National Association of Geoscience Teachers

Pacific Northwest Section

Fall 2007

In this Issue:

From the President

Are there any heroes in geology? Heroes may be the stuff of comic books and myths, but there are certainly people who have made great sacrifices, against the odds, to advance the field. Studying the thought processes of these intellectual pioneers is fascinating, especially when you look at the geologic evidence they examined, and consider the adversity they faced in publicizing their findings. To understand geology, or any of the Earth Sciences, we need to also understand the history of the science, the history of the ideas and the history of the people involved.

By telling stories--true stories--about the people who made the great breakthroughs in geology, our students may become inspired, may find role models with whom they can identify, and may realize that a person of any background, including one from the most humble of origins, may become a great scientist.

This past August, my wife Cheryl and I had the good fortune to spend some time in England and Scotland. We visited the regions of Bath and Oxford, where William "Strata" Smith laid the basis for the science of stratigraphy. Given that the greenery of England covers most of the rocks from Oxford to Bath, and we were not present during the digging of canals across the countryside as William Smith was in the late 1700s-early 1800s, our best view of the strata in the area was in the geology display at the Oxford University Natural History Museum. What an incredibly rich array of fossils are found in the Paleozoic and Mesozoic rock formations that William Smith examined! While in the museum, we scoped out the famous Iguanodon fossil, the first complete dinosaur skeleton to be reconstructed under the gaze of modern science, which powerfully illustrated the fact that creatures of the past could be totally unlike present-day species, yet show signs of common ancestry (i.e. reptilian ancestry.) In addition, we saw a plaque commemorating the famous 1860 public debate that Samuel Wilberforce, Bishop of Oxford, had with Thomas Huxley, zoologist and defender of Darwin's theory of evolution by natural selection, which took place in the museum.

We also toured the northern Highlands of Scotland, where the theory of thrust faulting was first established in the English-speaking world. Cheryl and I spent part of a day at Knockan Crag, a geological park in the northern Highlands. The geopark, with its geology displays and trails to the rocks, is an example that should be studied by public lands managers in the United States. The landscape that provides the setting of the geopark consists of isolated peaks of arkosic sandstone rising unconformably from a boggy moorland of gneiss. Closer at hand the displays and trails in the geopark lead to the Moine Thrust. We each experienced the geological thrill of simultaneously touching the hanging wall and footwall of this famous fault, mylonitic schist on one hand and fractured limestone on the other.

Continued on page 2…

This sequence had earlier been interpreted by Sir Roderick Murchison as a completely conformable sequence, with schist on top of limestone. We may now shudder that somebody would think schist could possibly overlay limestone as part of a conformable sedimentary sequence, but little was known of the origin of metamorphic rocks at the time. It was not until the end of the 1800s that Ben Peach and John Horne, working for the British Geological Survey, produced detailed maps of the northern Highlands with cross-sections, and the existence of the famous Moine Thrust was established. Since then, thrust faults have been recognized as important in the structural history of many regions.

Finally, we spent a day in Edinburgh, where James Hutton, the "Father of Modern Geology," developed the Plutonian theory for the origin of rocks such as diabase and granite. We walked along Salisbury Crag in Holyrood Park on the edge of town. At Salisbury Crag, James Hutton made observations that he published as evidence of an intrusive origin, in molten form, of the basaltic rock that forms the crag. This contradicted Neptunian theory, popular at the time, that such rocks were precipitated from a primeval ocean. In modern terms Salisbury Crag is a sill. Even without its place in the history of geology, the Crag is a great place to go for a walk, with a steep, fractured cliff of basalt and contact-metamorphosed sedimentary rock rising to a promontory with excellent views overlooking the city of Edinburgh.

The experience of looking at the rocks and reflecting upon the history of our first modern geologists was truly fascinating. Because these geologists worked so hard to understand the history of the Earth, and documented their work, they were great scientists, even if, as in Murchison's case, we think they made some major mistakes. We can literally follow in their footsteps, examine the same evidence they examined and reconstruct their thought processes that led to their conclusions. Such consideration of the history of geology can help us as we teach our students how to study the Earth scientifically.

