

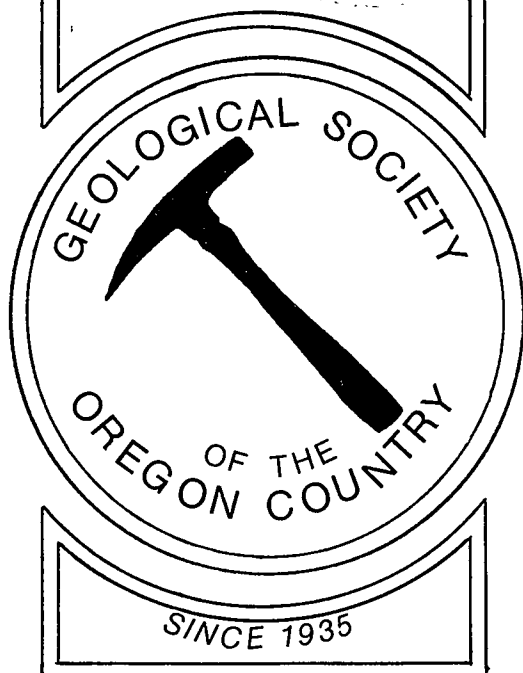
JAN 90

THE GEOLOGICAL NEWSLETTER

G S O C
GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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

Non-Profit Org.
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Dr. Frank Boersma
120 W. 33rd Street
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1989-1990 ADMINISTRATION

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THE GEOLOGICAL NEWSLETTER

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ACTIVITIES

ANNUAL EVENTS: President's Campout--summer. Picnic--August. Banquet--March.

FIELD TRIPS: Usually one per month, via private car, caravan, or chartered bus.

GEOLOGY SEMINARS: Third Wednesday, except June, July, August, 8:00 p.m. Room S17 in Cramer Hall, PSU. **LIBRARY:** Room S7, open 7:30 p.m. prior to evening meetings.

PROGRAMS: Evenings: Second and fourth Fridays each month, 8:00 p.m., Room 371, Cramer Hall, Portland State University, SW Broadway at Mill Street, Portland, Oregon.
Luncheons: First and third Fridays each month, except on holidays, at noon, Standard Plaza Cafeteria, third floor, Room A, 1100 SW Sixth Avenue, Portland, Oregon.

MEMBERSHIP: Per year from March 1: Individual, \$10.00; Family, \$15.00; Junior (under 18), \$6.00. Write to or call Secretary for membership applications.

PUBLICATIONS: THE GEOLOGICAL NEWSLETTER (ISSN 0270-5451) published monthly and mailed to each member. Subscriptions available to libraries and organizations at \$7.00 a year (add \$3.00 postage for foreign subscribers). Individual subscriptions at \$10.00 a year. Single copies 60¢. Order from Geological Society of the Oregon Country PO Box 907, Portland, OR 97207. TRIP LOGS - write to same address for price list.

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P.O. Box 907, Portland, OR 97207

VISITORS WELCOME
INFORMATION PHONE 284-4320

VOLUME 56, NO.1
JANUARY 1990

JANUARY CALENDAR

FRIDAY NIGHT LECTURES (Cramer Hall, Portland State Univ., Room 371, 8:00 p.m.)

- JANUARY 12 Global Climate Change and the Potential Contribution of Ice Core Analysis, illustrated, by Dr. Keith Mountain, Assoc. Professor, Department of Geography, Portland State Univ.
- JANUARY 26 Mid-Eocene Stratigraphy in the Tyee Basin, Oregon, illus., by Jerry Black, geologist, Oregon Department of Geology and Mineral Industries.

FRIDAY NOON LUNCHEONS (Standard Plaza, 1100 SW 6th Ave. Room A-B, third floor cafeteria. Program starts at 12:00)

- JANUARY 5 Seeing Mt. Lassen by Backroads, Trails, Shoe Leather, and Camera, illus., by Virgil and Freda Scott.
- JANUARY 19 Australia Opal Mines, by Mura C. Birdsall.

GEOLOGY SEMINAR (Cramer Hall, Portland State Univ., Room S-17, 8:00 p.m.)

- JANUARY 17 Central Oregon's Volcanic Wonderland - Review of GSOC 1982 Campout, by Dr. Ruth Keen, past GSOC president.

GSOC LIBRARY (Cramer Hall, Portland State Univ., Room S-7) Open 7:30 to 8:00 p.m. prior to evening meetings.

FIELD TRIPS (Charlene Holzwarth 284-3444; Alta Fosback 641-6323)

- JANUARY 24 SATURDAY 2:00 p.m. Home of Frances Rusche to see her collection. No reservations required. Frances lives between 99E and the Willamette River between Oak Grove and Jennings Lodge. From 99 E turn west on Concord St.; jog left, then right on Juniper to find 16777 SE Azalea Drive. Tele. 654-5975
- JANUARY 16, 17, 18, 19 Rescheduled Whidbey Island trip by bus with Dr. John Whitmer leading. Meet 6:45 P.M. Friday, Feb. 16 at Lloyd Center Red Lion. Bus will leave at 7:00 P.M. for Fri. night in Tacoma. Sat. and Sun. nights in Anacortes. Return Portland early evening on Monday Feb. 19.
RESERVATIONS REQUIRED. See page 4 for details.

A D D R E S S C H A N G E S

N E W M E M B E R

Sandy E. Bradetich
1707 S.E. Tempest Drive, #53
Bend, OR 97702

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15103 N.E. Rose Parkway
Portland, OR 97230

Thelma L. (Robert L.) Clark 775-5347
8425 S.E. 57th Ave.
Portland, OR 97206

D O N A T I O N S

Nancy Ann Wittpenn 239-9101
1225 S.E. Pine
Portland, OR 97214

The following people contributed to the
Edwin T. Hodge Lecture Fund as a memorial
to Viola L. Oberson:
Clara L. Bartholomay
Margaret and Bruce Miles

R E P O R T O N T H E A N N U A L G S O C B U S I N E S S M E E T I N G O F

February 24, 1989

The Annual Business Meeting of the Geological Society of the Oregon Country was held February 24, 1989, at 8:00 P. M. in Room 371, Cramer Hall, PSU. It terminated the GSOC fiscal year 1988-89. The meeting was called to order by President Joline Robustelli at 8:00 P. M. Officers and Committee Chairmen read their reports and presented them to the Secretary for the permanent file.

The reports of the Officers and Committee Chairmen will be on file with the current Secretary and will eventually be bound and placed in the GSOC library.

Election of Officers for the fiscal year 1989-90 followed the presentation of reports. Archy Strong assisted by Ruth Keen and Don Parks counted the ballots. The following persons, previously nominated, were elected:

- President Rosemary Kenney
- Vice President . . Margaret Steere
- Secretary Alta Fosback
- Treasurer Braden Pillow
- Director (3 yr.) . . Peter E. Baer

The Annual Business Meeting adjourned at 8:45 P. M.

NOTICE OF ANNUAL BUSINESS MEETING

The Annual Business Meeting of the Geological Society of the Oregon Country will be held on Friday, February 23, 1990, at 8:00 p.m. in room 371, Cramer Hall, Portland State University. At this time, ballots will be counted, results announced, and short annual reports will be given by officers and committee chairmen. A slide program follows the business meeting.

NOMINATIONS FOR 1990-91

The Nominating Committee consisting of Donald D. Barr (Chairman), John H. Bonebrake, Dr. Ruth Keen, Don B. Parks, and Gale S. Rankin presented the following slate of officers:

President	Dr. Ruth Keen
Vice President	Dr. Catherine Evenson
Secretary	Cecelia Crater
Treasurer	Archie Strong
Director (3 yrs)	Donald D. Barr

Other nominations may be made by the members of the Society by submitting the names in writing to the Secretary before January 10, 1990. Such nominations must be accompanied by the signatures of ten members of the Society.

Ballots will be mailed to all members about February 1st, and should be returned to the Secretary before the Annual Business Meeting on February 23rd.

ANNUAL BANQUET IN MARCH

The 55th Annual Banquet will be held on Friday, March 9, in the Ballroom at Smith Memorial Center, Portland State University. Esther Kennedy is chairman. Tickets will be available after the first of the year. More details next month.

Bring collectable, salable material for the banquet sales tables to Harold Moore and Archie Strong. Limit sizes to hand specimens or smaller, and books, maps, etc. Proceeds from the sale of these items help to meet expenses of the banquet.

ANNUAL DUES NOW PAYABLE

All memberships are renewable as of March 1 and dues are now being accepted by the Treasurer for the year 1990-91. Checks payable to GSOC may be sent to the Treasurers, P.O. Box 907, Portland, OR 97207, or they may be paid in person at meetings of the Society. If you wish to have a membership card mailed to you, please furnish a stamped, self-addressed envelope.

Dues are: Individual member, \$10; families, \$15; junior member (under age 18, not part of a family membership) \$6.

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

WHIDBEY ISLAND TOUR

February 16 - 19, 1990

Escorted by Alta Fosback
Lectured by Dr. John Whitmer

February 16

Load at 6:45 p.m., depart 7:00

p.m. from the Red Lion Lloyd Center on a comfortable ride to Tacoma. Whidbey Island is large and you will need all the time possible to see all that has been planned by Dr. Whitmer for the next three days. Overnight at the Lakewood Western Lodge.

Note: No luggage handling available.

February 17

Be sure your hiking boots are handy as you will do a 2 to 2½ hour hike along the Double Bluffs of Whidbey Island either today or tomorrow. Travel across the Narrows Bridge and through Bremerton to Port Townsend. Cover part of Whidbey Island on the way to Anacortes. Your home for the next two nights will be the Anacortes Inn. **Note:** No luggage handling provided.

February 18

Complete your study of the Island today.

February 19

Today Dr. Whitmer will concentrate on the area between Seattle and Tenino. Much of the route will follow the course of the Ice-Marginal Stream which flowed along the east edge of the Vashon Glacier. Return to Portland in early evening.

TOUR PRICE PER PERSON: \$185.00 sharing twin; \$238.00 single

TOUR PRICE INCLUDES: Private chartered motorcoach transportation, 3 nights hotel, ferry crossing at Port Townsend, taxes on all services listed and lecture throughout the tour.

NOT INCLUDED: Meals, luggage handling and items of a personal nature such as wine, liquor, telephone calls and maid gratuities.

DEPOSITS: Full payment is required to confirm reservations.

CANCELLATIONS and REFUNDS: A full refund will be made on all reservations prior to January 17. Cancellations after January 17 will be subject to the loss of any unrecoverable expenses.

TRIP LOG: Will be compiled by Dr. Whitmer and available upon departure.

TO THE MEMORY OF LON HANCOCK

Lon,
a mail carrier in our town,
on all of his week-long vacations
would gas up his ancient land rover
and scour the state all over
for fossils in old rock formations,
such as Miohippus,
or Eohippus,
Entelodonts
or Oreodonts,
Chalicotheres
or Titanotheres,
and it was certainly not quotidian
he would find one of these or a primitive Proboscidian.
But he once discovered a large bone
imbedded in a solid tomb of stone
which he worked on so long and carefully
that he finally got the huge thing free.
Identified as the skull of an Arynodon
by an eminent paleontologist,
in life it must have weighed more than a ton
and from the evidence was probably a pantophagist.
Now it can be seen face to face
as it lies in state in its resting place
at a science museum of our town,
promoted by that self-educated man of wide reknown,
Lon.

Jim Stauffer

BOOK REVIEW

THE ODYSSEY OF THOMAS CONDON -
Irish Immigrant, Frontier
Missionary, Oregon Geologist

By Robert D. Clark, Oregon
Historical Society Press, 1230 S.W.
Park Avenue, Portland, OR 97205,
1989, xv + 569 p., 5 maps, 54
photos, hardcover \$ 29.95.

The life of Thomas Condon
(1822-1907), Congregational
missionary, geologist and educator,
until now lacked a definitive

biography. Dr. Clark's carefully
researched and highly readable
account should grace the library of
every Oregon geologist and geology
teacher. But this book is more
than just an account of one man's
life, it is a skillfully researched
and written story of culture during
the 19th century in Ireland, New
York and Oregon.

It is also an important record of
the effect of Darwin's "Origin of
Species" upon geologic thought of
the time; a record of Condon's
remarkably perceptive and original

ideas about Oregon's geologic past; and an explanation of why public knowledge of and interest in geology is now more widespread in Oregon than elsewhere.

Although Condon became Oregon's pioneer geologist, it was as a missionary that he sailed around the Horn in 1852 to serve parishes in St. Helens, Forest Grove, near and in Albany and at The Dalles. When he left the church in 1872, he transferred his missionary zeal to the task of opening up the world of geology to students at the new University of Oregon and to the public through lectures, magazine and newspaper articles. In 1902 at age 80 he published "The Two Islands and What Came of Them", the first book on the geology of the state as a whole, and the only one available for 62 years!

Fortunately, Clark is never reluctant to stray from strict biography in perceptive and elegant excursions which explore educational practices, politics, controversial beliefs and prejudices, and business and living conditions of the times. I was immediately gripped by his sketch of Irish life during the first decades of the 19th century, since my own grandfather migrated from Tipperary County in 1835, only 3 years after the Condons.

Clark's research fills in the heretofore unreported days of Condon's New York schooling and teaching at Cazenova, Skaneateles, and Camillus with an account of what one man had to go through in order to get an education in those days. Clark not only gives the titles of geology and natural history texts used at the schools Condon attended but also outlines much of their content and the probable philosophical stance of Condon's teachers. In 1849 Condon taught at Auburn prison, experiencing the ghastly conditions that existed there only 140 years

ago. In 1852 he experienced the rigors of the 3 1/2 - month trip by sail around Cape Horn.

Condon had read Darwin, and during his missionary days he became involved in the arguments between evolution and creationism. He never saw contradictions between his science and a scholarly interpretation of the Bible. Clark's recapitulation of Condon's arguments is highly pertinent, since we are unfortunately still involved in this controversy.

Clark outlines the hardships Condon suffered for 10 years at several unsupportive ministries in western Oregon, but becomes more enthusiastic in recording the successful eleven years at The Dalles, where Condon first began to concentrate on his interest in geology and become involved with eastern scientists through his fossil collections.

The rigors of establishing the University of Oregon and its early problems is covered with a detail that is gratifying to one who has been involved with that university for much of his life. I particularly enjoyed the descriptions of Eugene and the University and its faculty during the decades bracketing 1900, since I came to Eugene as a "faculty kid" in 1913, only 5 years after Condon's death, and grew up within a few blocks of the campus.

John Eliot Allen

22 December 1988

BORING LAVA VOLCANIC FIELD

by John Eliot Allen

This is a one-page "Chapter" that I contributed to a new book, "Volcanoes North America". One can cram a lot into a small space!

Type: monogenetic volcano field
Lat/Long: 45.30 N, 122.50 W
Elevation: 91-236 m, ave. 200-300 m
Eruptive History, only 3 K/A dates:
2.56 Ma, Highland Butte
1.53 Ma, Pohl's Hill
1:3 Ma, Rocky Butte
Composition: high alumina
 olivine basalt

Metropolitan Portland, Oregon, like Auckland, New Zealand, includes most of a Plio-Pleistocene volcanic field. The Boring Lava includes at least 32 and possibly 50 eruptive vents lying within a radius of 21 km of Kelly Butte, which is 100 km W of Mt. Hood and the High Cascade axis. Only Clear Lake field, California, lies as far west in the conterminous United States. Unlike Clear Lake, Boring Lava vents have been inactive for at least 0.3 Ma.

The three dated samples show reversed remanent magnetism, but since tens of other determinations of Boring lava are about 50:50 normal and reversed, it is believed that the volcanoes were intermittently active from at least 2.7 to perhaps less than 0.5 Ma.

Northwest of the town of Boring 20 eruptive centers are concentrated within about 100 sq km. Vents in the E part of this cluster average less than 1.6 km in diameter and 122 m in height above their base. Lava from Highland Butte and Larch Mt shield volcanoes form gently sloping plains covering many tens of square kilometers. Well-logs indicate that in most places except near vents Boring lava is between 30 and 60 m thick.

Partial summit craters remain only at Bobs Hill, 33 km NE of Portland, and at a low cone enclosing a lake

N of Battleground, Washington, 33 km N of Portland. Most other volcanoes still have a low cone shape and are mantled with loess above 122 m el. Below this they were scoured by the cataclysmic Bretz floods about 13,000-15,000 ago.

Boring lava is characteristically a light-gray phyric olivine basalt with a pilotaxitic to diktytaxitic groundmass. A specimen from Rocky Butte was predominantly labradorite, with phenocrysts of olivine (Fo/80, Fa/20) mostly altered to iddingsite. The volcanoes locally contain scoria, cinders, tuff, tuff breccia and ash. Weathering may extend down to depths of 8 m or more, the upper 2 to 5 m commonly being a red clayey soil.

How to get there: The best and most accessible exposure is the cross-section of the cinder cone in the amphitheatre in Mt Tabor Park at about NE 64th St between Hawthorne and Stark Aves. Numerous quartzite-pebble xenoliths from the underlying Mio-Pliocene Troutdale gravels which make up the bulk of Mt Tabor have been found in the cinders here. The best view of the volcanic field is from the summit in Rocky Butte Park, at about NE 96th St and Shaver Ave, where massive cliffs of flood-scoured lava form the NE face of the Butte.

References:

Allen, John Eliot, 1975, Volcanoes of the Portland area, Oregon: Ore. Dept. Geol. & Mineral Industries, Ore-Bin], v. 37, n.9, p. 145-157.

-----, 1986, Cataclysms on the Columbia - a layman's guide to the features produced by the catastrophic Bretz floods: Timber Press, Portland, 211 p.

Beeson, Marvin H. and Hammond, Paul E., 1988, personal communication.

Trimble, Donald E., 1963, Geology of Portland, Oregon and adjacent areas: U. S. Geological Survey Bulletin 1119, 119 p.

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BOOK REVIEW

VOLCANOES. Cliff Ollier. Oxford, New York: Basil Blackwell, Ltd., 1988. vii and 228 pp., 53 figs., 48 photos, 38 maps, further reading, references, index, \$55.00 cloth (ISBN 0-631-15664-X), \$24.95 paper (ISBN 0-631-15977-0).

This moderate-sized volume updates Ollier's 1969 book of the same name, which was notable in that it was the first to emphasize volcanic landforms since Cotton's book of 1944. Addition of 51 more pages and 41 more illustrations to the new book brings current volcanology to students and general readers who have been "turned on" to this dynamic science by recent events at Mount Saint Helens, Augustine or Ruiz, or by a visit to Etna. The list of references contains 226 citations, 83 of which are dated since 1969, and 49 since 1980.

By omitting most geophysics and geochemistry and much petrology and by emphasizing geomorphology and structural geology, Ollier has been able to adequately cover in 6 of his 13 chapters volcanic activities, shapes, structures, plumbing and deposits. Chapter 1 on "Volcanoes and People" is an engrossing introduction to past catastrophic eruptions, present geologic hazards and possible methods for predicting future activity. Chapter 12 explains the role of plate tectonics in the origin and distribution of volcanoes, and Chapter 13 is a brief summary of volcanic rock classification. Other chapters discuss hydrology, weathering, and erosion. Numerous maps, physiographic sketches, cross-sections and photographs ably supplement the explanations. Photographs are placed near the appropriate text instead of being bunched, an annoying feature of the old book.

Ollier succeeds in his objective of writing "Volcanoes" for secondary school and university students, and general readers interested in volcanoes and scenery. As a text, it fills an important niche between the very short (Decker, Francis), and the very long (Macdonald, Bullard). The comprehensive index helps make it available to students and laity, and a useful reference for professionals who have not had a course in volcanology. I applaud the sole use of the metric system as an additional boost for American conversion to world standards.

John Eliot Allen

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Compiled by Dorothy R. Waiste

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THE GEOLOGICAL NEWSLETTER (ISSN 0270-5451) is published monthly by the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY and mailed to members of the Society. Yearly membership is \$10.00 for individuals, \$15.00 for families, \$6.00 for juniors (under age 18). Subscriptions are available to libraries and organizations at \$7.00 a year (plus \$3.00 postage outside the United States). Individual subscriptions are \$10.00 a year. Single copies are 60¢ plus postage. (All prices subject to change.) Order from the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY, P.O. Box 907, Portland, OR 97207. Write to the same address for membership applications and/or price list of available trip logs.

FEB 90

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Assist: Cecelia Crater	235-5158

ACTIVITIES CHAIRS

<p>Calligrapher Wallace R. McClung</p> <p>Field Trips Charlene Holzwarth Alta B. Fosback</p> <p>Geology Seminars Donald D. Barr</p> <p>Historian Phyllis G. Bonebrake</p> <p>Hospitality (Luncheon) Margaret Fink (Evening) Maxine Harrington</p> <p>Library: Esther Kennedy Betty Turner</p> <p>Past Presidents Panel Joline Robustelli</p> <p>Programs (Luncheon) Helen E. Nelson Joline Robustelli (Evening) Margaret L. Steere</p>	<p>637-3834</p> <p>284-3444</p> <p>641-6323</p> <p>246-2785</p> <p>289-8597</p> <p>289-0188</p> <p>297-1186</p> <p>287-3091</p> <p>246-3192</p> <p>223-2852</p> <p>661-1731</p> <p>223-2852</p> <p>246-1670</p>	<p>Properties and PA System (Luncheon) Donald Botteron 245-6251 (Evening) Walter A. Sunderland 625-6840</p> <p>Publications Geneva E. Reddekopp 654-9818</p> <p>Publicity Roberta L. Walter 235-3579</p> <p>Refreshments (Friday Evening) David and Marvel Gillespie 246-2368 Harold and Patricia Gay Moore 254-0135 (Geology Seminars) Catherine Evenson 654-2636</p> <p>Telephone Jean L. Boe 299-1101</p> <p>Volunteer Speakers Bureau Virgil Scott 771-3646</p> <p>Annual Banquet Esther Kennedy 287-3091 Gale Rankin 223-6784</p>
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ACTIVITIES

ANNUAL EVENTS: President's Campout--summer. Picnic--August. Banquet--March.

FIELD TRIPS: Usually one per month, via private car, caravan, or chartered bus.

GEOLOGY SEMINARS: Third Wednesday, except June, July, August, 8:00 p.m. Room S17 in Cramer Hall, PSU. **LIBRARY:** Room S7, open 7:30 p.m. prior to evening meetings.

PROGRAMS: Evenings: Second and fourth Fridays each month, 8:00 p.m., Room 371, Cramer Hall, Portland State University, SW Broadway at Mill Street, Portland, Oregon.
Luncheons: First and third Fridays each month, except on holidays, at noon, Standard Plaza Cafeteria, third floor, Room A, 1100 SW Sixth Avenue, Portland, Oregon.

MEMBERSHIP: Per year from March 1: Individual, \$10.00; Family, \$15.00; Junior (under 18), \$6.00. Write to or call Secretary for membership applications.

PUBLICATIONS: THE GEOLOGICAL NEWSLETTER (ISSN 0270-5451) published monthly and mailed to each member. Subscriptions available to libraries and organizations at \$7.00 a year (add \$3.00 postage for foreign subscribers). Individual subscriptions at \$10.00 a year. Single copies 60¢. Order from Geological Society of the Oregon Country PO Box 907, Portland, OR 97207. TRIP LOGS - write to same address for price list.

THE GEOLOGICAL NEWSLETTER

The Geological Society of the Oregon Country

P.O. Box 907, Portland, OR 97207

VISITORS WELCOME
INFORMATION PHONE 284-4320

VOLUME 56, NO 2
FEBRUARY 1990

FEBRUARY CALENDAR

FRIDAY NIGHT LECTURES (Cramer Hall, Portland State Univ., Room 371, 8:00 P.M.)

FEBRUARY 9 Hydrologic Units of the Portland Well Field Area, Oregon, illustrated, by Susan Hartford, Hydrologist, Oregon Water Resources Department.

FEBRUARY 23 ANNUAL GSOC BUSINESS MEETING, followed by slide program: Cappadocia, Goreme, and Pamukkale - Turkey's Ancient Dwelling Sites, by Frances Rusche.

FRIDAY NOON LUNCHEONS (Standard Plaza, 1100 SW 6th Ave., Room A-B, third floor cafeteria. Program starts promptly at 12:00)

FEBRUARY 2 Bahia Kino, on Sea of Cortez, Mexico, illus. by Glen Barber, Tillamook photographer.

FEBRUARY 16 Egypt, illustrated, by Frances Rusche.

GEOLOGY SEMINAR (Cramer Hall, Portland State Univ., Room S-17, 8:00 p.m.)

FEBRUARY 21 (Wed.) Review of GSOC President's Campout in Northern Cascades, Washington, illus. by Don Barr.

GSOC LIBRARY (Cramer Hall, Portland State Univ., Room S-7)
Open 7:30 to 8:00 p.m. prior to evening meetings.
Esther Kennedy, librarian.

NO FIELD TRIPS IN FEBRUARY - Whidbey Island trip cancelled.

* GSOC BANQUET FRIDAY MARCH 9 *
* GET YOUR TICKETS EARLY!!! *

55TH ANNUAL BANQUET NOTICE

PLACE: Grand Ballroom, third floor, Smith Memorial Center, PSU

DATE: Friday, March 9, 1990. Put that on your calendar!!!

TIME: 5:30 p.m. Grand Ballroom open for viewing exhibits and purchasing items from sales table. Dinner 6:30 sharp.

CHAIRMAN: Esther Kennedy and Gale Rankin

GUEST SPEAKER: Dr. Ula Moody, Western Oregon State College, Monmouth, Oregon, will give an illustrated talk "Catastrophic Flooding in Central Washington and Its Influence on the Willamette Valley."

SALES TABLE: Bring hand specimens or smaller minerals, slices, crystals, fossils, and bring books on geology or natural history, maps, etc. Proceeds from the sale of these items help to meet expenses of the banquet.

