noon meeting. Other GSOC members can assist with researching the geology and helping with your presentation, so don't let a little bit of inexperience stop you. We can all benefit!!!

WANTED: SLIDE PROJECTOR

If anyone has a slide projector in good working order which they would like to donate to GSOC, please contact Robert Strebin (503/665-2756).

FOP FIELD TRIP!

This year's Friends of the Pleistocene field trip (Pacific Northwest Cell) has been scheduled:

- Date: 16-18 August 2002
- Topic: Eolian Deposits and Megaflood Features, Columbia Plateau, Washington.
- For more info, visit the website:
http://www4.nau.edu/amqua/v31n2/friends_of_the_pleistocene.htm

Some more info:

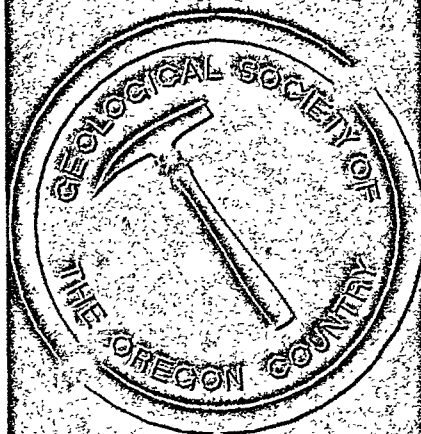
We are pleased to announce the Pacific Northwest Cell Friends of the Pleistocene 2002 Field Trip. This year's trip is titled "Paired Eolian Deposits and Megaflood Features, Columbia Plateau, Washington" and will take place 16-18 August 2002. Complete details and registration information is available here: <http://css.wsu.edu/FOP.htm>

Please note the trip is limited to 80 participants, so please register early.

THE GEOLOGICAL NEWSLETTER

6500
AUGUST 2002

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OF THE OREGON
COUNTRY
P. O. Box 907
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Behind the Wenatchee dome and Eagle Creek Fault upon which it lies the hills are composed of material of the Chumstick Formation, an Eocene formation which is largely sedimentary and contains much sandstone. Gold and silver have been found in this area in the contact zones between volcanic intrusions and the sedimentary rocks.

Looking further down the Columbia River south of Wenatchee, Charles Mason pointed out the enormous gravel delta at the mouth of Moses Coulee. This was the course of the Ice Age Floods about seven times after the first flood. This delta blocked the Columbia River, which rose and created a lake which lasted several hundred years. After these seven floods the Okanogan glacier pushed further south, necessitating the cutting of the Grand Coulee.

The afternoon drive consisted of driving west on US 2 through the town of Waterville, then south through the upper Moses Coulee to Ephrata, then east to Trinidad and back up the Columbia River valley to Wenatchee. This route crosses the Withrow moraine, the Palouse plain to the coulee, then crosses the Quincy Basin from Ephrata to Trinidad. The Ice Age Floods impounded in the basin, which deepened the soil in this area.

Trinidad was an impressive site. From an overlook north of the Columbia River, enormous basalt cliffs rose to the east side of the valley at a bend in which the Columbia turns south. The inside of the bend contained an enormous gravel bar with scalloping typical of flood ripples. The first Lake Missoula flood came down the Columbia River valley through Wenatchee, then slammed into the cliff here and dumped an enormous amount of sediment on the inside bend. Subsequent floods, which came

down Moses Coulee and finally Grand Coulee, entered the river here from the north through an eroded canyon and passed the high cliff face.

Monday, May 27, 2002

Before leaving the area and heading home through the Cascades, the GSOC tour headed down to the southern end of the Quincy Basin for some last views of Ice Age Flood and flood basalt features. The southern end of the Quincy Basin is bounded by the Frenchman Hills, which impounded Ice Age Flood waters until they could drain through the Columbia River valley or the Drumheller and Othello channels to the east.

Beyond the Frenchman hills is the small stream valley of Lower Crab Creek, then another set of hills called the Saddle Mountains. John Whitmer attributed these two sets of hills to compression between the Basin and Range province and Washington.

The way through the Frenchman Hills on Interstate 90 leads toward the town of Vantage, on the other side of the Columbia River. Before reaching Vantage, the group turned off the highway at the Old Vantage Road and headed down a hill, with spectacular views across a huge canyon to the north. Capping the cliffs across the canyon was a layer of white diatomaceous earth, which the group later explored. At the bottom of the hill the road ended at the Columbia River, with a fair prospect toward the town of Vantage, the I-90 bridge across the Columbia River, and the Sentinel Gap beyond, which allows the Columbia River to flow through the Saddle Mountains.

On the way back up the Old Vantage Highway the group stopped at a curious ring of basalt columns which form a ring-shaped bowl. This is a popular climbing spot. Our bus driver, Bill Clements, pointed out a fold in the cooling basalt beyond the ring which was similar to the formation observed in Moses Coulee.

In Vantage the group stopped one last time for lunch at the Ginkgo Petrified Forest State Park. The ginkgo logs were created by the flood basalts by

being trapped in the mud at the bottom of a basalt-covered lake. The logs are remarkably well preserved and contain many of the growth rings and features of the wood.

Reluctantly the GSOC trip turned homeward from this point.

Carol Hasenberg

Suggested Reading/Roadguides:

David Alt, Glacial Lake Missoula and Its Humongous Floods, Mountain Press Publishing Company, Missoula, Montana, 2001

David Alt and Donald Hyndman, Roadside Geology of Washington, Mountain Press Publishing Company, Missoula, Montana, 1984

Charles L. Mason, The Geological History of the Wenatchee Valley and Adjacent Vicinity, Pixie Publishing, P O Box 97, Rock Island, Wa 98850, ISBN # 1-883078-01-6

Mark Amara and George Neff, Geologic Road Trips in Grant County, Washington, Adam East Museum and Art Center, Moses Lake, Washington, 98837, 1996

There will be a noon meeting featuring the pictures taken on the trip. If any participants would like to include their pictures in the presentation, please contact Carol Hasenberg.

WEB TEASERS

Here are some interesting websites for the editor's home state, West Virginia.

Fun Facts:

- Geology plays a big part of the economy of West Virginia, one of the biggest coal producers in the US.
- There aren't any dinosaur fossils in West Virginia, the rocks are all Paleozoic (pre-dinosaur). Most of the state is overlain by rocks from the Permian and Pennsylvanian Periods.

Older rocks are exposed in folded belts on the eastern edge of the state.

- West Virginia was not covered by the continental ice sheets during the Pleistocene.

US Coal Fields Map:

<http://energy.er.usgs.gov/products/openfile/of96-92/map.htm>

USGS links to Mid Atlantic States:

http://geology.er.usgs.gov/states/mid_atl.html

USGS – West Virginia:

<http://biology.usgs.gov/state.partners/wv.html>

NOAA Satellite Image of West Virginia:

http://fermi.jhuapl.edu/states/avhrr/WV_213.n14.96_sep20_1819.html

USGS Fact Sheets by State:

<http://water.usgs.gov/wid/index-state.html>

West Virginia Geological and Economic Survey (WVGES) Welcome Page:

<http://www.wvgs.wvnet.edu/>

WVGES West Virginia Geology:

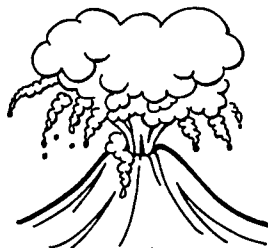
<http://www.wvgs.wvnet.edu/www/geology/geology.htm>

WVGES Frequently Asked Questions:

<http://www.wvgs.wvnet.edu/www/faq/faq.htm#GeoFacts>

Friends of the Pleistocene, Southeast Cell, 4-6 October, 2002, Greenbrier County, West Virginia

http://www4.nau.edu/amqua/v31n2/friends_of_the_pleistocene.htm



Glossary of Volcano and Related Terminology

From the USGS Cascades Volcano Observatory website:

<http://vulcan.wr.usgs.gov>

Vent:

The opening at the Earth's surface through which volcanic materials (lava, tephra, and gases) erupt. Vents can be at a volcano's summit or on its slopes; they can be circular (craters) or linear (fissures).

An opening in the Earth's surface through which volcanic materials (magma and gas) escape. (Gardner, et.al., 1995)

Vesuvian eruption:

In a "Vesuvian" eruption, as typified by the eruption of Mount Vesuvius in Italy in A.D.79, great quantities of ash-laden gas are violently discharged to form a cauliflower-shaped cloud high above the volcano. (Tilling, 1985)

Viscosity:

Measure of the fluidity of a substance. Taffy and molasses are very viscous; water has low viscosity.

Basalt is less viscous than dacite.

Volcano:

A vent (opening) in the surface of the Earth through which magma erupts; it is also the landform that is constructed by the erupted material.

Volcanic cone or edifice:

Used to describe the uppermost slopes and summit area of a volcano. (Gardner, et.al., 1995)

Volcanic landslide:

The downslope movement of soil, rock debris, and sometimes glacial ice, with or without water, from the flank of a volcano. (Brantley, 1994)

See: Debris Avalanche.

Vulcanian eruption:

The eruptive activity of Paricutin Volcano in 1947 demonstrated a "Vulcanian"-type eruption, in which a dense cloud of ash-laden gas explodes from the crater and rises high above the peak. Steaming ash forms a whitish cloud near the upper level of the cone. (Tilling, 1985)

WANTED: SLIDE PROGRAMS

This is a reminder for GSOC members to bring their cameras on vacation with them! If there is some interested geology, shoot a roll of slides, because we can always use a presentation for the GSOC noon meeting. Other GSOC members can assist with researching the geology and helping with your presentation, so don't let a little bit of inexperience stop you. We can all benefit!!!

WANTED: SLIDE PROJECTOR

If anyone has a slide projector in good working order which they would like to donate to GSOC, please contact Robert Strebin (503/665-2756).

FOP FIELD TRIP!

This year's Friends of the Pleistocene field trip (Pacific Northwest Cell) has been scheduled:

- Date: 16-18 August 2002
- Topic: Eolian Deposits and Megaflood Features, Columbia Plateau, Washington.
- For more info, visit the website:

http://www4.nau.edu/amqua/v31n2/friends_of_the_pleistocene.htm

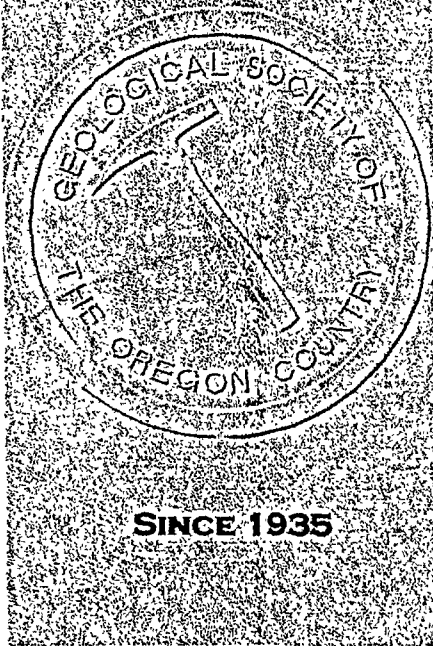
Some more info:

We are pleased to announce the Pacific Northwest Cell Friends of the Pleistocene 2002 Field Trip. This year's trip is titled "Paired Eolian Deposits and Megaflood Features, Columbia Plateau, Washington" and will take place 16-18 August 2002. Complete details and registration information is available here: <http://css.wsu.edu/FOP.htm>

Please note the trip is limited to 80 participants, so please register early.

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THE GEOLOGICAL NEWSLETTER

GRASSROOTS
SEPTEMBER 2002

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Business Manager:

Rosemary Kenney – 503/892-6514

Assistant Business Manager:

Cecelia Crater – 503/235-5158

ACTIVITIES:

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

FIELD TRIPS: Usually one per month. Fees: Members, free, Non-members, \$2.50. See calendar next page.

GEOLOGY SEMINAR: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.

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

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

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

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

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

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

WEBSITE: www.gsoc.org. Email address: gsoc@spiritone.com.

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Geologic Interests and Hobbies _____

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Tom Gordon, President, 360-835-7748

Ted Walling, Calendar Editor, 503-598-8067

VOL. 68, No. 9

September 2002

SEPTEMBER ACTIVITIES

Fri. Sept 13, 8:00 PM: Tertiary Geology of the Willamette Valley. Marshall Gannett and Jim O'Connor of USGS Water Resources. Rm. 371 Cramer Hall, PSU.

President's Field Trip Sept 8-13 Sun.-Fri.: Tour of Mammoth Lakes, Mono Lake and Yosemite, California. Cost will be: members \$700 for double occupancy, \$800 for single occupancy. Add \$20 each for non-members. Contact Tom Gordon, 360-835-7748 or e-mail at tndgardens@attbi.com for more details.

Field Trip Sat Sept 28: Geology of West Linn and Willamette Falls. Explore pillow basalts, tree molds, crystallized wood, faults, landslides, uplift and creation of Willamette Falls and much more. Meet at 8:45 AM at Willamette Falls Overlook off Hwy 205, halfway between the two West Linn exits. Taylor Hunt 503-662-4790. Fee Schedule: members free, non-members \$2.50.

Note: There will be no seminar or noon meeting in September.

