

THE GEOLOGICAL NEWS LETTER

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The
Official Bulletin
of the

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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With The
Constitution And By-Laws of The
Society

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Volume No. 1
May 23rd to December 21st
1935

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THE OFFICERS AND COMMITTEES OF THE GEOLOGICAL SOCIETY
OF THE OREGON COUNTRY

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Vice Pres. - K.N. Phillips
Secretary - A.F. Pratt
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Committee on Emblem and Insignia: Chairman Geary Kimbrell, Paul
Randolph.

CONSTITUTION

Adopted April 18, 1936

ARTICLE I - NAME, LOCATION AND OBJECT.

Section 1 - The name of this Association shall be the Geological Society of the Oregon Country.

Section 2 - The Offices of the Society shall be located in the City of Portland, Oregon.

Section 3 - The objects of the Society shall be:

- (1) To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country.
- (2) The establishment and maintenance of a library and museum of geological works, maps, and specimens.
- (3) The encouragement of geological study among amateurs.
- (4) The support and promotion of geologic investigation in the Oregon Country.
- (5) The designation, preservation and interpretation of important geologic features of the Oregon Country.

ARTICLE II - MEMBERSHIP

Section 1 - There shall be five classes of members: Junior, Associate, Member, Fellow and Honorary Fellow.

Section 2 - Members, Fellows, and Honorary Fellows in good standing shall be entitled to vote.

Section 3 - Qualifications for membership:

- (1) Juniors shall be persons under twenty-one years of age who have been recommended by the membership committee.
- (2) Associate members shall be persons twenty-one years of age and over who are interested in and support the aims and objects of the Society but who cannot for lack of time or other reasons become full members. They shall be recommended by the membership committee.
- (3) Members shall be persons twenty-one years of age and over who have been recommended by the membership committee.
- (4) Fellows and Honorary Fellows may be elected by the Society upon the recommendation of the Executive Committee for outstanding contribution to or attainment in the study of Geology.

ARTICLE III - DUES

Section 1 - The annual dues for a Junior shall be \$1.00, all other members shall pay annual dues of \$2.50; provided, however that the Executive Committee may remit the dues of any or all Honorary Fellows.

ARTICLE IV - OFFICERS.

Section 1 - The officers of the Society shall be a President, a Vice-President, three Directors, a Secretary and a Treasurer.

Section 2 - There shall be an Executive Committee of nine members consisting of the two latest living past Presidents continuing to be members, The President, Vice-President, Secretary, Treasurer, and the three directors provided for in Section 1 of this Article.

Section 3 - The terms of office of all officers shall be one year with the exception of the Directors who shall serve for three years, provided that at the first election the nominee for director receiving the highest number of votes shall serve for three years, the nominee receiving the next highest number of votes shall serve for two years, and the nominee receiving the third highest number of votes shall serve for one year. Thereafter one Director shall be elected each year. Until such time as the Society has existing living past Presidents, the positions provided for them on the Executive Committee shall be filled by appointment by the elected members of the Executive Committee.

Section 4 - The Executive Committee shall appoint officers to all vacancies except that the Vice-President shall complete the term of the President in case of a vacancy.

Section 5 - The Presidents shall be ineligible for re-election.

ARTICLE V - MANAGEMENT.

Section 1 - The Executive Committee shall be vested with the exercise of all the powers of the Society, subject to this Constitution. It shall make provisions in By-Laws for the duties of the several officers, and for the general administration of the affairs and property of the Society. It shall make an annual report to the Society at the annual meeting thereof, transmitting therewith the report of the Treasurer and such other reports as it shall deem advisable.

Section 2 - Meetings of the Executive Committee shall be held at the time of the annual meeting, and in each year not less than five other meetings shall be held at such times and places as the committee shall designate. Five members shall constitute a quorum at any meeting of the Executive Committee.

ARTICLE VI - NOMINATION AND ELECTION OF OFFICERS.

Section 1 - The Executive Committee shall appoint a Nominating Committee of five members, none of which shall be officers or directors of the Society. Not less than sixty days previous to the annual meeting the Nominating Committee shall file with the Secretary a ticket, to be known as the regular ticket, containing the name of one nominee for each office to be balloted on. The Secretary shall mail a copy of this ticket to each member of the Society not less than forty-five days previous to the annual election. Any ten members may file with the Secretary other nominations for any or all offices, but such nominations must reach the Secretary not less than

Article VI, Section 1, Continued

thirty days previous to the annual meeting. A list of these nominations, to be known as a special ticket, with the names of the members nominating each special ticket, shall be mailed not less than fifteen days previous to the annual meeting, to each member of the Society. A letter ballot containing the nominees of the regular and special tickets shall be enclosed with the special ticket. All ballots must be returned and in the hands of the Secretary previous to the Annual meeting at which meeting the Secretary shall announce the result thereof. In case a majority of all the ballots shall not have been cast for any candidate for any office, the Society shall proceed to make an election, in open meeting, for such office from the two candidates having the highest number of votes.