Dr. Ralph Dawes, *Wenatchee Valley College*

On-the-Go

Joe Hull, Seattle Central Community College

Cassie Strickland has migrated downstream from YVCC, Grandview to **Columbia Basin College** in Pasco, WA. Cassie received her BS from the University of Toledo (Ohio) and her MS from Kansas State (go Wildcats!). She worked at the Pacific Northwest National Laboratory before joining YVCC. Welcome to **Katie Gagnon**, new full timer at **Seattle Central Community College** teaching oceanography and environmental science. Katie's doctorate at UC-San Diego deals with subduction zone geodesy at the Peru-Chile trench. **Davene Meehan**, our excellent OEST coordinator, has moved to Florida. The southest section of the NAGT is lucky to have her!

State by State

British Columbia, Yukon, Alaska, Idaho, Oregon & Washington

Idaho

State Councilor: Shawn Willsey

Idaho Science Teachers Association, Oct. 4 & 5, 2007. The Fall conference for the Idaho Science Teachers Association will be held in Boise, ID, on October 4th and 5th. For more information, go to: **www.stoller-eser.com/ista/conference.htm**

Washington

State Councilors: Joe Hull & Jeff Tepper

Washington Science Teachers' Association, Oct. 12-13. WSTA will hold its annual Fall Conference in Tacoma. It will be held at the Tacoma Convention & Trade Center. Keynote speakers will be **Dr. Rodger Bybee** and **Dr. Bonnie Dunbar**. Featured speakers will be **Dr. Terry Bergeson** and **Dr. Michael Klentschy**. For information and to register go to **www.wsta.net**

GeoVentures Hawaii, August 2008

Jenny Thomson, Eastern Washington University

Announce to your geology students! GeoVentures Hawaii 2008- Geology on an Active Hot Spot, Big Island, HI- A Geological Society of America-sponsored field trip, **August 1 - 10, 2008** designed especially for students! Instructors **Dr. Jennifer Thomson** (Eastern Washington University) and **Dr. Bart Martin** (Ohio Wesleyan University). This eight-day field course (excluding two travel days) on the Big Island of Hawaii will serve to introduce students to plate tectonics, hot spot volcanism and the geologic features and hazards associated with living on an active volcano. We will discuss volcanic edifices, eruption styles, magma evolution, and see features such as various types of lava flows, lava lakes, lava tubes, fault scarps, rifts, craters and calderas and active lava flows. The learning sites are located on the Big Island of Hawaii primarily within the boundaries of Hawaii Volcanoes National Park. Sites to visit may include, but are not limited to: Kilauea Caldera, Thurston Lava Tubes, Crater Rim Drive, Halema'uma'u, Chain of Craters Road, Steaming Bluffs and Sulphur Banks, Devastation Trail, Kilauea Iki, Mauna Ulu and Pu'u Huluhulu, Pu'u Loa Petroglyphs, Ka'u Desert, Mauna Iki, South Point, Green Sand beach, Lava Tree State Park, Kalapana. A trip to the Mauna Kea KECK observatory is also included. Space is limited to 20 participants. Please check **www.geosociety.org/GeoVentures** for information as it becomes available.

From the VP:
Ramblings of an organizational nature

Ron Metzger, Southwestern Oregon CC

With best laid plans of a procrastinator, here I sit amidst in-service week following four days crammed with meetings. Now I have a moment to clear my head along with the cool crisp air that hints of a fast approaching fall, and catch up with my thoughts. In a few days I will be meeting with several of my colleagues in the second cohort for a Title III grant that is addressing "best teaching practices." This gave me pause to ponder (and also a perfect segue) to the Pacific Northwest section field conferences. While I work on this grant with various faculty departments, from adult learning skills, computer networking, Shutter Creek correctional facility and more, I reflect upon of the collegiality that has developed in recent years with the resurgence of the Pacific Northwest section of NAGT. In this, one of the things I most appreciate is the laid back way that we share what works in the classroom, what doesn't and present it without the stigma of the "paradigm, dogma, flavor of the month." As our small cohort of seven prepares to meet on campus, it makes me think of several organizations and events that I am affiliated with and how difficult it is to get people to turn out. This in turn leads to ruminations about PNW annual conference attendance, and how many people actually participate in the yearly conference. With the effort and care that our hosts put into the conferences, it would be great to see stronger levels of participation. Ironically, I suppose, the forty or so people that attend also makes for one of the strengths by allowing a camaraderie that might not exist with larger groups.