TICKETS: Tickets Chairman, Virgil and Freda Scott, 8012 S.E. Ramona Street, Portland, OR 97206. Write or call them for reservations (771-3646). Or send check to GSOC, P.O. Box 907, Portland, OR 97207. Send a stamped, self-addressed envelope for return of tickets, or they will be held for you. Tickets for sale at all GSOC meetings. Purchase tickets early to reserve the most desirable space and to help the Banquet Committee with table preparations.

PRICE: Cost of banquet tickets is \$12.00 each. Bring tickets to the banquet; they will be collected at tables.

PARKING: The 5th floor of parking structure No. 1, 1872 S.W. Broadway, between S.W. Harrison and S.W. Hall Streets, has been reserved from 3:30 p.m. until late for GSOC members attending the banquet. BE SURE TO PARK ON THE FIFTH FLOOR! Do not park in spaces marked "Handicapped" or "Reserved." From the 5th floor structure, a short stairway leads to a footbridge across Broadway directly to the level of the banquet room in Smith Memorial Center.

NEW MEMBERS

Benton R. (Shirley A.) Dailey 254-6062
16366 S.E. Salmon
Portland, OR 97233

John & Kathy & Didgette, Karissa,
Candace, & Audra Jordan 473-2202
2785 Bully Creek Road
Vale, OR 97918

Jeanne Pulliam 665-1437
626 N.E. Fleming
Gresham, OR 97030

CHANGE IN ADDRESS

Wallace R. & Eleanor K. McClung 774-2970
5020 S.E. 35th Ave.
Portland, OR 97202

DONATIONS

The following people contributed to
Funds as a memorial to Viola L. Oberson:

Don B. Parks
Dorothy Flegel (former member)

ANNUAL BANQUET!

ANNUAL BANQUET!

ANNUAL BANQUET!

SALES TABLE MATERIAL NEEDED: Archie Strong
and Harold Moore need material for the
sales table at the banquet. Small mineral
specimens, interesting rocks, good fossils,
books, maps, and collectables would be
appreciated. Proceeds from sales table
help support banquet.

EXHIBITS: Do you have an exhibit you would
like to share at the banquet? Displays
of rocks, minerals, pictures, or any hobby
collection, geologic or otherwise, are
most welcome. Call Don Parks at 288-3600.

BANQUET TICKETS: Please purchase your
banquet tickets early so Banquet Chairman
can make table arrangements. Cut off date
is March 6, 1990.

SOME MEDITATIONS ON EARTHQUAKES

by John Eliot Allen,
Portland State University
October 21, 1989

The most surprising result of the
October 16, 1989 Loma Prieta
earthquake south of San Francisco,
was the low number of fatalities,
and the exemplary conduct of the
public. If you exclude the
horrible concrete-sandwich on the
I-880 freeway in Oakland,
casualties may have been less
than 50 souls, which is unusual for
a quake with a Richter magnitude of
nearly 7, located near a densely
populated area.

The principle first enunciated 20
years ago by the remarkably
perceptive Dick Jahns (1969), still
holds: "A big quake has to occur
before the public will act to beef
up building codes, and formulate
plans for disaster management". Of
the 16 most significant earthquakes
in the history of the United
States, 5 have now occurred in
California, and each time new
building codes were passed, the
public became better informed on
how to act, public agencies learned
better how prevent panic and
looting, and became more able to
make quick rescue efforts. Oregon
has only recently begun to do this
because we have never had a big
earthquake.

Brian Atwater (1988) of the U.S.
Geological Survey, and Curt Peterson
(1988), now at Portland State
University, have been in the
forefront of the last 5 years of
research on estuarine sediments in
the northwest (summarized by Yeats,
1989). This research indicates that
for at least 5000 years the
northwest has suffered at least 8
subsidence and tsunami ("tidal
wave") producing earthquakes, 4 of
the most recent ones have been
dated as having occurred 350,
1,220, 1,640, and 1,760 years ago
(Peterson, 1988; Darienzo and
Peterson, 1989). These were
Alaskan-type subduction

earthquakes, with magnitudes of perhaps Richter 8, which is 30 times more powerful than the California earthquake of October 16.

One can play with the intervals between these quakes as follows, but it should be emphasized that there is so much variation in recurrence intervals that the average interval really has little value in predicting the next earthquake.

Years BP	Intervals	Dates
+85		2074 AD
NOW	435	1989
-350		1639
	435	
?		1119
	435	
-1220		769
	420	
-1640		349
	120	
-1760		229

With one interpolation and one exception, these intervals have a periodicity of 420 to 435 years, which might suggest that another earthquake is due 85 years from now. But let us come back from fancy to fact.

The evidence for these dates come from analyses of radioactive carbon 14 in peat taken from cores made in the estuarine sediments around several bays along the Oregon and Washington coast. These deposits show widely correlatable alternate layers of mud/sand (tidal flats) and peat (tidal marsh). They are interpreted as implying changes from low intertidal flats to supratidal marsh/freshwater wetland, accompanied by buildup of organic muck, now peat. An earthquake then causes subsidence, and an accompanying tsunami washes sands inland, covering the peat with sediment and completing the cycle.

Corroborative evidence is accumulating from a number of sources. Hemphill-Haley (1989) has found diatoms in the fresh water facies and forams in the brackish/salt water parts of the layers.

Anthropologists studying the kitchen middens along the coast have found site abandonment or abrupt changes in indian diet occurring close to these same dates. Remnants of submerged forests, also found in many places along the coast, were drowned slightly less than 400 years ago.

Dating of large landslides has also added suggestive evidence; the slide that buried the Ozette indian village on the Olympic peninsula occurred about 400 years ago. The Cascade landslide north of Bonneville which gave rise to the legend of the "Bridge of the Gods" occurred about 730 years ago, and may have been triggered by an earthquake filling the gap (?) in the above table.

Returning to the 1989 Loma Prieta earthquake, I am sorry to see that the "experts" quoted in the papers say that this quake is NOT the "big one". Well, maybe that is so, but maybe it's good propaganda to tell the public not to relax their efforts to bring older buildings up to par, and not to build on filled ground. And of course, maybe there will be another bigger one.

I chuckle when I think of how Perry Byerly, my seismology professor at Berkely, told his class in 1933 that "Within 10 years we ought to be able to predict earthquakes". Seismologists are still saying the same thing after 56 years!

References:

Atwater, B. F., 1988, Geologic studies for seismic zonation of the Puget Lowland, in National

Earthquakes Hazards Reduction Program, Summaries of Technical Reports: U.S.G.S. Open File Report, 88-16, p. 120-133.

Darienzo, M. E., and Peterson, C. D., 1989, Episodic tectonic subsidence of Late Holocene salt marshes, northern Oregon coast, central Cascadia margin, U.S.A.: Tectonics, in press.

Hemphill-Haley, E., 1989, (Abstract) Investigation into the use of estuarine microfossil zones for determining amounts of coseismic subsidence in southwestern Washington: Geol. Soc. America, Abstracts with programs, v. 21, n. 5, p. 92.

Jahns, Richard H., 1969, Seventeen years of response by the City of Los Angeles to geologic hazards, in Olson, R. A., and Wallace, M.M., eds., Geologic hazards and public problems, Conference proceedings: Office of Emergency Preparedness, Santa Rosa, California, p. 283-295.

Peterson, C. D., Darienzo, M. E., and Parker, M., 1988, Coastal neotectonic field trip guide for Netarts Bay, Oregon: Oregon Geology, v. 50, p.99-106

Peterson, C. D. and Darienzo, M. E., 1989, (Abstract) Episodic, abrupt tectonic subsidence recorded in late Holocene deposits of the South Slough syncline: an on-land expression of shelf fold belt deformation from the southern Cascadia margin: Geol. Soc. America, Abstracts with programs, v. 21, n. 5, p.129.

Yeats, Robert S., 1989, Current assessment of earthquake hazard in Oregon: Oregon Geology, v. 51, n. 4, p. 90-91.

BOOK REVIEW

"Wy'east The Mountain" (1937) McNeil's Mount Hood revisited, second edition, revised and published by Joe Stein, 1990: 220 pp, color map, many black and white and color photos, paperback, \$13.95 postpaid from Zig Zag Papers, Box 247, Zig Zag, OR 97049.

"McNeil's Mount Hood revisited", edited and published by Joe Stein, again makes accessible "Wy'east The Mountain", written more than fifty years ago by journalist Fred H. McNeil, who for twenty five years made Mount Hood a large part of his life.

A "Preface" to the new edition by Tom McAllister, presently outdoor columnist for The Oregonian and a former colleague of McNeil's, gives a perceptive profile of the McNeil who came to Portland as a 19-year old writer for the Journal, and during a dedicated 15-year career became more knowledgeable about climbing, skiing, and rescue work on Mt. Hood than any other writer before or since.

This revised and updated book can now again be enjoyed by all who want to know more about Mt. Hood - mountain climbers, skiers, photographers, or visitors just interested in stories about the mountain can profit from McNeil's remarkably comprehensive collection of stories about all the ordinary and extraordinary things that have happened there during geologic and historic time.

Early hardships, hazardous climbs, disasters, rescues, famous guides, poisonous fumaroles, avalanches and mudflows, illuminations on the Fourth of July, building of Cloudcap and

* * * * *

Timberline lodges, origin and work Mazamas, Crag Rats and Wy'east Climbers, Forest Sevice activities, the summit lookout cabin, how the mountain and the glaciers were measured - its all there, written with love and enthusiasm.

Stein introduces and updates McNeil's remarkable record of early days on Mount Hood with a thoughtful "Publisher's Note" and "Afterword". In them Stein records many of the events of the last 50 years on the mountain, especially the story of Timberline Lodge, the developement of the skiing industry, and the tragedy of May, 1986. Stein also adds to several chapters pertinent comments and notes which explain or bring up to date McNeil's account. He says that he found it necessary to revise, modernize or even omit portions of some chapters, but this is done so smoothly that they could not be detected without reference to the original text.

Fortunately, Stein also introduces information developed by geologists on Cascade volcanoes since McNeil's day, largely as a result of the eruption of Mt. St Helens. Hopefully this will help us to be prepared to cope with volcanic hazards that can come from Mount Hood when it, too, erupts again.

Last but not least, a visitor's guide to the mountain contains addresses and phone numbers of 15 sources of all kinds of information on Mt. Hood, details about 8 major resorts, location and phone numbers for 33 places to go, and location and phone numbers for the 29 restaurants and 25 lodgings closest to Mt. Hood.

John Eliot Allen
29 December 1989

ANNUAL DUES - DUE MARCH 1


Send checks, payable to GSOC, to P.O. Box 907 or pay at meetings.
Indiv. \$10, Family \$15, Junior \$6.

Mar 90

THE GEOLOGICAL NEWSLETTER

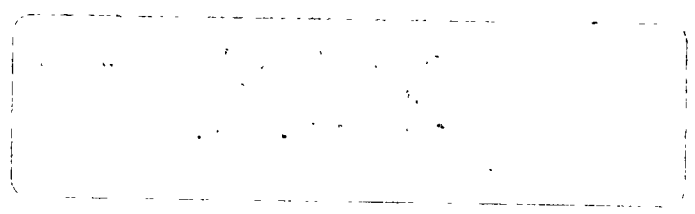
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THE GEOLOGICAL NEWSLETTER

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Field Trips		(Evening) Walter A. Sunderland	625-6840
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Geology Seminars		Publicity	
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Historian		Refreshments	
Phyllis G. Bonebrake	289-8597	(Friday Evening)	
Hospitality		David and Marvel Gillespie	246-2368
(Luncheon) Margaret Fink	289-0188	Harold and Patricia Gay Moore	254-0135
(Evening) Maxine Harrington	297-1186	(Geology Seminars)	
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Past Presidents Panel		Jean L. Boe	299-1101
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Programs		Virgil Scott	771-3646
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Joline Robustelli	223-2852	Esther Kennedy	287-3091
(Evening) Margaret L. Steere	246-1670	Gale Rankin	223-6784

ACTIVITIES

ANNUAL EVENTS: President's Campout--summer. Picnic--August. Banquet--March.

FIELD TRIPS: Usually one per month, via private car, caravan, or chartered bus.

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VOLUME 56, NO. 3
MARCH 1990

MARCH CALENDAR

55th ANNUAL BANQUET (Grand Ballroom, third floor, Smith Memorial Center,
Portland State University)

- MARCH 9 Speaker: Dr. Ula Moody, Assist. Professor, Western Oregon College,
Monmouth.
Subject: "Catastrophic Flooding in Central Washington and its
Influence on Willamette Valley"
Time: Doors open 5:30 p.m. for exhibits and sales tables.
Dinner served promptly at 6:30 p.m.
Tickets: \$12.00 each. Call Virgil or Freda Scott (771-3646)
by March 6. (Tickets will be collected at tables)
Parking: Reserved for 5th floor of PSU parking structure,
1872 S.W. Broadway. (Do not park in spaces marked "reserved")

FRIDAY NIGHT LECTURE (Cramer Hall, Portland State Univ., Room 371, 8:00 p.m.)

- MARCH 23 "Plate Tectonics and the Cascade Range" illustrated, by George
Priest, geologist, Oregon Department of Geology and Mineral Industries

FRIDAY NOON LUNCHEONS (Standard Plaza Bldg. 1100 SW 6th Ave., Room A-B, third floor
cafeteria. Program starts promptly at 12:00)

- MARCH 2 "Colorful Alaska" illustrated, by Lewis Birdsall, GSOC member.

- MARCH 16 "Mainland China" illustrated, by Phyllis Bonebrake, GSOC member.

GEOLOGY SEMINAR (Cramer Hall, Portland State Univ., Room S-17, 8:00 p.m.)

- MARCH 21 "Geology of the Western Cascades" Review of 1987 President's
Campout, by Andy Corcoran, past GSOC president.

GSOC LIBRARY (Cramer Hall, Portland State Univ., Room S-7)
Open 7:30-8:00 p.m. prior to evening meetings.

FIELD TRIPS

NO GSOC FIELD TRIPS IN MARCH.

See inside this issue of NEWSLETTER for preview of proposed field trips
for April through August.

PREVUE OF PROPOSED FIELDTRIPS FOR 1990

April 6,7,8,9 Camp Hancock reserve with Don Barr, 246-2785
May 26,27,28 Snake & Palouse areas, Dr. Whitmer leading, Reserve by check to GSOC,Alta Fosback,info. 641-6323
June 9 Saturday, not confirmed yet.
July 7, One-day bus trip,Crazy Hills Dr. Whitmer leading. Reserve with Alta Fosback 641-6323
August 7, Tuesday, one-day car trip to Centraliz coal fields, reclamation, and power plant,1 1/2 hr.drive Arrive 9 a.m.(2 hr. in field)
September (early) save for President's Campout in S.E.Oregon & vicinity. (More details soon.)

I N M E M O R I A M
Mickey McClure
of Salem, Oregon
Passed away in August 1989

HANCOCK FIELD STATION ANNUAL RETREAT

DATE: April 6,7,8,9

LEADER: Don Barr

DETAILS: Arrive on the afternoon of April 6. This will be a do-it-yourself weekend. You may do what you want: dig fossils in the town of Fossil, hike the country and look for flowers or just sit and read. I am sure there will be plenty to do.

HOW TO GET THERE: Leave Portland on Hwy. 26 through Government Camp to Hwy. 216. Turn left on 216 to Maupin. Cross the Deschutes River at Maupin and make a sharp left. About a third of a mile take the first road on the right and you will be on Bakeoven Road. It's about 27 miles to Shaniko. At the Texaco Station on the south side of the road make a right turn. Go through Antelope and Clarno. After crossing the bridge at Clarno (John Day River) the Camp will be about 2 miles. Watch for the sign Hancock Field Station on the north side of the road.

LODGING: Dormitory style A-Frames and a few places inside will be available. Bring sleeping bags, air mattresses and extra blankets. There are showers and toilets. There are places for R.V.s.

We will eat meals together that will be prepared by the camp cook. The cost for each day at camp will be \$18.00. The first meal will be Friday evening, April 6, and the last will be a lunch on Monday, April 9th.

Bring towels, soap, and whatever else you might need. Good walking shoes are a must if you intend to hike in the area. Bring an assortment of clothing. Who knows what the weather is going to be. Hopefully it will be good weather.

Please call Don Barr at 246-2785 or Rosemary Kenney at 221-0757 to make reservations. We must have a good count so they can be prepared with food. RESERVATIONS NO LATER THAN APRIL 2.

STATUS OF GSOC FUNDS THROUGH PSU FOUNDATION

EDWIN T. HODGE LECTURE FUND

The Lectureship honoring Dr. Edwin T. Hodge, founder and first president of the Geological Society of the Oregon Country, was established by GSOC and the faculty of the Geology Department of Portland State University. The purpose of the lectures is to enrich, interpret, and inform faculty, students, members, and friends of the results of significant scientific research in any related earth science by a recognized authority. Income from the Edwin T. Hodge Lecture Fund shall be used as a stipend for a lecture given by a scholar selected and invited jointly by the Chairman of the Geology Department at Portland State University and the President of the Geological Society. An honorarium from income will be used to support an eminent scientist; and when this amount of income has accrued in this Fund, an annual invitation may be initiated.

Effective September 30, 1989, the general endowment fund contains \$ 597.89. The lecture income, educational and general fund, effective September 30, 1989, contains \$ 119.86.

JOHN ELIOT ALLEN GEOLOGY FUND

The Geology Fund honoring Dr. John Eliot Allen, Emeritus Professor of Geology at Portland State University and president of GSOC in 1946, was established in conjunction with the celebration of the 50th anniversary of GSOC. Income from the Fund, established by GSOC and the Portland State University Geology Department, shall be used at the discretion of the faculty to purchase major pieces of equipment for the Department.

Effective September 30, 1989, the general endowment fund contains \$ 1,842.79. The income, education and general fund, effective September 30, 1989, contains \$ 313.73.

PAUL WILLIAM HOWELL MEMORIAL FUND

The Memorial Fund honoring Paul William Howell, geologist for the U. S. Army Corps of Engineers, Portland District, and president of GSOC in 1959, was established to provide fellowships for graduate geology students, who are doing research on geological problems of the Oregon Country. Recipients will report findings of summer field camp to the Society. Income from the fund shall be used according to the direction of the faculty of the Portland State University Geology Department.

Effective September 30, 1989, the general endowment fund contains \$ 11,634.76. The student aid fund, effective September 30, 1989, contains \$ 1,881.26.

GEOLOGIC TIME CHART

STRATIGRAPHIC DIVISIONS			TIME	DOMINANT LIFE		
ERA	SYSTEM OR PERIOD	SERIES OR EPOCH	Estimated ages of time boundaries in millions of years	ANIMALS	PLANTS	
CENOZOIC	QUATERNARY	Holocene Pleistocene	1.6	Man Mammals, birds, bony fish, mollusks, arthropods and insects	Flowering trees and shrubs	
	TERTIARY	Pliocene	5.3			
		Miocene	23.7			
		Oligocene	36.6			
		Eocene	57.8			
		Paleocene	66.4			
MESOZOIC	CRETACEOUS	Upper (Late) Lower (Early)	144	Dinosaurs and Flying and swimming reptiles Ammonites	Conifers, Cycads, Ginkgos and Ferns	
	JURASSIC	Upper (Late) Middle (Middle) Lower (Early)	208			
	TRIASSIC	Upper (Late) Middle (Middle) Lower (Early)	245			
PALEOZOIC	PERMIAN	Upper (Late) Lower (Early)	286	Giant insects, Primitive reptiles & Amphibians Crinoids and Blastoids Sharks & Lungfish Corals, Brachiopods, and Trilobites	Scale trees, Cordaites, Calamites, and Tree ferns Primitive scale trees and tree ferns Lycopods and Psilophytes Algae and Fungi	
	Carboniferous	PENNSYLVANIAN	Upper (Late) Middle (Middle) Lower (Early)			360
		MISSISSIPPIAN	Upper (Late) Lower (Early)			408
	DEVONIAN	Upper (Late) Middle (Middle) Lower (Early)	438			
	SILURIAN	Upper (Late) Middle (Middle) Lower (Early)	505			
	ORDOVICIAN	Upper (Late) Middle (Middle) Lower (Early)	570			
	CAMBRIAN	Upper (Late) Middle (Middle) Lower (Early)	3800?			
	PRECAMBRIAN		Informal subdivisions such as upper, middle, and lower; or upper and lower; or younger and older may be used locally.			3800?
<p>(More than 80% of earth's estimated 4.5 billion years falls within this era)</p>						

Oldest rocks known in Oregon: Limestones in central Oregon containing Middle Devonian fossils - about 370 million years old.
 Oldest rocks known in North America: Granitic gneisses in Minnesota - 3550 million years old.
 Oldest fossils known in the world: Algal stromatolites in southern Rhodesia - 2.7 billion years old.
 Oldest rocks known in the world: Australia, Finland, South Africa, and North America have rocks about 3.5 billion years old.
 Age of the earth: about 4.5 billion years old.

APR 90

THE GEOLOGICAL NEWSLETTER

G S O C
GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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

Non-Profit Org.
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Helen E. Nelson
854 N.E. Fleming St.
Gresham, OR 97030

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1989-1990 ADMINISTRATION

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THE GEOLOGICAL NEWSLETTER

Editor: Sandra Anderson	775-5538
Calendar: Margaret Steere	246-1670
Business Manager: Carol Cole	220-0078
Assist: Cecelia Crater	235-5158

ACTIVITIES CHAIRS

Calligrapher		Properties and PA System	
Wallace R. McClung	637-3834	(Luncheon) Donald Botteron	245-6251
Field Trips		(Evening) Walter A. Sunderland	625-6840
Charlene Holzwarth	284-3444	Publications	
Alta B. Fosback	641-6323	Geneva E. Reddekopp	654-9818
Geology Seminars		Publicity	
Donald D. Barr	246-2785	Roberta L. Walter	235-3579
Historian		Refreshments	
Phyllis G. Bonebrake	289-8597	(Friday Evening)	
Hospitality		David and Marvel Gillespie	246-2368
(Luncheon) Margaret Fink	289-0188	Harold and Patricia Gay Moore	254-0135
(Evening) Maxine Harrington	297-1186	(Geology Seminars)	
Library: Esther Kennedy	287-3091	Catherine Evenson	654-2636
Betty Turner	246-3192	Telephone	
Past Presidents Panel		Jean L. Boe	299-1101
Joline Robustelli	223-2852	Volunteer Speakers Bureau	
Programs		Virgil Scott	771-3646
(Luncheon) Helen E. Nelson	661-1731	Annual Banquet	
Joline Robustelli	223-2852	Esther Kennedy	287-3091
(Evening) Margaret L. Steere	246-1670	Gale Rankin	223-6784

ACTIVITIES

ANNUAL EVENTS: President's Campout--summer. Picnic--August. Banquet--March.

FIELD TRIPS: Usually one per month, via private car, caravan, or chartered bus.

GEOLOGY SEMINARS: Third Wednesday, except June, July, August, 8:00 p.m. Room S17 in Cramer Hall, PSU. **LIBRARY:** Room S7, open 7:30 p.m. prior to evening meetings.

PROGRAMS: Evenings: Second and fourth Fridays each month, 8:00 p.m., Room 371, Cramer Hall, Portland State University, SW Broadway at Mill Street, Portland, Oregon.
Luncheons: First and third Fridays each month, except on holidays, at noon, Standard Plaza Cafeteria, third floor, Room A, 1100 SW Sixth Avenue, Portland, Oregon.

MEMBERSHIP: Per year from March 1: Individual, \$10.00; Family, \$15.00; Junior (under 18), \$6.00. Write to or call Secretary for membership applications.

PUBLICATIONS: THE GEOLOGICAL NEWSLETTER (ISSN 0270-5451) published monthly and mailed to each member. Subscriptions available to libraries and organizations at \$7.00 a year (add \$3.00 postage for foreign subscribers). Individual subscriptions at \$10.00 a year. Single copies 60¢. Order from Geological Society of the Oregon Country PO Box 907, Portland, OR 97207. TRIP LOGS - write to same address for price list.

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P.O. Box 907, Portland, OR 97207

VISITORS WELCOME
INFORMATION PHONE 284-4320

VOLUME 56, NO. 4

CALENDAR OF ACTIVITIES FOR APRIL, 1990

FRIDAY NIGHT LECTURE (Cramer Hall, PSU, Room 371, 8:00 P.M.)

- April 13 "Historic Natural Dams in Oregon and Washington,"
Illustrated by Dr. John E. Costa, Hydrologist, U. S. G. S.
- April 27 "Beach Sand Distribution and its Relationship to Shore
Line Stability in the Pacific Northwest," illustrated,
by Don Pettit, Graduate Student, PSU.

FRIDAY LUNCHEON (Standard Plaza, 1100 S.W. 6th Avenue, Rooms A & B, Third Floor Cafeteria. Programs at 12:00 Noon)

- April 6 "Australia," Illustrated, by Benton Dailey, GSOC
member.
- April 20 "Early Historic Portland," Illustrated, by Marilyn
Finn, Oregon Historical Society.

GEOLOGY SEMINAR (Cramer Hall, PSU, Room S-17, 8:00 P.M.)

- April 18 Basin and Range Geology of Southeastern Oregon, Part
I, illustrated, by Dr. John Allen, Past President,
GSOC.

GSOC LIBRARY (Cramer Hall, Portland State University, Room S-7) Open 7:30-8:00 P.M. prior to evening meetings.

FIELD TRIPS April 6-9, 1990, Hancock Field Station Annual Retreat. Contact Don Barr (246-2785) for reservations.

Cancelled
May 12, 1990, Geology and Natural History of the
Molalla River. Auto trip lead by Don Barr. Details on
meeting time and place in the May Newsletter.

May 26-28, 1990, Snake River and Palouse Area. Bus
trip lead by Dr. John Whitmer. DEADLINE for
reservations April 18. Contact Alta Fosback (641-6323)
for details.

September 7-16, 1990, President's Campout lead by Dr.
Ruth Keen to Southeastern Oregon. See page 26 for more
details.