Section 2 - Officers shall take office as provided for in the By-Laws.

Section 3 - The first election of officers of the Society shall take place immediately after the adoption of this constitution. The acting Nomination Committee shall place its candidates in nomination consisting of one person for each office. Other nominations may be made from the floor. This section shall be inoperative after the first election.

ARTICLE VII - MEETINGS.

Section 1 - There shall be a regular business meeting annually and at such other times as the Executive Committee may select. Twenty members shall constitute a quorum at any meeting of the Society. Programme meetings shall be held as provided for in the By-Laws.

ARTICLE VIII - AMENDMENTS.

Section 1 - Proposed amendments to this Constitution must be reduced to writing and signed by not less than ten members in good standing, and be submitted and acted upon as follows:

Section 2 - Proposed amendments shall be filed with the Secretary who shall submit same to the Executive Committee at its first regular or called meeting thereafter for its approval or disapproval. At least fifteen days previous to the date of the regular annual meeting the proposed amendment, accompanied by the action of the Executive Committee, shall be mailed to each member of the Society. If the proposed amendment is filed with the Secretary more than ninety days previous to the regular annual meeting a letter ballot may be enclosed with said proposed amendment, which ballot shall be returned to the Secretary within fifteen days from the date of mailing by the Secretary. No proposed amendment shall be considered at the regular annual meeting unless filed with the Secretary at least thirty days previous thereto.

Section 3 - If the proposed amendment has been approved by the Executive Committee, then an affirmative vote of a majority of all ballots cast shall be necessary to the adoption of the amendment.

If the proposed amendment has not been approved by the Executive Committee, then an affirmative vote of two thirds of all ballots cast shall be necessary to the adoption of the amendment.

Article VIII, Section 3, Continued

Any amendment defeated by letter ballot shall not be re-submitted for adoption except at a regular annual meeting or until one year has elapsed.

Amendments shall become effective immediately, provided that the officers of the Society, at the time any amendment may be adopted shall continue in office until the expiration of the time for which they were elected.

Section 4 - The Executive Committee may by a two-thirds vote of those present at a meeting duly called, amend the By-Laws consistently with this constitution, provided that the Secretary shall have given written notice of such amendment to each member of the committee at least seven days before the meeting at which action thereon is to be taken.

BY-LAWS

ARTICLE I - MEMBERSHIP.

Section 1 - The Society shall comprise members who, by knowledge, experience, and honorable standing, are qualified to advance the objects of the Society, and who shall be elected to membership as hereinafter provided.

ARTICLE II - PAYMENT OF DUES.

Section 1 - Dues shall be payable annually in advance on January First. All applications for membership shall be accompanied by the annual dues. After October First the dues for applicants for membership for the balance of the year shall be One Dollar (\$1.00).

Any member whose dues are more than two months in arrears shall be notified by the Secretary of his delinquency. Should said delinquent dues be not paid when they are four months in arrears, the delinquent member shall lose the right to vote or to receive the publications of the Society; if such dues become six months in arrears the delinquent member shall forfeit his connection with the Society.

ARTICLE III - MANAGEMENT.

Section 1 - The Executive Committee shall manage the affairs of the Society in accordance with the provisions of the Constitution. They shall exercise all authority as to Public Relations, Publications, and such correspondence as may seem desirable.

All expenditures shall be authorized by the Executive Committee and warrants for the payment of such expenditures shall be drawn on the Treasurer and shall be signed by the President and the Secretary. The Treasurer shall draw the checks.

Section 2 - The annual business is to be held in February on a date set by the Executive Committee at which time the officers for the ensuing year shall be elected and immediately be inducted into office.

Article III, Section 2, Continued

The Executive Committee and the various officers of the Society shall file their annual reports at the meeting.

Section 3 - The President shall serve as the executive head of the Executive Committee. The President shall have general supervision of the affairs of the Society. He shall preside at the meetings of the Society and of the Executive Committee and shall be ex-officio member of all committees.

Section 4 - The Vice-President shall preside at meetings when required to do so by the President or in the absence of the President he shall exercise the duties of that office.