Enough ramblings. Here is a heartfelt **thanks to the dedicated group that coordinated and hosted the 2007 conference in Portland** as well as to all of you that were able to attend. Personally, I know that the trip produced a few new and different stops that I will be able to incorporate into my own Columbia Gorge trip (hopefully the PSU crew or someone else up there will get the restrictions on The Dalles' "calcite pineapple" site loosened.) I also think of the terroir trip fondly; any time that you can combine Oregon Pinot Noir and a geology field trip, that is a success in my book! With our return to Portland this past year, I still see an opportunity down the road…after eleven years in Oregon, I haven't spent much time on Mount Hood and the cancelled Elliot Glacier trip was one I was looking forward to…so maybe in another seven or eight years we'll be able to get there. Elsewhere in the newsletter you'll be getting a preview of the **2008 conference** that **David Huycke** (Yakima Valley Community College) and **Cassie Strickland** (Columbia Basin College, Yakima Valley Community College Grandview) have volunteered to host. They have been actively arranging the schedule and I know that I am looking forward to heading to Yakima next June. The rumor of terroir and wine tasting in Washington's next hot wine region isn't a bad prospect either. **By the next newsletter I am hoping to be able to announce a 2009 conference location…**we've bounced around Idaho and British Columbia for the future; now is the time to start firming up those commitments. Listening to the section members, field based conferences are obviously important, and we are indebted to the exceptional work of the hosts past, present and future, or the folks that travel and attend. **See you in Yakima!**

Celebrate Earth Sciences at UBC
UBC's Pacific Museum of the Earth

Mary Lou Bevier, UBC

On **October 13th** the **Pacific Museum of the Earth** will invite the general public for a rare Saturday visit in order to recognize both **Earth Science Week** and **National Science and Technology Week**. In addition to offering an opportunity to view all of our displays, including the Precious Minerals Vault, on a weekend, visitors will be able to take advantage of a series of special demonstrations and activities illustrating topics in geology, atmospheric science, geophysics, and other Earth Science related fields. A rock, mineral, and fossil identification table will be open all day for those visitors who'd like more information on objects in their collections.

Although the above activities will primarily be aimed at K-12 students and teachers and the general public, the museum will also feature a public evening lecture and panel discussion for those with a deeper interest in Earth Sciences. The lecture will be given by UBC EOS's own **Phil Austin** and will focus on climate change, a topic of great public interest recently.

Check the Pacific Museum of the Earth homepage for updates and further details: **www.eos.ubc.ca/resources/museum/index.html**

Outstanding Earth Science Teacher
Do you know one?

The Section welcomes our new Outstanding Earth Science Teacher (OEST) coordinator, **Deron Carter**. Deron teaches geology, oceanography and chemistry at Linn-Benton Community College in Albany, Oregon. OEST awards are given to exceptional geoscience teachers at the middle and high school levels. As OEST coordinator, Deron is responsible for receiving and reviewing OEST nominations.

Nominations are then voted upon by NAGT officers, and winners are selected at the section and state levels. One of the biggest challenges of the coordinator position is soliciting nominations. Historically, nominations have been low. If you know of an outstanding Earth Science teacher, please take time to make a nomination! The recognition is only part of the package; the material rewards are also significant. Individuals may nominate themselves, also. Nominations are due by February 1st. Please access the OEST homepage for a nomination form, and then send the completed form to: **Deron Carter**, Linn-Benton Community College, 6500 Pacific Blvd. SW, Albany, Oregon 97321, **carterd@linnbenton.edu**

www.nagt.org/nagt/programs/oest.html

OEST 2007 Award Winners

Ron Metzger, Southwestern Oregon Community College
Davene Meehan, former OEST coordinator

The Pacific Northwest Section OEST award this year goes to **Clay Good** who retired in 2007 after many years of teaching oceanography classes at **Juneau-Douglas High School** in **Alaska**. He offered students a variety of ways to meet class requirements, thereby empowering his students in assessing their own progress and grades. He incorporated the local setting into almost daily field trips and seminars. He also organized 21 teams for academic competition at the National Ocean Sciences Bowl, operated a student salmon hatchery, and developed scientist-shadowing opportunities for students. He served on numerous school and community committees such as president of the Juneau Education Association and as JDHS science department chair. He was the 2000 Marine Educator of the Year, and in 2005 four of his students presented regional issues at a Washington D.C. symposium. His interactions with organizations provided the school with a $30,000 aquarium, trips out to sea for all his students, trips to the wastewater treatment facility of Juneau as well as cruise ships, and visits to the Coast Guard's Search and Rescue Command Center.