*Intro K Jace
Sahel - Gearhart Natl Area
H. Rock*

Deniro - Prine Jordan Valley

*Ontario - note Steensmtn
Bonneville*

*100000
15 Ruth Keen
June 1990
\$500.00
Gaters - Jessie Linder
at Seaside OR 19
Home boat on Lake*

NEW MEMBERS

Thomas M. Chereck 284-5156
 3317 NE 67th
 Portland, OR 97213-5209

Lloyd & Margaret Giddings
 13048 SE Evergreen
 Portland, OR 97236

Cecilia M. MacGregor 752-6309
 2803 NW Elmwood Dr.
 Corvallis, OR 97330-1235

Barbara D. Halverson 645-2185
 1697 NW Midlake Lane
 Beaverton, OR 97006

Thomas B. & Doris P. Mansfield 246-3814
 4354 SW Chesapeake Ave.
 Portland, OR 97201

Ralph & Evelyn Pratt 223-2601
 2971 SW Canterbury Lane
 Portland, OR 97201

Herbert & Polly Winroth 649-4206
 19540 SW Butternut St.
 Aloha, OR 97007

DONATIONS

The following people contributed to the GSOC General Fund:

Walter A. Sunderland, M.D.
 Margaret Steere

Walter A. Sunderland, M.D. donated a small cart for transporting our sound system from place to place.

NOTICE

Members wishing to join Vice President Dr. Catherine Evenson and out-of-town guest speaker for dinner should contact Catherine at 654-2636 five days prior to the evening lecture to make reservations. Dinners will be at 6:00 P.M., at the Portland Center Red Lion, 310 SW Lincoln Street.

MINUTES OF THE ANNUAL BUSINESS MEETING of GSOC

February 23, 1990

The Annual Business Meeting of the Geological Society of the Oregon Country was held February 23, 1990, at 8:00 p.m. in Room 371, Cramer Hall, PSU. It terminated the GSOC Fiscal Year 1989-90. The meeting was called to order by President Rosemary Kenney. Officers and committee chairmen gave their reports and turned them in to the secretary for the Permanent File. The following paragraphs briefly summarize these reports:

President, Rosemary Kenney presided over 16 Friday evening meetings, 4 Executive Board Meetings, and planned and conducted the Annual President's Campout to Vancouver Island. During the year, the need to change the fiscal year to January-December was discussed and recommended for change; the post office box was changed to a smaller size to save costs; Emily DeLano and Dorothy Waiste were appointed to audit the books; and a \$400 scholarship was granted to Clay Kelleher from the Paul William Howell Memorial Fund.

Vice-president, Margaret Steere served as Program Chair. for the Friday night meetings. A total of 17 speakers presented various geological subjects. Margaret also organized the annual picnic at the Alpenrose site in August, assisted the President when requested, and prepared the Activities Calendar for each issue of the Newsletter.

Treasurer, Braden Pillow's report incomplete due to ongoing business.

Secretary, Alta Fosback participated in the meetings of the GSOC Board meetings, kept the minutes, typed and distributed them to the members of the Board. She prepared the material concerning membership for the 1989 Roster of Members; and, with the assistance of Charlene Holzwarth, succeeded in getting the membership list on a computerized program for quick changes and prints.

Immediate Past President GSOC, Joline Robustelli presided over and secured the programs for 4 meetings of the Past Presidents' Panel, held at the Portland Inn.

Calligrapher, Wally McClung's report was read. He has prepared 48 certificates for the Society during this fiscal year.

Field Trip Chairman, Charlene Holzwarth named her committee, thanked each and all for the help and participation and read a list of activities and leaders.

GSOC Seminars Chairman, Don Barr reported that during this past year the second year of review of the Past Presidents' Campouts was completed. A list was given.

Historian, Phyllis Bonebrake reported on the revisions and additions to the albums. The President's Books, current albums and Memorial Books will be on display at the Annual Banquet. Omissions were noted and pictures to complete these omissions were requested. Older albums are kept in the library for viewing.

Hospitality Chair., Maxine Harrington announced that during the year there had been a total of 38 guest in attendance at the evening meetings along with members.

Hospitality - Luncheon, Margaret Fink not present; no report.

Program, Luncheon Chair, Helen Nelson summarized topics of luncheon speakers as being a mixture of geology, almost geology, and travel logs. There were 23 programs in all.

Librarian, Esther Kennedy gave the title and a summary of the books that were given to or otherwise secured during the year for the library.

Editor, Sandra Anderson not present; no report.

Business Manager, Carole Cole reported for Cecelia Crater and herself as this position is currently held jointly with a division of the work, which was explained. She thanked and gave recognition to those other members who have assisted in the preparation for mailing of the Newsletter.

Property, Don Botteran not present; no report. Evening, Walter Sunderland reported that he was unable to attend all of the evening meetings but was glad to announce that we now have a new audio-visual cart which is kept in the library. Rosemary pointed out that he had donated the cart and it has our name on it!

Publications, Geneva Reddekopp submitted her written report indicating that \$123.75 worth of publications had been sold this year. The prices were revised to reflect the new postage rates. The new rates were published in the November 1989 Newsletter.

Publicity Chairman, Roberta Walter gave a summary of the work she had done to distribute the Newsletter each month, where they were taken and where posted.

Coffee Hour Committee Chairmen, Dave and Marvel Gillespie served a total of 17 meetings, gave \$30.00 to the General Fund and had a balance of \$24.24 on hand 3-1-90.

Seminar Refreshment Committee Chairman, Catherine Evenson reported a balance of \$44.45 on hand 2-3-90 and indicated that 8 members had furnished refreshments.

Telephone Committee Chair., Jean Boe not present; no report.

Volunteer Speakers Bureau Chairman, Virgil Scott gave a report that will be submitted to the Editor of the Newsletter for publication as has been the custom. That report will give names, titles of the presentations and topics. During the last year 54 lectures were given to outside groups. There were 24 field trips organized and 5 exhibits held during the past year.

Annual Banquet Chairman, Esther Kennedy had Virgil Scott, Co-Chairman For Reservations, report on ticket sales. Members were urged to purchase tickets as soon as possible.

Minutes were read as held by the Secretary. The minutes were approved.

President Kenney called for any old business. Reported new business:

Board of directors has recommended the fiscal year be changed from March 1st to February 28 to read January 1 to December 31. This is for accounting and tax purposes. Nothing except the dues payment time would be changed. Andy Corcoran moved this change be made. Seconded and passed unanimously.

Ruth Keen asked for opinions on

the campout as to time of the campout and the length of time involved. Consensus seemed to indicate 10 or 12 day maximum with concern for hunting season expressed. She gave an outline of the places she hoped to visit.

The Counting Committee reported the following officers were elected:

President:	Dr. Ruth Keen	Treasurer:	Archie Strong
Vice President:	Dr. Catherine Evenson	Director (3 yrs.):	Don Barr
Secretary:	Cecelia Crater		

President Kenney requested a short Joint Board Meeting to be held in this room immediately following the program.

Meeting was adjourned and Frances Rusche presented a most interesting slide program on Turkey. After the program all were invited to the coffee hour in the Geology Department Center.

Respectfully Submitted,
/s/ Alta Fosback, Secretary

VOLUNTEER SPEAKERS BUREAU

Fiscal Year March 1, 1989 to March 1, 1990

One of the principal functions of our Society is to build knowledge and appreciation of the natural sciences, especially geology. In addition to our scheduled meetings, some of our members reach beyond our doors by giving lectures, assisting with field trips, or making geological displays for other organizations.

The Speakers Bureau assists this valuable activity by helping get audiences and speakers together, and reporting the activity to our Society. This fiscal year our members reported 55 lectures, leadership or assistance to 23 field trips, and setting up 5 displays. Details of this activity follow.

Melvin Ashwill

"Plants Through the Ages" - "Geology and Fossils of Central Oregon" -
3 lectures - Central Oregon Community College
"Lecture and Display of Fossils" - OMSI Summer Camp Paleontological Group -
Camp Hancock

Don Barr

"Roadside Geology of Oregon" - National Federation of Minerals Societies
"Geology of Lake Oswego and West Linn" - Tryon Creek State Park
"Geologic Features of Western Oregon", "Roadside Geology of Western Oregon",
"Plate Tectonics", "Roadside Geology of Eastern Oregon", "Bretz Floods",
and "Cascade Volcanoes" - Adult Community Center, Lake Oswego
Field trips: "Lake Oswego and West Linn Geology" and "Columbia River
Gorge" - Adult Community Center, Lake Oswego

Dorothy and Don Barr

Field trips: "Fossils of the Oregon Country" - Dorothy and Don Barr's Collection, Adult Community Center, Lake Oswego. Hancock Field Station Yearly Field Trip.

Lewis Birdsall

"Thunder Eggs" - American Federation of Mineralogical Societies at Expo Center

Mura Birdsall

"Australian Rock Hunting" - United Church of Christ
"Australian Tour" - Tualitan Valley Gem Club

Benton Dailey

"Morocco" - East Multnomah Retired Teachers, Travel Club, Star Travelers Group, Film Pack Camera Club
"China in Winter" - Congenial Garden Club - Sellwood

Frank Dennis

"Alaska" - Philanthropic Education Organization Ladies Group

Alta Fosback

Alta organized and led field trips for the Oregon Retired Educators Association. GSOC members, Alta, Dr. Ruth Keen, Guy Leabo, and perhaps others enriched these trips by explaining geological and historic features along the way.

"Reno Trip" - Rare deposit of "mares eggs" in Spring Creek - Tule Lake area - Willamette Pass Hot Springs

"Mt. Hood Trip" - Train ride through Hood River Valley - Flood damage and deposits - Historic Coopers Spur Inn

"Trout Lake Area" - Mt. Adams - Lava Beds - Natural Bridges

"Eastern Oregon" - Wallowa Mts. - Sumpter mining area - Dredging damage - Bend volcanic area

"Frazer River Train Trip" - Frazer River Gorge - 100 Mile House - Old mill site

Dr. Paul E. Hammond

"Guide to Geology of the Cascade Range" - Paper presented to the American Geophysical Union. Our library has a 285-page bound copy.

Charlene Holzwarth

"Rocks and Crystals" - Montessori Pre-School

"Sierra Leone" - Presbyterian Church, Oregon City

Dr. Ruth Keen

"Central Oregon Wonder Land" - Tualitan Valley Gem Club
"Winter Twigs" and "Conifers" - Lectures to John Inskeep Environmental Learning Center

Dr. Keen played violin with the Vancouver Pops Orchestra at 30 schools and in the rotunda of the Washington State Capitol. She also played with the Gresham Senior Orchestra at several rest homes.

Esther Kennedy, President, Oregon Agate and Mineral Society

"Set up Display" - World Forestry Center
"Set up Display" - Native Shrubs in Landscaping - Rock Creek Community College
Field Trips: Led trips to various locations for Native Plant Society
"Wintering In" - Lecture for Oregon Historical Society, at Howell House, Sauvie Island
"Plant Moving Project" - Helped move 130 native plants, Hood River Quarry to Columbia River Highway.

Dr. William Laval

"Geology of Australia and New Zealand" - Lewis and Clark State College
"Matters Geological" - Lewiston, Idaho YWCA
"Show and Tell Excursion Up Snake River" - Lewiston 6th grade teachers
Field Trips: "Lewis and Clark State College" - Geology Club, Dr. Laval Adviser, Pittsburg Landing in Hells Canyon, Sawtooth Mountains, Clarkia Lake & Carpenter Creek garnet beds.

Ralph Mason

"Geology Under Foot" - Portland Audubon Society
"Northwest Volcanos" - Hood River School District
"Mt. Hood" - Hood River School District
"Mt. Hood" - 3 lectures at dedication of Timberline Lodge
"Field Trip in Columbia Gorge" - Hood River School District

Wallace McClung

"African Animals" - First Presbyterian Church
"Galapagos Wild Life" - First Presbyterian Church and Terwilliger Plaza
"Beyond Bangkok" - Terwilliger Plaza

Don Parks

"England, Scotland, and Wales Trip" - Lecture presented to AIA, American Institute of Architects.
Don attended a special service in Christ Church, Kilndown, Kent. The service commemorated restoration of ten artistic wood panels, now designated as national treasures. Don's grandfather was chief craftsman of the group which produced the panels in 1875.

Badge Bury Panels

Frances Rusche

Frances has been very active in sharing her extensive travel experience and pictures with interested groups. She has presented 15 lectures on such subjects as: The Amazon, Patagonia, Antarctica, Oregon, Ginkgo State Park, Glaciers, and Turkey.

Lectures were given at American Association of University Women, Unity Masonic Lodge, Clark College, Milwaukie Presbyterian Church, American Federation of Mineralogical Societies, King City, Mt. Tabor Presbyterian Church, Clackamas Community College Senior Group, Portland Photographic Society, East Multnomah County Retired Teachers, and Oregon Agate and Mineral Society.

Clair Stahl

15 Slide Programs - Port Orford Senior Center
Class on Map Reading - Kalmiopsis Audubon Society

/s/ Virgil Scott, Chairman, Speakers Bureau

PRESIDENT'S CAMPOUT or Geological Tour

September 7-16, we will go by bus to Southwestern Oregon, Northern California, and possibly spillover into Nevada and Idaho. There is much of interest in geology, archeology, history, and natural history in this area. Plans are under way, but I need some reconnaissance trips to look things over. I expect to go soon for the first one. Some of the places of interest that I know about now are: Lava Beds National Monument, Gearhart Mountain Wilderness, Fort Rock, Winter Ridge, Summer Lake, Hole-in-the-ground, Pleistocene Lake beds and shore lines, Caves, Rock art Hart Mountain Wildlife Refuge, Abert Rim, Leslie Gulch, Succor Creek, Steens Mountain, Malheur Wildlife Refuge, to name some of the most spectacular ones. Meantime perhaps you would like to start reading up on the region. I recommend: *Geology of Oregon* by Ewart M. BALDWIN 3rd edition section on BASIN AND RANGE AND OWYHEE UPLAND AREAS, and *Oregon'S GREAT BASIN COUNTRY* by Denzel & Nancy Ferguson (Maverick Publications, Drawer 5007, Bend, Oregon 97701).

Ruth Keen.

MAY 90

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Dr. Frank Boersma
120 W. 53rd Street
Vancouver, WA 98660

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Milwaukie, OR 97222			
Secretary			
Cecelia Crater	235-5158		
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Treasurer			
Archie Strong	244-1488		
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(Luncheon) Margaret Fink	289-0188	(Geology Seminars)	
(Evening) Gale Rankin and		Freda and Virgil Scott	771-3646
Manuel Boyes	223-6784	Telephone	
Library: Esther Kennedy	287-3091	Jean L. Boe	299-1101
Frances Rusche	654-5975	Volunteer Speakers Bureau	
Lois Sato	654-7671	Robert Richmond	282-3817
Past Presidents Panel		Annual Banquet	
Rosemary Kenney	221-0757	Esther Kennedy	287-3091
Programs		Gale Rankin	223-6784
(Luncheon) Helen E. Nelson	661-1731		
(Evening) Dr. Catherine Evenson	654-2636		

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VISITORS WELCOME
INFORMATION PHONE 284-4320

VOLUME 56, NO. 5

CALENDAR OF ACTIVITIES FOR MAY, 1990

FRIDAY NIGHT LECTURE (Cramer Hall, PSU, Room 371, 8:00 P.M.)

- May 11 "Water and Land Resources of Yugoslavia," Illustrated, by Douglas Speers, hydraulic engineer and management supervisor, Columbia River Reservoir Systems.
- May 25 "Decade of Dome Growth at Mt. St. Helens," Illustrated, by Dr. Don Swanson, Geologist, U. S. G. S., Vancouver, Wa. 10th Anniversary of the Eruption.

FRIDAY LUNCHEON (Standard Plaza, 1100 S.W. 6th Avenue, Rooms A & B, Third Floor Cafeteria. Programs at 12:00 Noon)

- May 4 "Australia - From Adelaide to Alice Springs," Illustrated, by Rosemary Kenney, Past President, GSOC.
- May 18 "Covered Bridges," Illustrated, by Otto Eckleman.

GEOLOGY SEMINAR (Cramer Hall, PSU, Room S-17, 8:00 P.M.)

- May 16 Basin and Range Geology of Southeastern Oregon, Part II, illustrated, by Dr. John Allen, Past President, GSOC.

GSOC LIBRARY (Cramer Hall, Portland State University, Room S-7) Open 7:30-8:00 P.M. prior to evening meetings.

FIELD TRIPS

May 26-28, 1990, Snake River and Palouse Area. Bus trip lead by Dr. John Whitmer. A detailed itinerary is available. Reservations are still being accepted.

Saturday, July 7, 1990, Crazy Hills, Washington. Bus trip lead by Dr. John Whitmer. Cost \$27.00 (includes box lunch). Leave from N.E. 15th and Halsey at 8:00 A.M. Reservation deadline June 15. Checks payable to GSOC and mailed to Alta Fosback.

Tuesday, August 7, 1990, car trip to the Centralia, Washington, coal reclamation project.

September 7-16, 1990, President's Campout lead by Dr. Ruth Keen to Southeastern Oregon. Call her at 222-1430 for more information. Also, see April Newsletter and this issue page 28 for details.

Society of Miscellaneous Oregon Geophysicists (SMOG) will meet in Albany on Thursday, May 24, 1990, for dinner and a program (to be announced). GSOC can rent a van for the trip to Albany for \$15 to \$20 per person. The buffet dinner cost is \$12.50 (including gratuity). If you are interested, contact Dr. Ruth Keen (222-1430) for reservations.

NEW MEMBER

Booth E. Joslin 636-2384
 2195 S. Hillcrest Drive
 West Linn, OR 97068

Samuel C. Sargent died February 28, 1990, at the age of 67. Mr. Sargent was a GSOC member 1954-56, 1976-83 and again joined in 1989.

Mr. Sargent was born April 1, 1922, in Scott Country, VA. He earned degrees from the University of Tennessee, Stanford and the University of Oregon. He served in World War II and then taught at the University of Washington, University of Oregon, and Portland State College Extension Division.

From 1952 to 1956, he was the resident and Chief Geologist on The Dalles Dam, and in 1958 returned to work on the John Day Dam. In 1956, he went to Venezuela to advise its government about a series of dams on the Orinoco River. About 1962, he went to Mangla, Pakistan, as senior geologist on the Mangla Dam complex. Later, he worked as an engineering geology consultant to the U.S. Power Commission until his retirement in 1973, after which he worked as a private consultant.

Mr. Sargent was a member of many engineering and geological societies. He was a fellow in the Geological Society of America.

He is survived by a son, a daughter, four half-brothers and three grandchildren.

THEODORE JOHNSTON

Theodore Johnston died September 8, 1989, in a care center in The Dalles at the age of 99.

Theodore and his wife, Florence, were members of GSOC continuously from 1958 to 1987. They joined us on many field trips and campouts. They often attended our banquets, sometimes returning early from their winter Hawaiian vacation just to be here for the event.

Theodore and Florence operated a farm at Moro, Oregon, which is still managed by Florence. She now resides at Camlu Apartments in The Dalles.

Other survivors include nieces and nephews.

Dorothy R. Waiste

Dorothy R. Waiste

PRESIDENT'S CAMPOUT

or

Geological Tour

Tour prices per person: \$556 sharing twin, \$682 single, add \$40 per person if you want a sack lunch provided every day except Friday, September 7. you will bring your own lunch. Tour prices include private motor coach, nine nights hotel, two dinners, one lunch, one admission, handling of two suite cases per person, taxes and gratuities on all services listed.

Note: baggage handling is not available at Jordan Valley or Prineville.

Deposit: a deposit of \$100 per person is required to confirm reservation. Make check payable to GSOC. Send to Ruth Keen.

For more information refer to April Newsletter and more details later.

HIGHLIGHTS OF THE 1990 GSOC BANQUET

The annual banquet of the Geological Society of the Oregon Country was held Friday, March 9, 1990, in the Grand Ballroom of Smith Memorial Center, Portland State University. Members and guests gathered together to install the slate of officers for the coming year and to celebrate the completion of the 55th year.

Hosts and hostesses Emily Delano, John and Phyllis Bonebrake, and Don and Betty Turner greeted diners upon arrival. Before and after the dinner, time was allowed to view the exhibits and visit the sale tables. Clair Stahl, GSOC Photographer, wandered around taking pictures.

Archie Strong and Harold Moore, assisted by Patricia Moore and Roberta Walter, had much to sell at the sales tables: fossils, shells, mineral specimens, geodes, etc. Charlene Holzwarth sold GSOC publications. Historian Phyllis Bonebrake displayed the Past Presidents' Book and Scrapbooks. She also had an interesting collection of place favors used during all previous banquets. Frances Rusche had a display of copper. Rosemary Kenney showed her collection of sponges from the Southern Ocean. Ruth Keen displayed various kinds of fossil wood. Margaret Steere's display was of marine and terrestrial fossils, and Don and Dorothy Barr had a display of fossil insects and leaves.

After the invocation by Dr. Franklin Evenson, Don Barr, Master of Ceremonies, introduced the charter members: Mildred Phillips, Louis Oberson and Kenneth Phillips.

After out-going President Rosemary Kenney's farewell address, the new officers for 1990 were installed:

President	Dr. Ruth Keen
Vice-President	Dr. Catherine Evenson
Secretary	Cecelia Crater
Treasurer	Archie Strong
Executive Board	
Member, 3 Years	Donald Barr

During Dr. Ruth Keen's inaugural address, she outlined her plans for the annual President's Campout in September to southcentral and southeastern Oregon. She was then presented with the memorabilia of the Society: Dr. Thomas Condon's book, Two

Islands, which was the first book written about Oregon geology, the president's gavel, and the engraved pick with the names of all the GSOC presidents since 1964.

Dr. Ula Moody, Assistant Professor, Physical Science Department, Western Oregon State College, Monmouth, Oregon, presented the illustrated program, "Catastrophic Flooding in Central Washington and Its Influences on the Willamette Valley." The method of age-dating the volcanic ash layers between flooding was interesting. The slides showed excellent photography.

After the program, there was a sing-a-long led by Karl Bach, accompanied on the piano by Elizabeth Handler.

It was an enjoyable evening, thanks to the efforts and work of Esther Kennedy and Gale Rankin, banquet chairpersons, and their helpers.

Rosemary Kennedy
Immediate Past President

EXHIBITS AT THE GSOC BANQUET

A display of Oligocene insects and leaves from the Upper Ruby River Basin in Montana was placed by Dorothy and Don Barr. The leaf specimens, quite comparable to those of the fossil leaves of the John Day formation of Oregon, are also found in a lake bed environment. The locale is famous for its paper shales.

Dr. Ruth Keen exhibited petrified wood. A large polished slab of *Woodworthia arizonicum* was outstanding. There were also two spheres of petrified wood; two logs, one with knots and the other with woodpecker holes; a pink limb cast with dendrites from near Prineville; and two cubes of petrified wood, one was black oak and the other was pine.

Frances Rusche exhibited copper featuring samples of native copper in the form of amygdaloidal (full of holes), arborescent (tree-like) crystal groups, single crystals on a black mineral (?) background, and polished copper used in useful or decorative objects. Other samples included mineral ores of copper in both rough and polished form. These included azurite (blue), malachite

(green), chrysocolla (bluish green) and a sample of copper with realgar (arsenic). The samples came from upper Michigan and the Arizona mines at Ajo, Christmas, and Independence.

Rosemary Kenney's collection of sponges were obtained while beachcombing on the shores of the Southern Ocean in South Australia. Sponges have a worldwide distribution, being found in arctic and tropical waters, in shallow and in deep waters, in fresh lakes and rivers and in salty oceans. However, most sponges are marine and most are abundant in the tropics. Sponges are animals with skeletons made up of hundreds of thousands of tiny spicules of either calcium carbonate or silica. They have no nervous tissue so they appear lifeless. The earliest known fossil sponges date from Precambrian.

Margaret Steere displayed a variety of Oregon fossils. They were shown on brightly colored backgrounds: blue for the marine animals and green for the plants. All of the fossils were identified and their ages shown.

Rosemary Kenney
Immediate Past President

FARWELL ADDRESS

Members of the Geological Society, honored guests and friends:

At the close of the 55th year of the Society, I wish to thank all the people who have helped to make this a successful year; not only you officers and committee chairmen but, also, all of you who were there when I needed you and so graciously and generously gave your time. Margaret Steere, our vice president, arranged some excellent evening programs and was there as my "right hand person." Alta Fosback, our secretary, answered my many questions concerning the Campout which she and John Whitmer had scouted, and she kept us on track at our board meetings. Marvel Gillespie made sure that we always had goodies to eat after the evening lectures,

even when she had to make them herself because no one signed to bring them. We have had three Business Managers this year. I was beginning to think we were jinxed. When Carol Cole accepted the position without hesitation, I was overjoyed. Esther Kennedy and Gale Rankin have spent hours and days planning and preparing for the banquet tonight. I won't take time to name everyone but, again, I do thank you for your cooperation.

The year has passed quickly. It has been educating and challenging, and I have enjoyed it.

The annual President's Campout was a fun time. Thirty-four of us went to Vancouver Island, saw lots of rocks and minerals, rode ferries, and walked into a sulfide mine. We saw where Captain Cook landed on the Island in 1778; admired tall old trees; and rode a train, complete with a whistle and belching smoke. We even became bird watchers for a while. On top of a piling near a ferry slip, we saw a Western Gull nest with three downy babies, which I hear is rare because they usually nest on isolated islands, far from people. Later, during a lunch stop, we watched bald eagles and saw a nest with two immature eagles. We learned what a drumlin is, saw much evidence of glaciation, and admired spectacular scenery. When we returned to Portland, I am sure that the bus was at least 2,000 lbs. heavier than when we left, due to the rocky souvenirs that we collected. The slabs of chrysanthemum rocks in the banquet table decorations are part of this weight. Dr. John Whitmer, our geology guide, assured me that one week of the year there would be sunshine, for sure! It never fails. Records proved that it never rained during that one week of July. Guess what? But, at least, it wasn't too hot and no one got sunburned.

The Paul William Howell Scholarship fund has multiplied, thanks to memorial contributions. This year's award was granted to a GSOC member, Clay Kelleher.