PREVIEW OF COMING EVENTS

Fri. Oct. 4, 3-4:30 PM (note change of day and location of the usual "noon meeting") Report on GSOC field trip to Central Washington and Wenatchee. Area geology and core complexes. Carol Hasenberg, past president. *NEW LOCATION:* Oregon State Office Building, 800 NE Oregon St, Portland. This is near the Convention Center. Call Bob Streben for more information, 503-665-2756.

Fri. Oct. 11, 8:00 PM: Landslide Monitoring at the Washington Park Light Rail Station and the Oregon Zoo. Gary Peterson, landslide geologist with Squire Associates, Portland. Rm 371 Cramer Hall, PSU.

Seminar Wed. Oct. 16, 8:00 PM: New Thoughts on Modern Subduction Zones in the Pacific NW. Richard Bartels, past president. Rm S17 Cramer Hall, PSU.

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

WELCOME

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

Randy Simonis

BOARD MEETING NOTES

AUGUST 3, 2002

President Tom Gordon called the meeting to order at Rosemary Kenney's home at 7000 SW 15th Ave., in Portland. Board members and GSOC members present included Tom Gordon, Phyllis Thorne, Rosemary Kenney, John Newhouse, Beverly Vogt, Evelyn Pratt, Taylor Hunt, and Su Ikeda.

The president appointed a field trip committee to establish and write down all procedures related to field trips. Members of the committee will be Beverly Vogt, chair; John Newhouse; Evelyn Pratt; Richard Bartels; and Taylor Hunt. The committee will address such issues as safety procedures, leadership training, accounting and record keeping, field trip guides, number and types of trips, liability issues, accident reports, waivers, contracts, etc. The committee will report to the board on its progress.

A membership committee to explore the makeup of the present organization and ways of attracting new members was created. Members are Tom Gordon, Su Ikeda, and someone else yet to be appointed.

The Nominating Committee was appointed. Members include John Newhouse, Chair; Bev Vogt; Carol Hasenberg; and Taylor Hunt. The committee is to present its report to the at the November meeting, nominations from the floor will be closed after the December meeting, and the nominations are to be published in the January Newsletter. Voting will take place at the February meeting.

This was a long meeting, and many issues were discussed. The group reflected on the long history of GSOC and the contributions made by past and present members. The board particularly wanted to recognize the contribution made by Taylor Hunt as he has led all these monthly field trips.

The board also recognized the work done by many other of its members. Carol Hasenberg works long and hard to keep the web site up to date and the newsletter created every month. Rosemary Kenney and Cecelia Crater see that the newsletter is printed and mailed out each month--in the thriftiest way possible. Don Barr keeps the labels up to date. Ted Walling takes care of the calendar. Bob Strebin and Tim Tolle take care of the monthly noon meetings. Phyllis Thorne takes care of the money, keeps the roster up to date, and sees it is printed. Diana Gordon takes care of the library. All of these people plus many others do GSOC work all the time without being reminded to do so, and the board thanks them for all their hard work. We would be lost without them.

The next meeting is scheduled for November 2, at 10:30 a.m. at Rosemary's house.

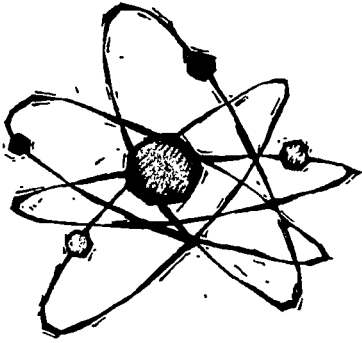
Respectfully submitted,

Beverly Vogt, Secretary

**END OF
SUMMER
BOOKWORM**



Getting in those last few rays at the end of the summer? Want an interesting book to read? Check out a couple of new books and look forward to the next GSOC field trip!



ATOM: AN ODYSSEY FROM THE BIG BANG TO LIFE ON EARTH...AND BEYOND

Lawrence M. Krauss, Author
Copyright 2001, Little, Brown, and Company,
Boston, New York, and London. Hardback price
\$26.95.

a book review by Carol Hasenberg

I have had an interest in books about cosmology ever since this winter. I had the fortune to attend most of the Science, Technology, and Society lectures sponsored by the Institute for Science, Engineering and Public Policy. After the excellent lecture delivered by Brian Greene, I developed a thirst to find out more about the frontiers of cosmology, and have read quite a few layman's books on the subject. The several books I found most appealing are listed at the end of the review. This book I thought would be interesting for GSOC members because it touched on geology from a cosmologist's viewpoint. Dr. Krauss also delivered a very absorbing lecture last May, just after the Stephen Hawking lecture which was added to the series.

Remember when your Mom would tell you, "Don't touch that, you don't know where it's been", well, after reading this book, you ought to have some idea. The premise of the book is that it follows the evolution of an oxygen molecule from the instant after the Big Bang to the breath you are about to take. Along the way, it discusses how matter came into being, how quarks, protons, and neutrons were able to combine as the universe cooled and enlarged, the constitution of the original universe,

the birth of the first stars and the formation of the galaxies, and subsequent evolution of the stars and the creation of heavier elements.

About the middle of the book, our oxygen atom arrives in the newly born solar system and its odyssey on Planet Earth begins. At this point, I was thinking, oh boy, this is literally going to be a comedown after the wonderful description Krauss wrote of what goes on inside a supernova. However, it was a pleasant surprise to read this overview of the geology of the Earth from a physicist's perspective. In particular, Krauss describes the role oxygen and carbon dioxide play in regulating the temperature of the planet and how the overabundance of oxygen led to the conditions which created Snowball Earth. And then he describes the subsequent conditions which warmed the Earth again. Krauss also describes the role of oxygen as the fuel for life and how life evolved to "tame" this highly reactive element and maximize its high potential for delivering energy to living systems.

On a more cosmic scale, Krauss discusses the evolution of the planetary system with respect to the evolving sun, and thus why the planets look like they do, and contain the elements that they contain. He also discusses the creation of the Oort cloud, the bombardment of Planet Earth from comets and how these episodes have influenced the development of the Earth and life. Our oxygen atom arrives on earth from just such a bombardment, and becomes part of the cycles of carbon dioxide, and ultimately of life itself.

The final chapters of the book are an opportunity for Krauss to discuss the possible fates of the oxygen atom, Planet Earth and the solar system and also the fate of the universe. Indeed, the evidence is mounting for the universe to expand forever, and Krauss takes a philosophical approach to the inevitable demise of the systems which have nourished our creation. He recommends that we immerse ourselves in the mysteries of the cosmos.

I found this book to be a light and mostly fun journey through a plethora of topics which may warrant a more in-depth exploration. I very much

enjoyed Krauss' wry, down-to-earth style in presenting the material, and appreciated the amount of research he must have had to do to discuss some of the topics outside of his area of expertise. If you are looking for a well written, informative layman's book on cosmology and its geological and biological implications, I would recommend it. And though the price of the hardback edition may daunt you, it does have a very cool glow-in-the-dark jacket!

Here are some other books on cosmology which I have found interesting. All are written for the layman (i.e., minimum amount of mathematics required, but still require some thought):

Stephen Hawking, A Brief History of Time, Bantam Books, 1998, original version published 1988. This is a classic, well written history of cosmology from Aristotle to Hawking himself. The updated version contains lavish illustrations, updates to the original text and a new chapter on wormholes and time travel.

Brian Greene, The Elegant Universe, Vintage Books, 1999. This Pulitzer Prize finalist is an excellent follow-up to Hawking's book and expands the reader into the latest developments in Unified Field Theory. The early chapters contain excellent and humorous illustrations of general relativity. The chapters on superstring theory are a little more difficult to picture. After all, what do 11 dimensions really look like?

John Gribbin, The Birth of Time: How We Measured the Age of the Universe, Weidenfeld and Nicolson, 1999. I have read this and other books by this well-known science writer. His books cover a remarkable variety of subjects and are fairly easy to read.

SCIENCE, TECHNOLOGY AND SOCIETY LECTURE SERIES

Here is this year's line-up at the STS Lecture Series by the Institute for Science, Engineering, and Public Policy. Expand your horizons!

The Future of the Oceans Jean Michel Cousteau
 The Fractal Revolution..... Benoit Mandelbrot
 Flesh and Machines..... Dr. Rodney Brooks
 Uncle Tungsten.....Dr. Oliver Sacks
 The Super Renaissance..... Burt Rutan
 Origins: Search for our Cosmic Roots
Dr. Anne Kinney
 Becoming Human Dr. Ian Tattersall
 Technology and Social Justice.....Freeman Dyson

MORE SUMMER READING IDEAS

by Evelyn Pratt

Here's an excerpt from a book I've been reading. Maybe it'll be of interest to GSOC newsletter readers:

HOW FAST DOES GEOLOGY WORK? Maybe faster than you think!

From New Views on an Old Planet, 2nd Ed.1994, by Tjeerd Van Andel

This book discusses and gives illustrations for rates of geological processes. Some common rates are expressed in this table from the book:

Process	Rate
Glacio-eustatic sea level change	up to 10 meters/1000 years (fast) 2m/1000 years (slow)
Regional erosion	meters/1000 years
Deposition on continental shelves	centimeters/year
Deep-sea deposition	millimeters/1000years
Uplift and subsidence	
In subduction zones	up to 10 m/1000 years
Common rate	10 cm/1000 years
Continental drift	centimeters/year

DAVID GILLESPIE DECEASED

Some long-time GSOC members might want to mark the passing of David Gillespie, an avid GSOC participant until his health prevented him from attending GSOC functions about five years ago.

Mr. Gillespie was born in Slater, Colorado, in 1913. A veteran of World War II, he moved to Portland in 1967 where he taught business administration at Clackamas Community College (CCC).

Gillespie died July 25, 2002. Survivors include his wife Marvel, son David, and three daughters, Diane, Deda and Doreen. Remembrances can be sent to CCC Foundation in Oregon City.

WEB TEASERS

Here's a few web pages to get you psyched for the upcoming trip to Mammoth Lakes/Mono Lake and Yosemite. You lucky devils!!!

A Field Trip to Owens Valley/Mammoth Lakes, from David Jessey at Cal Poly/Pomona. This page is great!!! It's got a geology field trip complete with geology maps, illustrations, references and lots of pictures.

<http://www.csupomona.edu/~geology/docs/sierra.html>

And what does USGS have to say about the area?

<http://lvo.wr.usgs.gov/>

And the National Park Service:

<http://www.aqd.nps.gov/grd/parks/depo/>

<http://www.aqd.nps.gov/grd/parks/yose/>

Commercial site of Mammoth Lakes area with a good description of the geological sights to see:

<http://www.visitmammoth.com/summer/geologyhome.html>

South Coast Geological Society sells guidebooks for this and other areas:

<http://www.southcoastgeo.org/pubform.html>

The Modesto Junior College website contains a geological field trip to Yosemite:

<http://virtual.yosemite.cc.ca.us/ghayes/roadside.htm>



ROCK COLLECTING GUIDE
Oregon & Washington
U.S. Bureau of Land Management



● **GENERAL INFORMATION:** A wide variety of rocks, minerals, and semi-precious gemstones is available for collecting on 16 million acres of lands managed by the U.S. Bureau of Land Management (BLM) in Oregon and Washington. Most BLM lands are open to rock collecting, and some areas, such as the Glass Buttes obsidian area in our Prineville District and a public sunstone area in our Lakeview District, have been specifically set aside for this purpose. Collectors should note that there are some restrictions and a BLM permit may be required, depending on the amount of material you collect, how you collect it, where or when you collect, and whether the material will be used commercially. The following information is provided for the public to be used as a general guide for collecting on BLM lands in Oregon and Washington.

● **COLLECTING LIMITS & PERMITS:** An individual can collect a reasonable amount of rocks and minerals from BLM lands, but a permit or fee may be required if certain amounts are exceeded, as described below. Note: Collecting limits for petrified wood are slightly different.

<p><u>A Reasonable Daily Collecting Amount</u> - fits into the trunk of a car or, - is a partial pickup truck load and, - weighs less than 250 lbs., - and the material is for non-commercial use. (For petrified wood, see below)</p>	<p>No fee or BLM permit is required.</p>
<p><u>More Than a Reasonable Daily Collecting Amount</u> - is a full pickup truck load or, - involves more than one trip (or partial load) and, - weighs more than 250 lbs., - or the material is for commercial use, - or explosives or power equipment is used. (For petrified wood, see below)</p>	<p>Fee and BLM permit are required.</p>

● **PETRIFIED WOOD:** Collecting petrified wood is free up to 25 pounds per day, plus one piece, but no more than 250 pounds per year. Pooling of quotas among two or more people to obtain pieces over 250 pounds is prohibited. A permit is needed for amounts over these limits.

● **REMAINS, ARTIFACTS, AND FOSSILS:** The excavation, collection or destruction of any human remains and archaeological or historical materials located on Federal land is illegal and prohibited by Federal and State laws. This includes: skeletal materials, arrowheads, flakes, pottery or potsherds, mats, rock art, old bottles, and pieces of equipment or buildings. Any human remains should be left intact and reported to Federal or State authorities immediately. A permit is needed for collecting vertebrate fossils, but not for common invertebrate fossils.

GSOC Member Field Trip Survey

We would like to get information from our members on how they feel about field trips. Please fill out this form and either return to Beverly Vogt at the September 13 Friday night GSOC lecture or return by mail to Beverly Vogt, 4841 SW 60th Place, Portland, OR, by October 1, 2002. Thank you for your help.