The **British Columbia provincial winner** is **Chris Loewen**, from **W.J. Mouat Secondary School** in **Abbotsford**. From teaching in China to an inner city school with a high population of ESL students, he visualizes and works toward a single class that is an integration of Earth Science, Science, PE, and Community Recreation. He uses diverse methods to reach his students—and his students exceed district and provincial averages in their 12th grade geology provincial exam. During class he combines his MS PPT lectures with the Internet for instruction, and works hard to motivate struggling students. He provides after-school and evening study sessions, and authors a great website for geology teachers and students:

www.mouatonline.com/Teachers/Cloewen/geology12/geo12index.htm

The **Idaho State winner** is **Mike Emory** of **Woodland Middle School** in **Coeur d'Alene**. Mike teaches Earth Science. He also finds time to be the president of the Idaho Earth Science Teachers Association (IESTA) and is involved with the Yellowstone workshop in July and an important website for Earth Science teachers:

www.idahogeology.org/Services/EarthScienceEducation/Resources.htm

He has been designated the school district building technology leader for his school and has acquired a grant from the Excel Foundation for his integrated curriculum using GPS combined with water quality.

Sheila Guard is the **Washington State Winner**. Sheila teaches integrated science, including Earth Science. She coaches science teams, which participate in Science Olympiad and Decathlon competitions that have taken the teams to state and nationals. She emphasizes instruction on scientific writing and employs novel methodologies to encourage assessment skills and promote inquiry. She passionately presents difficult concepts in a manner relevant to middle school students. She is a member of the National Science Teacher and WA Science Teacher's Association, serves as the NW Science Olympiad Board chair in which she organizes nearly 50 local school teams, is on the Teaching and Assessment Research Committee, is National Board certified, and has earned a WA Initiative Scholarship and Seattle Pacific U's Mathematics in Teaching scholarship.

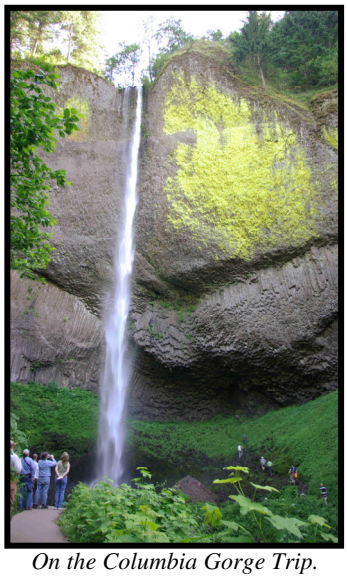
Congratulations to all of our winners!

Highlights:PNW NAGT Conference
Portland State University, June 2007

2007 conference attendees at the Oswego Hills winery.

This year the Pacific Northwest section of the NAGT held the annual conference at the Portland State University campus in downtown Portland, Oregon. The meeting was well attended, averaging ~ 25 participants per field trip, and ~30 members present for the conference day.

The meeting started off on a Tuesday with a trip to the Columbia Gorge. This inquiry-based excursion was led by PSU's energetic Mike Cummings. The trip provided an opportunity to spend more time addressing issues at fewer stops in a manner similar to the field-based class that Mike teaches at PSU. This generated a discussion on how introductory level field trips are led, contrasting the more focused approach of this trip in comparison with a broader overview associated with a greater number of stops. Indeed, the conference provided such a comparison with the Geology of Portland trip on the following day.



On the Columbia Gorge Trip. Photo by Karen Brown.

Wednesday was another field day; this time oriented on the geology of Greater Portland area. This trip was organized by Dr. Scott Burns and Dr. Martin Streck of PSU. We started with the Mt. Tabor cinder cone and Rocky Butte, both composed

of enigmatic Boring lavas (insert gratuitous pun). A couple of stops along the Sandy River illustrated the distal facies of a Mt. Hood lahar and the type locality of the Troutdale alluvium (good palagonite debate). Fantastic views and a great picnic lunch at sun-drenched Womens Forum State Park were followed by a tree in the Miocene Columbia River basalts along I-205. The peerless leaders ended with active mass movements at Washington Park near the zoo, exemplified by disruption of a tennis court. Kudos to Scott and Martin!

Thursday was a busy day of formal talks, posters and a workshop discussion (read next article concerning the workshop discussion on climate change.) We will never forget Tark Hamilton's song and accompanying guitar, as he serenaded us at the end of a full day.