There have been numerous other things that we have accomplished this year, but I will leave it at this. It has been a good year, thanks to everyone.

Rosemary Kenney
Immediate Past President

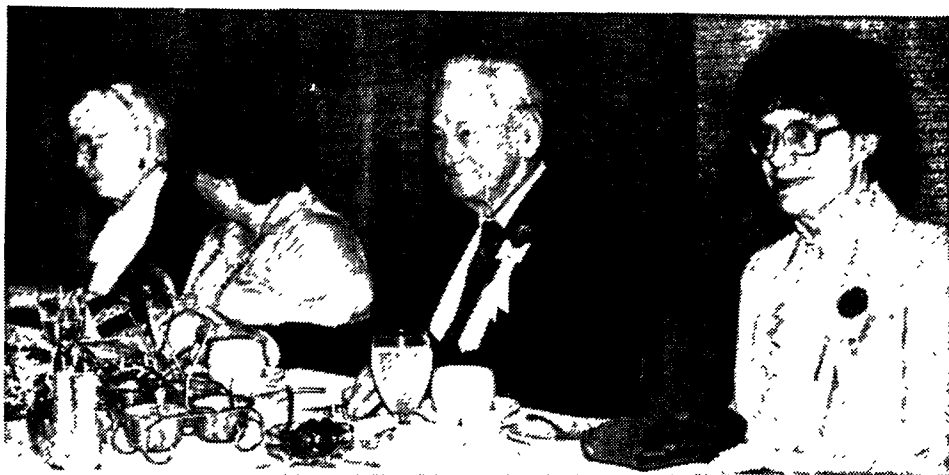
The following banquet photographs are by Clair Stahl



Seated at the head table: Rosemary Kenney, Outgoing President; Dr Ruth Keen, Incoming President; Dr. Franklin Evenson; Dr. Catherine Evenson, Incoming Vice President; Charlene Holzwarth, Board Member; and Peter Baer, Board Member.



Outgoing President, Rosemary Kenney, presenting the engraved pick to Incoming President, Dr. Ruth Keen.



Seated at the head table: Joline Robustelli, Past President; Archie Strong, Incoming Treasurer; Dr. Ula Moody, Guest Speaker; Dorothy Barr, wife of Don Barr, Master of Ceremonies.



Banquet Co-Chairman, Gale Rankin, was pleased with results of the banquet!



Executive Board, 1990: Don Barr, Board Member; Rosemary Kenney, Immediate Past President; Charlene Holzwarth, Board Member; Archie Strong, Treasurer; Dr. Catherine Evenson, Vice President; Dr. Ruth Keen, President; and Peter Baer, Board Member.



Past Presidents. Back row, L to R: Ralph Mason, Don Barr, Louis Oberson, McNeal Fahrion, Andy Corcoran, Irving Ewen. Middle row: Kenneth Phillips, Bob Waiste, Rosemary Kenney, Dr. Ruth Keen, Joline Robustelli, Opal Helfrich. Front row: Clair Stahl, John Bonebrake, Don Turner.



Outgoing President, Rosemary Kenney, presenting pick to banquet speaker, Dr. Ula Moody, Western Oregon State College, who spoke on "Catastrophic Flooding in Central Washington and Its Influence on the Willamette Valley."



Historian's Table with collection of place favors used during all previous banquets.



Charter members of GSOC: Louis Oberson; Mildred Phillips, and Kenneth Phillips



Outgoing President, Rosemary Kenney, receiving engraved pick from Don Barr, Master of Ceremonies.

THE GEOLOGICAL NEWSLETTER

The Geological Society of the Oregon Country

P.O. Box 907 • Portland, OR 97207

VISITORS WELCOME
INFORMATION PHONE 284-4320

VOLUME 56, NO. 6

CALENDAR OF ACTIVITIES FOR JUNE, 1990

FRIDAY NIGHT LECTURE (Cramer Hall, PSU, Room 371, 8:00 P.M.)

- June 8 "Collecting Fossils in Oregon - Especially the Mist Area," by Paul Kirkland
- June 22 "Suspect Terrains and Life in the Soviet Far East," illustrated, by George W. Moore, Ph.D., Oregon State University

FRIDAY LUNCHEON (Standard Plaza, 1100 S.W. 6th Avenue, Rooms A & B, Third Floor Cafeteria. Programs at 12:00 Noon)

- June 1 "Geology in City Planning," illustrated, by John A. Anderson, AICP.
- June 15 "Northwest Soils," illustrated, by Dr. Bob Meurisse, Regional Soil Scientist, U.S. Forest Service.

GEOLOGY SEMINAR Cancelled until September.

GSOC LIBRARY (Cramer Hall, Portland State University, Room S-7) Open 7:30-8:00 P.M. prior to evening meetings.

FIELD TRIPS Saturday, June 9, 1990, to the home of Richard and Helen Rice to view the mineral and crystal collection. Meet at 12:00 Noon at Safeway in the Cedar Hills Shopping Center for directions. Trip leader: Dr. Ruth Keen. Visitors Welcome.

Saturday, July 7, 1990, Crazy Hills, Washington. Bus trip lead by Dr. John Whitmer. Cost \$27.00 (includes box lunch). Leave from N.E. 15th and Halsey at 8:00 A.M. Reservation deadline June 15. Checks payable to GSOC and mailed to Alta Fosback.

Tuesday, August 7, 1990, carpool to the Centralia, Washington, coal reclamation project.

September 7-16, 1990, President's Campout lead by Dr. Ruth Keen to Southeastern Oregon. Details will be announced.

MARGARET M. MUCK

Services have been held for Margaret Muck who died April 11, 1990 at the age of 88.

Mrs. Muck was born in Iowa in 1901 and came to Portland in 1920. She was a homemaker and retired legal secretary.

She married Dr. Earl C. Muck on October 24, 1925, who survives, along with two daughters, a son, 17 grandchildren and eight great-grandchildren.

Mrs. Muck was a member of St. John Lutheran Church, Lutheran Women's Missionary League, Concordia College Guild and Good Shepherd Home of the West Auxiliary.

Dr. and Mrs. Muck have been members of the Geological Society since January 1969, having joined at the time the GSOC schools were held.

—Dorothy R. Waiste

PAULA E. STAUFFER

Paula Stauffer died in a Lake Oswego hospital on April 18, 1990 at the age of 88. Memorial services were held on April 22 in the chapel of the Portland Memorial Funeral Home.

Paula was born in Michigan where she attended teacher's college and taught for several years before coming to Portland in 1948.

Mrs. Stauffer was a homemaker and had been a volunteer vocational librarian for the Lake Oswego Senior Center for a number of years.

Survivors include her husband of 61 years, James; a son; a daughter; a brother; a sister; six grandchildren and five great-grandchildren.

Dr. and Mrs. Stauffer joined the Society in March 1949.

—Dorothy R. Waiste

G S O C PRESIDENT'S CAMPOUT

September 7 through 16, 1990

Southeastern Oregon

9/7/90 Portland to Klamath Falls. Highway I- 5 & 99 to Wilbur, secondary road to Glide, North Umpqua Road to Diamond Lake, continue to east side of Crater Lake, on to Fort Klamath, then west side of Upper Klamath Lake to Klamath Falls. **Two nights at the Cimarron Motel.**

9/8/90 Klamath Falls to Lava Beds National Monument and return.

We will travel Highway 97 to the State Line Road then through Tule Lake Wildlife Refuge. Fall migration of water birds will be under way. The refuge borders the Lava Beds National Monument. Features of the Lava Beds include: fault line escarpments marked by cinder cones, spatter cones, and aa lava flows. If we are lucky, we will see big horn desert sheep on top of the cliff. We will visit a few lava tube caves. Captain Jack's Strong hold, and there is more!

9/9/90 Klamath Falls to Lakeview. The main feature of this day will be the Gearhart Mountain Wilderness. Gearhart Mountain, a 8,384' volcanic dome mountain comes into view before we leave the main highway for a loop road that takes us within a half mile of the wilderness boundary and brings us back to the highway near Quartz Mountain. Wilderness areas do not have roads, so we will walk about a mile to see The Pinnacles. The trail may be too difficult for some of us, but the scenery is beautiful. I will check it out before we go. If I can make it most of you can.

We will be at Lakeview two nights at Best Western Skyline Motor Lodge.

9/10/90 Today we will travel to Winter Rim and Summer Lake, studying wet lands, Pleistocene lake shores, and the historic Fremont expedition in this area.

9/11/90 Lakeview to Jordan Valley by way of Adel, Charles Sheldon Antelope Range, Virgin Valley opal area, Denio, Fields, Andrews, Alvord Desert to Highway 78 southeast to Burns junction East to Rome and Jordan Valley. This is a long day, with lots to see. We may have to leave out the road on the east side of Steens Mountain and take the shortcut just north of Denio across to Highway 95 and north to Burns junction.

We will be one night at Jordan Valley at the Sahara Motel. This is a Basque town.

9/12/90 Jordan Valley to Ontario. This is the day we have been waiting for when we will have time to see Leslie Gulch, cruise through Sucker Creek canyon and on to Lake Owyhee Resort, where we will board houseboats on pontoons for a three hour luncheon cruise on the lake.

Tapadera Motor Inn in Ontario will be our home for one night.

9/13/90 Ontario to Burns. The Oregon Department of Geology and Mineral Industries has been making quadrangle geologic maps in the area south of the road between Ontario and Vale. A new gold rush is taking place here and all through the area south of here. White stakes marking mineral claims are every where. We will visit some of the newly mapped geologic areas, hopefully with some one from the Baker office to show us around. The method of mining is new, we will hear about it.

We will be two nights in Burns at the Best Western Ponderosa.

9/14/90 Today we will visit Malheur and Harney Lakes, Diamond Craters, French Glen, Pete French's Round Barn, Steens Mountain and return to Burns.

9/15/90 Today we will go from Burns to Bend, but not the usual way. We will follow Highway 20 to Riley, then Highway 395 to 9 miles south of Wagontire, west on a secondary road through Christmas Valley to Fort Rock and the lava area just east, to Hole in the Ground and Big Hole, to Highways 31 and 97 to Bend.

We will be one night in Bend at the Riverhouse.

9/16/90 Today we go home to Portland, but there is still much to see: Benham Falls on the Deschutes, the Desert Museum, Paulina Lake, East Lake, Paulina Peak, then home by way of the Willamette Pass.

Tour Price per person: \$556.00 sharing twin; \$682 single. Add \$40.00 if you want a sack lunch provided, except the first Friday when you will bring your own.

Tour price includes: Private chartered motorcoach, 9 nights hotel, 2 dinners, 1 lunch, 1 admission, handling of 2 suitcases per person, taxes and gratuities on all services listed. **NOTE:** luggage handling is **NOT** available at the **Sahara Motel**.

Deposits: A deposit of \$100.00 per person is required to confirm reservations. Make check to GSOC and send to **Ruth Keen, 4138 S.W 4th Ave, Portland, Or. 97201. Until June 15, reservations will be accepted only from GSOC members, after that it will be open to others.**

Final Payment is due no later than **July 16, 1990.**

By Dr. Ruth Hopson Keen, President.

COPPER

By Frances Rusche

Copper, said to have been in use longer than any other metal, up to 20,000 years, was discovered on the island of Cyprus. At first called Cyprium (copper of Cyprus) from the Greek Kyprios, it was later anglicized to copper. Its pale red color distinguishes it from other metals. It is both malleable and ductile as it can be beaten into leaves, rolled into thin sheets, and can be drawn into lengths of very fine wire. It can be cut with a knife, and has high specific gravity. It is an excellent conductor of heat and electricity.

The uses of copper are widespread and vital. It is the backbone of the

electrical industry and is present in many alloys such as brass and bronze which are extensively used.

Several years ago, while travelling through the northern peninsula of Michigan, we observed a river of copper-colored water flowing far out into Lake Superior. The water had been used in the process of mining in the vast open-pit copper mines of the Keweenaw Peninsula where copper is found in a deposit four miles wide, 20,000 feet deep, which extends for nearly 100 miles.

This deposit, according to Paul E. Desautels, is "unique in the world because the ore mineral is native copper itself and not one of the various minerals of copper with something else, as usually found."

About five million years ago, according to Desautels, earth disturbances caused lava to well up through great cracks in the crust of the earth in the Lake Superior area. Steam bubbled up through the lava, making it frothy. This molten, bubbly rock cooled and solidified, leaving a thick porous layer. The steam holes in the rock are called amygdules. These layers were later tilted to a nearly vertical position. Millions of years later, hot copper-bearing solutions, reacting with the iron-oxide minerals in the basalt, deposited their load of copper in the frothy rock, filling the holes and cracks in the tilted lava beds, called amygdaloidal rock beds. This native copper from Michigan is almost chemically pure.

Although native copper in small amounts is found in many parts of the world and the United States, the copper deposits of Arizona, especially those of Ajo, became valuable for their large deposits of native copper. This copper was deposited when copper-bearing solutions leached or dissolved in the sandstones and conglomerates, and reacted with other minerals, notably iron. These minerals were re-deposited in more concentrated form deep in the earth. Later, erosion exposed the enriched ores.

Copper is usually found in combination with other minerals, and there are 150 minerals which contain copper as an essential element. Thirty are ore minerals.

Scrap iron is used with water to precipitate copper from crushed rock containing copper ore.

Copper is formed by crystallization from molten material. Good copper crystals are not common as the metal appears in nodules, sheets, or great masses. When it does crystallize, it is in arborescent form (tree-like groups).

Among the ore minerals is chrysocolla, a hydrated copper ($\text{CuSiO}_3 \cdot 2\text{H}_2\text{O}$), of bluish-green color, which is found in the upper reaches of open pit copper mines such as the Inspiration mine in Miami, Arizona.

Another ore mineral is malachite, a copper carbonate ($\text{Cu}_2(\text{OH})_2\text{CO}_3$), which has concentric banding of different shades of green. It occurs in weathered parts of mines. The fine greenish coating of weathered copper is malachite.

A third ore mineral is azurite, another carbonage of copper, ($\text{Cu}_3(\text{OH})_2(\text{CO}_3)_2$), in light to dark blue. It alters to malachite and the two are often found together.

All of the above ores are used for ornamental objects and cabinet specimens.

Copper in its many forms and with its limitless number of uses, both decorative and useful, is truly one of the "Treasures from the Earth."

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REVISITING CRATER LAKE

by
John Eliot Allen

Without doubt, Crater Lake is the most spectacular scenic and geologic experience offered by Oregon, even exceeding the magnificent Columbia River Gorge. An extraordinarily blue lake, the deepest in North America, covers 20 sq mi of a caldera in the throat of an quiescent volcano.

Lying at an elevation of more than 6100 ft, Crater Lake is up to 1932 ft deep, and is surrounded by steep walls 500 to 2,000 ft high. Within the lake is Wizard Island, a basaltic cinder cone which rises to 6940 ft (764 ft above the water); another 1200-ft high cone is completely submerged.

Discovered in 1853 by gold prospectors, Crater Lake was soon recognized as an unrivalled volcanic phenomenon and made a National Park in 1902. The Mazama mountaineering club in 1895 named the volcano whose destruction produced the caldera "Mount Mazama" after the Spanish name for mountain goat.

A visitor's center/gift shop/cafeteria and Sinnott Memorial overlook and museum allows purchase of lunch, literature, maps and postcards; and briefs the visitor on the story of the volcano. From here, a 33-mi Rim Drive encircles the caldera, permitting numerous photo-opportunities.

Ice Age Mt Mazama was a cluster of at least 5 volcanoes, which grew like several other High Cascade volcanoes to a height of perhaps 12 thousand feet during the last half million years. It was predominantly composed of andesitic lava flows, interbedded with pyroclastic rocks and mudflows. Glaciers cut deep U-shaped valleys in Mazamas' flanks, one of these was later filled with a massive flow of dacite lava (Llao Rock).

Just prior to the climactic catastrophe about 7,000 yrs ago, radial dikes were intruded and a series of viscous domes were extruded from ring-fractures part way down the the slopes of the mountain. The caldera now occupied by Crater Lake was then created about 4900 BC by a series of tremendous explosive events which culminated in the blowing out of 12 cubic mi of ash and pumice, followed by the collapse of the upper part of Mt Mazama into the empty cavity from which came the magma that produced the series of explosions.

The ash and pumice flowed down valleys for 30 mi, and filled them to depths of hundreds of feet. Ash fall covered an area of 2,000 sq mi with more than 6 in, and has been found over 500,000 square miles. The eruption was 100 times more powerful than the 1980 eruption of Mt St Helens, and 10 times greater than that of Krakatoa in 1883.

ANNOTATED REFERENCES:

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Johnson, Daniel M., et. al., 1985, Atlas of Oregon Lakes: Ore. State Univ. Press, Corvallis, OR., p.56-57. More than one needs to know about the lake itself: bathymetry, morphometry, chemistry, water quality, temperature, oxygen.

Williams, Howell, 1942, The geology of Crater Lake National Park, Oregon: Carnegie Inst. Washington Publ., 540, 162 p. The first modern and still the most readable story of the origin of Crater Lake, by the dean of american volcanologists.

VICE-PRESIDENT RESIGNED

Dr. Catherine Evenson resigned as Vice-President due to health reasons. She has been replaced by Dr. Walter A. Sunderland.

THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

AIMS AND OBJECTIVES

- (1) To provide facilities and leadership for members of the Society to study geology, particularly the geology of the Oregon Country.
- (2) To establish and maintain a library of geological publications.
- (3) To support and promote geologic study and research, and to designate, preserve and interpret the important geologic features of the Oregon Country.

MEMBERSHIP QUALIFICATIONS

Members shall be persons who are interested in and support the aims and objectives of the Society.

DUES

The annual dues shall be paid on or before March first of each year. Annual dues are:

- Individual Membership: A person of age 18 or older, shall receive a Newsletter subscription and have one vote \$10.00
- Family Membership: Adult family members shall receive one Newsletter subscription and have two votes \$15.00
- Junior Membership: A person under age 18, not included in a family membership, shall receive a Newsletter subscription, but may not vote or hold elective office. \$ 6.00

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THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Date _____

Name _____ Spouse _____

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Address: Residence _____ Phone _____

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Occupation: _____

Geological Interests & Hobbies: _____

Remittance of \$ _____ for dues is attached:

Signature of Applicant

Make check payable and mail to:
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Attention: Secretary

THE GEOLOGICAL NEWSLETTER

JUL 90
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1990-1991 ADMINISTRATION

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(Evening) Gale Rankin and		Freda and Virgil Scott	771-3646
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Programs		Gale Rankin	223-6784
(Luncheon) Helen E. Nelson	661-1731		
(Evening) Dr. Catherine Evenson	654-2636		

ACTIVITIES

ANNUAL EVENTS: President's Campout-summer. Picnic-August. Banquet-March.
FIELD TRIPS: Usually one per month, via private car, caravan or chartered bus.
GEOLOGY SEMINARS: Third Wednesday, except June, July, August, 8:00 p.m. Room S17 in Cramer Hall, PSU. LIBRARY: Room S7, open 7:30 p.m. prior to evening meetings
PROGRAMS: Evenings: Second and fourth Fridays each month, 8:00 p.m. Room 371, Cramer Hall, Portland State University, SW Broadway at Mill Street, Portland, Oregon.
Luncheons: First and third Fridays each month, except on holidays, at noon, Standard Plaza Cafeteria, third floor, Room A, 1100 SW Sixth Avenue, Portland, Oregon.
MEMBERSHIP: Per year from January 1: Individual, \$10.00; Family, \$15.00, Junior (under 18), \$6.00. Write or call Secretary for membership applications.
PUBLICATIONS: THE GEOLOGICAL NEWSLETTER (ISSN 0270-5451) published monthly and mailed to each member. Subscriptions available to libraries and organizations at \$7.00 a year (add \$3.00 postage for foreign subscribers). Individual subscriptions at \$10.00 a year. Single copies 60¢. Order from Geological Society of the Oregon Country, PO Box 907, Portland, OR 97207.
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VOLUME 56, NO. 7

CALENDAR OF ACTIVITIES FOR JULY, 1990

FRIDAY NIGHT LECTURE (Cramer Hall, PSU, Room 371, 8:00 P.M.)

July 13 "Economic Geology of the Owyhee Region," illustrated, by Michael Cummings, Ph.D., Geology Department, PSU.

July 27 "Geology of the Owyhee Reservoir Area," illustrated, by R.E. (Andy) Corcoran, Past President, GSOC.

FRIDAY LUNCHEON (Standard Plaza, 1100 S.W. 6th Avenue, Rooms A & B, Third Floor Cafeteria. Programs at 12:00 Noon)

July 6 "Volcano Kilauea Eruption," illustrated, by Jeanne Pulliam, retired teacher.

July 20 "Bedgebury Panels," illustrated, by Don Parks, Past President, GSOC, and his wife, Enid. Recent travel through the Great Britain countryside culminated in the Parks attending a ceremony marking the rediscovery and restoration of the 10 handsomely crafted inlaid wood panels, now designated by Britain as a 'National Treasure'.

GEOLOGY SEMINAR Cancelled until September.

GSOC LIBRARY (Cramer Hall, Portland State University, Room S-7)
Open 7:30-8:00 P.M. prior to evening meetings.

FIELD TRIPS Saturday, July 7, 1990, Crazy Hills, Washington. Bus trip lead by Dr. John Whitmer. Cost \$27.00 (includes box lunch). Leave from N.E. 15th and Halsey at 8:00 A.M. Reservations are being accepted. Checks payable to GSOC and mailed to Alta Fosback.

SPECIAL BONUS - Sunday, July 8, 1990. Dr. John Whitmer has agreed to lead a car pool trip through the Columbia River Gorge to Philippi Canyon. Meet at N.E. 15th and Halsey at 7:45 A.M., for an 8:00 A.M. departure. Bring lunch, binoculars and walking shoes. There will be a contribution to the drivers to cover expenses.

Tuesday, August 7, 1990, carpool to the Centralia, Washington, coal reclamation project.

September 7-16, 1990, President's Campout lead by Dr. Ruth Keen to Southeastern Oregon. Please see June, 1990, newsletter for details.

NEW MEMBERS

Mel Anderson 245-6385
 11611 SW Lesser Road
 Portland, OR 97219

Robert R. Lyon 206-273-7279
 50 Forrest Road
 Oakville, WA 98568

Teddy Pendergrass 274-0387
 710 NW Front Ave. #C12
 Portland, OR 97209

Victor Wynhoep 661-4251
 18320 NE Everett
 Portland, OR 97230

GEOLOGY AND PLANNING

List of books displayed by speaker
 John A. Anderson, AICP, "Geology
 in City Planning", at the Friday
 Luncheon on June 1, 1990:

Geology of Oregon - E. Baldwin
 Environmental Geology - P. Flawn
 Cities and Geology - R. Legget
 Principles of Hydrology - R. Ward
 Introduction to Physical Hydrology
 - R. Chorley
 Environmental Planning and Geology
 - U.S.G.S. & H.U.D.
 Soil Survey of Multnomah County
 - U.S. S.C.S.
 Soil Survey of Deschutes Area
 - U.S. S.C.S.
 Sand and Gravel Resources: Protec-
 tion, Regulation and Reclamation
 - APA/PAS, Joel Werth
 Soil Surveys and Land Use Planning
 - Edited by L. Bartelli
 Geomorphology in Environmental
 Management - R. Cooke
 Design with Nature - I. McHarg
 Geological Map of the Bend Area
 -ODGAMI
 Oregon's Statewide Planning Goals
 - LCDC
 A Plan for Land and Water Use, Clatsop
 County, Oregon, 1973, Phase I
 Deschutes County Comprehensive Plan,
 Resource Element Grade Easy - R.
 Unterman
 Site Analysis Handbook, - G. Bressler

By Helen E. Nelson

PRESIDENTS CAMPOUT

Enough people have signed up to fill the
 bus for the Campout. Full payment is due
 on or before July 15th. Make check out
 to GSOC and send to Ruth Keen. Refunds
 will be made until that date for necess-
 ary cancellations. After that, refunds
 will only be made if there is a replace-
 ment or the money spent for that person
 can be recovered.

By Dr. Ruth Hopson Keen, President

RAIL EXCURSION "SHASTA DAYLIGHT - 1990" SPONSORED BY
 THE PACIFIC NORTHWEST CHAPTER, NATIONAL RAILWAY HISTORICAL SOCIETY

The Southern Pacific Railroad "Shasta Daylight" passenger train
 operated between San Francisco, California, and Portland, Oregon, from
 1949 through September, 1966. Today, Amtrak covers the route through
 Northern California during the night and the passengers miss seeing
 the Sacramento River canyon north of Dunsmuir, and the Mt. Shasta
 area. To mark the 40th Anniversary of the "Shasta Daylight", the

Pacific Northwest Chapter, National Railway Historical Society chartered a special Amtrak train from Portland, Oregon, to Redding, California, and return.

Saturday, May 12, 1990 - Don and Betty Turner, Dr. Ruth Keen and Joline Robustelli, along with 520 other passengers, boarded Amtrak at Portland Union Station. There was a departure delay due to a computer problem on the lead engine of the 8-coach train. The route south from Portland along Southern Pacific's main line crosses the Clackamas River, passes Willamette Falls at Oregon City, and the upper Willamette River. Soon we entered the Willamette Valley, which is approximately 80 miles long and 30 miles wide. The Coast Range was visible to our right and the western Cascade Range to the left. The valley's rich soil provides widely diversified agriculture, ranging from flower bulbs, flax, berries, vegetables, peppermint, and hops, to fescue, rye and other grass seeds. Passenger stops included Salem, Oregon's capital, Albany, and Eugene.

Geologically, the Willamette Valley dates from the Miocene, before then much of Western Oregon was covered by the ocean. Sandstone, mudstone, and thick gravel deposits rest on top of Eocene seafloor basalt. Oligocene marine fossils of the Eugene Formation are found along the ancient shore line. The basaltic (Yakima) Salem hills are capped with red laterite soil rich in bauxite. South of Salem, the valley again becomes a broad basin. Silt washed into the valley during the repeated Pleistocene drainages of glacial Lake Missoula. Near Albany are the Knox Buttes, capped by basalt estimated to be 20-15 million years old.