How many times a year would you like to attend GSOC field trips? _____

What kind of field trips do you like?

How long do you want field trips to be? One day____, weekend____, weeklong____

How many hours do you want one-day trips to last? _____

Do you prefer car caravan or bus for one-day trip____, for weekend trip____, for weeklong trip_____?

Why do you go on field trips?

What were your favorite field trips in the past, and why were they your favorite?

What do you expect from a field trip guide? Do you like maps and references (yes or no)?_____ Do you want general or more technical information?_____ Do you want facts or do you prefer to answer questions about your observations?_____ Other comments about field trip guides?

How much money are you willing to spend on a weekend trip?____; a weeklong trip?_____

How did you hear about GSOC?

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FIELD TRIPS: Usually one per month. Fees: Members, free, Non-members, \$2.50. See calendar next page.

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

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

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

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

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INFORMATION: www.gsoc.org or e-mail: gsoc@spiritone.com

Tom Gordon, President, 360-835-7748

Ted Walling, Calendar Editor, 503-598-8067

VOL. 68, No. 9
September 2002

SEPTEMBER ACTIVITIES

Fri. Sept 13, 8:00 PM: Tertiary Geology of the Willamette Valley. Marshall Gannett and Jim O'Connor of USGS Water Resources. Rm. 371 Cramer Hall, PSU.

President's Field Trip Sept 8-13 Sun.-Fri.: Tour of Mammoth Lakes, Mono Lake and Yosemite, California. Cost will be: members \$700 for double occupancy, \$800 for single occupancy. Add \$20 each for non-members. Contact Tom Gordon, 360-835-7748 or e-mail at tndgardens@attbi.com for more details.

Field Trip Sat Sept 28: Geology of West Linn and Willamette Falls. Explore pillow basalts, tree molds, crystallized wood, faults, landslides, uplift and creation of Willamette Falls and much more. Meet at 8:45 AM at Willamette Falls Overlook off Hwy 205, halfway between the two West Linn exits. Taylor Hunt 503-662-4790. Fee Schedule: members free, non-members \$2.50.

Note: There will be no seminar or noon meeting in September.

PREVIEW OF COMING EVENTS

Fri. Oct. 4, 3-4:30 PM (note change of day and location of the usual "noon meeting") Report on GSOC field trip to Central Washington and Wenatchee. Area geology and core complexes. Carol Hasenberg, past president. *NEW LOCATION:* Oregon State Office Building, 800 NE Oregon St, Portland. This is near the Convention Center. Call Bob Streben for more information, 503-665-2756.

Fri. Oct. 11, 8:00 PM: Landslide Monitoring at the Washington Park Light Rail Station and the Oregon Zoo. Gary Peterson, landslide geologist with Squire Associates, Portland. Rm 371 Cramer Hall, PSU.

Seminar Wed. Oct. 16, 8:00 PM: New Thoughts on Modern Subduction Zones in the Pacific NW. Richard Bartels, past president. Rm S17 Cramer Hall, PSU.

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

WELCOME

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

Randy Simonis

BOARD MEETING NOTES

AUGUST 3, 2002

President Tom Gordon called the meeting to order at Rosemary Kenney's home at 7000 SW 15th Ave., in Portland. Board members and GSOC members present included Tom Gordon, Phyllis Thorne, Rosemary Kenney, John Newhouse, Beverly Vogt, Evelyn Pratt, Taylor Hunt, and Su Ikeda.

The president appointed a field trip committee to establish and write down all procedures related to field trips. Members of the committee will be Beverly Vogt, chair; John Newhouse; Evelyn Pratt; Richard Bartels; and Taylor Hunt. The committee will address such issues as safety procedures, leadership training, accounting and record keeping, field trip guides, number and types of trips, liability issues, accident reports, waivers, contracts, etc. The committee will report to the board on its progress.

A membership committee to explore the makeup of the present organization and ways of attracting new members was created. Members are Tom Gordon, Su Ikeda, and someone else yet to be appointed.

The Nominating Committee was appointed. Members include John Newhouse, Chair; Bev Vogt; Carol Hasenberg; and Taylor Hunt. The committee is to present its report to the at the November meeting, nominations from the floor will be closed after the December meeting, and the nominations are to be published in the January Newsletter. Voting will take place at the February meeting.

This was a long meeting, and many issues were discussed. The group reflected on the long history of GSOC and the contributions made by past and present members. The board particularly wanted to recognize the contribution made by Taylor Hunt as he has led all these monthly field trips.

The board also recognized the work done by many other of its members. Carol Hasenberg works long and hard to keep the web site up to date and the newsletter created every month. Rosemary Kenney and Cecelia Crater see that the newsletter is printed and mailed out each month--in the thriftiest way possible. Don Barr keeps the labels up to date. Ted Walling takes care of the calendar. Bob Strebin and Tim Tolle take care of the monthly noon meetings. Phyllis Thorne takes care of the money, keeps the roster up to date, and sees it is printed. Diana Gordon takes care of the library. All of these people plus many others do GSOC work all the time without being reminded to do so, and the board thanks them for all their hard work. We would be lost without them.

The next meeting is scheduled for November 2, at 10:30 a.m. at Rosemary's house.

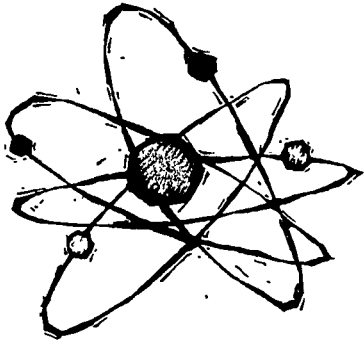
Respectfully submitted,

Beverly Vogt, Secretary

**END OF
SUMMER
BOOKWORM**



Getting in those last few rays at the end of the summer? Want an interesting book to read? Check out a couple of new books and look forward to the next GSOC field trip!



ATOM: AN ODYSSEY FROM THE BIG BANG TO LIFE ON EARTH...AND BEYOND

Lawrence M. Krauss, Author

Copyright 2001, Little, Brown, and Company,
Boston, New York, and London. Hardback price
\$26.95.

a book review by Carol Hasenberg

I have had an interest in books about cosmology ever since this winter. I had the fortune to attend most of the Science, Technology, and Society lectures sponsored by the Institute for Science, Engineering and Public Policy. After the excellent lecture delivered by Brian Greene, I developed a thirst to find out more about the frontiers of cosmology, and have read quite a few layman's books on the subject. The several books I found most appealing are listed at the end of the review. This book I thought would be interesting for GSOC members because it touched on geology from a cosmologist's viewpoint. Dr. Krauss also delivered a very absorbing lecture last May, just after the Stephen Hawking lecture which was added to the series.

Remember when your Mom would tell you, "Don't touch that, you don't know where it's been", well, after reading this book, you ought to have some idea. The premise of the book is that it follows the evolution of an oxygen molecule from the instant after the Big Bang to the breath you are about to take. Along the way, it discusses how matter came into being, how quarks, protons, and neutrons were able to combine as the universe cooled and enlarged, the constitution of the original universe,

the birth of the first stars and the formation of the galaxies, and subsequent evolution of the stars and the creation of heavier elements.

About the middle of the book, our oxygen atom arrives in the newly born solar system and its odyssey on Planet Earth begins. At this point, I was thinking, oh boy, this is literally going to be a comedown after the wonderful description Krauss wrote of what goes on inside a supernova. However, it was a pleasant surprise to read this overview of the geology of the Earth from a physicist's perspective. In particular, Krauss describes the role oxygen and carbon dioxide play in regulating the temperature of the planet and how the overabundance of oxygen led to the conditions which created Snowball Earth. And then he describes the subsequent conditions which warmed the Earth again. Krauss also describes the role of oxygen as the fuel for life and how life evolved to "tame" this highly reactive element and maximize its high potential for delivering energy to living systems.

On a more cosmic scale, Krauss discusses the evolution of the planetary system with respect to the evolving sun, and thus why the planets look like they do, and contain the elements that they contain. He also discusses the creation of the Oort cloud, the bombardment of Planet Earth from comets and how these episodes have influenced the development of the Earth and life. Our oxygen atom arrives on earth from just such a bombardment, and becomes part of the cycles of carbon dioxide, and ultimately of life itself.

The final chapters of the book are an opportunity for Krauss to discuss the possible fates of the oxygen atom, Planet Earth and the solar system and also the fate of the universe. Indeed, the evidence is mounting for the universe to expand forever, and Krauss takes a philosophical approach to the inevitable demise of the systems which have nourished our creation. He recommends that we immerse ourselves in the mysteries of the cosmos.

I found this book to be a light and mostly fun journey through a plethora of topics which may warrant a more in-depth exploration. I very much

enjoyed Krauss' wry, down-to-earth style in presenting the material, and appreciated the amount of research he must have had to do to discuss some of the topics outside of his area of expertise. If you are looking for a well written, informative layman's book on cosmology and its geological and biological implications, I would recommend it. And though the price of the hardback edition may daunt you, it does have a very cool glow-in-the-dark jacket!

Here are some other books on cosmology which I have found interesting. All are written for the layman (i.e., minimum amount of mathematics required, but still require some thought):

Stephen Hawking, A Brief History of Time, Bantam Books, 1998, original version published 1988. This is a classic, well written history of cosmology from Aristotle to Hawking himself. The updated version contains lavish illustrations, updates to the original text and a new chapter on wormholes and time travel.

Brian Greene, The Elegant Universe, Vintage Books, 1999. This Pulitzer Prize finalist is an excellent follow-up to Hawking's book and expands the reader into the latest developments in Unified Field Theory. The early chapters contain excellent and humorous illustrations of general relativity. The chapters on superstring theory are a little more difficult to picture. After all, what do 11 dimensions really look like?

John Gribbin, The Birth of Time: How We Measured the Age of the Universe, Weidenfeld and Nicolson, 1999. I have read this and other books by this well-known science writer. His books cover a remarkable variety of subjects and are fairly easy to read.

SCIENCE. TECHNOLOGY AND SOCIETY LECTURE SERIES

Here is this year's line-up at the STS Lecture Series by the Institute for Science, Engineering, and Public Policy. Expand your horizons!

The Future of the Oceans Jean Michel Cousteau
 The Fractal Revolution..... Benoit Mandelbrot
 Flesh and Machines..... Dr. Rodney Brooks
 Uncle Tungsten.....Dr. Oliver Sacks
 The Super Renaissance..... Burt Rutan
 Origins: Search for our Cosmic Roots
Dr. Anne Kinney
 Becoming Human Dr. Ian Tattersall
 Technology and Social Justice..... Freeman Dyson

MORE SUMMER READING IDEAS

by Evelyn Pratt

Here's an excerpt from a book I've been reading. Maybe it'll be of interest to GSOC newsletter readers:

HOW FAST DOES GEOLOGY WORK? Maybe faster than you think!
 From New Views on an Old Planet, 2nd Ed.1994, by Tjeerd Van Andel

This book discusses and gives illustrations for rates of geological processes. Some common rates are expressed in this table from the book:

Process	Rate
Glacio-eustatic sea level change	up to 10 meters/1000 years (fast) 2m/1000 years (slow)
Regional erosion	meters/1000 years
Deposition on continental shelves	centimeters/year
Deep-sea deposition	millimeters/1000years
Uplift and subsidence	
In subduction zones	up to 10 m/1000 years
Common rate	10 cm/1000 years
Continental drift	centimeters/year

DAVID GILLESPIE DECEASED

Some long-time GSOC members might want to mark the passing of David Gillespie, an avid GSOC participant until his health prevented him from attending GSOC functions about five years ago.

Mr. Gillespie was born in Slater, Colorado, in 1913. A veteran of World War II, he moved to Portland in 1967 where he taught business administration at Clackamas Community College (CCC).

Gillespie died July 25, 2002. Survivors include his wife Marvel, son David, and three daughters, Diane, Deda and Doreen. Remembrances can be sent to CCC Foundation in Oregon City.

WEB TEASERS

Here's a few web pages to get you psyched for the upcoming trip to Mammoth Lakes/Mono Lake and Yosemite. You lucky devils!!!

A Field Trip to Owens Valley/Mammoth Lakes, from David Jessey at Cal Poly/Pomona. This page is great!!! It's got a geology field trip complete with geology maps, illustrations, references and lots of pictures.

<http://www.csupomona.edu/~geology/docs/sierra.html>

And what does USGS have to say about the area?

<http://lvo.wr.usgs.gov/>

And the National Park Service:

<http://www.aqd.nps.gov/grd/parks/depo/>

<http://www.aqd.nps.gov/grd/parks/yose/>

Commercial site of Mammoth Lakes area with a good description of the geological sights to see:

<http://www.visitmammoth.com/summer/geologyhome.html>

South Coast Geological Society sells guidebooks for this and other areas:

<http://www.southcoastgeo.org/pubform.html>

The Modesto Junior College website contains a geological field trip to Yosemite:

<http://virtual.yosemite.cc.ca.us/ghayes/roadside.htm>



ROCK COLLECTING GUIDE
Oregon & Washington
U.S. Bureau of Land Management



● **GENERAL INFORMATION:** A wide variety of rocks, minerals, and semi-precious gemstones is available for collecting on 16 million acres of lands managed by the U.S. Bureau of Land Management (BLM) in Oregon and Washington. Most BLM lands are open to rock collecting, and some areas, such as the Glass Buttes obsidian area in our Prineville District and a public sunstone area in our Lakeview District, have been specifically set aside for this purpose. Collectors should note that there are some restrictions and a BLM permit may be required, depending on the amount of material you collect, how you collect it, where or when you collect, and whether the material will be used commercially. The following information is provided for the public to be used as a general guide for collecting on BLM lands in Oregon and Washington.

