



THE GEOLOGICAL NEWSLETTER

"NEWS OF THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY"

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The Geological Society of the Oregon Country

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www.gsoc.org

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VISITORS WELCOME AT ALL MEETINGS

MARCH/APRIL ACTIVITIES

The **Eightieth Annual GSOC Banquet** is scheduled for Sunday, March 8, 2015. Full details and a registration form is available online and in the January/February issue of *The Geological Newsletter*.

There will be no March Friday night meeting due to the annual banquet.

Friday Night Lecture, April 10, 2015: Dr. John Bershaw, Department of Geology, Portland State University, will present "Using Fossil Teeth to Understand How and When the Andes Formed."

The Altiplano and Andes Cordillera of South America are one of the most significant topographic features on Earth. Though basic models exist to

explain how they formed, the details are not well understood.

Recent paleoelevation constraints from fossil leaves and stable isotopes of sedimentary carbonates suggest that significant surface uplift may have occurred over a relatively short period of time, shedding light on the geodynamic mechanisms responsible for the topography seen today.

Dr. Bershaw has examined teeth from modern and extinct mammals spanning the late Oligocene (~29 Ma) to present which preserve a record of surface water isotopes that animals ingested while their teeth were mineralizing. A predictable relationship between tooth isotopes and elevation exists across the Andes. Tooth data show substantially more positive isotopic compositions ($\delta^{18}O$) for the late Oligocene compared to mid-late Miocene teeth.

This suggests that the Andean plateau was at a very low elevation during the late Oligocene and had risen to present-day elevation by the late Miocene. In addition, these data suggest modern climate variations across the Andean plateau have persisted since the late Miocene. Ongoing research indicates that modern climate has complex effects on environmental isotopes across the Altiplano.

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

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

FUTURE ACTIVITIES

President's Field Trip, Sept. 8, 2015 – Sept. 13, 2015 PLEASE NOTE THE DATE CHANGE FROM EARLIER ANNOUNCEMENTS

Mark your calendars for next year's President's Field Trip (PFT) to Steens Mountain. Reservations can be made now for accommodations at the [Steens Mountain Resort](#). (Field trip will be Sept. 9th, 10th, 11th, and 12th, with the 8th and 13th being travel days.)

Janet also wants all PFT participants to have a copy of Marli Miller's new 2014 edition of [Roadside Geology of Oregon](#). Of course couples can share a copy. Everyone will want a copy anyway and Miller's diagrams and maps are wonderful. People who don't often drive across Oregon will enjoy having it to interpret the landscape along the way. Janet says she got her copy via Amazon for about \$25 w/ shipping.

Janet would also like to compile a list of those who intend to go on the PFT, so those people should email jkayerocks@yahoo.com or call her.

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

BOARD MEETING NOTES

February 14, 2015

President Sheila Alfsen called the meeting to the home of Rosemary Kenney. Other board members in attendance constituting quorum were Paul Edison-Lahm, Marty Muncie, Bev Vogt, Bo Nonn, and John Piccinnini. Also in attendance was GSOC member Bart Bartels, and Directors-elect Kirben Smoody and Larry Purchase. The minutes of the December 13th, 2014 board meeting were approved.

Treasurer's Report

The Treasurer's report was approved by the board.

Events

Friday Night Lectures: Bo will be lining up speakers for Friday night lectures starting in April. Sheila is working with PSU on possibility of a seminar credit for PSU students who attend lectures. Pizzicato needs to be reminded of our Friday night meetings in order to reserve a section for us. (Bev will ask Janet for their email.)

Snack committee: Marty has volunteers for April and May, and needs volunteers for June.

Field Trips

Downtown Geology field trip: Tour guides for this year include Rik, Clay, Tara, Cris Morgante, Larry, Barbara and Paul. The tour format will be similar to that of two years ago. Paul will update the printed guide and put it online. The board suggested that the trip be scheduled for late August.

President's Field Trip to Steens Mountain: Field Trip dates are Sept. 8th – 13th. Bev will check with Janet about lodging availability. *PLEASE NOTE THE DATE CHANGE FROM EARLIER ANNOUNCEMENTS*

Mt. Hood Field Trip: Larry will be planning the trip for July 11-12th and will plan a preliminary trip as soon as the access road is opened. An

accompanying Friday night lecture may be planned as well.

Annual Picnic scheduled for August 2nd. John will reserve our spot at Guy Talbot State Park.

Annual banquet: Forty-one people have signed up for banquet so far. Dawn has reserved two rooms at Ernesto's for the banquet. Students will meet with Dr. Atwater at PSU afterwards. Students are eligible for discounted rate (\$26) that is calculated to cover their costs for the banquet room and meal only. Paul will announce the banquet by Facebook, Twitter, and email one week prior to the February 28th deadline.