The Willamette River is a meandering stream, and one change of its course is near Harrisburg, leaving a draw span over dry land.

Eugene, at the southern end of the Willamette Valley, is an important fruit and vegetable canning center and location of the University of Oregon. Skinner and Spencer Buttes are prominent landmarks, formed by gently east-dipping sills of basalt 35 million years old.

Springfield, Oregon, an important industrial and lumber center, is east of Eugene. The western Cascades are 30-15 million years old. It is difficult to see the outcrops of basalt, andesite and lighter colored rhyolites due to the thick hillside vegetation, Douglas fir and western hemlock forest. Hills and Fall Creeks flow into the Middle Fork of the Willamette River. Across Dexter Lake is a covered bridge. The concrete spillway at Lookout Point Dam was completed in 1954 by the Corp of Engineers, part of the Willamette River Basin Project for flood control, irrigation and power generation. The earth filled dam is 3,370 feet long, 256 feet high, and creates a reservoir 14 miles long and one mile wide. State Highway 58 and twenty-two miles of railroad track were relocated from the east to the west bank of the river during the dam construction.

At Oakridge, a lumber community, we encounter "The Hill", one of the most famous ascents in American railroading. The 44 mile climb toward Willamette summit covers a 3,634 foot elevation up the western slope of the Cascades, a continuous rise of 1.8 feet per hundred with many curves, loops, tunnels, snowsheds, and switchbacks, much of it across a giant landslide. Numerous water falls plunge down the mountain side.

The high Cascades begin five miles east of McCredie Springs. The train moves slowly through this section of the Willamette National Forest, allowing the passengers to view the heavily forested Salt Creek u-shaped glacial valley, the Cascade Range, and Willamette Pass. Dark andesite and Mt. Mazama ash can be seen in clear cut and exposed areas on the higher peaks.

Glacial Odell Lake, formed by a morainal dam, is one of the largest in the Cascades located at Cascade Summit. The train follows the western shore of this deep Pleistocene lake.

The Central Oregon high plateau east of the Cascades has a semi-arid climate. The Winema National Forest (formerly the Klamath Indian Reservation) contains thin, well spaced stands of ponderosa and lodge pole pine. Bitterbush provides additional ground cover. The red, iron oxide soil is nutrient poor, here composed of Mt. Mazama ash and pumice particles. Due to fires, it takes years for a forest to become re-established. Timber management is a challenge to this region. A dry Pleistocene lake bed, presently a meadow with grazing livestock, is located south of Chemult.

Mt. Thielsen "The Needle" (9,178), a snow capped composite volcano, is seen through the clouds. Crater Lake was once Mt. Mazama, which erupted approximately 6,600 years ago spewing ash and pumice over a wide area of western Canada and the United States. A caldera was formed. Today, Mt. Scott (9,128), a parasite volcano, and Llao Rock mark the east and west rims of Crater Lake.

Originating in the marshland of northern Klamath County, the Williamson River drains a portion of this high plateau. The swift flowing river has cut a deep canyon through the basalt, but slows and meanders when nearing Upper Klamath Lake.

Mt. McLoughlin (9,760), a high-Cascade, andesite composite volcano, and Pelican Butte, a shield volcano, are west of Upper Klamath Lake. The lake (8 miles wide, 40 miles long including Agency Lake and approximately 10 to 50 feet deep) is situated in a graben, created when a large block of earth's crust dropped along fault lines. The slickensided fault surface on the escarpment can be seen in a quarry along the 18 mile eastern shore of Upper Klamath Lake between Modoc Point and Algoma. The bald eagle, white pelican and other birds nest on or near the lake. Wocus, a water plant, grows near the shore. The seeds were formerly harvested, dried, and pounded into flour to become a food staple for the Klamath and Modoc Indians.

Klamath Falls is located in the Klamath Lake Basin, the western edge of the basin and range. The upper terrace above the city is underlain by naturally hot ground water. Young, hot volcanic rock at a shallow depth traps water, heats it, and produces steam used to heat homes, the Oregon Institute of Technology, and the nearby hospital.

T O B E C O N T I N U E D

Joline Robustelli
Past President

AUG 90

THE GEOLOGICAL NEWSLETTER

G S O C
GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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OF THE OREGON COUNTRY
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120 W. 33rd Street
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ACTIVITIES

ANNUAL EVENTS: President's Campout-summer. Picnic-August. Banquet-March.

FIELD TRIPS: Usually one per month, via private car, caravan or chartered bus.

GEOLOGY SEMINARS: Third Wednesday, except June, July, August, 8:00 p.m. Room S17 in Cramer Hall, PSU. LIBRARY: Room S7, open 7:30 p.m. prior to evening meetings

PROGRAMS: Evenings: Second and fourth Fridays each month, 8:00 p.m. Room 371, Cramer Hall, Portland State University, SW Broadway at Mill Street, Portland, Oregon.

Luncheons: First and third Fridays each month, except on holidays, at noon, Standard Plaza Cafeteria, third floor, Room A, 1100 SW Sixth Avenue, Portland, Oregon.

MEMBERSHIP: Per year from January 1: Individual, \$10.00; Family, \$15.00, Junior (under 18), \$6.00. Write or call Secretary for membership applications.

PUBLICATIONS: THE GEOLOGICAL NEWSLETTER (ISSN 0270-5451) published monthly and mailed to each member. Subscriptions available to libraries and organizations at \$7.00 a year (add \$3.00 postage for foreign subscribers). Individual subscriptions at \$10.00 a year. Single copies 60¢. Order from Geological Society of the Oregon Country, PO Box 907, Portland, OR 97207.

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THE GEOLOGICAL NEWSLETTER

The Geological Society of the Oregon Country

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VOLUME 56, NO. 8

CALENDAR OF ACTIVITIES FOR AUGUST, 1990

ANNUAL GSOC PICNIC

August 10 Time: 6:30 P.M.
 Location: Alpenrose Dairy Picnic Area
 6149 S.W. Shattuck Road, 1/2 mile south of
 Beaverton-Hillsdale Highway
 Bring: A main dish, a salad, or a dessert--enough
 for 3 or more people beside yourself. Also
 bring your own table service, including a
 serving utensil. Beverages will be
 provided.

FRIDAY NIGHT LECTURE (Cramer Hall, PSU, Room 371, 8:00 P.M.)

August 24 Preview of 1990 President's Campout to Southeastern
 Oregon, illustrated, by Dr. Ruth Keen, President.

FRIDAY LUNCHEON (Standard Plaza, 1100 S.W. 6th Avenue, Rooms A & B, Third Floor Cafeteria. Programs at 12:00 Noon)

August 3 "Arctic Alaska," illustrated, by Mel Anderson.

August 17 Preview of 1990 President's Campout to Southeastern
 Oregon, illustrated, by Dr. Ruth Keen, President.

GEOLOGY SEMINAR Cancelled until September.

GSOC LIBRARY (Cramer Hall, Portland State University, Room S-7) Open 7:30-8:00 P.M. prior to evening meetings.

FIELD TRIPS Tuesday, August 7, 1990, auto trip to the Centralia, Washington, coal reclamation project at WIDCO, Logan Hill formation with 11+ horizons enclosing fossils, PP&L power plant. Optional trip to Fort Borst and the Borst family homestead.

Meet 7:45 A.M., Jantzen Beach Safeway parking lot for
car pooling and maps. There will be a \$.50 per person
reconnaissance fee. Bring your lunch, thermos. Wear
sturdy shoes and a sun hat. Visitors are welcome.
(See inside for additional information on the trip).

September 7-16, 1990, President's Campout lead by Dr.
Ruth Keen to Southeastern Oregon. Please see June,
1990, newsletter for details. Waiting list forming.

FIELD TRIP TO WASHINGTON IRRIGATION & DEVELOPMENT COMPANY
CENTRALIA, WASHINGTON

TUESDAY, AUGUST 7, 1990

Meet at 7:45 A.M., at Jantzen Beach Safeway parking lot off I-5 for car pooling and maps to the open surface coal mining fields at Washington Irrigation and Development Company. Maximum registration is 30 people. For additional information contact Alta Fosback, 641-6323. Visitors are welcome.

Leave Jantzen Beach at 8:00 A.M., travel north on I-5. There will be a stop at Toutle River rest area, mile post 54. (Coffee will be served).

Continue north on I-5 to exit 82, Centralia. Turn east (right) on Harrison Street to Tower Street, turn north (left) onto this one-way street, which jogs left and then north to Route 507 on Pearl Street, follow the yellow line to Downing Street at mile post 4. Cross Skookumchuck River twice. Look for Hanaford Road on the right fork at Schaefer Park entrance. Continue on to Washington Irrigation and Development Company, which is located 1/4 mile past the PP&L power plant. Park near the WIDCO office. Allow time to see the fossil exhibit near the main entrance.

At 10:00 A.M., a WIDCO geologist will meet with the group. Following a short introduction, we will load into company vehicles to tour the coal fields, reclamation areas and Logan Hill formation and fossil area (approximately 2 hours).

Return to Schaefer Park for a 30 minute lunch. The PP&L coal-steam-power plant tour begins at 12:45 P.M. Allow 1 1/2 hours. This tour includes walking up stairs.

Optional trip to Fort Borst, a replica of the 1856 block house, and the Borst family homestead (original 120 year old house), small arboretum, family burial plot, and test garden. A second option is a visit to downtown Centralia with its historical murals, 61 antique dealers and turn of the century buildings.

Allow 2 1/2 hours for the return trip to Portland.

HISTORY OF LEWIS COUNTY

The Washington District was divided by the 1845 legislature. The area west of the Cowlitz River and north of 54 degrees 40 minutes was named Lewis County in honor of the explorer, Meriweather Lewis.

In 1845 George Waunch settled on the prairie north of the present Centralia city limits. In the 1850s, James Cochran, William Holmes and Noah Kritzer located claims on Indian Prairie, which comprise today's Centralia. The real founder of Centralia was George Washington, a Negro, who had been raised by the James Cochran family. In 1852, Washington staked a squatter's claim at the confluence of the Skookumchuck and Chehalis Rivers and for a period operated a river ferry. The first name given to the site was Cochran's Landing. Washington feared he could not legally hold the land, so sold to the

Cochrans. When Cochran died, Washington held a part of their land. In 1872, the railroad from the Columbia River to Puget Sound came through the area. Washington built a town site on his property and called it Centerville. He also donated much of his property for schools and churches and was extremely generous with holdings in developing the new area. In 1885, the name Centerville was changed to Centralia to avoid a mail mix up with another town of that name.

Charlene Holzwarth
Field Trips

* * * * *

RAIL EXCURSION "SHASTA DAYLIGHT - 1990" SPONSORED BY
THE PACIFIC NORTHWEST CHAPTER, NATIONAL RAILWAY HISTORICAL SOCIETY
CONTINUED FROM LAST ISSUE

Link River connects Upper Klamath Lake and Lake Euwana to the south. The Klamath River flows from Lake Euwana through southern Oregon and northern California. The river does not have a natural levee and is often bank full.

To the east is Stukel Mountain, a fault block. The lower Klamath Wildlife Refuge, part of the Pacific flyway, is all that remains of Lower Klamath Lake, since the Reclamation Act of 1904 provided for lake drainage to reclaim the rich farmland. Annual rainfall in the Klamath Basin averages 12 inches. Irrigation canals provided water for grain, hay, livestock, and potato production.

Butte Valley in northern California is famous for potatoes, grain, and livestock. This 17 miles long, 10 miles wide valley once contained a Pleistocene lake. Irrigation allows the valley to be productive.

Upon leaving Butte Valley the topography changes. Stands of ponderosa and lodgepole pine dot the landscape. With the decline of available timber in the late 1950's, the logging communities of Tennant and Bray moved from the area, returning the land to its natural state. Farther south, the red, rocky soil supports knobcone pine and widely spaced juniper. Small andesite peaks called goose nests cover this area. The train slows as we climb through the Cascade Range toward Grass Lake (5,063) the highest point on the Cascade line. Grass Lake fills a depression between volcanoes, the toe of a lava flow protruding into the lake. Wildflowers bloom in the meadow.

To the west are the Klamath Mountains, an ancient complex of (Mesozoic) at least 17 exotic metamorphosed terranes which came from the west and were thrust onto the continent in pre-Tertiary Times.

We are now traveling along the northwestern slope of Mt. Shasta (14,380) and Shastina. This massive composite andesitic volcano dominates the Northern California landscape and, like all High Cascade volcanoes, is less than 700,000 years old. Shasta has steep sides with deep glacial valleys. The winter snow had melted, exposing the 5 perpetual glaciers and the talus slopes. These glaciers lie between the 8,000 and 13,000 foot level and feed the headwaters of the

McCloud, Sacramento, and Shasta Rivers. Shastina, a subsidiary cone to the west, was formed from a single vent during eruption following the last ice age. A large lava flow erupted from Shastina within the last few hundred years. Shastina's summit contains a small crater.

Strawberry Valley to the west contains one of the largest ancient debris landslide which flowed down the north side of Shasta and produced tens of square miles of "hummocky" topography. Mt. Shasta has numerous hot spots and is being closely monitored.

Due to its height, Mt. Shasta effects the climate in this portion of northern California. Wind currents and updrafts create clouds which swirl around the mountain. Sudden thunder storms occur during the summer.

Although Mt. Shasta receives 20-40 feet of snow annually, the portion of the Modoc Plateau to the northeast has a dry, desert like climate. Logging has cleared the original old growth forest. The lower slopes contain dwarf shrubs and chaparral. The soil is porous, allowing the melting snow to percolate downward into underground aquifers to form springs. A spring near Mt. Shasta City becomes the source of the Sacramento River.

The region is a sports paradise with hiking and mountain climbing in the summer and skiing during the winter.

Black Butte (6,250) is a volcanic plug dome. These large volcanic viscous rock masses squeezed slowly from the earth. Angular blocks of reddish-brown andesite talus covers Black Butte so completely the only solid rock is exposed near the summit.

The Sacramento River has cut a 200 foot canyon between Mt. Shasta City and Lake Shasta. The canyon walls are steep with landslides occurring during heavy winter snow and spring rain. The river repeatedly washes away railroad track causing derailments. Broken and rusted freight cars are observed in the canyon.

The Sacramento River canyon was first opened to rail travel in the late 1880s. Traveling north from Dunsmuir, surveyors encountered a box canyon. They constructed a 180 degree curve on the canyon floor where the track crosses the Sacramento River, followed by a 2 percent upward grade to the plateau.

In the early 1900s, Shasta Springs resort was noted for its sparkling mineral water. A rustic spring house was located on the station grounds, with a cable incline car carrying visitors and guests from the station to their cottages. Mossbrae Falls is observed through a curtain of moss and fern.

Dunsmuir is picturesquely situated in a widening of the canyon with homes nestling among trees on the hillside and along the Sacramento River. The round house turn table is the only reminder of Dunsmuir's past when steam engines pulled trains through the steep canyon. Most of the rail trackage south of town has been removed.

At Castella, the gray granite spires of Castle Crags tower 2,000 feet above their base. This Trinity Mountain intrusion is part of the Klamath Mountain complex.

Project City is built on valley fill gravels and limestone deposits.

By late afternoon, it is cloudy and rainy. We arrive in Redding at 7:45 P.M. Buses were waiting to transport us to the Red Lion-Holliday Inn convention complex.

Sunday, May 13, is a clear sunny day. Mt. Lassen can be seen to the east and Mt. Shasta to the north. Buses transport us to the Amtrak station for an 8:30 A.M. departure.

Redding is situated at the northern end of the Sacramento Valley, which is a deep syncline filled with Cretaceous sediments. Directly north of Redding is the southern boundary of the Klamath Mountains. They may be a continuation of the Sierra Nevada Range, offset by 60 miles of earth movement.

Shasta Dam was completed in 1946, a part of the Central Valley Project for flood control, irrigation, and power. The Sacramento, Pit, and McCloud Rivers flow into this mountainous region to form Lake Shasta. The double deck Pit River railroad and I-5 bridge was constructed prior to completion of the dam. The lake is 40 miles long with a shore line of over 300 miles. Railroad tunnels were constructed, but I-5 is on surface level. Due to the water shortage in northern California, the lake is 50 feet below normal with dry or muddy inlets and boat launching ramps on dry land. The old highway, usually covered by back water, is visible. Lake Shasta is the recreational area for northern California. The weathered red soil contrasts to the deep blue lake.

The train enters the Sacramento canyon with red bud and black oak growing along the river.

Between Redding and Castella the valley is cut into old sedimentary rocks deposited on the Pacific Ocean floor about 300 million years ago. This bedrock is mostly black igneous and serpentinite.

There is an announcement of a picture stop along the north side of Mt. Shasta. We detrain for pictures at which time the two engines and 8 coaches back down the grade out of sight. We are treated to the moving train with a backdrop of a partial cloud covered Mt. Shasta.

We reboard and continue our journey, arriving at Portland Union Station at 9:00 P.M.

Joline Robustelli
Past President

EXERCISES IN IMAGINEERING AND WRITING
by

John Eliot Allen

ABSTRACT

In large classes, optional one-page reports replying to "brain-stretching" problems can help develop and evaluate student skills in proposing, analyzing and describing new ideas.

Key words: Education - undergraduate; geology - introductory course; geology teaching.

During the late 60's, I taught a class of 600 students in beginning geology by closed circuit television, which required many efforts to stretch student imagination and at the same time improve writing skills. One of these I called "Brain-stretchers".

Towards the end of each term, any student who wanted to boost his grade by 5 to 10 percent could take on for extra credit one of these thought problems, to be researched and written within a week. Because of the size of the class and the fact that I had to grade them myself, each problem had to be answered on one page, typewritten, single-spaced.

Each term from 50 to 100 students took advantage of this opportunity, and I graded their reports on a "CAONS scale" of 100 points, allowing 20 points for each of five criteria:

- C - Completeness: an adequate account of results or number of alternate hypotheses.
- A - Accuracy: theoretically possible; not against known scientific laws.
- O - Originality and organization: new ideas and methods of presentation.
- N - Neatness: This was before the days of word processing, and many students were still poor at a typewriter.
- S - Spelling, grammar and composition: amazing how few students got full credit on this one!

The emphasis (40%) upon the last two items seemed necessary, since many students had never learned them in high school. This grading method (which I also used on term papers in other classes) at least gave me the feeling that I was making a fair determination of the relative value of the reports.

The following four problems produced the most interesting results; good problems are difficult to devise.

WATER BECOMES NORMAL

Water is a unique liquid, in that it expands upon freezing. Bismuth, and a few compounds are the only other materials that do this. If this peculiar property of water changed tomorrow, so that water contracted the same amount that it now expands upon freezing, what would happen?

Discuss conditions that would result on earth during the next few years, the next few hundred years, the next few thousands of years. How would it affect climate, winds, rivers, the ocean, other geologic processes? Life on earth?

RAINFALL QUINTUPLED

The Northwest is noted for its "excessive" rainfall, which varies from 30 to 150 inches west of and 6 to 20 inches east of the Cascades. If during the next 20 years, the rainfall increased by a factor of five, how would we be affected? What would northwest inhabitants have to cope with? What would the northwest be like a thousand years from now?

EARTH'S AXIS CHANGED

The earth's axis of rotation at present tilts 23 1/2 degrees from a perpendicular to the ecliptic. Now assume that:

1. The earth's axis of rotation lies parallel to the plane of the ecliptic.
2. The moon's orbit is, like today, nearly parallel to the earth's equatorial plane.
3. The rates of rotation and revolution and the distance from the sun remain the same as today.

Discuss earth's characteristics, under this new set of conditions. Oceans? Seasons? Weather and climate? Plate tectonics? Life?

ARRIVAL OF THE NEO-PLEISTOCENE

According to Ewing & Donn, within the next 100 years glaciers may advance and seas retreat to the position attained during the Wisconsin maximum. In North America, that would indicate an ice advance of 1,000 miles from the ice centers, at a rate of 10 miles a year or .83 miles a month.

How would this affect Portland, and what could we do to attempt to cope with it?

Students who were readers of science fiction tended to do the best on these problems, and they were also good at suggesting new problems.

7 June 1990
Department of Geology
Portland State University
Portland, Oregon 97207-0751

Please submit articles
suitable for the

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to the editor.

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ACTIVITIES CHAIRS

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ACTIVITIES

ANNUAL EVENTS: President's Campout-summer. Picnic-August. Banquet-March.

FIELD TRIPS: Usually one per month, via private car, caravan or chartered bus.

GEOLOGY SEMINARS: Third Wednesday, except June, July, August, 8:00 p.m. Room S17 in Cramer Hall, PSU. LIBRARY: Room S7, open 7:30 p.m. prior to evening meetings

PROGRAMS: Evenings: Second and fourth Fridays each month, 8:00 p.m. Room 371, Cramer Hall, Portland State University, SW Broadway at Mill Street, Portland, Oregon.

Luncheons: First and third Fridays each month, except on holidays, at noon, Standard Plaza Cafeteria, third floor, Room A, 1100 SW Sixth Avenue, Portland, Oregon.

MEMBERSHIP: Per year from January 1: Individual, \$10.00; Family, \$15.00, Junior (under 18), \$6.00. Write or call Secretary for membership applications.

PUBLICATIONS: THE GEOLOGICAL NEWSLETTER (ISSN 0270-5451) published monthly and mailed to each member. Subscriptions available to libraries and organizations at \$7.00 a year (add \$3.00 postage for foreign subscribers). Individual subscriptions at \$10.00 a year. Single copies 60¢. Order from Geological Society of the Oregon Country, PO Box 907, Portland, OR 97207.

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THE GEOLOGICAL NEWSLETTER

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VOLUME 56, NO. 9

CALENDAR OF ACTIVITIES FOR SEPTEMBER, 1990

FRIDAY NIGHT LECTURE (Cramer Hall, PSU, Room 371, 8:00 P.M.)

- September 14 Cancelled due to President's Campout
- September 28 "Conservation of Indian Rock Art," illustrated, by Greg Bettis, cultural artist and rock art specialist.

FRIDAY LUNCHEON (Standard Plaza, 1100 S.W. 6th Avenue, Rooms A & B, Third Floor Cafeteria. Programs at 12:00 Noon)

- September 7 Cancelled Due to President's Campout
- September 21 "Moscow Olympic Games, Leningrad, and Minsk, illustrated by Eldon Fix.

GEOLOGY SEMINAR (Cramer Hall, PSU, Room S-17, 8:00 P.M.)

- September 19 Planning meeting conducted by Dr. Ruth Keen.

GSOC LIBRARY (Cramer Hall, Portland State University, Room S-7) Open 7:30-8:00 P.M. prior to evening meetings.

FIELD TRIPS September 7-16, 1990, President's Campout lead by Dr. Ruth Keen to Southeastern Oregon. Please see June, 1990, newsletter for details.

DR. EARL C. MUCK

Dr. Earl C. Muck, a GSOC member since 1969, died at his home May 27, 1990, at the age of 87.

Dr. Muck was born in Wisconsin and moved to Portland in 1921, where he received his dental degree in 1925 from the North Pacific College of Dentistry. Until his retirement in 1979, he practiced dentistry at his one-man office on Union Ave.

In 1925, Dr. Muck married Margaret Georg, who died last April 11.

He was a member of several dental associations, Oregon Historical Society, St. John Luthern Church, and other organizations, and was a charter member of the Portland Symphonic Choir.

Survivors include three daughters, a son, a sister, 17 grandchildren and eight great-grandchildren.

—Dorothy Waiste

NEW MEMBERS

Norman D. Webb 666-2864
1215 SE 34th Circle
Troutdale, OR 97060

Edwin Thomas 652-6748
12705 SE River Rd. #3157
Portland, OR 97222



Alta Fosback, Judy & Dr. John Whitmer, and Jolene Robustelli. Any Ol' Place was Field Trip to Central Washington Channeled Scablands May 26-28, 1990.

FIELD TRIP TO CENTRAL WASHINGTON CHanneled SCABLands

MAY 26-28, 1990

The weekend of May 26-28, 1990, Dr. John Whitmer lead 27 GSOCers on a field trip to the southern channeled scablands of central Washington; through the Palouse hills, the wheat region of eastern Washington and western Idaho; and to the Snake River canyon. Approximately 10,000 years ago between 25 to 40 Lake Missoula floods scoured central Washington, creating coulees, dry waterfall escarpments, deep recessional gorges, and large gravel bars covered with giant current ripples.

Following an 8:00 A.M., departure from Portland, we traveled east through the Columbia River gorge to Biggs Junction, crossed the river into Washington, ascended the high, steep north slope of the Columbia Hills anticline, continued north into the Little Klickitat River valley to Goldendale. Clouds and mist obscured the Cascade Range volcanoes.

The Pleistocene to Recent Simcoe basalt field, dated between 4.7 to 1.0 million years, is located north and west of Goldendale. The bedrock to the northeast contains Columbia River basalt. Satus Pass marks the crest of the Simcoe Mountains, an anticline which plunges east from the Cascade Range and continues eastward to become the Horse Heaven Hills.

At Union Gap, the Yakima River cuts through Rattlesnake Ridge, a rising anticline in the Columbia plateau. The Yakima valley has typical scabland topography, since glacial Lake Missoula flood water surged upstream. The Columbia River Project provides irrigation to this semi-arid region.

The Toppenish basin, a synclinal trough between anticlinal arches, contains young deep fill sedimentary deposits, resulting from temporary lakes that filled the basin. Following lunch in the Toppenish city park, we continued south to Sunnyside, then north on State Highway 241, crossing the Rattlesnake Hills, a northwest-southeast trending member of the Yakima fold and thrust belt.

Nearing the restricted Hanford Nuclear Reservation, the landscape is dotted with reactors and related structures. Within the Hanford boundary is the Arid Lands Ecology Reserve, established to study the endangered native sagebrush grasslands ecosystem.

Gable Mountain (1,085), a remnant of an island of Columbia River basalt which was covered by the deepest Lake Missoula floods, is directly east along the river. Tremendous flood currents deposited downstream a 12 mile long gravel bar. The white bluffs above the river consist of lake bed deposits which accumulated in the lower part of the Pasco Basin and are subject to landslide. The Vernita bridge crosses the last free flowing, 50 mile section of the Columbia River.