● **COLLECTING LIMITS & PERMITS:** An individual can collect a reasonable amount of rocks and minerals from BLM lands, but a permit or fee may be required if certain amounts are exceeded, as described below. Note: Collecting limits for petrified wood are slightly different.

<p><u>A Reasonable Daily Collecting Amount</u></p> <ul style="list-style-type: none"> - fits into the trunk of a car or, - is a partial pickup truck load and, - weighs less than 250 lbs., - and the material is for non-commercial use. <p style="text-align: center;">(For petrified wood, see below)</p>	<p>No fee or BLM permit is required.</p>
<p><u>More Than a Reasonable Daily Collecting Amount</u></p> <ul style="list-style-type: none"> - is a full pickup truck load or, - involves more than one trip (or partial load) and, - weighs more than 250 lbs., - or the material is for commercial use, - or explosives or power equipment is used. <p style="text-align: center;">(For petrified wood, see below)</p>	<p>Fee and BLM permit are required.</p>

● **PETRIFIED WOOD:** Collecting petrified wood is free up to 25 pounds per day, plus one piece, but no more than 250 pounds per year. Pooling of quotas among two or more people to obtain pieces over 250 pounds is prohibited. A permit is needed for amounts over these limits.

● **REMAINS, ARTIFACTS, AND FOSSILS:** The excavation, collection or destruction of any human remains and archaeological or historical materials located on Federal land is illegal and prohibited by Federal and State laws. This includes: skeletal materials, arrowheads, flakes, pottery or potsherds, mats, rock art, old bottles, and pieces of equipment or buildings. Any human remains should be left intact and reported to Federal or State authorities immediately. A permit is needed for collecting vertebrate fossils, but not for common invertebrate fossils.

GSOC Member Field Trip Survey

We would like to get information from our members on how they feel about field trips. Please fill out this form and either return to Beverly Vogt at the September 13 Friday night GSOC lecture or return by mail to Beverly Vogt, 4841 SW 60th Place, Portland, OR, by October 1, 2002. Thank you for your help.

How many times a year would you like to attend GSOC field trips? _____

What kind of field trips do you like?

How long do you want field trips to be? One day _____, weekend _____, weeklong _____

How many hours do you want one-day trips to last? _____

Do you prefer car caravan or bus for one-day trip _____, for weekend trip _____, for weeklong trip _____?

Why do you go on field trips?

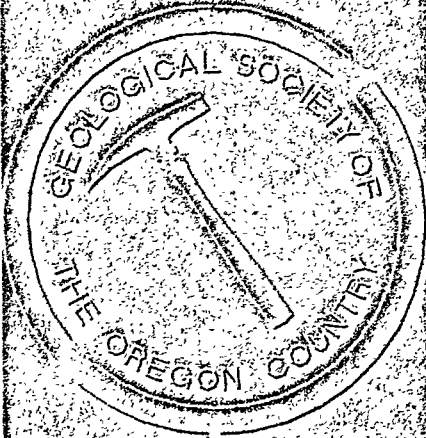
What were your favorite field trips in the past, and why were they your favorite?

What do you expect from a field trip guide? Do you like maps and references (yes or no)? _____ Do you want general or more technical information? _____ Do you want facts or do you prefer to answer questions about your observations? _____
Other comments about field trip guides?

How much money are you willing to spend on a weekend trip? _____; a weeklong trip? _____

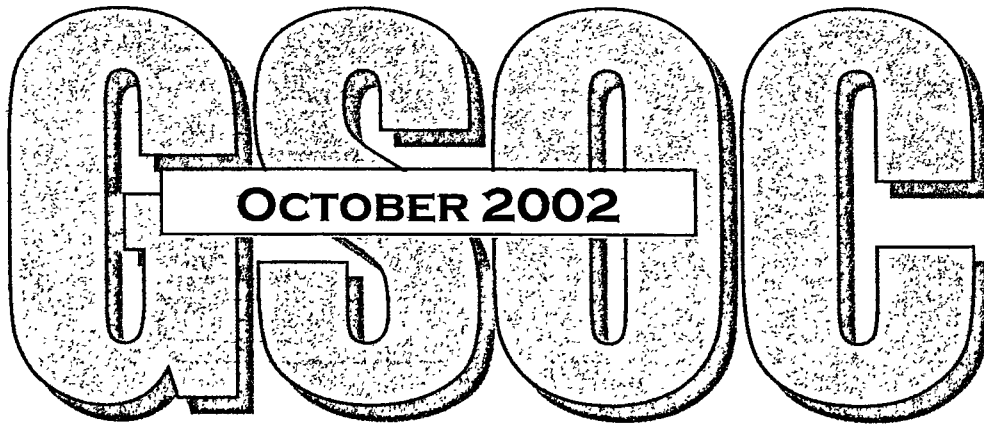
How did you hear about GSOC?

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ACTIVITIES:

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

FIELD TRIPS: Usually one per month. Fees: Members, free, Non-members, \$2.50. See calendar next page.

GEOLOGY SEMINAR: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.

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Children under age 18 _____

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

Geologic Interests and Hobbies _____

Please indicate Membership type and include check for appropriate amount:

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VISITORS WELCOME AT ALL MEETINGS

INFORMATION: www.gsoc.org or e-mail: gsoc@spiritone.com

Tom Gordon, President, 360-835-7748

Ted Walling, Calendar Editor, 503-598-8067

VOL. 68, No. 10

October 2002

OCTOBER ACTIVITIES

Fri. Oct. 4, 3-4:30 PM (note change of day and location of the usual "noon meeting") Report on GSOC Field Trip to Central Washington and Wenatchee. Area Geology and Core Complexes. Carol Hasenberg, past president. **NEW LOCATION:** Oregon State Office Building, 800 NE Oregon St, Portland, Rm 120B (Crooked River Suite). This is near the Convention Center.

Fri. Oct. 11, 8:00 PM: Landslide Monitoring at the Washington Park Light Rail Station and the Oregon Zoo. Gary Peterson, landslide geologist with Squier Associates, Portland. Rm 371 Cramer Hall, PSU.

Field Trip Sat. Oct. 12: Continuation of cool beach trip. Meet at the entrance to **Ecola State Park at 9:00 AM** (there may be a park fee). Besides other stops, we will visit a **BRIAN ATWATER SIT** which was used to prove earthquakes and tsunamis. Knee or hip boots are highly recommended. Bring lunch, water and walking boots. Taylor Hunt 503-662-4790. Fee Schedule: members free, non-members \$2.50. Note: This is also Cranberry Festival Weekend.

Seminar Wed. Oct. 16, 8:00 PM: New Thoughts on Modern Subduction Zones in the Pacific NW. Richard Bartels, past president. Rm S17 Cramer Hall, PSU.

PREVIEW OF COMING EVENTS

Fri. Nov. 8, 12:00-1:30 PM: 2002 Friends of Pleistocene Trip-Wind (eolian) Deposits and Megaflood Features, Columbia Plateau, Washington. Charles Carter, retired geologist. Rm 120B (Crooked River Suite), Oregon State Office Building, 800 NE Oregon St.

Fri. Nov. 8, 8:00 PM. TBA

Seminar Wed. Nov. 20, 8:00 PM. Extinct Accretionary Wedges in Pacific NW. Richard Bartels, past president. Rm S17 Cramer Hall, PSU.

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

WELCOME

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

Janet Kaye
James R. Moore
Ed Lump
Andrew Lump
Donald G. McLeod
Joanna M. McLeod

COMPLETELY GEOLOGY

FRACTURED

by Evelyn Pratt

1. **Dextral shear:** A haircut similar to one worn by Hollywood's latest leading men.
2. **Chondrite:** What the two crooks told each other when their scam paid off: "We sure chondrite!"
3. **End member:** One of what's at the front of a foot.
4. **Eolian:** Refers to a donkey in Winnie-the-Pooh stories.
5. **Phyteral:** What the referee said to the boxer: "Ya gotta hit above the belt – that's a phyteral!"
6. **Gas cap:** This is what, when you're in Washington filling your car's tank with gasoline, you've got to be sure to replace when you're done!
7. **Gangue:** French spelling for a group of juveniles.
8. **Firn:** As in, "If it's not made in the USA, it's firn!"
9. **Fossa:** a female fossil.
10. **Syntaxis:** What the government makes us pay for things like cigarettes and alcohol.

See pages 49 and 50 for the correct definitions.

WILLAMETTE VALLEY DEPOSITIONAL HISTORY

Friday, September 13, 2002

Notes from the presentation by Marshall Gannett, USGS hydrology geology specialist, and Jim O'Connor, USGS Quaternary geology specialist

The presentation given to GSOC is an expanded version of the presentation Marshall gave to the Cordilleran Section of the Geological Society of America (GSA) last May.

Marshall began the talk by describing the **questions** about the Willamette Valley that the USGS research team set out to answer:

1. What is the regional scale distribution of soil grain size (and thus permeability) in the Willamette Valley?
2. What are the dominant depositional environments responsible for this distribution?

The USGS answered these questions primarily through collection and analysis of existing well logs (water, oil, etc.) in the Willamette Valley, which includes the following basins:

1. **Southern Basin** which extends from Eugene north to the Salem Hills
2. **Central Basin** from Salem north to Chehalem Mountains
3. **Tualatin River Valley Basin**
4. **Portland Basin**

All the basins except for the Southern are deep structural basins which are lined with Columbia River Basalt. These basins contain up to 1800 feet of sediments, except for the Southern Basin, which is not as deep. Dividing the basins are outcroppings of Columbia River Basalt: The Tualatin Mountains, the Chehalem Mountains, the Eola Hills, the Salem Hills, and Waldo Mountain.

The basins of the Willamette Valley are filled with the following types of material:

- **Post-Columbia River Basalt alluvium (Miocene and Pliocene)**, which are mostly fine grained (and not very permeable) sediments consisting primarily of layers of blue clay. These sediments are the oldest, thickest, and deepest material in the basins. This material is over 1400 feet thick in each of the three northern basins and over 340 feet thick in the Southern Basin. In the Portland Basin, the coarse-grained Troutdale Formation is included in this category.
- **Quaternary coarse-grained sediments** are concentrated in the southern and eastern basin regions, where rivers fed by Cascades streams deposit sediment into the valley. These deposits are up to 300 feet thick in the Stayton Basin (the sub-basin to the east of the Salem Hills and fed by the North Santiam river) and thinner in the other basins.
- **Willamette silts** deposited by the Ice Age Floods in a southward thinning wedge are up to 130 feet thick in the Central Basin and sit atop most of the other alluvium, except that deposited by rivers since the floods.

Marshall's and Jim's work concentrated on the coarse grained layers as these are the layers which contain the groundwater.

The geological units of coarse basin sediment include the following from the work done by Jim:

Weathered terrace gravels – This unit is age dated from 420 ka (thousand years) to 750 ka. These layers predate the present basin fill and are characterized by the formation of thick red soils and tectonic deformation, processes which are indicative of their age. Jim noted that these high terraces are preferred sites for pioneer cemeteries.

Pleistocene river alluvium – This unit is at least 23ka to 420 ka in age. The ice age material forms the bulk of the coarse gravels (up to 100 m thick) and is located below the current river alluvium. The largest deposits occurred in times of glacial advances, and the material is deposited in broad braid-plains, characteristic of high water volumes in the system.

Willamette silts from the Ice Age Floods – This mica-rich material up to 30 m thick consists of individual deposits up to 2 m thick, and is age dated between 12 ka and 15 ka. It contains ice-rafted erratics (Jim passed around two examples) which can be identified by their foreign lithology (rock-type), their faceted rather than rounded shape and the presence of glacial striations (grooves) on some specimens

Holocene alluvium – This most recent material has accumulated since the end of the Ice Age (12ka). The material is deposited in meandering river channels rather than the more energy-intensive braid-plains. The Willamette silts and Pleistocene river alluvium may be cut and reworked by the river systems since the Ice Age.

After piecing together the depositional history and location of the layers of alluvium, the USGS team came to the following conclusions:

1. The coarse grained sediments in the Willamette Valley come from the Cascade Mountains.
2. The gravel is located in the alluvial fans of the Cascade streams, where the streams enter the basins from the mountains (there is also a fan through which the ancestral North Santiam river cut the Turner gap north into the Central Basin).
3. The drainage system in the Willamette Valley has remained essentially the same throughout its history.
4. Two episodes of more widespread gravel distribution occurred in the early history of the basin.
5. The Willamette River has always been situated against the west side of the basin downslope from the alluvial fans from the Cascade streams.

Carol Hasenberg

If you are interested in finding out more about the USGS work in the Willamette Valley, you may purchase a copy of USGS Professional Paper 1620, by JE O'Connor, AM Sarna-Wojcicki, KC Wozniak, DJ Polette and RJ Fleck. A description of the publication is given in this page of the USGS website:

<http://pubs.usgs.gov/publications/2001/books2001.html>

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CHARLES HANLIN HIBBS, JR., DECEASED

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Mr. Hibbs was born in Dallas, Oregon, in 1943. He served in the Navy, earned his bachelor's degree at Portland State University, and did post-baccalaureate studies at Oregon State University. His career included site archaeology, marine archaeology, research, and education. He was an advisor to the Oregon Archaeological Society.