Ron Metzger illustrates proper technique to Cassie Strickland and Deron Carter. Photo by K. Brown.

Friday marked the final day of the meeting, and we ended in true geology fashion: at the wineries. The Friday field trip focused on the Terroir of the Willamette Valley, led by Dr. Scott Burns (PSU), geology professor extraordinaire, terroir authority and vineyard owner. A tour bus full of eager earth scientists, from middle school teachers to geology professors and their spouses, eagerly soaked up (in) all of the knowledge Scott poured upon us. 'Terroir' describes the unique combination of climate, soil, slope aspect and wine making savvy that produces an individual wine. Scott led us to three different wineries and educated our palates. The first winery was Anne Amie Vineyards, whose vineyards grow upon soils derived from Mesozoic marine sedimentary rock. Our second stop was Erath Vineyard, whose grapes grow on Jory soils derived from underlying basalt flows. Our final stop was Oswego Hills Vineyard, which sits on some of the best soil of the Willamette Valley, known as Nekia soil. All three are known for their superb Pinot Noirs.

What's the grain size, Brett? Brett Gilley supplements his drink with a bit of sediment. Tark Hamilton's annual pic in field kilt; wouldn't be a newsletter without it!

Thanks to **Scott Burns**, PSU (general meeting information), **Ron Metzger**, SOCC (Gorge trip), and **Joe Hull**, SCCC (Portland area trip) for their contributions to this article.

To see more pictures from the various field trips, please visit **Karen Brown's** (Western OR University) web page. Thanks, Karen, for posting these!

www.wou.edu/~brownk/NAGT200706.htm

Workshop Discussion on Teaching Climate Change

Tark Hamilton, Camosun College, Victoria, BC
Andy Buddington, Spokane Community College, WA

At the Portland Pacific Northwest NAGT section meeting we led a discussion workshop on teaching climate change. This is the veritable hot topic in Earth Science right now. Here is a golden opportunity to teach any fundamental subject matter we have on the curriculum, dressed up in a fashionable new guise, much like the emperor's new clothes. Here are a few topics that bear on the questions of climate and feedback: annual weather patterns, latent heat, thermohaline convection in the oceans, the solar constant, Milankovitch cycles, cyclic stratigraphy, global extinctions, chaos theory, desertification, ice ages, eustatic sea level changes, El Nino events, Hadley cells. A earth scientists, we understand earth's internal and external physical processes, global cycles, cyclic changes and the stratigraphic record. The extreme topicality and diverse and readily available unverified information make this topic more difficult than it should be. As scientists we should encourage our students, colleagues and acquaintances, to review the original data, judge the claims against the processes involved and help devise tests to nullify or support the various claims. That is after all what science is all about.

The deluge of apocalyptic scenarios including run-away polar melting, sudden sea level rise, and global hothouse climates runs counter to our intuition and counter to a long trend in Earth Science of promoting uniformitarian and gradual processes and changes. While we know of singular events in geologic history like ocean stratification, caldera eruptions and bolide impacts, we are schooled to rejecting ideas that smack too much of Velikovsky or other catastrophists. We encounter the onslaught of climate change information, not so much from reading scholarly journal articles first hand, but from newspapers, electronic blogs, slick video presentations and public reaction. Extreme positions abound ranging from evangelistic environmentalists with a new-found cause to petrochemical corporations and other major industries who'd like to keep up their carbon burning ways. The conservative position has vast economic systems and infrastructures at stake. The green team feels the planet will surely die without their zeal. This is certainly a charged fray to wade into, more like a holy war than staid academic debate.

While intending to lead the discussion along these lines, we opened up the floor to collect a few personal experiences, viewpoints and anecdotes. This rapidly consumed the whole hour, discussing our reactions as people, our roles and our confusion of the basic facts. We were caught up in the emotional responses rather than discussing how to remain objective and how to teach the science of it all. That is telling in itself of how much this spirit of the times is sweeping through our classrooms, faculty discussion and lives. It is apparently affecting us more as people than as scientists.

We went on for a while discussing a strategy rather than the issue. The notion was based on 2 pairs of scenarios: 1) that

either there is accelerated global climate change or there is not and 2) that either we should do something about it or we should not. Depending on which way the needle threads through these possibilities, the outcomes might be either really bad and devastatingly expensive or good but unnecessarily expensive or some lesser combination. This is for governments and for planners to decide. Compelling as this analysis might be, it is fundamentally off topic and even presenting it is a distraction from addressing the issues of the science behind climate change.