The Saddle Mountain National Wildlife Refuge contains valuable preserves of native plants, birds, and mammals.

Directly to the north is Saddle Mountain, an asymmetric anticline of the Columbia Plateau with a gently sloping southern limb and a steeply dipping faulted northern limb. Saddle Mountain's north face is heavily eroded, terraced and oversteepened due to diversion of the bulk of glacial Lake Missoula flood waters which swept the Grand Coulee and tracts to the east. The main flow was diverted west, up the slope of the Crab Creek syncline, where it quarried vast quantities of basalt from the floor of the syncline to form the broad, channeled lower Crab Creek valley. The flood water then flowed through Sentinel Gap into the Pasco Basin or via coulees north of Pasco, Washington, and east of the white bluffs. A significant flood stream flowed eastward, however, to establish the Othello channels, and cut butte and basin scabland at the eastern, plunging end of Saddle Mountain.

Priest Rapids and Wanapum Dams provide water storage to irrigate this arid region. Sentinel Gap reveals the anticlinal structure of Saddle Mountain. The flood torrents carried gravel, sand and silt which were deposited in gravel bars. Crab Creek enters the Columbia River after cutting a gorge through Beverly Bar.

Leaving the Columbia River, we enter the agricultural Crab Creek valley. Road construction necessitated a detour, prior to crossing the Frenchman Hills anticline to descend into Quincy Basin. During major Lake Missoula floods, water from the Grand Coulee and Upper Crab Creek drainage filled Quincy Basin, depositing sediments. Most of the water drained directly south through Drumheller Channels, cutting the canyon in gravel which now contains Moses Lake and the potholes reservoir. The overflow spilled over the Basin's west rim directly into the Columbia River in three major cataracts which left dry falls about 400 feet high and recessional gorges 1 to 1 1/2 miles long. Sand dunes fill the valleys leading from Quincy Basin to Drumheller Channels, impounding Moses Lake. The Bureau of Reclamation built O'Sullivan Dam, raising the level of Moses Lake 8 feet to create the reservoir. The grass-marsh covered Drumheller Channels and the Columbia National Wildlife Refuge contain a network of butte and basin topography, quarried 300 feet deep into the basalt of the east end of Frenchman Hills. This 9 mile wide scabland tract carried most of the Lake Missoula flood waters from Grand Coulee and the major coulee tracts to the east.

A side trip to the north crest of Saddle Mountain provided an over view of the Othello Basin.

On Sunday, May 27, following an 8:00 A.M., departure from Othello, we continued south on Highway 17 across Paradise Flat, a Columbia plateau surface which retains its sedimentary (Ringold Formation) veneer. The plateau is several miles wide and extends more than 20 miles north to south from Warden (where the Drumheller Channels begin) to Connell at the mouth of Washtucna Coulee. Scootenev Reservoir contains water for the Columbia Basin Irrigation project. It is similar to a glacial lake, since it straddles a divide between the Othello and the Pasco Basin. The flood torrent quarried a closed rock basin 135 feet deep, which contained Scootenev Lake prior to the irrigation project.

At Connell, Providence Coulee merges with Washtucna Coulee to become Esquatzel Coulee. The mouth of Washtucna Coulee is blocked by a huge gravel bar similar to Beverly Bar at the mouth of Crab Creek. The south rim of

Washtucna Coulee provides a view of gravel bar deposits in its downstream reach and the lakes which those sediments impound. Washtucna Coulee is the abandoned, scabland flood-scoured, pre-glacial valley of the lower Palouse River. Its southern rim is cut into the 400 high divide between the ancestral Palouse River and the Snake River canyon.

At Kahlotus, Lake Missoula flood torrents overtopped the Palouse-Snake divide in two places and descended the steep slope to the Snake River, carving the deep Devil's Canyon recessional gorge with a dry waterfall escarpment at its head. A side trip into Devil's Canyon revealed a cliff of columnar basalt which filled an ancestral Snake River canyon. The basalt layers consist of at least three successive intracanyon lava flows, i. e., each canyon having been cut into the basalt by the River, subsequently filled by a huge lava flow, only to have another canyon cut into it. The road ends at Lower Monumental Dam.

East of Kahlotus, the HU Ranch Cataract scabland channel, more than 100 feet deep, crosses the divide and drops over a dry waterfall escarpment into a recessional gorge. At this location the sedimentary cover is about 200 feet thick leaving streamlined loess islands.

Palouse Falls State Park provided a lunch/picture stop. The Palouse River falls 400 feet into a recessional gorge. The falls occupies a small portion of the large, amphitheater-like dry waterfall alcove. Soil erosion gives the river a muddy appearance as it flows downstream through the canyon.

To the south, the Snake River scabland canyon contains large gravel bars covered with giant current ripples extending for miles both up and downstream.

We return to State Highway 260 and continue east toward Lewiston. The broad, rolling palouse landscape, with its great depth of topsoil (loess), contains thousands of acres of wheat. Steptoe and Kamiak Buttes, islands of Paleozoic and Precambrian gneiss, surrounded by Columbia River flood basalt, are seen in the distance.

The "Lewiston Hill" viewpoint is a monocline of Columbia River basalt leading 2,000 feet down to the "Lewiston embayment". Lewiston, Idaho, and Clarkston, Washington, are situated in this unfilled graben. The Clearwater River valley enters from the east and the Snake River valley from the south. Both valleys have over steepened walls due to stream cutting and back flooding from glacial Lake Missoula, while the dip slopes reflect the surface of the Columbia River basalt. In places downstream from Lewiston, Paleozoic to Precambrian rock is visible in the Snake River canyon bottom, the remnants of ancient hills which were buried by Columbia River flood basalts. Between Lewiston and the Wallowa Mountains to the south, there are dozens of exceptionally large basalt dikes, which fill fissures through which the Columbia River basalt flows erupted.

An inactive gravel quarry near Hell's Gate State Park revealed deposits of Tammany Bar. More than 60 years ago, J. Harlan Bretz recognized this gravel bar, constructed across the Tammany Creek valley, was deposited by catastrophic floods. The coarse, dark gravel with south (downstream) dipping foresets was deposited by the Lake Bonneville flood, which occurred about

15,000 years ago. Above the Bonneville gravel are 20 or more fine gravel to sand to silt deposits with upstream dipping foresets deposited from glacial Lake Missoula backwash up the Snake River.

The stern-wheeler "JEAN" was moored at the State Park marina. Jet boats were returning from the day-long trip into Hells Canyon. A 24 inch garter snake was observed near the river.

An extensive levee on the Snake River protects Lewiston from major flooding. Lower Granite Dam impounds a reservoir, providing slack water for barge traffic.

On Monday, May 28, following an 8:00 A.M., from Clarkston, we traveled west on Highway 12 along the Snake River, beginning the 2,000 foot climb up the steep grade on the dip slope of the Lewiston Embayment, a monocline, to reach the upland plateau surface at Alpowa Summit. A side road covering 8 miles takes us to the rim of the Snake River canyon. The river has cut through the entire local thickness of Columbia River basalt, exposing occasional outcrops of underlying metamorphic rock.

In 1908, a wooden gravity operated grain tramway was constructed on the bluff overlooking the 2,000 foot Snake River canyon. The hoisting machinery powered by a steam engine was located on the river at the lower end of the tramway. In the period before the railroad and highway, developers constructed a pipeline to let gravity carry the grain down the canyon slope to waiting barges. Gravity proved too vigorous, for by the time the grain reached the bottom, it had been ground to flour and partially burned owing to friction. GSOC member, Gwen Miller, was thrilled to visit this site, since her first husband, Charles Helm, once worked on the tramway. Today, the partially burned tram and rusted machinery remain on the canyon rim.

Between Pomeroy and Dayton, Washington, the highway loops to the north to circumvent the north end of the Blue Mountains, a folded-faulted mountain range extending to John Day Oregon. Miocene Columbia River basalt flows are included in the folding, indicating deformation occurred after the great outpouring of lava.

The "Touchet" formation near Walla Walla consist of scores of layers of alternating sand and silt, evidence of the catastrophic flood deposits which underlie the agricultural valley.

South of Pasco, Washington, the Columbia River rounds the Horse Heaven Hills, cutting through them at Wallula Gap. Over steepened, scabland walls extend to 1,100 feet above the river behind McNary Dam. It is estimated it took 2 weeks for each of the 25 to 40 floods to pass through the Gap.

West of Wallula Gap, the Columbia River basalt tilts westward and disappears beneath the River and soil in the Umatilla Syncline. Silt deposited during the glacial Columbia River floods provides rich soil for this agricultural region.

Following a lunch stop in Umatilla, we returned to I-84 and continue to Portland.

Joline Robustelli
Past President

OCT 90

THE GEOLOGICAL NEWSLETTER

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1990-1991 ADMINISTRATION

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ACTIVITIES CHAIRS

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Wallace R. McClung	637-3834	(Luncheon) Donald Botteron	245-6251
Field Trips		(Evening) Walter A. Sunderland	625-6840
Charlene Holzwarth	284-3444	Publications	
Alta B. Fosback	641-6323	Geneva E. Reddekopp	654-9818
Geology Seminars		Publicity	
Dr. John Allen	223-6375	Robert L. Walter	235-3579
Historian		Refreshments	
Phyllis G. Bonebrake	289-8597	(Friday Evening)	
Hospitality		Donald and Betty Turner	246-3192
(Luncheon) Margaret Fink	289-0188	(Geology Seminars)	
(Evening) Gale Rankin and		Freda and Virgil Scott	771-3646
Manuel Boyes	223-6784	Telephone	
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Frances Rusche	654-5975	Volunteer Speakers Bureau	
Lois Sato	654-7671	Robert Richmond	282-3817
Past Presidents Panel		Annual Banquet	
Rosemary Kenney	221-0757	Esther Kennedy	287-3091
Programs		Gale Rankin	223-6784
(Luncheon) Helen E. Nelson	661-1731		
(Evening) Dr. W. Sunderland	654-2636		

ACTIVITIES

ANNUAL EVENTS: President's Campout-summer. Picnic-August. Banquet-March.

FIELD TRIPS: Usually one per month, via private car, caravan or chartered bus.

GEOLOGY SEMINARS: Third Wednesday, except June, July, August, 8:00 p.m. Room S17 in Cramer Hall, PSU. LIBRARY: Room S7, open 7:30 p.m. prior to evening meetings

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VOLUME 56, NO. 10

CALENDAR OF ACTIVITIES FOR OCTOBER, 1990

FRIDAY NIGHT LECTURE (Cramer Hall, PSU, Room 371, 8:00 P.M.)

- October 12 Slides from the 1990 President's Campout to Southeastern Oregon.
- October 26 "A Mining Engineer's Viewpoint Regarding The Environment," by Ralph Mason, Past President, GSOC.

FRIDAY LUNCHEON (Standard Plaza, 1100 S.W. 6th Avenue, Rooms A & B, Third Floor Cafeteria. Programs at 12:00 Noon)

- October 5 Slides from the 1990 President's Campout to Southeastern Oregon.
- October 19 "Water Quality," illustrated, by Dr. Lolita Carter, Water Quality Specialist, Portland General Electric.

GEOLOGY SEMINAR (Cramer Hall, PSU, Room S-17, 8:00 P.M.)

- October 17 To Be Announced.

GSOC LIBRARY (Cramer Hall, Portland State University, Room S-7) Open 7:30-8:00 P.M. prior to evening meetings.

FIELD TRIPS A field trip has not been scheduled for October.

ADELAIDE TO ALICE SPRINGS, SOUTH AUSTRALIA

Excerpts from a slide program, "Adelaide to Alice Springs," presented by Rosemary Kenney, GSOC Immediate Past President. Rosemary lived in Australia from 1973 to 1979. Program was presented at the GSOC Luncheon, May 4, 1990.

Australia has been isolated by the sea since at least the beginning of the Tertiary geological period, at least 50 million years ago. Australian flora and fauna differ from other parts of the world because they were able to proliferate in all kinds of variations; leaping kangaroos, woolly koalas, huge flightless birds, egg-laying mammals, and marsupials. Even the vegetation evolved differently. Spinifex grows in a round circle like a pin cushion with the center dying out, Eucalyptus with over 500 species, cycad the most primitive of seed-bearing plants, and Moreton Bay fig with extended roots of 20 - 25 feet radius are just a few.

Australia has a land mass of almost 3 million square miles, about the size of the United States. It is the flattest of all continents, less than half of it rises more than 1,000 feet above sea level, only 5% exceeds 2,000 feet. The highest peak, Mt. Kuskiosko, in New South Wales, is only 7,308 feet high.

The continent falls into three sections physiographically. The Great Western Plateau or Shield, which is mostly 1000 - 2000 feet elevation, covers the western half. This includes large expanses of ancient rock laid down in Archeozoic and Proterozoic Eras. The Central Eastern lowlands occupy a broad tract from the Gulf of Carpentaria to the Southern Ocean. Most of it is less than 800 feet above sea level and was under the sea for much of the Cretaceous Period. The Eastern Highlands extend in a great arc parallel to the coast from north Queensland to western Victoria and Tasmania. This segment is narrow in the north and up to 300 miles wide in the south. It is made up of a mixture of ancient Palozoic and more recent rock deposited in a huge geosyncline of the earth's crust.

"Goyder's Line" is the boundary separating areas of the frequent drought from areas of abundant rainfall capable of supporting agriculture. Areas north of this line receive 10 inches or less rainfall per year, and is unsuitable for agriculture.

The Murray River is the largest river in Australia, 1600 miles long and about the same size as the Yukon River in Alaska. The Columbia River, in the northwestern United States, is about 1400 miles long. The last 900 miles of the Murray River before it empties into the Southern Ocean has a gradient of one inch per mile.

Adelaide lies at the southern coastal edge of the Central Eastern Lowlands section, near the mouth of the Murray River. It is the business, industrial, and administrative capitol of the state of South Australia. It contains 70% of the state's population. Precambrian rocks constitute practically all the prominent topographic features, including most of the mineral deposits of copper, gold and silver. Glacial rocks occur near Adelaide where striations can be seen. Fossils such as archeocyathos, brachipoda and ammonites are abundant. In a state deficient in timber, mineral substances were used for building material: slate, sandstone, granite, marble, limestone, and clay for bricks.

Flinders Ranges, the largest mountain range in South Australia, extends from Adelaide to 300 miles north of Adelaide in a great horseshoe shape, running north-east-southwest. It is a rugged chain of mountains surrounded by wide and mostly dry salt pans. The highest peak, Mt. Woodruffe, is only 3,900 feet high. In Pre-Cambrian times, a great trough of ocean water extended far into the continent. For a thousand million years, rivers flowing from landmasses on either side of the trough discharged sediments. An ice age followed; glaciers scoured the land and dumped their ballast into the trough on top of the river sediments. The greatest record of Pre-Cambrian glaciation is here in the Flinders Ranges. Tillite, over 600 feet thick, form the backbone of the ranges. When the ice melted, running water laid down further deposits. After a build-up of several miles, tectonic pressure caused the sediments to buckle and fold, forcing them up to create a

mountain range. This range was partially eroded, subsided, uplifted again, and has since eroded to its present shape.

Erosion has carried away most of the fossil-bearing limestone of Cambrian times. The older, more resistant sandstone remains, being highly mineralized of quartzite, stillbite, fluorspar, hemitite, and uranium. Some limestone still remain. Archaeocyathinae reefs of lower Cambrian constitute important formations.

Lake Eyre is the largest of all Australian dead lakes. It is 60 miles long with a drainage basin of 480,000 square miles, one of the largest in the world for an inland lake. The lake itself, 5,000 square miles, is only a vestige of a much larger Pleistocene lake that covered 40,000 square miles, 180 feet deep. In 1950, Lake Eyre filled with water for the first time in living memory, then water evaporated 100 inches per year. In 1974, the lake filled again to 20 feet deep. Rainfall in this area is usually less than five inches per year.

Central Australia is like a giant saucer filled with sediments. During Mesozoic Era, it was all under water, then an upheaval occurred. The water evaporated, lakes dried up, aridity set in, and the Great Artesian Basin developed. Rain water trickles off the mountains to the east and is trapped between bedrock and the sediments of the old sea. The water is under intense and constant pressure, so that any break in the top rock layer causes it to gush in steaming jets to the surface. In some places, it flows from man-made artesian wells. At the edge of the Great Artesian Basin, the water is salty and cool. Towards the interior, it is hotter but less mineralized. In other places, the water erupts in natural aqueous volcanoes known as Mound Springs. Some of the mounds are 300 feet high. The springs are the home of the hardyhead, a fresh water fish.

Palm Valley, approximately 70 miles west of Alice Springs, Northern Territory, is a valley eroded into red sandstone. The varied shapes of the sandstone hills is due to differential erosion of soft and hard zones, controlled only by the position of joint planes. *Livistonia mariae* palm is the most primitive palm

known. It has changed very little since the days of the dinosaurs. Its nearest relatives and other palms are found 700 miles north. The *Livistonia mariae* palm is isolated and found only in Palm Valley, a valley two miles long, a remnant of a more moist climate.

The MacDonnell Ranges is a mountain range consisting of a long series of quartzite rock standing on end. Some dip southward, others dip northward, producing a switchback-like formation. Ellery Gorge has been eroded through one of these quartzite formations. The yellow to red color of the rocks is due to iron oxide stain in and on them.

Glen Helen, a gorge in the MacDonnell Ranges, is eroded through sandstone and its shape is controlled by jointing. A Glen Helen formation, Organ Pipes, is a cross section showing vertical bedding and each vertical "pipe" is one bed. Erosion was by the Finke River, the geologically oldest water course in the world.

Also within the MacDonnell Ranges is Standley Chasm, 15 feet wide, 90 feet high, a narrow gorge with very steep sides of quartzite. The walls of the gorge are formed along two parallel vertical joint planes, and all the rock between these two planes has been removed during water erosion.

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FIELD TRIP LONE BUTTE - CRAZY HILLS - LEWIS RIVER

LAND OF VOLCANOES, GLACIERS, TUYAS AND MOBERGS

On Saturday, July 7, 1990, Dr. John Whitmer lead 24 GSOCers on a bus field trip along the Wind River and through the Crazy Hills Mt. St. Helens region of southwestern Washington. The various lava flows, pyroclastic units and sedimentary deposits accumulated in stream valleys, synclines and grabens range in age from the Hatchet Mountain Formation, approximately 40 to 35 million years old, to the Recent Mt. St. Helens deposition.

I-84 leaves Portland eastbound via Sullivan's Gulch, a ravine cut into the Troutdale Formation by glacial Lake Missoula floods. Northbound I-205 passes Rocky Butte, the neck of a Pliocene-Pleistocene volcano. The rich farmland along the Columbia River results from glacial Lake Missoula flood deposition. The Portland delta--Columbia River flood plain--extend south to Oregon City, north to Woodland, and east to Washougal, Washington. Numerous islands dot the Columbia River channel. The Glenn Jackson highway bridge crosses a slough, a portion of Lady Island, underlain by Oligocene andesite covered with recent river alluvium, and the Columbia River into Washington.

East of Washougal, Highway 14 ascends from the flood plain onto the terraced Troutdale Formation, a Pliocene-Pleistocene conglomerate deposited by the Columbia River.

The Grande Ronde Member of the Columbia River basalt makes a prominent cliff at the Cape Horn viewpoint. Columnar jointing and a brickbat fracture pattern is evident in the basalt. The rock layers dip southward in the Columbia River gorge so that each unit crops out at a higher elevation in Washington than does its counterpart in Oregon. Mt. Zion, a Pliocene-Pleistocene volcano to the north, has covered the Cape Horn basalt with an apron of andesite. To the east the lowland between Cape Horn and Beacon Rock, the core of a Pliocene-Pleistocene basaltic volcano, contains several large landslides occurring in post-glacial time. The clay soil covering the Ohanepecosh Formation, combined with the southward dip of the rock units subject this area to sliding. The series of glacial Lake Missoula floods eroded the valley walls, oversteepening them and adding to the landsliding in the gorge.

West of Bonneville Dam, the highway follows the Eagle Creek Formation with Columbia River flood plain deposits. Debris flows and lahars from early Miocene volcanoes built this formation by aggrading the stream valleys of the ancient Western Cascade Range long before the eruption of Columbia River basalts. The Eagle Creek beds form a syncline, which was uplifted, permitting erosion to strip the Grand Ronde basalt from its surface, except in areas where the basalt filled canyons to form massive intracanyon deposits at Hamilton and Table Mountains.

Originating from the headwall scarp on the east side of Table Mountain, the Bonneville landslide and debris flow partially dammed the Columbia River during the Pleistocene. The slide crowded the river against the Oregon side of the gorge, creating a narrow channel at Cascade Locks. Bonneville Dam, completed in 1937, was built upon this landslide. The third powerhouse on the Washington side of the Columbia River was completed in 1982.

Stevenson, Washington, is underlain by Eagle Creek Formation. Stevenson Ridge, a Miocene andesite unit, is to the left of the town. Carson, Washington, is noted for the hot mineral baths. The road north of Carson is constructed on the surface of the Wind River intracanyon lava flow, which emanated from Trout Creek Hill to the northwest and flowed across the Columbia River, damming it temporarily more than 35,000 years ago.

The Wind River bridge provides a view of the deep box canyon, typical of cuts through intracanyon lava flows. The river flowed at the west side of the lava flow, incising a progressively deeper canyon until it turned 90 degrees to cut completely across the valley and follow the east side of the lava flow to the Columbia River. Panther Creek flows parallel to the Wind River for several miles before the Wind River cuts directly across the lava flow.

The northern portion of the Wind River valley near Mineral Springs Road has been built up to its present level by stream deposited alluvium, since Trout Creek Hill volcano and intracanyon lava flow dammed the valley.

Our first stop was a massive outcrop of Oligocene Ohanepecosh andesite resting on a thick clay layer. The lava is altered to a tan color since it flowed onto a swampy area and interacted with water. A road cut at milepost 27 on Wind River Road reveals vesicular Quaternary basalt of the Indian Heaven volcanic field.

Lone Butte, a tuya or volcano which erupted through a glacier, is observed at milepost 28-29. The ice of Indian Heaven glacier was about 770 feet thick when the lava pierced it, interacting with meltwater to form pillow breccia, hyaloclastite and a tuff ring at the surface of the ice. Continued eruptions occurred early in the Hayden Creek glacial stage (190,000-130,000 years) before the Lewis River glacier had risen to this level. At length, the eruption ceased, but the Lewis River glacier continued to advance, filling its valley and causing ice to overtop the Lone Butte volcano. Subsequent glacial and water erosion removed most of the summit and much of the northern flank of the butte, exposing the tuff, hyaloclastite, pillow breccia and basalt dikes on the western and north eastern sides. Additional, but less extensive, erosion occurred during the Evans Creek glaciation (25,000 to 10,000 years ago).

Our next stop was the southeast quarry of Crazy Hills volcano. Late in Hayden Creek glaciation, when the merged Lewis Creek and Indian Heaven glaciers were near maximum size, a volcano erupted under, but did not penetrate, the ice to form a Moberg (Icelandic

for palagonitic rock). The remnant of this volcano was named the Crazy Hills by early surveyors, who were perplexed by the peculiar drainage pattern of the area. The Crazy Hills are encircled by tributaries of Rush Creek and Big Creek, but virtually lack surface water because water so readily percolates through the palagonite and hyaloclastite cap of the volcano.

The Outlaw Ridge viewpoint on the southeast side of Mt. St. Helens was the lunch stop. This provided a good view of the mountain, Shoestring Glacier and the area where major debris flows originated.

Continuing west on the Lewis River Road, we see a series of Indian Heaven basalt flows, which dammed the Lewis River Canyon. The river then cut through the basalt to expose the underlying Stevens Ridge andesites and tuffs. Curly Creek follows the western edge of this basalt to the Lewis River.

Our next stop was Curly Creek Falls. The falls passes under two natural bridges as Curly Creek drops from its hanging valley into the box canyon of the Lewis River.

At the Pine Creek Visitors Information Center, Mt. St. Helens National Volcanic Area, the andesite lava flows and tuffs of the Stevens Ridge Formation dip eastward. The prominent columnar cliffs are remnants of a Lewis River intracanyon flow from the Indian Heaven area. The flow filled the Lewis River valley to a depth of more than 350 feet.

The Lewis River valley widens near milepost 17 on Lewis River Road due to sediment debris flows from Mt. St. Helens. The Evans Creek glacier did not advance beyond this point.

At milepost 8, Swift Creek has cut a deep canyon revealing numerous debris flows. Pacific Power and Light has constructed three reservoirs and hydroelectric dams on the Lewis River, Swift Creek Reservoir, Yale Lake near the town of Cougar, and Merwin Lake near Ariel. Swift Creek Reservoir fills a narrow canyon. The highway is constructed on land fill resting on the Cave basalt flow. This flow, about 1,900 years old, contains little soil and vegetation. The road descends to the surface of the flow, where pressure ridges are visible. From here to Cougar, the higher slopes to the north and south across the valley are underlain by Ohanepecosh Formation. Cougar, on the south side of Mt. St. Helens, rests upon debris flow (lahar) deposits which fill the valley to a depth of nearly 500 feet. Between Cougar and Woodland, the rock is Oligocene-Eocene andesitic Hatchet Mountain Formation of the Western Cascades group. Although the Hayden Creek glacier advanced to within two miles of Woodland, it had less influence on shaping the valley than did the erosive action of the Lewis River and its tributaries, together with filling of the valley by debris flows to form a broad valley floor.

On I-5 south of Woodland, Goble volcanics (Oligocene) are exposed in the road cuts for three miles until the freeway follows a canyon of Troutdale Formation and climbs onto the Portland Delta, which is covered with glacial Lake Missoula flood deposits.