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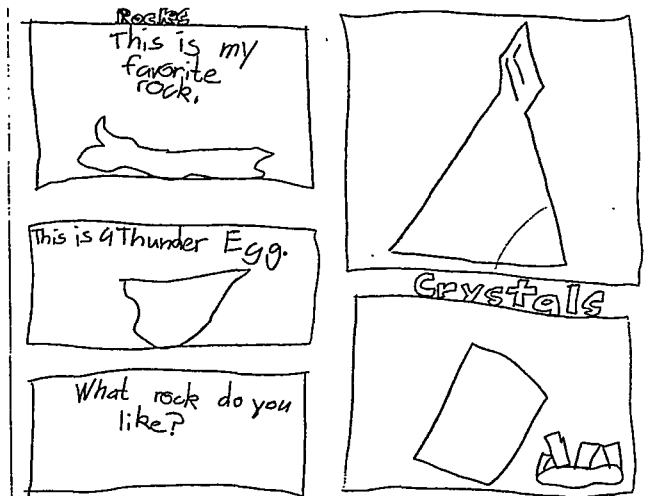
the joy of giving

Carol Hasenberg

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Here are a few of the thank you notes. Wish I had room to print them all!

Thank you for showing us about rocks!
 It was very fun!
 I learned about the three types of rocks:
 igneous sedimentary metamorphic.
 to: miss carol



THANK YOU



MISS CAROL!

Dear Miss Carol
 Thanks for sharing your rocks!
 I really like them
 love Lily

THE ORIGIN OF THE SOCIETY'S NAME

Reprinted from the article by charter member Franklin L. Davis, who died in 1964. Originally printed in Vol. 11, No. 1, p. 9.

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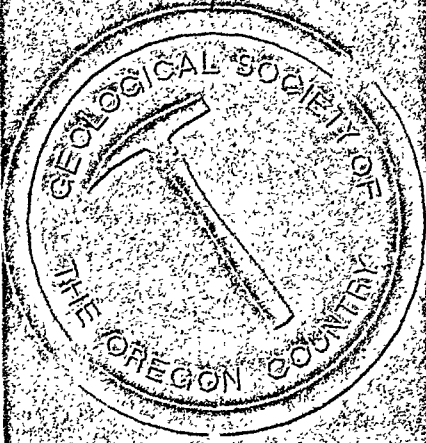
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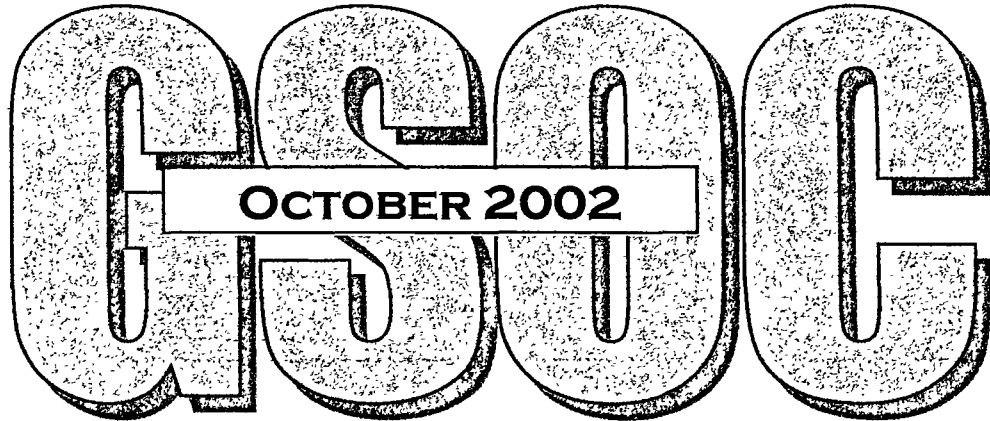
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Children under age 18 _____

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Please indicate Membership type and include check for appropriate amount:

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VISITORS WELCOME AT ALL MEETINGS

INFORMATION: www.gsoc.org or e-mail: gsoc@spiritone.com

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Ted Walling, Calendar Editor, 503-598-8067

VOL. 68, No. 10

October 2002

OCTOBER ACTIVITIES

Fri. Oct. 4, 3-4:30 PM (note change of day and location of the usual "noon meeting") Report on GSOC Field Trip to Central Washington and Wenatchee. Area Geology and Core Complexes. Carol Hasenberg, past president. **NEW LOCATION:** Oregon State Office Building, 800 NE Oregon St, Portland, Rm 120B (Crooked River Suite). This is near the Convention Center.

Fri. Oct. 11, 8:00 PM: Landslide Monitoring at the Washington Park Light Rail Station and the Oregon Zoo. Gary Peterson, landslide geologist with Squier Associates, Portland. Rm 371 Cramer Hall, PSU.

Field Trip Sat. Oct. 12: Continuation of cool beach trip. Meet at the entrance to **Ecola State Park at 9:00 AM** (there may be a park fee). Besides other stops, we will visit a **BRIAN ATWATER SIT** which was used to prove earthquakes and tsunamis. Knee or hip boots are highly recommended. Bring lunch, water and walking boots. Taylor Hunt 503-662-4790. Fee Schedule: members free, non-members \$2.50. Note: This is also Cranberry Festival Weekend.

Seminar Wed. Oct. 16, 8:00 PM: New Thoughts on Modern Subduction Zones in the Pacific NW. Richard Bartels, past president. Rm S17 Cramer Hall, PSU.

PREVIEW OF COMING EVENTS

Fri. Nov. 8, 12:00-1:30 PM: 2002 Friends of Pleistocene Trip-Wind (eolian) Deposits and Megaflood Features, Columbia Plateau, Washington. Charles Carter, retired geologist. Rm 120B (Crooked River Suite), Oregon State Office Building, 800 NE Oregon St.

Fri. Nov. 8, 8:00 PM. TBA

Seminar Wed. Nov. 20, 8:00 PM. Extinct Accretionary Wedges in Pacific NW. Richard Bartels, past president. Rm S17 Cramer Hall, PSU.

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

WELCOME

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

Janet Kaye
James R. Moore
Ed Lump
Andrew Lump
Donald G. McLeod
Joanna M. McLeod

COMPLETELY GEOLOGY

FRACTURED

by Evelyn Pratt

1. **Dextral shear:** A haircut similar to one worn by Hollywood's latest leading men.
2. **Chondrite:** What the two crooks told each other when their scam paid off: "We sure chondrite!"
3. **End member:** One of what's at the front of a foot.
4. **Eolian:** Refers to a donkey in Winnie-the-Pooh stories.
5. **Phyteral:** What the referee said to the boxer: "Ya gotta hit above the belt – that's a phyteral!"
6. **Gas cap:** This is what, when you're in Washington filling your car's tank with gasoline, you've got to be sure to replace when you're done!
7. **Gangue:** French spelling for a group of juveniles.
8. **Firn:** As in, "If it's not made in the USA, it's firn!"
9. **Fossa:** a female fossil.
10. **Syntaxis:** What the government makes us pay for things like cigarettes and alcohol.

See pages 49 and 50 for the correct definitions.

WILLAMETTE VALLEY DEPOSITIONAL HISTORY

Friday, September 13, 2002

Notes from the presentation by Marshall Gannett, USGS hydrology geology specialist, and Jim O'Connor, USGS Quaternary geology specialist

The presentation given to GSOC is an expanded version of the presentation Marshall gave to the Cordilleran Section of the Geological Society of America (GSA) last May.

Marshall began the talk by describing the questions about the Willamette Valley that the USGS research team set out to answer:

1. What is the regional scale distribution of soil grain size (and thus permeability) in the Willamette Valley?
2. What are the dominant depositional environments responsible for this distribution?

The USGS answered these questions primarily through collection and analysis of existing well logs (water, oil, etc.) in the Willamette Valley, which includes the following basins:

1. **Southern Basin** which extends from Eugene north to the Salem Hills
2. **Central Basin** from Salem north to Chehalem Mountains
3. **Tualatin River Valley Basin**
4. **Portland Basin**

All the basins except for the Southern are deep structural basins which are lined with Columbia River Basalt. These basins contain up to 1800 feet of sediments, except for the Southern Basin, which is not as deep. Dividing the basins are outcroppings of Columbia River Basalt: The Tualatin Mountains, the Chehalem Mountains, the Eola Hills, the Salem Hills, and Waldo Mountain.

The basins of the Willamette Valley are filled with the following types of material:

- **Post-Columbia River Basalt alluvium (Miocene and Pliocene)**, which are mostly fine grained (and not very permeable) sediments consisting primarily of layers of blue clay. These sediments are the oldest, thickest, and deepest material in the basins. This material is over 1400 feet thick in each of the three northern basins and over 340 feet thick in the Southern Basin. In the Portland Basin, the coarse-grained Troutdale Formation is included in this category.
- **Quaternary coarse-grained sediments** are concentrated in the southern and eastern basin regions, where rivers fed by Cascades streams deposit sediment into the valley. These deposits are up to 300 feet thick in the Stayton Basin (the sub-basin to the east of the Salem Hills and fed by the North Santiam river) and thinner in the other basins.
- **Willamette silts** deposited by the Ice Age Floods in a southward thinning wedge are up to 130 feet thick in the Central Basin and sit atop most of the other alluvium, except that deposited by rivers since the floods.

Marshall's and Jim's work concentrated on the coarse grained layers as these are the layers which contain the groundwater.

The geological units of coarse basin sediment include the following from the work done by Jim:

Weathered terrace gravels – This unit is age dated from 420 ka (thousand years) to 750 ka. These layers predate the present basin fill and are characterized by the formation of thick red soils and tectonic deformation, processes which are indicative of their age. Jim noted that these high terraces are preferred sites for pioneer cemeteries.

Pleistocene river alluvium – This unit is at least 23ka to 420 ka in age. The ice age material forms the bulk of the coarse gravels (up to 100 m thick) and is located below the current river alluvium. The largest deposits occurred in times of glacial advances, and the material is deposited in broad braid-plains, characteristic of high water volumes in the system.

Willamette silts from the Ice Age Floods – This mica-rich material up to 30 m thick consists of individual deposits up to 2 m thick, and is age dated between 12 ka and 15 ka. It contains ice-rafted erratics (Jim passed around two examples) which can be identified by their foreign lithology (rock-type), their faceted rather than rounded shape and the presence of glacial striations (grooves) on some specimens

Holocene alluvium – This most recent material has accumulated since the end of the Ice Age (12ka). The material is deposited in meandering river channels rather than the more energy-intensive braid-plains. The Willamette silts and Pleistocene river alluvium may be cut and reworked by the river systems since the Ice Age.

After piecing together the depositional history and location of the layers of alluvium, the USGS team came to the following conclusions:

1. The coarse grained sediments in the Willamette Valley come from the Cascade Mountains.
2. The gravel is located in the alluvial fans of the Cascade streams, where the streams enter the basins from the mountains (there is also a fan through which the ancestral North Santiam river cut the Turner gap north into the Central Basin).
3. The drainage system in the Willamette Valley has remained essentially the same throughout its history.
4. Two episodes of more widespread gravel distribution occurred in the early history of the basin.
5. The Willamette River has always been situated against the west side of the basin downslope from the alluvial fans from the Cascade streams.

Carol Hasenberg

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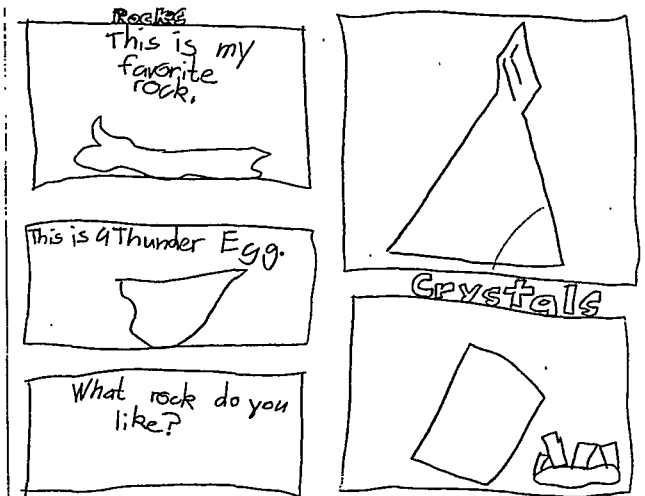
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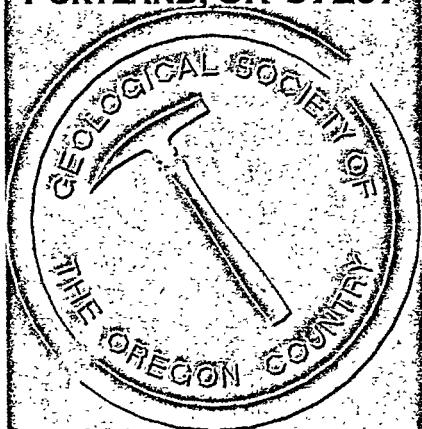
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GEOLOGICAL NEWSLETTER

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

VISITORS WELCOME AT ALL MEETINGS

VOL. 68, No. 11

INFORMATION: www.gsoc.org or e-mail: gsoc@spiritone.com

November 2002

Tom Gordon, President, 360-835-7748

Ted Walling, Calendar Editor, 503-598-8067

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All this data might be quite definitive if it weren't for the Klamath Basin's tectonic activity, which results in high-angle, pull-apart normal faulting. Most Klamath Basin hills are due to faults. Margi Jenks showed three possible models for sediment deposition and preservation in the area. She favors one in which the lake sediments were on top, then eroded away as fault blocks were uplifted. This would explain why sediments next to scarps don't contain large cobbles or boulders such as would have fallen off nearby fault-created basalt cliffs.