As with many discussions, this was lively, engaging, reflective and diverse. Perhaps that is the real message we should take away, whatever our level of understanding of the data and issues, and whatever our position in this current grand global debate. There is enough material to guide a class discussion or focus an entire course. There are also diverse ways to approach the subject ranging from presenting the fluctuations of the ice core record or singing a song about warming rising seas and the impending evacuation of the Carteret Islands.

GSA, Denver, CO: Oct. 28-31

Don't forget to attend these special topic sessions while at this year's Geological Society of America Annual Meeting:

Session T138: ***Learning in the Field: Effective Strategies for Teaching Undergraduate Geology Outside the Classroom***

Session T129: ***Teaching Climate Change and Energy Issues in the Classroom: An Imperative for Educated Citizens and Geoscientists*.**

It's Official: Yakima, WA in 2008 June 17-21, Yakima, WA

Yakima Valley Community College in **Yakima, WA** will be the venue for our **section conference** in **June, 2008**. For those of you unfamiliar with Washington, Yakima is located on Washington's semi-arid eastern side. While we may not be lushly verdant like Washington's west side (interpret—we aren't wet 2/3 of the year ;), we do have our own unique attractions, namely the geologic kind. Yakima is bounded by several uniquely distinct geologic provinces: to the west, the south-central Cascades, including Mt. Rainier, dominate the skyline. To the east (and north and south), the numerous flows of Columbia River Basalt which build the Columbia Plateau are uplifted in the Yakima Fold Belt. The Columbia Plateau landscape gives testimony to the catastrophic Pleistocene floods that later inundated Eastern Washington, ripping out enormous pieces of real estate and leaving behind flood features on a massive scale. The Yakima Valley is also renowned for producing world-class wines, and is ranked among the top wine regions in the world.

The 2008 conference will take place during the third week in June. On **Tuesday**, **June 17th**, **Dr. Steve Reidel** of Washington State University will lead participants on a hard rock exploration of the Columbia River Basalts and the Yakima Fold Belt. This all-day trip will explore the flood lavas (~2 miles thick in the Yakima area!) that created the Columbia Plateau and their subsequent uplift along the thrusted folds of the Yakima Fold Belt. The Columbia River basalts and the Yakima fold belt comprise a great example of a planetary wrinkle ridges, an important geologic feature found on the terrestrial planet and our moon. The active and lengthy Olympic-Wallowa lineament roughly bisects the province and, along with the other folds of the fold belt, form a seismic hazard not only for local residents, but also for the nearby Hanford Nuclear Reservation, currently the Department of Energy's largest storage facility for nuclear waste.

On **Wednesday, June 18th**, we will host another all-day field trip, this time heading west into the south-central Cascades. **Pat Pringle** of Centralia College, Centralia, WA, **(and others to be announced)** will showcase the tectonic and volcanic history of the White Pass and Bumping Lake areas on our way to Mount Rainier National Park. The Mount Rainier area has splendid scenery, but we will also be focusing on the complex geology in this area, including the abundant evidence of past volcanism, the potential of future volcanic activity, the recent flood damage that destroyed large portions of the tourist-developed portions of the park, and the rapidly retreating glaciers that crown Rainier's 14,410 foot peak.

Thursday, June 19th will be the conference day. The schedule includes talks, a poster session, a session on using computer-based labs and exercises for all Earth Science classes and workshop session. Please consider presenting on this day. The next newsletter will include an abstract submittal form. You can email earlier submissions to **Cassandra Strickland** (**cstrickland@yvcc.edu**). We encourage student participation!

Friday, June 20th, will be the final day of the conference and the final field trip. **Dr. Alan Busacca**, emeritus professor in WSU's department of Crop and Soil Sciences and owner of Vinitas Vineyard Consultants, will lead us on a day trip to explore the terroir of the Yakima Valley. Participants will experience the contrasting physical characteristics of the region's wine appellations, as a function of soil differences that reflect the underlying geology and climatic differences. Yes, wine tasting is included, and yes, we'll have the chauffeured tour bus again!

Early registration materials and more in-depth information will be in the winter 2008 newsletter (late Jan. /early Feb.) Please mark the dates on your calendars, and start working the power-that-be for travel monies now!

Mt. Adams, a composite volcano of the south-central Cascades, looms over Yakima, Washington.