Joline Robustelli
Past President

NOV 90

THE GEOLOGICAL NEWSLETTER

G S O C
GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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

Non-Profit Org.
U.S. POSTAGE
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Portland, Oregon
Permit No. 999



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1990-1991 ADMINISTRATION

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ACTIVITIES

ANNUAL EVENTS: President's Campout-summer. Picnic-August. Banquet-March.
 FIELD TRIPS: Usually one per month, via private car, caravan or chartered bus.
 GEOLOGY SEMINARS: Third Wednesday, except June, July, August, 8:00 p.m. Room S17 in Cramer Hall, PSU. LIBRARY: Room S7, open 7:30 p.m. prior to evening meetings
 PROGRAMS: Evenings: Second and fourth Fridays each month, 8:00 p.m. Room 371, Cramer Hall, Portland State University, SW Broadway at Mill Street, Portland, Oregon.
Luncheons: First and third Fridays each month, except on holidays, at noon, Standard Plaza Cafeteria, third floor, Room A, 1100 SW Sixth Avenue, Portland, Oregon.
 MEMBERSHIP: Per year from January 1: Individual, \$10.00; Family, \$15.00, Junior (under 18), \$6.00. Write or call Secretary for membership applications.
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THE GEOLOGICAL NEWSLETTER

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VOLUME 56, NO. 11

CALENDAR OF ACTIVITIES FOR NOVEMBER, 1990

FRIDAY NIGHT LECTURE (Cramer Hall, PSU, Room 371, 8:00 P.M.)

November 9 "The Mining History of Granite, Oregon," illustrated, by Bo Janko, GSOC member.

November 23 Meeting cancelled. Thanksgiving Holiday.

FRIDAY LUNCHEON (Standard Plaza, 1100 S.W. 6th Avenue, Rooms A & B, Third Floor Cafeteria. Programs at 12:00 Noon)

November 2 "Metro-Vancouver Green Spaces," illustrated, by Dr. Ruth McFarland, District 7 METRO Counselor, Vice Chairman of METRO Green Spaces, Policy Advisory Committee.

November 16 "The High Road in Utah," illustrated, by Don and Betty Botteron, GSOC members.

GEOLOGY SEMINAR (Cramer Hall, PSU, Room S-17, 8:00 P.M.)

Cancelled due to Thanksgiving Holiday.

GSOC LIBRARY (Cramer Hall, Portland State University, Room S-7) Open 7:30-8:00 P.M. prior to evening meetings.

FIELD TRIPS

Saturday, November 17, 1990.

Don Turner, Past President, GSOC, (246-3192) will lead a car field trip along the north side of the Columbia River.

MEET: 9:00 A.M., at the former Parker House Restaurant parking lot between Camas and Washougal, Washington, on Highway 14.

Bring lunch and thermos. Lunch stop near Horse Thief Lake State Park. Wear walking shoes and appropriate weather clothing. (If snowing, trip will be cancelled.) NO HAMMERS, TOOLS OR COLLECTING WILL BE ALLOWED IN THIS PROTECTED AREA.

Saturday, January 12, 1991 proposed BUS trip to Eugene to meet Dr. Baldwin and see the new geology department at the University of Oregon, meeting any department officials who took part in "Trends in Geology" seminar; and possibly visiting the Museum of Natural History. Pack a lunch and return home the same day. More information in the next Newsletter.

NEW MEMBERS

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CHANGE OF ADDRESS

May R. Dunn
900 NE 81st #218
Portland, OR 97213

NOMINATING COMMITTEE APPOINTMENT

In accordance with Articles VII and VIII of GSOC By-Laws, the Board of Directors, on October 12, 1990, appointed the following members to the Nominating Committee:

Gayle Rankin, Chairman
Bob Richmond
Bob Waiste
Esther Kennedy
Don Turner

JESSE R. RENTSCH

JESSE R. RENTSCH, who became a member of the Geological Society of the Oregon Country in 1958, passed away on September 25, 1990 in Moorestown, New Jersey, where he was residing with his daughter, Mrs. Q. A. Lerch. During his membership, he held the office of Editor of the GSOC Newsletter for two years.

Jesse was born March 5, 1891, in New Philadelphia, Ohio. He started his academic education at Wooster College in Ohio. His education was interrupted by World War I, at which time he went to Portland, Oregon, to work in the shipyards. Upon his return to Ohio, he attended Wesleyan University from which he received his B.A. degree. He married Ruth E. Mowrey of Wooster after which they moved to New York City where their son, Elbert S. Rentsch, and daughter, Esther Rentsch Lerch, were born. They later changed their residence to Rocky Point, Long Island. After the death of his wife and the emancipation of his children, he chose to return to Portland, Oregon, the countryside of which he loved so much. He remained in Portland until 1977 at which time he went to live with his daughter in New Jersey. Beside his son and daughter, he is survived by five grandchildren and three great grandchildren.

Jesse had many interests and occupational experiences. He was a construction worker for the Ohio Oil Company prior to World War I. This experience, along with his visits as a boy to the local coal fields, unquestionably whetted his interest in Geology. He held an interest in the clergy for a time and taught school for a while. His last occupation was that of home construction in which he remained until retirement.

Jesse had an interest in all of the natural sciences but his greatest interest of all was in Ornithology. He spent many hours on Sauvie, an island in the Willamette River. On this island, he placed over twenty bird houses. No greater story can be told of the affinity between man and fowl than that of Jesse and Joey, a gander of a flock of Asiatic geese on the lake in Laurelhurst Park in Portland. Jesse had but to call and Joey would come to his side to be picked up. He would then sit at Jesse's side on a park bench to be petted.

Laurette W. Kenney

PRESIDENT'S CAMPOUT
Lead by Dr. Ruth Keen

SOUTHEASTERN OREGON - SEPTEMBER 7-16, 1990

Day 1 - Friday, September 7th
Portland to Klamath Falls
by Helen E. Nelson

We GSOCers sat on the bus eager to leave for the ten-day field trip. The chilly morning air and gray skies did not dampen the spirit of high anticipation. We pulled away from the Lloyd Center Red Lion to begin our tour under the guidance of geologist-leader President Dr. Ruth Keen with help of bus driver-geologist Guy Leabo and tour guide Alta Fosbeck.

We traveled on I-5 along the sedimentary Willamette Valley, a trough between the Cascades on the east and Coast Range on the west. It holds lots of interest for geologists. In fact, our leader explained the bus would have been fitted with pontoons 35 million years ago and we would be cruising on the Pacific Ocean along the shoreline of the Cascades.

The Cascades are a barrier to rain-bearing west winds which bring moisture to the low, warmer and wetter interior. Both marine and leaf fossils deposited along the former shoreline 35 million years ago have been discovered in several locations: one near Goshen, another near Eugene.

South of Portland, I-5 winds through rolling hills underlaid with basalt. North of Salem, we viewed the Salem-Eola hills formed by volcanism, faults, anticlines and synclines.

We rolled across the sediments on the flat valley floor, pierced by various conical shaped buttes. The sediments were deposited by the forty or more Missoula floods of 10,000 or more years ago. Deposits of layers of silt visible along the Willamette River above Champoeg and the Willamette meteorite and other rock formations rafted in on ice floes from great distances are indications of the many floods.

The Willamette River meanders in snake-like loops through the flat valley. The Long Tom, Marys, and Amazon Rivers, all Willamette tributaries, are held back by natural levees and flow parallel to the Willamette before joining it. Such tributaries are called yazoo rivers.

South of Cottage Grove, where the Cascade and the Coast Ranges meet, is the Bohemia gold mining area. Dr. Keen explained that the geological formations along this area give us an understanding of those we will examine on our explorations.

The sun greeted us near Rice Hill where we stopped for Yoncolla ice cream. We stood as one! Was the catalyst the ice cream some ate, or the prunes Guy and Alta brought, or the coffee others drank, or the beginning of our adventure together, or our leadership? We were as diverse as the two rivers we saw at Glide: the North Umpqua River and the Little River, rushing at each other like two cars meeting on a single lane highway. There the rivers met to amicably join in a slow moving whirlpool before flowing south as one, the North Umpqua. Whatever it was that brought us together, we were separate individuals operating as a whole.

Our route east through Wilbur was along the North Umpqua River which flows over picturesque basalt blocks in a wide shallow stream bed. We saw basalt pillows (lava flows that erupted under water) at Frear Bridge on our way to Glide and the colliding rivers. We continued along State Highway 138 to view the scenic North Umpqua River and the Spencer, Tyee, Flournoy and Roseburg formations.

We had lunch at Steamboat Park overlooking the beautiful North Umpqua River rapids coursing around huge basalt boulders. Western Cedar and Pencil Cedar (used for pencils) sheltered us. Between Steamboat and Eagle Rock, hot solutions altered the rocks. Around a granitic plug, where minerals are brought up in hot solutions, is the place to look for commercially-valuable minerals.

We crossed into the High Cascades where there are rocks of mainly basalt, andesite, rhyolite, dacite, and tuffs. Near Crater Lake, pumice spewed from Mt. Mazama nearly 7,000 years ago. We viewed a wide basalt dike from the westside rim road, and counted three U-shaped glacial notches. At the east rim, we stopped at Cleetwood Cove to view Diller's Backflow. On a side road, we visited Cloudcap, a 7,838 foot high viewpoint (the highest road of any roadside we view in the park) with the lake being 2,000 feet directly below us. The trees at timberline are Whitebark Pine. Also, with diligent searching, we found a rare Crater Lake pumice grapefern, a two-inch plant, growing in the nearby pumice. We continued on Rim Road to Sentinel Point and viewed the Phantom Ship, a dike in a small cone that was enveloped by Mount Mazama.

While munching prunes on the bus, we watched a small United States Forest Service (U.S.F.S.) plane guide and pinpoint the target for a larger, fire-retardent transport plane to drop its cargo on a rapidly growing, smokey forest fire. We continued on past State Highways 62 and 97 through a graben along a north-south line to Crater Lake and other Cascade volcanic peaks which begin at the Lavabeds National Monument in California.

Highway 97 is built between the eastern shore of upper Klamath Lake and the 300 foot Modoc Scarp. In one place, slickensides and grooves show a verticle displacement of at least 1,600 feet.

We arrived in early evening at our motel in Klamath Falls. This city is built over a hot-spot. Businesses and at least one steep pitched street are heated by circulating water in pipes imbedded in hot ground water.

So ended a long, eventful, pleasant day. Plenty of prunes for the next few days, but few ice-cream cones until at Christmas Valley.

Day 2 - Saturday, September 8th

Klamath Basin National Wildlife Refuge and the Lava Beds National Monument

by Esther Kennedy

Paul Travis, who accompanied us on this day, identified the many birds we saw, pointed out deer, and told us some of the history of the area. The annual fall migration of waterfowl was just beginning. It is estimated that over one million birds feed and rest in the area during the peak of the migration in November.

From the refuge, we traveled to the Lave Beds National Monument. The rugged terrain of this area indicated a very violent past. Flows of basalt, andesite, dacite, and rhyolite, which once covered the area, are slowly being eroded into soil. Plants, grasses, and some trees provide food and shelter for much of the wildlife.

The mammoth crater, a huge hole in the ground which formed when the volcano collapsed within itself, is thought to have erupted 100,000 years ago. The lava from this eruption formed many of the lava tubes and caves.

We visited two of the caves; Mushpot and Valentine. The walls of the caves showed a smooth pathway down which the lava flowed. The ceilings had wonderful patterns formed from dripping lava.

Of special interest were the Fleener Chimneys, a series of spatter cones. These cones were hollow and quite deep with walls built up from flows and spatters of lava. One of our members lost his camera as he bent over to peer into the depth of a cone.

Dr. Ruth Keen pointed out many bluffs, cinder cones, fault blocks, and pressure ridges. She told us of her varied experiences when she was Ranger Naturalist at the monument.

We walked through Captain Jack's Stronghold where the Modoc Indians fought valiantly to preserve their way of life. The rugged, rocky terrain made it possible for the Indians to hold a growing army of soldiers for five months before surrendering.

Paul Travis explained the many studies being conducted in the monument. Records are being kept on all forms of life in the caves. The ice deposits are being carefully monitored. Paul is working on this project.

At the northeast corner of the monument, there are welded tuff cliffs. Wave action from ancient Tule Lake cut terraces and old shore lines in the cliffs. Petroglyphs, ancient Indian art, are quite visible on the cliff walls. Raptors, owls, swallows and other birds nest in the holes in the wall above the petroglyphs.

This is a very brief resume of the happening on this exciting day.

Day 3 - Sunday, September 9th
Klamath Falls to Lakeview
by Walter Sunderland, M.D.

Six a.m. and everybody was up. It was cool with clear skies. Luggage was being stacked outside for loading; and people were off to breakfast. Alta was busy packing our lunches for the day and checking the seat assignments. Guy Leabo was loading luggage by 7:30 a.m.; and GSOCers loaded into the bus at 7:45 a.m. We left at 8:00 a.m., eastbound on State Highway 140.

Mt. Shasta was south, on the right of us. Dr. Ruth Keen discussed geologic faults. We planned to pass through the divide from the Klamath Lake Basin to the Great Basin. We saw green meadows everywhere thanks to irrigation. By 8:30 a.m., we were climbing out of the valley into drier country with ponderosa pines. We entered the Winema National Forest. After we got to Sprague River, we saw Gearhart Mountain in the distance with its distinctive notch. Alta saw a harrier hawk with its white chest patch. It was standing on an irrigation pipe. Traveling Highway 140 east through Beatty, the Sprague River is on the north side of the road and the railroad is north of the river. Some of the railroad cuts show white-colored diatomite. This earth has many uses: one is purifying sugar. Miners can get a pneumoconiosis from inhaling the dust.

Gearhart Mountain was a shield volcano and underwent glaciation during the pleistocene period. It is now a wilderness area. By 9:05 a.m., we passed the ranger station for the Fremont National Forest in the town of Bly. Lots of yellow rabbit bush along the roadside.

By 9:15 a.m., we entered the Sprague River Picnic Grounds. Archie Strong laid out this road to the camp for the U.S. Forest Service just before World War II. We saw several mule deer with large ears. There are several small garden areas with woven wire fences surrounding them.

Archie Strong gave a dissertation of his work here as a field biologist with the U.S. Forest Service and the CCC. He was studying food problems as well as migratory patterns of deer, birds and fish.

Entering Lake County, we soon approached Quartz Mountain. When the railroad from Klamath Falls to Lakeview passed through this area, gold bearing quartz was found. A small mill was erected but failed because the gold content was too low. Also, cinnabar ore was found and that was prospected and a retort set up. It was not very profitable either.

We drove to Pegasus Gold Mining Enterprise where we met Kevin Russel, a geologist from that organization. We obtained some samples of opalized quartz and low grade cinnabar. Kevin Russel then gave us an interesting lecture on the geology of Quartz Mountain. He spoke of rhyolite flows, epithermal waters, mercury and gold deposits. The lecture was taped and an edited copy will be printed and made available through GSOC distributions.

After the lecture, we drove to where exploratory drilling and a trench was dug. In the trench, we were shown the quartz vein with the low grade gold ore. We collected specimens of quartz from the area.

We left the Quartz Mountain area and entered the Great Basin region of Oregon. There were many meadows along the roadside that were created by lava flows which obstructed streams and allowed lakes to develop that were subsequently filled with eroded sediments. We left Fremont Forest, drove along Drews Creek, passed Howard Creek, and saw Drews Reservoir which was very low. We saw eight or nine antelope running across the huge valley. Archie Strong said this was the southern end of the antelope range.

We stopped at Booth Memorial State Park for lunch. The *Populum tremuloides* (Quaking aspen) were lovely. Frank Evenson said the leaves quake because the leaf stems are flat. Dr. Keen demonstrated that feature of the petioles.

Goose Lake is the remnant of a pleistocene lake that was much larger. It has receded at least 4-1/2 miles in the last 100 years. It sits in a graben.

By 2:10 p.m., we entered Lakeview and stopped at our motor lodge to leave the luggage and get keys. Then we left for Hart Mountain. We passed a geyser on the outskirts of the city. The geyser blows off every 90 seconds. We took a side road to Plush and stopped at the "General Store." Quite unique. Someone there offered to sell a dinosaur egg.

At Hart Mountain National Antelope Refuge, we saw many geese and an eagle. Looking across the valley, we could see the old lake shore lines. Part way up the mountain, we stopped for pictures and another look at the spectacular shore lines with from the pleistocene epoch. Margaret Fink pointed toward the Rabbit Hills area across the valley where sunstones are found and gave a short dissertation on the gemstone.

At the headquarters building of the National Antelope Refuge, we went through a small museum. Jackrabbits were plentiful in the field as we travelled to the hot springs region. We saw a herd of 10 pronghorns loping along. A cement block structure has been erected at the hot springs so bathers can enjoy the flowing hot water (100°+ F.).

On the way back across and down the side of the mountain, a coyote happily demonstrated his manner of pouncing on a rodent. We went back to Plush, then to Adel. The entire valley is called Warner Valley. At Adel, we noted a roadcut through a pleistocene glacial gravel deposit. There were huge boulders that had rolled down from the escarpment.

We enjoyed the lovely valley and a waterfall while enroute to Lakeview. The sun set at 7:15 p.m. We arrived at the hotel late, satisfied with the scenery of the day, but tired and hungry.

Day 4 - Monday, September 10th
Lakeview and Areas North
by John H. Bonebrake

We left the Best Western Skyline Motor Lodge in Lakeview at 8:09 a.m. and traveled north on U.S. Highway 395. The first stop was at the well-known hot water geyser on the north edge of town. The water in the accompanying receiving lake is only pleasantly warm. While feeding snacks to the many ducks and geese in the receiving ponds, we observed two 60 foot high spurts of the geyser.

While on the bus, Dr. Ruth Keen read about the area through which we were traveling. Ancient Lake Che-wau-can, which existed from the Pleistocene 75,000 to about 800 years ago, was approximately 350 feet deep. At its peak, it covered around 3,500 square miles which included all of the Christmas Valley area and south to beyond Goose Lake. The Indians called it "She-wa-kan." Originally this lake was saline. We observed wave shelves at approximately 100, 200 and 300 feet. Sediments in the bottom are up to 3,000 feet thick.

We traveled on to the east to Abert Rim, around 2,500 feet high, and past Valley Falls. Originally this area was a huge marsh. There were five ancient shorelines on the west. Tumbleweeds prevailed and alluvial fans were much in evidence at all incoming streams and creeks.

Paisley, at 92° F., proved to be a good ice cream stop. A large poplar tree in front of their ancient store was a point of interest. A short distance northwest we saw Summer Lake. It covers 60 square miles and is actually a huge alkaline marsh fed by creeks and hot springs. Many lake levels, alluvial fans, landslides and volcanic ash were all visible. The lake was named by Captain Fremont in 1843 when he looked down from the snowy, windy, welded tuff cliff to the west into the sunny valley below. We drove to the top to observe what he saw. It was a sight worthy of much picture taking.

Dr. Keen lectured on Captain Fremont's "Winter Ridge Versus Summer Lake," also pointed out the immense root spread of juniper trees, mountain mahogany and large Ponderosa pines. After leaving this scenic point, we climbed up on Picture Rock Pass and ended up at the town of Silver Lake. It was here that Don Parks filled our water jug with

horrible tasting sulfur water and Don Turner related some railroad stories interspersed with fibs. Margaret Fink's beautiful black rock specimen turned out to be a piece of truck tire. A large gravel bar is evident at Che-wau-can River crossing. Back at Paisley, Archie Strong showed us the site of the 1894 catastrophe where 43 people died in a hotel fire during a Christmas gathering and celebration of the early pioneers.

Backtracking to Valley Falls, we stopped at Lake Abert where Bo Janko carried on a prolonged discussion as to whether the grey scum along the leeward side of the lake was bird droppings or dead algae. The algae won.

Our day's trip ended at Lakeview's Best Western Motor Lodge culminating a delightful day and trip.

Day 5 - Tuesday, September 11th
Lakeview to Jorday Valley
by Betty and Donald Turner

We left Lakeview at an early 7:35 a.m. Our first stop was Hunter Geyser where we watched the water spew forth at regular periods. The eruption was channeled through a pipe. The lake at the geyser was home to quite a few waterfowl; and they were very hungry. One mama of the flock had three wee babies which we found cute and fuzzy. Three minutes after leaving the geyser, we saw a water hole with a group of antelope about one hundred feet from the road. Leaving State Highway 395, we started east on State Highway 140. We passed the U.S.F.S. ski-lift, which is the only lift in Oregon that is operated by the U.S.F.S. Before reaching Adel, we stopped to observe some interesting bedding. We noted ash deposited in a lake bed, and a beautiful fault line. Then we stopped at Adel and its fascinating store. This is Warner Valley. Adel exhibits an old Studebaker wagon, vintage 1914 or so. Adel is in School District No. 21, as noted on the small school bus parked there. A mileage signpost indicates Denio 21, Winnemucca 178, Ft. Dowell 35, Plush 18, and Lakeview 33. Talk about miles from nowhere!

Leaving Adel on State Highway 140, our route was up Greaser Canyon, through Blizzard Gap at 6,122 foot elevation, and then over another pass at 6,240 foot elevation up through a volcanic center.

We arrived in Nevada and the Charles Shelton Antelope Refuge at 10:06 a.m. Our Refuge stop was at Virgin Valley with its hot springs and headquarters. We understood that this is a good place to dig opals. The opals are found in rhyolite as petrified wood which is silica. Driving from the Refuge to Denio Junction, we saw the Pueblo Mountains as we crossed Bog Hot Valley with its Continental Lake. We tested the slot machines and Cecelia Crater cleaned out the house of quarters. Others were not so lucky. Now, north to Denio on the Oregon-Nevada border at 12:23 p.m. We made a short stop at Fields to ask about roads. OOPS! Missed the turn and headed for Frenchglen. So we returned to the correct routing to cross that ancient lake bed, now Alvord Desert. We saw the High Steens Mountains on our left, with a U-shaped gorge, Wild Horse Canyon.

While on the dirt road between Fields and the north end of Alvord Lake, we stopped; a motorhome was also stopped there. Our Dr. Ruth got these travelers interested in the G.S.O.C. Will they join?

Some snow was still in evidence at higher elevations on the Steens Mountains. We were glad to return to paved road as we got on State Highway 78 and motored east to Burns Junction and U.S. Highway 95. We made a lunch stop at the B.L.M.'s Rome Launch site. We backtracked to turn off at Rome to view the Rome Formation with its grand pillars. On the viewing loop in the Owyhee Valley, we saw the Pillars of Rome which are in lake tuff or ash of Pliocene Age. Our arrival in Jordan Valley was either 5:10 or 6:10 p.m., depending on the time zone; and we stayed at the Sahara Motel.

Thanks to the leadership of Dr. Ruth Hopson Keen, our president, the guidance of Alta Fosback, and the driving by Guy Leabo, we all had one grand day.

Day 6 - Wednesday, September 12th
Jordan Valley to Ontario
by Margaret Fink

The day dawned clear and crisp in Jordan Valley with a beautiful pink and gold sunrise. This was our "turn-around" day as our travels would now take us back toward Portland. Many of us were unaware of the exciting things that still lay ahead.

The bus rolled north about 18 miles from Jorday Valley on U.S. Highway 95 through low farmland and grazing country to Malloy Ranch. West of this road lay the Cow Lake Lava Beds, similar to Idaho's "Craters of the Moon." This may be one of the youngest flows in Oregon but we didn't take time to investigate the area.

From near the Malloy Ranch, we took a side road north and, by this time, we had a good view of the Mahogany Mountains to the northwest. Beyond them is Owyhee Lake where we were going later in the day.

About 30 miles north of Jordan Valley is a sign directing us to turn west to Leslie Gulch. This road goes down the Gulch to the south end of Lake Owyhee where fishermen launch their boats. Suddenly we heard someone call for a camera stop and we made the usual scramble for the door. In a cloud above us, we saw a glorious display of colors due to light refraction on ice particles. It was dubbed "The Opal Cloud" and we hope to see some excellent slides of it.

Leslie Gulch is cut through an ash flow tuff deposit of Miocene age. It is intersected by side canyons which contribute to the breath-taking beauty of the area. There were fantastic eroded formations of many sizes and shapes. The colors tend to be reds, yellows, orange and tan but they change constantly due to weather conditions and the position of the sun. Streaks of brown and black, caused by water-carried iron stain, add to the photogenic quality of Leslie Gulch. Every turn and curve brought a different scene and cameras clicked busily.

All too soon we heard the "Board" call and we continued on north, toward Succor Creek Canyon. The Succor Creek formation is composed of Miocene sediments overlain with rhyolite. Succor Creek cut down through these deposits to create a deep canyon. This became quite a sight to view as we neared the campground.

Many years ago, Indian artifacts were found in caves in the deep canyon area and, in recent years, this has become a rockhound's paradise. Several kinds of thundereggs, which is Oregon's state stone, have been found here. We saw evidence of recent flash floods which had covered the road in several places. Needless to say, we were thankful for our good bus driver.

Time marched on and we were already one hour late for a 1:00 o'clock rendezvous with geologist Dr. Mike Cummings who would join us at the Lake Owyhee Resort. Here we had a three-hour cruise.

Being a hearty, as well as a hardy, group of GSOCers, we looked forward to lunch as soon as we got there, considering the fact that we were late. Not so! Our hosts had decided that we would board three boats and go to a certain point for lunch. The food was carried on two of the boats and by the time we tied up for lunch, one boatload had already succumbed to the inner man. However, there was plenty of food and, after considerable passing back and forth of salad bowls, etc., we all felt revived.

Owyhee Dam, built in 1932 for irrigation purposes, forms a reservoir 52 miles long. We didn't cover the entire length of the lake although we cruised for three hours. The dam is 895 feet long and towers 405 feet from the foundation. A road from the dam to the resort is cut into the east wall of the canyon. We really appreciated Guy's expertise here.