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Margi Jenks is dismayed by the small amount of data on Upper Klamath Lake geological history that both the Federal government and Indian tribes have considered when allotting water to irrigators and to protect endangered fish species. She added, "Klamath Basin needs to be looked at on a regional scale. Even with all the work that we've done, we're still only seeing parts of the elephant."

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Gary Peterson, Squier Associates, speaker
"Landslide Monitoring at the Washington Park Light Rail Station and Oregon Zoo, Portland, Oregon"

Meeting Notes

Gary presented the results of several years' work stabilizing and monitoring the massive landslide at the Oregon Zoo in the Portland hills above downtown Portland, Oregon. The zoo slide is a section of a massive ancient landslide complex (known as the Highlands Slide Complex) covering several square miles which includes the zoo, Portland Rose Garden and Washington Park reservoir above Canyon road in the west side of Portland. As seen from the air, the complex encompasses a large section of the hill and creates a large bulge in the canyon. Geologically, the area is a graben, not an erosional feature. Another slide which is part of the complex, recently discovered at the Vista Bridge tunnel entrance to the light rail has been dated at 40,000 years.

The zoo slide has been known for years, especially since freeway and sewer construction in the 1950's and 1960's triggered a lot of movement in the slide. The Washington Park Reservoir landslide was also mitigated years ago when the reservoir was built, with the result that the reservoir is still operational. Although some mitigating measures such as buttresses and local grading and drainage projects were done in the 1970's and 1980's, which slowed the movement of the zoo slide, it was not until the 1990's and the construction of the light rail tunnel that a more comprehensive effort was undertaken.

Gary got his first encounter with the slide as the head geologist for the West light rail tunnel in the 1990's. The zoo landslide had never been mapped, so one of the tasks was to perform core samples and determine the slip plane of the slide and its location within the hill. It was determined that the clayey slip plane layer lies between the Portland Hills silt and the weathered Columbia River Basalt in part of the hill, then dips between two layers of Columbia River Basalt elsewhere.

The reason that the mapping of the slide slip plane was so critical is that the proposed elevator shaft at the Oregon Zoo station passes right through it. The slip zone is at about a 60 to 80 foot depth at the shafts, which are the deepest train station elevators in North America at 260 feet below the surface. The light rail tunnels themselves are about a maximum of 330 feet deep at Sylvan business district. Thus the tunnels go way down within the CRB layers. This can actually be observed by a person at the zoo train station, because the drill core is on display there along with a lot of interesting geological information.

The elevator shaft was constructed for a fifty year design life with 2 inches of horizontal movement as the allowance. That means that the net tolerable movement is 0.025 in/yr!!! In order to achieve this goal, the slide movement was arrested with a dewatering program and a long term, highly sensitive monitoring array and alarm system was emplaced on the slide. The Squier team designed the mitigation work and are currently reviewing the monitoring data.

A series of horizontal drains were installed in the hill to dewater the slide. This consisted of 11 bores of up to 700 feet in length, at a depth of about 35 to 40 feet in the ground. The Squier team was confident that this scheme would be a success when the first bore had an initial output of 125 gallons per minute!!! The bores have effectively lowered the water table in the area. The discharge water is diverted to flow through the zoo as a water feature rather than within the hill. Peak flows occur from the bores during the winter.

The long term monitoring program was instigated by Tri-Met in order to confirm that the structures built at the station are not getting damaged, and also to warn train operators if fast slide movement occurs. The slide is instrumented by tilt meters in the elevator shafts, inclinometers, piezometers (groundwater level indicators), and a horizontal drain discharge flow meter. Both manual and automated data are collected, the instruments are connected to an integrated warning system, and data is reported quarterly.

So far, things have been good – there have been no alarms, and the annual creep rate is well below critical, at a net rate of 0.003 in/yr. The highly sensitive instruments record precise measurements which show deflection in winter which is mostly returned in the summer. The slide did not respond to the 2001 Nisqually earthquake or any other earthquake. Anticipated earthquake shaking at the slide is 0.25 g., or about 25% of the weight of objects at the ground level. However, Gary does not believe with the dewatering program that an earthquake trigger is likely, given the cohesive properties of the clay in the slip plane.

The Squier team placed instrumentation at other locations in the slide in the zoo area. The fastest slide rates monitored are about 0.02 in/yr (much higher than at the station which is central to the dewatering bores). In the initial decade of sliding after the highway was built, movements were measured in feet. In the current decade, the highest response is measured in inches or 10ths of an inch. We can all reap the benefits of this project whenever we step onto a light rail train.

Carol Hasenberg

You can read more about the monitoring system for the slide from a presentation that Gary Peterson made to the GSA last April at the Cordilleran section meeting:

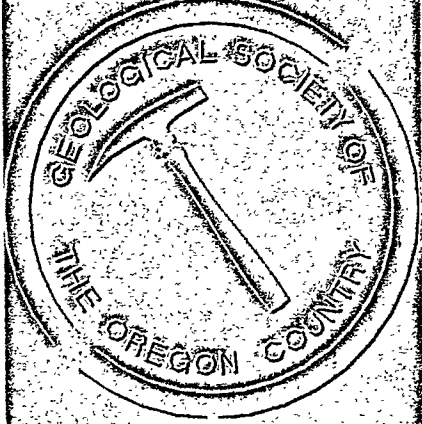
http://gsa.confex.com/gsa/2002CD/finalprogram/abstract_34695.htm

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Guides can be ordered from GSOC, PO Box 907, Portland, OR 97207-0907. Prices include postage and handling.

Geologic Trip Log through Eastern Foothills of Oregon Coast Range between Vernonia and Banks, 1964 ..	\$0.75
Columbia River Gorge and Grand Canyon of the Deschutes River	0.75
Geological Guide Book for Central Oregon, Prineville, Paulina, Suplee, Delintment Lake, 1965	0.75
Geological Trips in the Mitchell-John Day Area, 1969	1.75
Condon's First Island, Geological Trips in the Siskiyou and along the Rogue River, Oregon, 1970	1.25
Field Trips Along the Oregon Coast in Lincoln County, Oregon, 1974	2.25
Field Guide to Geological Sites in the Newberry Crater Area, OR, 1976.....	2.00
Investigating the Geology of the North Cascades, Washington, 1977	2.25
Sawtooth Mountains and the Stanley Basin, Idaho, 1978	1.75
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ACTIVITIES:

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

FIELD TRIPS: Usually one per month. Fees: Members, free, Non-members, \$2.50. See calendar next page.

GEOLOGY SEMINAR: Third Wednesday, excluding June, July, August, and holidays, 8:00 p.m., Rm. S17, Cramer Hall, PSU.

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

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

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

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Meeting Notes

Gary presented the results of several years' work stabilizing and monitoring the massive landslide at the Oregon Zoo in the Portland hills above downtown Portland, Oregon. The zoo slide is a section of a massive ancient landslide complex (known as the Highlands Slide Complex) covering several square miles which includes the zoo, Portland Rose Garden and Washington Park reservoir above Canyon road in the west side of Portland. As seen from the air, the complex encompasses a large section of the hill and creates a large bulge in the canyon. Geologically, the area is a graben, not an erosional feature. Another slide which is part of the complex, recently discovered at the Vista Bridge tunnel entrance to the light rail has been dated at 40,000 years.

The zoo slide has been known for years, especially since freeway and sewer construction in the 1950's and 1960's triggered a lot of movement in the slide. The Washington Park Reservoir landslide was also mitigated years ago when the reservoir was built, with the result that the reservoir is still operational. Although some mitigating measures such as buttresses and local grading and drainage projects were done in the 1970's and 1980's, which slowed the movement of the zoo slide, it was not until the 1990's and the construction of the light rail tunnel that a more comprehensive effort was undertaken.

Gary got his first encounter with the slide as the head geologist for the West light rail tunnel in the 1990's. The zoo landslide had never been mapped, so one of the tasks was to perform core samples and determine the slip plane of the slide and its location within the hill. It was determined that the clayey slip plane layer lies between the Portland Hills silt and the weathered Columbia River Basalt in part of the hill, then dips between two layers of Columbia River Basalt elsewhere.

The reason that the mapping of the slide slip plane was so critical is that the proposed elevator shaft at the Oregon Zoo station passes right through it. The slip zone is at about a 60 to 80 foot depth at the shafts, which are the deepest train station elevators in North America at 260 feet below the surface. The light rail tunnels themselves are about a maximum of 330 feet deep at Sylvan business district. Thus the tunnels go way down within the CRB layers. This can actually be observed by a person at the zoo train station, because the drill core is on display there along with a lot of interesting geological information.

The elevator shaft was constructed for a fifty year design life with 2 inches of horizontal movement as the allowance. That means that the net tolerable movement is 0.025 in/yr!!! In order to achieve this goal, the slide movement was arrested with a dewatering program and a long term, highly sensitive monitoring array and alarm system was emplaced on the slide. The Squier team designed the mitigation work and are currently reviewing the monitoring data.

A series of horizontal drains were installed in the hill to dewater the slide. This consisted of 11 bores of up to 700 feet in length, at a depth of about 35 to 40 feet in the ground. The Squier team was confident that this scheme would be a success when the first bore had an initial output of 125 gallons per minute!!! The bores have effectively lowered the water table in the area. The discharge water is diverted to flow through the zoo as a water feature rather than within the hill. Peak flows occur from the bores during the winter.

The long term monitoring program was instigated by Tri-Met in order to confirm that the structures built at the station are not getting damaged, and also to warn train operators if fast slide movement occurs. The slide is instrumented by tilt meters in the elevator shafts, inclinometers, piezometers (groundwater level indicators), and a horizontal drain discharge flow meter. Both manual and automated data are collected, the instruments are connected to an integrated warning system, and data is reported quarterly.

So far, things have been good – there have been no alarms, and the annual creep rate is well below critical, at a net rate of 0.003 in/yr. The highly sensitive instruments record precise measurements which show deflection in winter which is mostly returned in the summer. The slide did not respond to the 2001 Nisqually earthquake or any other earthquake. Anticipated earthquake shaking at the slide is 0.25 g., or about 25% of the weight of objects at the ground level. However, Gary does not believe with the dewatering program that an earthquake trigger is likely, given the cohesive properties of the clay in the slip plane.

The Squier team placed instrumentation at other locations in the slide in the zoo area. The fastest slide rates monitored are about 0.02 in/yr (much higher than at the station which is central to the dewatering bores). In the initial decade of sliding after the highway was built, movements were measured in feet. In the current decade, the highest response is measured in inches or 10ths of an inch. We can all reap the benefits of this project whenever we step onto a light rail train.

Carol Hasenberg

You can read more about the monitoring system for the slide from a presentation that Gary Peterson made to the GSA last April at the Cordilleran section meeting:

http://gsa.confex.com/gsa/2002CD/finalprogram/abstract_34695.htm

FIELD GUIDES FROM GSOC FIELD TRIPS

Guides can be ordered from GSOC, PO Box 907, Portland, OR 97207-0907. Prices include postage and handling.

Geologic Trip Log through Eastern Foothills of Oregon Coast Range between Vernonia and Banks, 1964 ..	\$0.75
Columbia River Gorge and Grand Canyon of the Deschutes River	0.75
Geological Guide Book for Central Oregon, Prineville, Paulina, Suplee, Delintment Lake, 1965	0.75
Geological Trips in the Mitchell-John Day Area, 1969	1.75
Condon's First Island, Geological Trips in the Siskiyou and along the Rogue River, Oregon, 1970	1.25
Field Trips Along the Oregon Coast in Lincoln County, Oregon, 1974	2.25
Field Guide to Geological Sites in the Newberry Crater Area, OR, 1976.....	2.00
Investigating the Geology of the North Cascades, Washington, 1977	2.25
Sawtooth Mountains and the Stanley Basin, Idaho, 1978	1.75
Central Oregon's Volcanic Wonderland and How it Came to Be, 1982	1.75
Lewiston, Idaho, 1984	3.50
Northern Idaho and Montana, 1988.....	6.50
Vancouver Island, British Columbia, 1989	7.00
Cascadia Subduction Zone, 1992	7.00
The Missoula Floods, 2000.....	15.00

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INFORMATION: www.gsoc.org or e-mail: gsoc@spiritone.com

Tom Gordon, President, 360-835-7748

Ted Walling, Calendar Editor, 503-598-8067

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WELCOME

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

Laura Pace
Andrew Goodell
Pati Goodell
Karen Elder

PRESIDENT'S FIELD TRIP 2002

President's Field Trip 2002, (Part 2)
September 10

After a continental breakfast of fruit, bagels, and cereal at our motel, The Quality Inn, in Mammoth Lakes, we drove north on Highway 395 toward Mono Lake. Five miles south of Lee Vining, we turned right onto Highway 120 and proceeded to the South Tufa Formation. There at 9:30 a.m. we met Barshay Miller from the Mono Lake Committee, a preservation group.