80th Birthday Activities: Our online archive of newsletters is now completely searchable back to 1935. Bev, Rosemary and Sheila will be working on an article on geologist and GSOC member Margaret Steere. Paul will be reposting Viola Oberson's 1979 *Ore Bin* article on Lon Hancock with an updated bio by her daughter Mary Lou Oberson. *We have also completed the GSOC president's history bios through 1990 on the website.*

Old and New Business

The board voted to designate Sheila as **Public Outreach Coordinator**. This will be publicized on the website. Sheila may be coordinating the Kids in the Wild program again or planning a Downtown Geology Tour for highschool students.

New members: The board would like to continue to receive the email notification of our new members that Paul has been sending out. As long as these emails are going out to board members only, they may include publically available member photos. In the future, we may want to ask members if they consent to having their information and/or photo in an online directory of GSOC members. Paul will send membership list to out to the board. Sheila will continue to meet and greet new members at our Friday night meetings as part of her Outreach Coordinator duties.

GSOC Business Cards: Anne O'Neill has put together a draft of the business card. Sheila will contact her.

Director-elect **Kirben Smoody** was welcomed to the board.

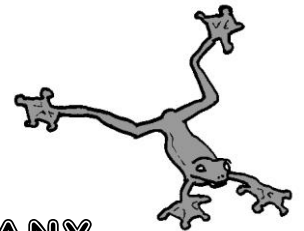
Next board meeting is 10:00 a.m., **April 11th, 2015**, at Rosemary Kenney's house.

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

GSOC has a new officer's position of Public Outreach Coordinator!

One of GSOC's objectives is to support and promote geologic study and research, and as requests for speakers/educators come to GSOC, the board felt it would be appropriate to create this new position. Sheila Alfsen has volunteered to staff the position, in keeping with her interest in public education. She has given numerous public talks to civic groups and schools throughout her term as president. She looks forward to keeping the public's interest and curiosity for Geology alive.

EVOLUTIONARY FLIGHT PATHS



-THERE WERE MANY

synopsis of GSOC Friday night lecture, January 9, 2015, given by Dr. William Orr, professor emeritus, University of Oregon, entitled "Perspectives on the Origin of Flight"

by Kyle Dittmer

Over 100 of us gathered in Cramer Hall 53 – a big upgrade from the smaller classroom – to hear a former aeronautical engineering student now turned paleontologist share the geologic evidence on how the ability to fly has come to evolve. He described the various modes of flight and the thresholds between what humans might define as “true flight” and all the ways evolution has developed gliding,

falling, and powered flight. The idea of flight is a major part of American culture, along with automobiles. The idea of flight goes back to ancient times. How did the wing evolve? Unlike a simple airfoil, a bird-wing is a complex venetian-blind like structure and with an opening-and-closing folding motion.

Clear record of wings goes back 300 million years ago in the fossil record. The earliest bird is Archaeopteryx – a hybrid of bird and reptile (but more bird than reptile). That bird was discovered in a “Lagerstätten” (or stellar fossil site) in Germany-the Solnhofen Limestone. Similar localities of “Lagerstätten” are the Green River Shale (SW Wyoming) and the John Day Formation (central Oregon). Archaeopteryx clearly had feathers but was its effort true flight or soaring/gliding? The modes of flight: suspension, leaping, jumping, gliding, and powered/hovering flight (most advanced) were examined.

The flying lizard (SE Asia) is a good example of gliding, as are flying squirrels and snakes. Even spiders can “fly” with a net of webbing extended like a parachute. We even see ancestors of the modern flying fish go back to early Cenozoic times (~60 m.y.). One example of the earliest flying creature was the Dragonfly (~330 m.y.) with a 3-ft wingspan. Modern bats can be traced back to Paleocene times (66-56 m.y.). The largest bird known was a Pliocene (5-2.5 m.y.) condor/raptor with a 22-ft, wing-span.

Conclusions: (1) There were many evolutionary paths to flight, (2) These modes of flight – jumping and gliding – preceded powered flight, (3) The first flying creatures were small in size, (4) Early flight was most likely an evasion tactic rather than being used in a predatory manner, (5) Flight was more easily developed in coastal areas, given the constant supply of onshore/offshore breezes, (6) Some creatures that do not fly well are still evolving and will likely improve in ability over time, (7) Evolution is continuous, so there are no “missing links” in seeing the progression of flight. Dr. Orr also quoted author Michael Crichton (of “Jurassic Park” fame) that “Life will find a way” and implied that the ability of flight always finds a way. We

enjoyed Dr. Orr’s presentation. He took on many questions afterwards as we retreated to the PSU Geology Office for a reception of tasty treats.