Section 5 - The Secretary shall be under the direction of the President and the Executive Committee. He shall be expected to attend all meetings of the Society and of the Executive Committee and prepare the business therefor and record the proceedings thereof. He shall see that all monies due the Society are collected. He shall scrutinize all expenditures and use his best endeavour to secure economy in operation of the Society. He shall personally certify to the correctness of all bills and vouchers on which money is to be paid, to the best of his ability and belief. He shall perform all duties which may be assigned to him from time to time by the President or the Executive Committee.

Section 6 - The Treasurer shall receive all monies and deposit the same to the name of the Society. He shall pay all bills when certified and audited by the Secretary, and warrants for the payment of the same have been drawn on him by the President and the Secretary.

ARTICLE IV - COMMITTEES.

Section 1 - All committees shall be appointed by the Executive Committee in not to exceed thirty days after the regular annual business meeting. All committee members shall continue to function until they have been replaced by new appointees. The number of members on the various committees shall be left to the discretion of the Executive Committee.

Section 2 - MEMBERSHIP COMMITTEE - The Membership Committee shall pass on the credentials of all applicants for membership.

Section 3 - EDUCATIONAL AND PROGRAM COMMITTEE - This committee shall outline all activities, lectures, programs and study courses.

Section 4 - FIELD PROJECT AND TRIP COMMITTEE - This committee shall have charge of the selection and execution of all field projects and field trips.

Section 5 - MUSEUM AND LIBRARY COMMITTEE - The object of this committee shall be to collect material for preservation, accumulate books, maps, photographs, and other documents of geologic interest.

ARTICLE V - MEETINGS.

Section 1 - Meetings shall be held at such time and places as fixed by the Executive Committee.

ARTICLE VI - PARLIAMENTARY PROCEDURE.

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No. 1

Portland, Oregon

May 23, 1935

Across The Editor's Desk

This publication is the first effort of the society to develop and maintain a news medium, dealing with club activities and facts allied with it for its members. It is as yet in an embryonic stage and does not even possess a name of its own. Members are invited to suggest names for the consideration of the executive committee. You have a name, our society has a name, lets find one for our paper.

Our Past Lectures

Although the society is in the process of formulating its offices and activities, we have already enjoyed two excellent lectures. For record, and for those who were not fortunate enough to attend, we offer these resumes:

THE HISTORY OF THE COLUMBIA RIVER Dr. Edwin T.Hodge - May 2, 1935

The Columbia River, with its deep and scenic gorge, is the largest river flowing into the Pacific Ocean on the west coasts of North and South America, and while it cannot claim as extensive a drainage basin as several other river systems, yet enormous quantities of water are carried through its canyon to the sea. During the great flood of 1894 it was estimated that 1,171,000 second feet of water emptied into the ocean through its channel, and the average daily load carried is approximately 100,000 second feet.

But the mighty Columbia was not always as we see it today. The history of its development from a small ancestral stream which followed a meandering course to the sea reveals a dramatic geologic story covering great periods of time. The course of the ancient river was first disturbed by volcanic activity when cinders and ash were belched forth, the great masses of debris finally building up so high that the Cascade Range resulted. These volcanic deposits gradually buried the old passage of the Columbia through the Cascade Mountains. The river so dammed formed Condon Lake. During the Ice Age, the rivers flowing toward the north were blocked and dammed by ice and formed Lake Lewis.

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Russell R. Norton Editor and Manager
Harry L. Clark
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This lake rose higher and higher until it spilled over the Horse Heaven Hills and cut through the Wallula Gateway. The escaping waters from Lake Lewis in Southeastern Washington increased the size of Lake Condon in Oregon. Lake Condon, in its turn rose to an elevation of 1900 feet above tide and poured over a low sag in the Cascade Range. This channel became the youthful V-shaped gorge through which flows our present Columbia River.

The great changing processes of nature continued, consuming eons of time, and this portion of the country was depressed below the level of the sea. The canyon of the river may yet be traced out into the ocean and in fact in following this deep cut to Astoria, there are places the depth of which have not yet been sounded. Because of the submergence, the ocean extended in and the valley became filled with salty water making of the river an estuary. Through more ages, a delta was built up which the river is at present extending to the sea. This depositional process has continued until bedrock at Bonneville is overlaid with 100 feet of silt, while at Portland the depth is no less than 1500 feet, and at Astoria about 3000 feet.