While Mono Lake is 10 % salt, it has more biomass per unit volume than any other lake in the U. S. This consists of shrimp, flies, and algae. The average lake depth is 50 feet, and the algae go down to 30 feet, but most are in the first 10 feet, as is the other life. Also, the lake has two islands. The oldest is Pahua Island, made up of lake sediment pushed up by a volcanic eruption and Negit Island formed 1700 bp from volcanic action leaving a cinder cone. Mono Lake is at least 760,000 years old and looking east lies bare gravel which was covered by the lake in the Pleistocene. The name Mono comes from the Indians who lived 200 miles away, referring to the Indians who lived by the lake and means "fly-eaters". Actually, the flies were not eaten, but the cocoon of the alkali fly, the **puparium**, were. The flies metamorphosed from larva to flies in these, leaving them floating on the water surface from which they were collected and dried.

The main attraction of Mono Lake is the **tufa** formations. Created by springs under the lake, calcium in the water combines with carbonates in the lake to form limestone. These columns form strange shapes around the springs. In 1941, water was diverted from four of five tributaries to the lake and sent by aqueduct to LA. The lake lost its water supply and began to drop, exposing the tufa formations. In 1982, Mono Lake reached its low point and life in the lake was threatened by salinity which had nearly doubled. Preservation efforts resulted in the lake getting more water.

Barshay led a 2.5 hour tour of the formations along the shoreline, pointing out the flies, which did not bother us, the pupa, brine shrimp, and points where exposed hot springs still deliver hot water. The red on the shore comes from **cyano bacteria** which put out sulfur.

We thanked Barshay, returned to Highway 395, and went north, passing through Lee Vining, and stopped in a county park on the north side of the Mono Lake, just off the highway. With more tufa formations nearby, we enjoyed lunch and then rejoined Highway 395, proceeding north to SR 270, the road to Bodie, the last great **gold** "excitement" of the 1800s. The road is paved for about ten miles, but the last three miles are dirt and gravel.

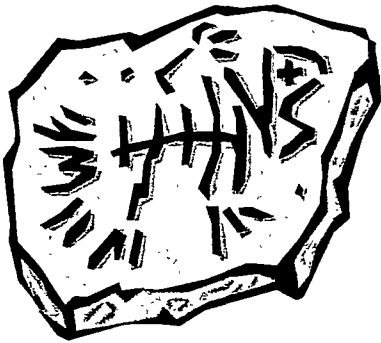
After exploring the ghost town, we went on a prearranged tour of the Standard **stamp mill**. Here the ore taken from the mines was crushed in the stamp mills, with each stamp or block of iron weighing 800 pounds. This was the site for the first use of alternating power in an industrial setting. Electricity was delivered from a dam several miles away and powered the main engine in the stamp mill. Also, with a lathe 23 feet in length, the mill could construct almost anything it needed. Conditions were harsh and injuries common as the men worked in the mill processing the ore with mercury and separating the gold. Almost \$100 million dollars in precious metals were taken out in Bodie's lifetime. At over 8,000 feet, the summers were short and winters long as the miners toiled below ground in various mines.

Bodie is now a California State Park, thanks to a company that came in, found rich ore next to the park and then went bust. California bought the land when the company went out of business. Thus the park and its surroundings are now preserved for future generations. This past summer the park was designated as California's Official Ghost Town.

We returned to Lee Vining for dinner and spent the night in Mammoth Lakes at our motel. The next day we headed for Yosemite.

Next time, we will visit Mono Lake and Bodie, the official ghost town of California,

Tom Gordon



F.O.P. FIELD TRIP REPORT

August 16-18, 2002
by Janet Kaye
edited by Carol Hasenberg

The following are a few excerpts from GSOC member Janet Kaye's field notes of the Friends of the Pleistocene field trip. Recall that the topic of this year's Pacific Northwest Cell field trip was Eolian Deposits and Megaflood Features, Columbia Plateau, Washington. I think we can all chuckle a little at our experiences of some field trips which were similar. Thanks, Janet!!!

8/15/02 (Thursday): Today I drove to eastern Washington to join the Friends of the Pleistocene on their 10th annual field trip to look at eolian (wind-blown) sediments and Missoula flood deposits there. I was nervous about hanging out with a lot of strangers and I wasn't sure which campground it was: Lyons Ferry Marina Campground or Lyons

Ferry State Park. I went to the State Park first, but not seeing any large cohesive group, I stopped to talk to a middle-aged couple, Bob and Sherry, who were camping there. We had a nice visit, and once I dragged out my materials for the trip, I saw that it was at the other campground. They offered to redirect any other lost geologists who happened by.

I found a row of tents along a grassy bluff at Lyons Ferry Marina Campground, and about 60 people. Someone directed me to a check in table where I found my name tag and a trip guide. I pitched my tent in a gap between a couple others. There were a few younger men on my left and an older man on my right. The older man was a retired archeologist from Fairbanks. We got acquainted and talked about Alaska. I turned in, being really tired from not much sleep the night before.

8/16/02: In the morning, my neighbor and I decided to carpool in his small rental car. He was a typical Alaskan driver; and I was an inattentive navigator; still, we made it to most of the stops. I soon learned that the trip leaders had no more respect for the requirements of natural bodily processes than did Melinda Hutson at PCC. At the first stop, as they went on and on and on about dirt, I took advantage of a slight hill to hide me from traffic and geologists so I could pee. Returning to the roadside, I walked through a sticker-bush that left tiny spines in my left foot and leg. I was picking them out for the next 24 hours, and they left an itchy rash lasting a week!

We looked at sediment deposits from the Missoula floods, learning about how the Ice Ages of the Pleistocene and Holocene times shaped the landscapes of eastern Washington, and how the prevailing winds shaped the sand and fine, floury soil (loess, pronounced "luss") into hills. In places the hard basalt rock had been worn away by the massive floods, while "islands" of loess hills had remained. The reason for this is that the basalt is fractured in so many places, that the rocks can be torn away in pieces by the force of water; but the loess soil of the hills is packed and cemented tightly, so it resists erosion.

We had first-hand experience each day of loess suspended thickly in the air by wind; we were covered with a fine layer of it. It adhered well to

sunscreen, teeth, and mucus membranes, and worked its way into crevices and camera parts. By the end of the trip, my camera lens cover wouldn't close.

There must be at least several hundred words for dirt in the sedimentologist's lexicon. A very few from the beautifully colored map of Washington soils that I received: vitrandic haploxeralfs, andic xerochrepts, xeric torripsamments, and duric natrixerolls. One day, I will know what these mean; and I'll tell you, if I've had enough to drink.

It was fascinating to see how these scientists could interpret the layers of dirt exposed in roadcuts, canyons, and dunes. At first, it all just looked like dirt. Some layers had soil hardened into oblong shapes which represented old cicada burrows; and these only occurred where the soil had once supported sagebrush plant communities. In one of these layers, I found a rhizolith, a piece of relatively hardened soil in the shape of a sagebrush root.

GSOC Board Meeting Notes

GSOC Board discusses new field trip procedures, nominees for next year's officers, and President Tom Gordon's successful field trip

The Board of the Geological Society of the Oregon Country (GSOC) met November 2, 2002, at the home of Rosemary Kenney. GSOC members present included Tom Gordon, Phyllis Thorne, Rosemary Kenney, John Newhouse, Beverly Vogt, Evelyn Pratt, and Clay Kelleher.

The main discussion during the meeting was about the report of the ad hoc Field Trip Committee, which had met for the previous three months to develop new procedures, position descriptions, and forms related to field trips. Chair Beverly Vogt summarized the activities of the committee, passed out copies of procedures, forms and position descriptions prepared by the committee, and asked for permission to try out the proposed process for one year, with a promise to keep the board informed as the year progresses. She will present a report on the field trips next November, and the Board can

decide whether it wants to keep the proposed process or not. The Committee hopes to have trips planned and announced before the outdoor field season begins. Field trip leaders will have an assistant and a phone/email contact person provided by the committee. The committee will also work with the president for the President's Field Trip. The board suggested that new GSOC members be asked to help as assistants or contact persons. Members of the new Field Trip committee include Evelyn Pratt, Beverly Vogt, Richard Bartels, and John Newhouse. The board agreed to give this new process a one-year trial.

John Newhouse presented the report of the Nominating Committee. Nominees are Evelyn Pratt, President; Clay Kelleher, Vice President; Beverly Vogt, Secretary; Phyllis Thorne, Treasurer; and John Newhouse, Su Ikeda, and Richard Meyer, Board Members. Clay Kelleher was appointed to fill in the remainder of Taylor Hunt's term as a board member.

Tom discussed his president's trip. The group flew to California, and Tom rented and drove the van. Bob Strebin was his assistant driver. The participants were charged \$700, but Tom was able to return \$200 to each of the six participants. A good and very busy time was had by all.

The next meeting is scheduled for Saturday, January 4, at 10:00 a.m. at Rosemary's house.

Respectfully submitted,

Beverly Vogt, Secretary

DONATIONS TO THE GSOC LIBRARY



The following books have been donated to the GSOC library. They were part of deceased GSOC member Don Botteran's library and were donated by Betty Botteran.

The Desert's Past, a Natural Prehistory of the Great Basin, by Donald K. Grayson, 1993

Digging Dinosaurs, by John B. Horner and James Gorman, 1988

Dance of the Continents, Adventures with Rocks and Time, by John W. Harrington, 1983

The Violent Earth, by Frank W. Lane, 1986

The Ring of Truth, an Inquiry into How We Know What We Know, by Philip and Phylis Morrison, 1987

Our Vanishing Wilderness, by Mary Loise and Shelly Grossman and John N. Hamlet, 1969

The Horizon Book of Vanishing Primitive Man, by Timothy Severin, 1973

The History of Earth, by William K. Hartmann and Ron Miller, 1991

Larouse Encyclopedia of Modern History from 1500 to the Present Day, 1964

The Atlas of Natural Wonders, by Rupert O. Matthews, 1988

American Caves and Caving, by William R. Halliday, M.E., 1974

Continents in Collision, Time-Life

Glaciers, Time-Life

GEOLOGICAL TIME CHART

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

Phanerozoic Eon (544 ma to present)

Cenozoic Era (65 ma to present)

Quaternary Period (1.8 ma to present)

Holocene Epoch (8,000 years ago to present)

Pleistocene Epoch (1.8 ma to 8,000 years ago)

Tertiary Period (65 to 1.8 ma)

Pliocene Epoch (5.3 to 1.8 ma)

Miocene Epoch (23.8 to 5.3 ma)

Oligocene Epoch (33.7 to 23.8 ma)

Eocene Epoch (55.5 to 33.7 ma)

Paleocene Epoch (65 to 55.5 ma)

Mesozoic Era (248 to 65 ma)

Cretaceous Period (145 to 65 ma)

Jurassic Period (213 to 145 ma)

Triassic Period (248 to 213 ma)

Paleozoic Era (544 to 248 ma)

Permian Period (286 to 248 ma)

Carboniferous Period (360 to 286 ma)

Pennsylvanian Period (325 to 286 ma)

Mississippian Period (360 to 325 ma)

Devonian Period (410 to 360 ma)

Silurian Period (440 to 410 ma)

Ordovician Period (505 to 440 ma)

Cambrian Period (544 to 505 ma)

Precambrian Time (4500 to 544 ma)

Proterozoic Era (2500 to 544 ma)

Vendian Period (544 to 650 ma)

Archaean Era (3800 to 2500 ma)

Hadean Time (4500 to 3800 ma)

For more info on geological time, visit the USGS web site at:

<http://geology.er.usgs.gov/paleo/geotime.shtml>

<http://pubs.usgs.gov/gip/geotime/>

or, try the University of California (Berkeley) Museum of Paleontology's excellent Web Geological Time Machine:

<http://www.ucmp.berkeley.edu/help/timeform.html>

or this one:

Do you keep forgetting the geo time chart? Read some hilarious pneumonic sayings on Dr. Bob's Geologic Time Page:

<http://oldsci.eiu.edu/geology/jorstad/geoltime.html>

One of my favorites was "Perhaps Eggplants or Mushrooms Prevent Pizza Halitosis"!!!

Nominating Committee Results

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

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

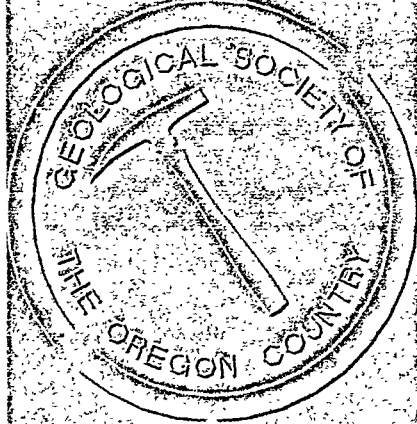
Nominations will also be open at the December club meeting on Friday, December 13, 2002. Consent of the nominees must be secured prior to their nomination. Nominations will be closed after the December meeting. Final nominations will be published in the January newsletter. The slate of officers will be voted on and approved at the February monthly meeting.