Additional Reading

Wikipedia – The Solnhofen Limestone: en.wikipedia.org/wiki/Solnhofen_limestone

Livescience article - Archaeopteryx: The Transitional Fossil: www.livescience.com/24745-archaeopteryx.html

University of California Museum of Paleontology (UCMP) article The Solnhofen Limestone of Germany: www.ucmp.berkeley.edu/mesozoic/jurassic/solnhofen.html

Another UCMP article discusses the evolution of gliding and parachuting in vertebrates: www.ucmp.berkeley.edu/vertebrates/flight/gliding.html

NOVA – “The Evolution of Flight” addresses the evolution of powered flight, mostly in birds: www.youtube.com/watch?v=g2dXznoURBw

The University of Portsmouth, UK, has a website which discusses variations of the evolution of flight: www.port.ac.uk/special/pterosaurs/evolutionofflight/

Mt. Lassen - a Geological Must-See

synopsis of GSOC Friday night lecture, February 13, 2015, given by Dr. Scott Burns, professor emeritus, Portland State University, entitled " Mt. Lassen National Park – A “Must See” Site for Geologists "

by Kyle Dittmer

About 100 of us gathered in Cramer Hall 53 to hear a very knowledgeable geologist talk about his newest adventure – first trip to Mt. Lassen National Park. This active volcano, the southernmost in the Cascade Mountains, last erupted in 1916. The mode of eruptions seems to be bi-modal – either quiet or violent. The volcano was named after Danish immigrant Peter Lassen who was a local blacksmith. The LA Times recently wrote that Mt.

Lassen was California's "most overlooked volcanic park" with only 400,000 visitors per year, as compared with Yosemite's 4-million visitors per year.

The geology of Mt. Lassen is complicated, being near the edge of the Sierra-Nevada Range. Unlike the Cascades, the Sierras were formed during the Nevadan Orogeny over 100-million years ago. Much granite formed deep underground. The Sierras underwent uplift 2-3 million years ago and has been sculpted by Pleistocene glaciers. Field studies suggest that although one may expect the granites of the Sierras to be beneath the Mt. Lassen magma chamber, we have yet to find this evidence.

The tectonic subduction of the Gorda Plate, very close to the northern California coast, is the driver of the southern Cascade volcanoes. Mt. Tehama was a large composite volcano that erupted over 1-million years ago, erupted violently 30,000 years ago, then formed a caldera on its internal collapse. Mt. Tehama would serve as the base for the newly emerging Mt. Lassen about that time and formed on the northeast slope of Mt. Tehama. The lakes are formed due to lava flows damming and/or diverting the local streams. There are tarns and some deep lakes, such as Soda Lake.

Mt. Lassen's origin began 5-million years ago as new volcanic activity was increasing. The Willow Creek Basalt, a major event, was 3-million years old. Andesite was flowing at 2-million years ago as seen at Juniper Lake. The Lava River Basalt flowed at 1.8 million years ago. By 100,000 years ago, four shield volcanoes had formed – Raker Peak (north), Prospect Peak (NE), Red Mountain (south-central), and Mt. Harkness (SW). Glaciation occurred during 25,000 – 15,000 years ago.

Mt. Lassen, at 10,457 feet elevation, is the largest volcanic dome in the world. The primary rock is dacite, although flows of basalt and andesite have added to the complex rock mosaic.

There are four craters in the summit that formed in 1917, 1915-16, 1914-15, and pre-1914. There were 400 eruptions during 1914-17. The May 22, 1915 eruption was a great event with ash plumes and lahars. Bumpass Hell is a 16-acre geothermal area of boiling springs, mud-pots, and fumaroles. We see hydrothermal alternation of some of the andesite. Sulfur Works had a community bathhouse since 1865, driven by hot springs. Cinder Cone (10-miles NE) was formed by two basalt eruptions (1850s) building up to 750 feet and is perfectly preserved. Diatoms (algae), which look like white dust, can be found near the edge of the basalt flows.

The Cascade Volcano Observatory does monitor the area, but Mt. Lassen is not active now and probably dormant. He did point out that since Mt. Lassen is an active geothermal area then the magma chamber is active and close to the surface.

Dr. Burns raved about the beautiful ponderosa pine forest that surrounds the volcanoes, which just adds to the majestic beauty of the area. He ended with a good quote, "This park has everything that a geologist could wish for – shield volcanoes, cinder cones, calderas, composite cones, domes, geothermal areas, and great biology!" We enjoyed Prof. Burns' presentation. He took on many questions afterwards then we retreated to the PSU Geology Office for a reception of yummy treats.

WELCOME NEW MEMBERS FOR 2015!
We've gotten some new members already this year! We wish you a warm welcome!

Martha Kiser	Elizabeth VanBoskirk
John Anderson	Barbara Portwood
Debbie & Steve Shannon	Melissa Lehman
Elizabeth VanBoskirk	Adrian Nunenkamp
Karen Small	Megan Scott