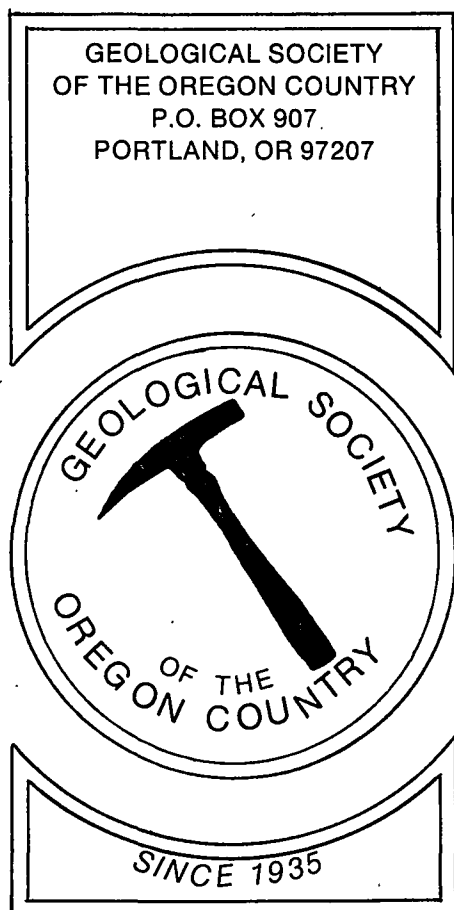
From the lake, driving north to our motel at Ontario, we traveled through alluvial farmlands which benefit from the waters of Lake Owyhee.

As President Ruth had stated in her synopsis of the trip, it was a day worth waiting for.

TO BE CONTINUED

THE GEOLOGICAL NEWSLETTER

G S O C
GEOLOGICAL SOCIETY OF THE OREGON COUNTRY



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OF THE OREGON COUNTRY
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Permit No. 999

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ACTIVITIES

ANNUAL EVENTS: President's Campout-summer. Picnic-August. Banquet-March.
FIELD TRIPS: Usually one per month, via private car, caravan or chartered bus.
GEOLOGY SEMINARS: Third Wednesday, except June, July, August, 8:00 p.m. Room S17 in Cramer Hall, PSU. LIBRARY: Room S7, open 7:30 p.m. prior to evening meetings
PROGRAMS: Evenings: Second and fourth Fridays each month, 8:00 p.m. Room 371, Cramer Hall, Portland State University, SW Broadway at Mill Street, Portland, Oregon.
Luncheons: First and third Fridays each month, except on holidays, at noon, Standard Plaza Cafeteria, third floor, Room A, 1100 SW Sixth Avenue, Portland, Oregon.
MEMBERSHIP: Per year from January 1: Individual, \$10.00; Family, \$15.00, Junior (under 18), \$6.00. Write or call Secretary for membership applications.
PUBLICATIONS: THE GEOLOGICAL NEWSLETTER (ISSN 0270-5451) published monthly and mailed to each member. Subscriptions available to libraries and organizations at \$7.00 a year (add \$3.00 postage for foreign subscribers). Individual subscriptions at \$10.00 a year. Single copies 60¢. Order from Geological Society of the Oregon Country, PO Box 907, Portland, OR 97207.
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VOLUME 56, NO. 12

CALENDAR OF ACTIVITIES FOR DECEMBER, 1990

FRIDAY NIGHT LECTURE (Cramer Hall, PSU, Room 371, 8:00 P.M.)

- December 14 "Persian Lifestyles," illustrated, by Helen Nelson, member, GSOC.
- December 28 Meeting cancelled. Christmas Holiday.

FRIDAY LUNCHEON (Standard Plaza, 1100 S.W. 6th Avenue, Rooms A & B, Third Floor Cafeteria. Programs at 12:00 Noon)

- December 7 "Iceland and Greenland," illustrated, by Margery Robertson, member, GSOC.
- December 21 "Volcanic Soils of Chile and Ecuador," illustrated, by Dr. Robert Meurisse, Regional Soil Scientist, U.S. Forest Service.

GEOLOGY SEMINAR (Cramer Hall, PSU, Room S-17, 8:00 P.M.)

Cancelled due to Christmas Holiday.

GSOC LIBRARY (Cramer Hall, Portland State University, Room S-7) Open 7:30-8:00 P.M. prior to evening meetings.

FIELD TRIPS

Saturday, December 29, 1990

Bonneville Dam Museum to see artifacts uncovered during construction of the dam. Take I-84 east to Bonneville Exit. Meet in parking area adjacent to the Bonneville Interpretative Center. For carpooling, meet at 9:00 A.M. by Cramer Hall, PSU, S.W. Broadway. No host lunch will be at a restaurant in the Gorge.

Saturday, January 12, 1991

Bus trip to Eugene to meet with Dr. Baldwin to tour the new University of Oregon Geology Dept. and the Museum of Natural History. RESERVATIONS REQUIRED. Cost \$27.00 mailed to GSOC, 8942 S.W. Fairview Place, Tigard, Oregon 97332 by January 2, 1991. Meet at 7:45 for an 8:00 A.M. departure from Cramer Hall, PSU, S.W. Broadway. Option to bring your lunch or have a hot lunch at Eugene's 5th Street Market.

NEW MEMBERS

Shirley O'Dell
9050 SW Scholls Ferry Rd. #524
Tigard, OR 97223

James & Cindy Lynn Troupe 249-7044
3236 NE 47th Ave.
Portland, Or 97213

NOTICE OF ANNUAL BUSINESS MEETING

Pursuant to the provisions of the By-Laws of the Society, the Annual Business Meeting of the Geological Society of the Oregon Country will be held in Room 371, Cramer Hall, Portland State University on February 22, 1991, at 8:00 p.m. At this meeting, results of the election of officers for 1991-1992 will be announced, reports of committees will be read or copies of reports made available, and any other business applicable to the proper functioning of the Society will be conducted.

ADDRESS CHANGE

Helen Whyte
1400 NE 2nd Ave. #512
Portland, OR 97232

NOMINATIONS FOR 1991-1992

The Nominating Committee Chairman, Gale Rankin, presented the following slate of officers:

President	Dr. Walter Sunderland
Vice President	Evelyn Pratt
Secretary	Charlene Holzwarth
Treasurer	Archie Strong
Director (3 yrs)	Betty Turner

Other nominations may be made by the members of the Society by submitting the names in writing to the Secretary before January 20, 1991. Such nominations must be accompanied by the signatures of ten members of the Society.

Ballots will be mailed to all members about February 1st, and should be returned to the Secretary before the Annual Business Meeting February 22, 1991.

PRESIDENT'S CAMPOUT
Lead by Dr. Ruth Keen

SOUTHEASTERN OREGON - SEPTEMBER 7-16, 1990

CONTINUED FROM NOVEMBER ISSUE

Day 7 - Thursday, September 13th
Ontario to Burns
by Bo Janko

We left Ontario on Mountain Standard Time, soon to be changed to Pacific, adding one more hour of activity to the day. The first leg of the trip between Ontario and Vale took us through rich farmland which reminds us so vividly how water can bring prosperity to a region.

In Vale, we met Mark Ferns from the Baker office of DOGAMI, and Dan Maus, the geologist with Atlas Mining, the company which is trying to develop the claims on Grassy Mountain into a mine. Dan gave us a lot of information on various aspects of mine development. Here is a short summary.

The mine was located and identified by a small consulting group (they used to call them prospectors in the old days) and subsequently offered to Atlas as only a large

company has sufficient resources to pursue mine development. The Grassy Mountain project comprises 38 claims. Atlas acquired the mineral rights in 1986 and spent three years exploring. A total of 193 holes have been drilled so far by reverse air circulation method, some exceeding 800 feet in depth. This resulted in the decision to pursue mine development. Their estimate is that the deposit contains one million ounces of gold and of this, 800,000 ounces are mineable. So far, they invested \$5.4 million into the Grassy Mountain project and expect to invest \$80 million total, if the project proceeds. The yearly production estimates are 100,000 ounces of gold and an equal amount of silver. Open pit mining would be used. The 150-200 foot tall "knob" over the deposit would be removed. A pit would be mined to the depth of 800 feet and a diameter of 2,200 feet covering the total 83 acres. They would mine removing ore in shelves. The material would be separated into three parts: the rich portions go directly into milling, lower concentrates into cyanide, and the waste is discarded.

The reclamation process would restore and reseed the mined shelves, but the pit itself would remain since the operation would not otherwise be economical. The project is currently tied up in the approval process with the environmental impact statement being prepared by a third party selected by the state. The approval process is expected to be resolved within one year. The powerful argument Atlas has is that 190 jobs and \$8 million tax income would be added to local economy.

Mark Ferns of DOGAMI gave a broad overview of the area pointing out the large older volcanic flows and younger rhyolite flows which often physically resemble caps.

The field part of geology involved digging freshwater snail fossils and observing the countryside from the nearby mound, which turned out to be a local garbage dump. Some members with archeological instincts promptly went to work. Apparently the Grassy Mountain area was too difficult to access. We did not get there.

The rest of the day was consumed in travel to Burns.

The unexpected delight of the day turned out to be a visit to John Bonebrake's niece in Burns. Virginia and her husband, Chuck Weightman, (P. O. Box 831, Hines, OR 97738) operate the Snow Mountain Gems Mine and jewelry operation. They mine sunstones. Sunstone is a member of the feldspar group of minerals. Virginia showed us their gems in various phases: raw ore, separated and sorted pieces, and faceted gemstones (the faceting is done overseas). The colors range from red, orange and yellow to green. A very entertaining part of the visit to see sunstone gems was John Bonebrake's tour through the city of Hines attempting to locate his niece's house. After getting lost approximately a half dozen times and negotiating the curves of small suburban streets with a huge RAZ bus, we finally got some local citizens to help and found Virginia's house. While we filled their front yard in our usual jovial fashion, some members of GSOC were approached by curious neighbors trying to find out whose wedding was taking place.

Day 8 - Friday, September 14th

Burns Area

by Lloyd and Margaret Giddings

We started from Burns at 8:00 a.m. for an interesting day. The pelicans were beautiful on Malheur Lake. In 1874, Diamond Craters got its name from a ranch named Diamond Ranch. They used a diamond-shaped brand on their cattle. Dr. Ellen M. Benedict, our guide for the Diamond Craters, brought six students with her. Diamond Craters, formed nine million years ago, was dedicated in October 1982, and is managed by BLM. There is no other place like Diamond Craters.

At 12:00 noon, we left Diamond Craters for Peter French's round barn. It was built round so they could train mules and horses in it. It was mainly constructed of juniper posts in 1880 and the wood is still in excellent condition.

French Glen is an interesting wide spot in the road with an old hotel and a grocery store with a post office. It got its name from Pete French and his partner, Glen.

On our return back to Burns, we encountered a dust storm with heavy winds. Sand was blowing on the road. Rabbit brush was blooming a beautiful yellow on both sides of the straight highway.

Day 9 - Saturday, September 16th

Burns to Bend
by Gale Rankin

As we departed from Burns at 8:15 a.m. under sunny skies, the group seemed in fine fettle and sounded like a happy gaggle of geese. The Hines Lumber Co. was pointed out to us as we passed by it. The Lumber Co. is a very important part of the area's economy. All along the highway are great expanses of sage, bunch grass, occasional irrigated green fields of alfalfa, natural pasture for winter cattle herds, and many large stacks of grass hay. One of the fields we passed had at least a hundred sand hill cranes feeding. As we continued on our route, the number of Juniper trees increased. Exposed rock frequently was visible on the horizon. The edges of the road were decorated with brilliant yellow rabbit brush. The rabbit brush seems to thrive especially well along the road edges. Two theories concerning this preference of location were: The hard road surface allowed the water to run off to the edge, and the exhaust from cars contained some moisture that the plants utilized.

A rest stop was made at the Sage Hen Rest Area that is located off U.S. 20 mile post 114.11. This was a very well groomed area and had green lawn, trees, and picnic tables with sun roofs - a great place to keep in mind when going this way again.

Traveling toward Wagontire, we observed Palamino and Iron Mountains in the distance. From Wagontire, we traveled another 46 miles to Christmas Valley. Along the road, we noted that on one side of the road rabbit brush was growing, and on the other side of the road sage was growing. A fire had swept through the side with the rabbit brush. After a fire, the rabbit brush is the first to return as it has deep roots; but the sage, with its shallow root base, is more vulnerable and may take several years to re-establish itself.

When we arrived at Christmas Valley, we found that our anticipated ice cream wouldn't be ready for an hour. It was then decided we would travel to Hole-in-the-Ground and return for our ice cream later. When we returned, we were met by a waiting dog who I had a feeling knew she might get to share our treat - needless to say, she did very well.

Fort Rock was our next destination and again we passed fields of sage, rabbit brush, large alfalfa fields, harvested rolls of alfalfa and hay, herds of beef cattle, and flocks of sheep. We saw a large storage shed with a sign, "High Dessert Hay Shed." The shed was full of baled cattle feed and there were large stacks of baled feed out in the open fields. We also observed a coyote in the sage and a herd of antelope. We arrived at Fort Rock to have lunch, take pictures and explore. The trip guide, prepared by Dr. Keen, contained the following information:

Fort Rock, the rock, not the town, is one of the most impressive of the maars or tuff-rings in this area. It stands alone in the Pleistocene lake basin that includes Christmas Valley and Fort Rock basins. Water over 300 feet deep washed its shores and the waves carved spectacular terraces. Fort Rock is about 450 feet in diameter, 20 feet high, and the floor of the crater is 2 to 4 feet above floor lake basin. It looks like a giant donut with a large bite taken out of it.

Fort Rock maar is composed of tuff, lapilli-tuff, and tuff breccias in beds of various thickness. The inward dipping beds suggest a funnel. On the west side of Fort Rock is an angular unconformity caused by the beds slumping into the crater.

Leaving Fort Rock, we started seeing Ponderosa Pine trees. The day was becoming cooler, clouds were forming, and someone thought they felt a drop of rain. This was the first time since we left home that the sun had not been out all day. Our lunch was well shaken down by the road we traveled to Hole-in-the-Ground. The road could be compared to corduroy or a series of very-close-together-slow-down-bumps. The Hole-in-the-Ground is tremendous and has thrown huge rocks out to its edges. A family from LaPine camped at the edge in two trailer homes and were visited by members of our group. Wonderful place to camp if you want to get away from it all. Must have been a challenge to get there with those large trailers. 'Way down in the center of the hole was what looked like a garbage can which inspired a member to say, "If we could find a hole like that between Seattle

and Portland, we might be able to solve our garbage disposal problems." The travel guide prepared for us by Dr. Keen contained the following information:

Hole-in-the-Ground is an explosion type maar, located on the northern edge of Fort Rock basin. The lack of trees except for a few scattered junipers gives it a spectacular exposure. This large circular hole was formed 13,500 to 18,000 years ago when a lake occupied the basin. The explosions were near water level close to shore. Explosions were triggered when basaltic magma came in contact with abundant ground water at 100 to 166 feet below the surface. Large blocks of older rock were blown out by the explosion and now lie along the rim.

We returned to Bend and stayed at the River House. The amenities provided were exceptional and the setting couldn't have been more pleasant with the Deschutes River right outside our patio doors. Don't know how Archie resisted activating his fishing rod. The evening was capped off with a farewell banquet and the most often repeated words heard were, "We must return again to spend more time at the many beautiful and interesting places we have seen."

Day 10 - Sunday, September 16th

Bend to Portland

by Rosemary Kenney, Immediate Past President

The air was crisp and cool as we left Bend on our last morning of the trip. The feel of autumn was in the air, much cooler than the last few mornings.

Our first stop was at Benham Falls on the Deschutes River. The river had a different appearance from the same river that flowed by our motel in Bend. Benham Falls is a series of untamed rapids. When Lava Butte erupted about 6,000 years ago, lava broke through the southern side, spread westward and blocked the ancestral channel of the Deschutes River. The river then cut a new path around the toe of the lava flow where Benham Falls is now. The Deschutes River still boils, churns and tumbles. Captain John C. Fremont traveled along the river in 1843 and described the river as having abundant falls and always hearing the roaring of falls. An interesting item about the Deschutes River between Benham Falls and the confluence of the Crooked River is that its height does not vary more than 8 to 10 inches throughout the year. This is because the Deschutes River flows over porous lava which absorbs the excess water. The river rarely creates a flood, even with heavy rains and rapid snow run-off.

A stop at the High Desert Museum was next. The museum represents the cultural and natural history of the Pacific Northwest's arid region. The 20 acre museum has both indoor and outdoor exhibits, nature trails, art galleries and live animals. The otters were especially fun to watch but we were too early for the Birds of Prey demonstration. Among the outdoor exhibits are the Settler's Cabin (a fully furnished one room log cabin), a vegetable garden, sheep wagon, and the Forest Learning Center complete with an old sawmill operated by four men. The Earle A. Chiles Center on the spirit of the West depicts sights and sounds of the past: fur trade, overland migration, mining, and settlement. Each exhibit had its own sounds, even breaking mine timbers and crickets at night.

Newberry Volcano, a shield volcano, is 25 miles in diameter at its base. Its highest point is Paulina Peak, 7,985 feet above sea level. Newberry Volcano's development was mostly in the Pleistocene epoch but it has been active off and on until a few centuries ago. The shield was built up by flows of basalt; later, molten lava leaked out and drained the central feeding pipes. The top of Newberry collapsed about 6,000 years ago, leaving a single caldera. Later volcanic activity created an obsidian dam across the center to form two lakes. The Big Obsidian Flow is one of the largest in the United States, flowing for more than a mile. The view of Paulina Peak is awe-inspiring. Yes, Guy drove the bus up there!

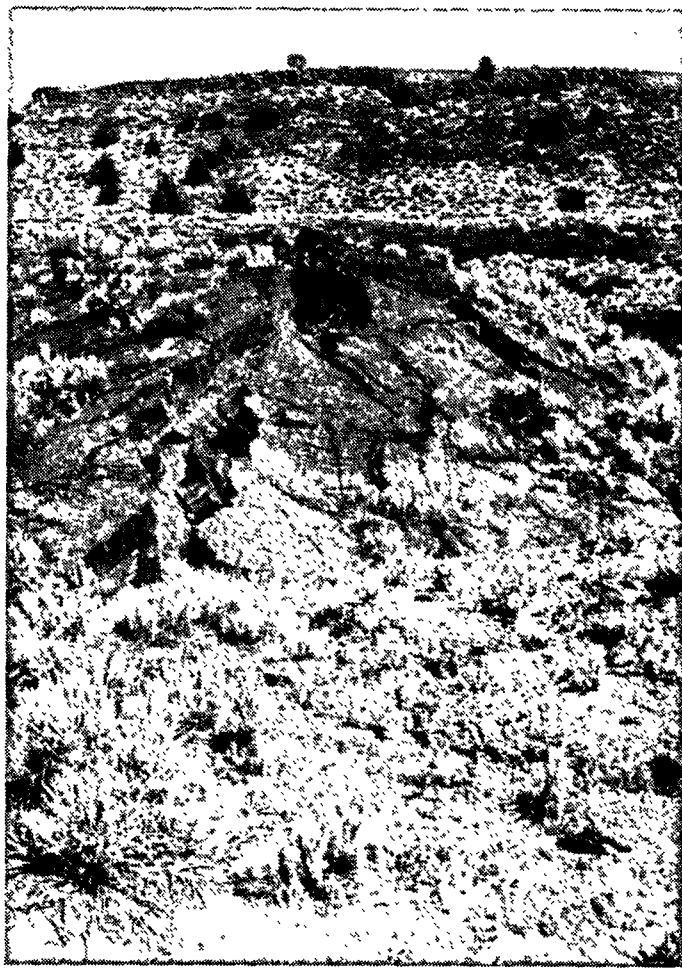
On our way back to Portland, we were entertained by Dr. Ruth Keen relating tales of her youth and early teaching years. Esther Kennedy, Helen Nelson, Clara Bartholomay and Cecelia Crater immortalized our trip with poetry. Lack of space prevents printing the poems but you may obtain copies from the above people. It was a great trip!



Frenchglen Hotel and the Post Office



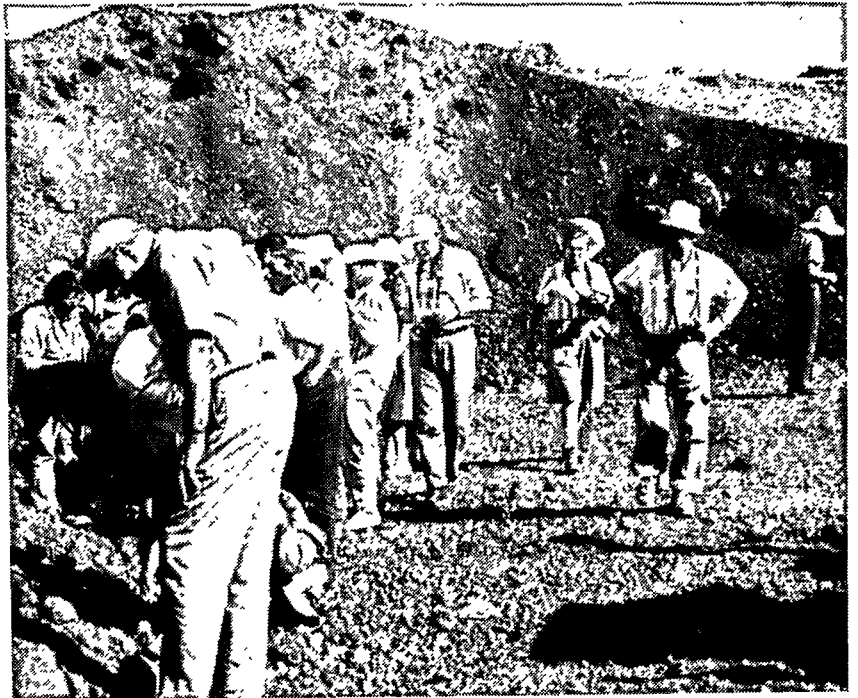
Crack In Ground near Christmas Valley.



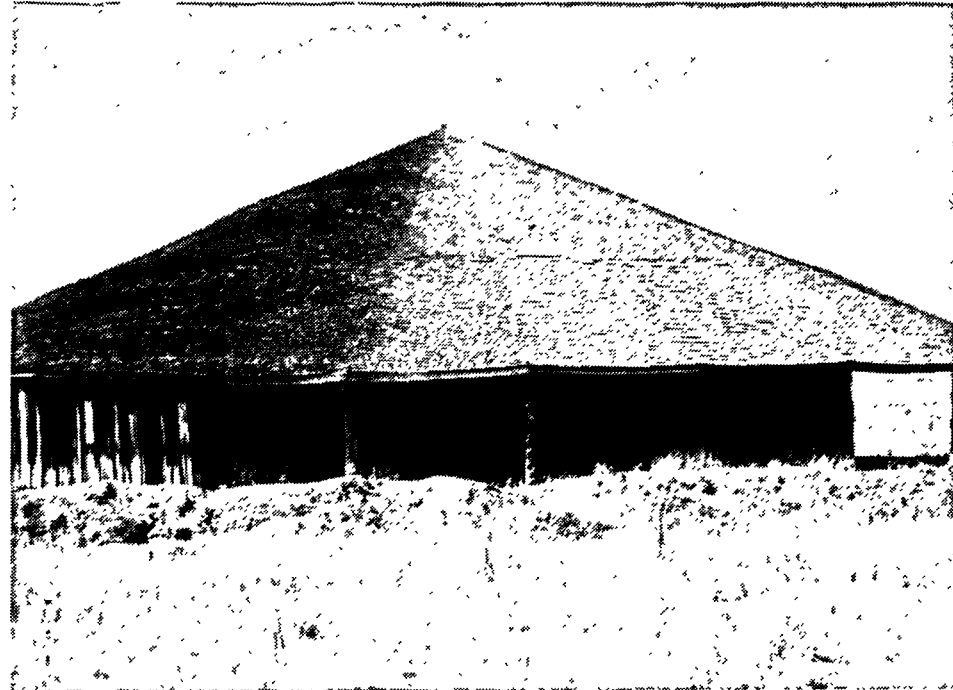
Diamond Crater pressure ridge.



Guy Leabo, Frances Ruche and others examining opals in Virgin Valley.



Part of the group at Diamond Crater.



The Pete French Barn. A round barn?

PHOTOGRAPHS BY DON PARKS



Alta Fosbeck and Ruth Keen at the pumps near Rome.

CORRECTION TO ARTICLE IN OCTOBER, 1990 NEWSLETTER

"Field Trip Lone Butte-Crazy Hills-Lewis River,
Land of Volcanoes, Glaciers, Tuyas and Mobergs"

Dr. Paul E. Hammond, Portland State University, and member, GSOC, submitted corrections and additional information not contained in the trip log. The age of the intracanyon lava flows from Trout Creek Hill in the Wind River is 340,000 years ago, not 35,000 years ago (Hammond, P.E., and M.A. Korosec, 1983, Geochemical analyses, age dates, and flow-volume estimates for Quaternary volcanic rocks, southern Cascade Mountains, Washington: Washington Division of Geology and Earth Resources, Open-file Report 83-13, 36 pp.).

New age dates from M. Shafiqullah, University of Arizona, Tucson, reported in Korosec, M.A. 1989, (New K-Ar age dates, geochemistry, and stratigraphic data for the Indian Heaven Quaternary volcanic field, southern Cascade Range, Washington: Washington Division of Geology and Earth Resources, Open-file Report 89-3, 42 pp.) show that Lone Butte and Crazy Hills are 314,000 and 309,000 years ago respectively in age. These dates suggest that the next oldest widespread alpine glaciation (Hayden Creek Glaciation) in the Cascade Range is of this age, older than the 130,000-190,000 years ago previously thought by Colman and Pierce (1981, Weathering rinds on andesitic and basaltic stones as a Quaternary age indicator, western United States: U.S. Geological Survey Professional Paper 1210, 56 pp.), although additional field work and dating of critical rock units are necessary to fully establish this age for the glaciation.

However, it appears that the lack of Trout Creek Hill lava flows to the north in the Wind River is because (1) the Wind River glacier, during Hayden Creek Glaciation, removed the lavas there, or (2) the glacier was occupying the valley during eruption of Trout Creek Hill, thereby blocking the northward spread of the lavas. There are indeed interesting relations between glaciation and volcanism in the Cascade Range.

Joline Robustelli
Past President