The Nominating Committee members include John Newhouse, Chair; Bev Vogt; Carol Hasenberg; and Taylor Hunt. Our thanks to the selected members and members of the Nominating Committee!

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

PS – If you joined GSOC in September or later, your 2003 dues are paid, good deal!!!

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September 10

After a continental breakfast of fruit, bagels, and cereal at our motel, The Quality Inn, in Mammoth Lakes, we drove north on Highway 395 toward Mono Lake. Five miles south of Lee Vining, we turned right onto Highway 120 and proceeded to the South Tufa Formation. There at 9:30 a.m. we met Barshay Miller from the Mono Lake Committee, a preservation group.

While Mono Lake is 10 % salt, it has more biomass per unit volume than any other lake in the U. S. This consists of shrimp, flies, and algae. The average lake depth is 50 feet, and the algae go down to 30 feet, but most are in the first 10 feet, as is the other life.. Also, the lake has two islands. The oldest is Pahua Island, made up of lake sediment pushed up by a volcanic eruption and Negit Island formed 1700 bp from volcanic action leaving a cinder cone. Mono Lake is at least 760,000 years old and looking east lies bare gravel which was covered by the lake in the Pleistocene. The name Mono comes from the Indians who lived 200 miles away, referring to the Indians who lived by the lake and means "fly-eaters". Actually, the flies were not eaten, but the cocoon of the alkali fly, the **puparium**, were. The flies metamorphosed from larva to flies in these, leaving them floating on the water surface from which they were collected and dried.

The main attraction of Mono Lake is the **tufa** formations. Created by springs under the lake, calcium in the water combines with carbonates in the lake to form limestone. These columns form strange shapes around the springs. In 1941, water was diverted from four of five tributaries to the lake and sent by aqueduct to LA. The lake lost its water supply and began to drop, exposing the tufa formations. In 1982, Mono Lake reached its low point and life in the lake was threatened by salinity which had nearly doubled. Preservation efforts resulted in the lake getting more water.

Barshay led a 2.5 hour tour of the formations along the shoreline, pointing out the flies, which did not bother us, the pupa, brine shrimp, and points where exposed hot springs still deliver hot water. The red on the shore comes from **cyano bacteria** which put out sulfur.

We thanked Barshay, returned to Highway 395, and went north, passing through Lee Vining, and stopped in a county park on the north side of the Mono Lake, just off the highway. With more tufa formations nearby, we enjoyed lunch and then rejoined Highway 395, proceeding north to SR 270, the road to Bodie, the last great **gold** "excitement" of the 1800s. The road is paved for about ten miles, but the last three miles are dirt and gravel.

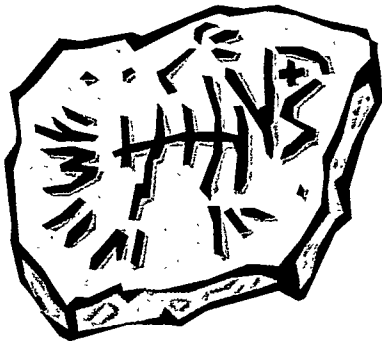
After exploring the ghost town, we went on a prearranged tour of the Standard **stamp mill**. Here the ore taken from the mines was crushed in the stamp mills, with each stamp or block of iron weighing 800 pounds. This was the site for the first use of alternating power in an industrial setting. Electricity was delivered from a dam several miles away and powered the main engine in the stamp mill. Also, with a lathe 23 feet in length, the mill could construct almost anything it needed. Conditions were harsh and injuries common as the men worked in the mill processing the ore with mercury and separating the gold. Almost \$100 million dollars in precious metals were taken out in Bodie's lifetime. At over 8,000 feet, the summers were short and winters long as the miners toiled below ground in various mines.

Bodie is now a California State Park, thanks to a company that came in, found rich ore next to the park and then went bust. California bought the land when the company went out of business. Thus the park and its surroundings are now preserved for future generations. This past summer the park was designated as California's Official Ghost Town.

We returned to Lee Vining for dinner and spent the night in Mammoth Lakes at our motel. The next day we headed for Yosemite.

Next time, we will visit Mono Lake and Bodie, the official ghost town of California,

Tom Gordon



F.O.P. FIELD TRIP REPORT

August 16-18, 2002
by Janet Kaye
edited by Carol Hasenberg

The following are a few excerpts from GSOC member Janet Kaye's field notes of the Friends of the Pleistocene field trip. Recall that the topic of this year's Pacific Northwest Cell field trip was Eolian Deposits and Megaflood Features, Columbia Plateau, Washington. I think we can all chuckle a little at our experiences of some field trips which were similar. Thanks, Janet!!!

8/15/02 (Thursday): Today I drove to eastern Washington to join the Friends of the Pleistocene on their 10th annual field trip to look at eolian (wind-blown) sediments and Missoula flood deposits there. I was nervous about hanging out with a lot of strangers and I wasn't sure which campground it was: Lyons Ferry Marina Campground or Lyons

Ferry State Park. I went to the State Park first, but not seeing any large cohesive group, I stopped to talk to a middle-aged couple, Bob and Sherry, who were camping there. We had a nice visit, and once I dragged out my materials for the trip, I saw that it was at the other campground. They offered to redirect any other lost geologists who happened by.

I found a row of tents along a grassy bluff at Lyons Ferry Marina Campground, and about 60 people. Someone directed me to a check in table where I found my name tag and a trip guide. I pitched my tent in a gap between a couple others. There were a few younger men on my left and an older man on my right. The older man was a retired archeologist from Fairbanks. We got acquainted and talked about Alaska. I turned in, being really tired from not much sleep the night before.

8/16/02: In the morning, my neighbor and I decided to carpool in his small rental car. He was a typical Alaskan driver; and I was an inattentive navigator; still, we made it to most of the stops. I soon learned that the trip leaders had no more respect for the requirements of natural bodily processes than did Melinda Hutson at PCC. At the first stop, as they went on and on and on about dirt, I took advantage of a slight hill to hide me from traffic and geologists so I could pee. Returning to the roadside, I walked through a sticker-bush that left tiny spines in my left foot and leg. I was picking them out for the next 24 hours, and they left an itchy rash lasting a week!

We looked at sediment deposits from the Missoula floods, learning about how the Ice Ages of the Pleistocene and Holocene times shaped the landscapes of eastern Washington, and how the prevailing winds shaped the sand and fine, floury soil (loess, pronounced "luss") into hills. In places the hard basalt rock had been worn away by the massive floods, while "islands" of loess hills had remained. The reason for this is that the basalt is fractured in so many places, that the rocks can be torn away in pieces by the force of water; but the loess soil of the hills is packed and cemented tightly, so it resists erosion.

We had first-hand experience each day of loess suspended thickly in the air by wind; we were covered with a fine layer of it. It adhered well to

sunscreen, teeth, and mucus membranes, and worked its way into crevices and camera parts. By the end of the trip, my camera lens cover wouldn't close.

There must be at least several hundred words for dirt in the sedimentologist's lexicon. A very few from the beautifully colored map of Washington soils that I received: vitrandic haploxeralfs, andic xerochrepts, xeric torripsamments, and duric natrixerolls. One day, I will know what these mean; and I'll tell you, if I've had enough to drink.

It was fascinating to see how these scientists could interpret the layers of dirt exposed in roadcuts, canyons, and dunes. At first, it all just looked like dirt. Some layers had soil hardened into oblong shapes which represented old cicada burrows; and these only occurred where the soil had once supported sagebrush plant communities. In one of these layers, I found a rhizolith, a piece of relatively hardened soil in the shape of a sagebrush root.

GSOC Board Meeting Notes

GSOC Board discusses new field trip procedures, nominees for next year's officers, and President Tom Gordon's successful field trip

The Board of the Geological Society of the Oregon Country (GSOC) met November 2, 2002, at the home of Rosemary Kenney. GSOC members present included Tom Gordon, Phyllis Thorne, Rosemary Kenney, John Newhouse, Beverly Vogt, Evelyn Pratt, and Clay Kelleher.

The main discussion during the meeting was about the report of the ad hoc Field Trip Committee, which had met for the previous three months to develop new procedures, position descriptions, and forms related to field trips. Chair Beverly Vogt summarized the activities of the committee, passed out copies of procedures, forms and position descriptions prepared by the committee, and asked for permission to try out the proposed process for one year, with a promise to keep the board informed as the year progresses. She will present a report on the field trips next November, and the Board can

decide whether it wants to keep the proposed process or not. The Committee hopes to have trips planned and announced before the outdoor field season begins. Field trip leaders will have an assistant and a phone/email contact person provided by the committee. The committee will also work with the president for the President's Field Trip. The board suggested that new GSOC members be asked to help as assistants or contact persons. Members of the new Field Trip committee include Evelyn Pratt, Beverly Vogt, Richard Bartels, and John Newhouse. The board agreed to give this new process a one-year trial.

John Newhouse presented the report of the Nominating Committee. Nominees are Evelyn Pratt, President; Clay Kelleher, Vice President; Beverly Vogt, Secretary; Phyllis Thorne, Treasurer; and John Newhouse, Su Ikeda, and Richard Meyer, Board Members. Clay Kelleher was appointed to fill in the remainder of Taylor Hunt's term as a board member.

Tom discussed his president's trip. The group flew to California, and Tom rented and drove the van. Bob Strebin was his assistant driver. The participants were charged \$700, but Tom was able to return \$200 to each of the six participants. A good and very busy time was had by all.

The next meeting is scheduled for Saturday, January 4, at 10:00 a.m. at Rosemary's house.

Respectfully submitted,

Beverly Vogt, Secretary

DONATIONS TO THE GSOC LIBRARY



The following books have been donated to the GSOC library. They were part of deceased GSOC member Don Botteran's library and were donated by Betty Botteran.

The Desert's Past, a Natural Prehistory of the Great Basin, by Donald K. Grayson, 1993

Digging Dinosaurs, by John B. Horner and James Gorman, 1988

Dance of the Continents, Adventures with Rocks and Time, by John W. Harrington, 1983

The Violent Earth, by Frank W. Lane, 1986

The Ring of Truth, an Inquiry into How We Know What We Know, by Philip and Phylis Morrison, 1987

Our Vanishing Wilderness, by Mary Loise and Shelly Grossman and John N. Hamlet, 1969

The Horizon Book of Vanishing Primitive Man, by Timothy Severin, 1973

The History of Earth, by William K. Hartmann and Ron Miller, 1991

Larouse Encyclopedia of Modern History from 1500 to the Present Day, 1964

The Atlas of Natural Wonders, by Rupert O. Matthews, 1988

American Caves and Caving, by William R. Halliday, M.E., 1974

Continents in Collision, Time-Life

Glaciers, Time-Life

GEOLOGICAL TIME CHART

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

Phanerozoic Eon (544 ma to present)

Cenozoic Era (65 ma to present)

Quaternary Period (1.8 ma to present)

Holocene Epoch (8,000 years ago to present)

Pleistocene Epoch (1.8 ma to 8,000 years ago)

Tertiary Period (65 to 1.8 ma)

Pliocene Epoch (5.3 to 1.8 ma)

Miocene Epoch (23.8 to 5.3 ma)

Oligocene Epoch (33.7 to 23.8 ma)

Eocene Epoch (55.5 to 33.7 ma)

Paleocene Epoch (65 to 55.5 ma)

Mesozoic Era (248 to 65 ma)

Cretaceous Period (145 to 65 ma)

Jurassic Period (213 to 145 ma)

Triassic Period (248 to 213 ma)

Paleozoic Era (544 to 248 ma)

Permian Period (286 to 248 ma)

Carboniferous Period (360 to 286 ma)

Pennsylvanian Period (325 to 286 ma)

Mississippian Period (360 to 325 ma)

Devonian Period (410 to 360 ma)

Silurian Period (440 to 410 ma)

Ordovician Period (505 to 440 ma)

Cambrian Period (544 to 505 ma)

Precambrian Time (4500 to 544 ma)

Proterozoic Era (2500 to 544 ma)

Vendian Period (544 to 650 ma)

Archaean Era (3800 to 2500 ma)

Hadean Time (4500 to 3800 ma)

For more info on geological time, visit the USGS web site at:

<http://geology.er.usgs.gov/paleo/geotime.shtml>

<http://pubs.usgs.gov/gip/geotime/>

or, try the University of California (Berkeley) Museum of Paleontology's excellent Web Geological Time Machine:

<http://www.ucmp.berkeley.edu/help/timeform.html>

or this one:

Do you keep forgetting the geo time chart? Read some hilarious mnemonic sayings on Dr. Bob's Geologic Time Page:

<http://oldsci.eiu.edu/geology/jorstad/geoltime.html>

One of my favorites was "Perhaps Eggplants or Mushrooms Prevent Pizza Halitosis"!!!

Nominating Committee Results

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

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

Nominations will also be open at the December club meeting on Friday, December 13, 2002. Consent of the nominees must be secured prior to their nomination. Nominations will be closed after the December meeting. Final nominations will be published in the January newsletter. The slate of officers will be voted on and approved at the February monthly meeting.

The Nominating Committee members include John Newhouse, Chair; Bev Vogt; Carol Hasenberg; and Taylor Hunt. Our thanks to the selected members and members of the Nominating Committee!

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

PS - If you joined GSOC in September or later, your 2003 dues are paid, good deal!!!