As is characteristic of young rivers, many land slides occurred. Perhaps it was only about 1000 years ago that such a slide of enormous proportions took place when millions of tons of earth slipped from the Washington side, damming the river and burying the toes of two certain rocky spurs which jut out from the Oregon side. With the blocking of the gorge at this location a new lake was created to which has been given the name "Lake of the Gods". That this particular slide is of very recent origin is borne out by the fact that Lewis and Clark are said to have been greatly impressed by the sight of huge woody snags in the river, the evident remains of trees which had grown on the valley walls and were still in a good state of preservation when the explorers viewed them.

Finally from the Lake of the Gods, the river spilled over and cut a channel near the Oregon side and the stream in its erosional process uncovered the two Oregon spurs to bare rock. The exposed section of the upstream spur became known as Boat Rock and that of the downstream as Bonny Rock. From The Dalles to the mouth of the Columbia there are only these two known places where bedrock within a reasonable distance of the surface has

been struck. The silt and debris deposited by the river between the two rocks built up a land mass which resulted in Bradford Island.

Four years ago, after repeated drilling without encountering bedrock, it was believed that the dam would have to be built on a floating foundation at Warrendale as the logical location. And then Bonny Rock was discovered! Here the drills bit into the submerged rock spur and the present desirable site was decided upon. Nature had built up on the one side of the river the natural wide, water-tight abutments so essential in dam-building, and had furnished a solid igneous rock foundation on the other, presenting an ideal location.

With the completion of the Bonneville Dam Project - the highest single lift navigation lock of its type in the world will be placed in operation - the Oregon Country and environs will be afforded cheap and plentiful power, and ships from the Seven Seas will carry produce to and from our great Inland Empire.

THE PROBLEMS ENCOUNTERED IN LOCATING AND CONSTRUCTING BONNEVILLE DAM

Mr. C. I. Grimm-May 16, 1935

Mr. C. I. Grimm, Chief Civilian Engineer of Bonneville Dam spoke to the society about the "Problems Encountered in Locating and Constructing Bonneville Dam".

Mr. Grimm's talk was liberally illustrated with slides. He emphasized the importance of a suitable foundation for the building of a dam. The peculiar fact about dam sites is that the best sites are seldom accompanied by ideal hydraulic conditions.

The Federal Government has for some time been exercising control over the location of dam sites on important rivers. Beginning about 1920, the Federal Power Commission began to exercise authority in that respect and where rivers have been improved for navigation the army engineers have controlled the location of the dam sites. Any one dam site must be located relative to other sites so as to form a comprehensive plan for developing the river which means a series of steps, each one backing the water up to the site above. Such plans have been developed for the Columbia River.

Some of the slides illustrated the several locations planned for the dam; others dealt with the Cascade Rapids in which there is a fall of 35 feet; and still others with Ruckel Slide which has caused considerable trouble in the past and is now demanding attention from the engineers. Mr. Grimm feels, however, that the difficulty has been satisfactorily met. During the past the slide has been well controlled by the Union Pacific by the driving of drainage tunnels into the toe of the slope. Inasmuch as some

of these tunnels will be flooded by the dam pond, new tunnels will be constructed to insure continued drainage. The slide on the Washington side has become well stabilized and is viewed with but little concern.

The old river courses with its wanderings and undercutting, which caused the great landslides, were followed across several maps by Mr. Grimm. There is foundation for a dam at the present site because the river has been recently, geologically speaking, diverted to its present location and has not had time to scour its bed to any great depth.

The basalt on which the locks and power house are being constructed is a strong, durable rock, but contains many seams and hair cracks. The slides revealed more or less horizontal seams and vertical columns. The type of construction of the locks is peculiar, but very interesting; concrete lines the rock walls of the cut and extends well above it, to a total height from the floor of 102 feet. This lock will be one of the highest ever built. A 50 foot pot hole at one end of the locks had to be excavated and filled with concrete.

The diversion of the river offered a serious problem to engineers. Many slides well illustrated the construction and use of cofferdams. The channel of the Columbia south of Bradford Island can be blocked and the blocked area kept dry twelve months of the year. Construction in the other channel can be carried on but seven months in the year. The area kept dry by the cofferdam is in some places as much as 70 feet below sea water level. Pumps keep the area dry by removing about 65 second feet of seepage. Extensive use of hydraulic models has been made in figuring actual results at the dam. The actual water passing over the dam will be controlled by spillway gates which can be raised or lowered. The photographs and diagrams which Mr. Grimm had selected showed well the method by which the power of the water will be captured. The surface of the impounded water will have an elevation of plus 72 feet. The power house, as it is being built, will have two power units installed, but it will accommodate four more with room on one end to excavate and install four additional units.

Half of the excavated material will be used to level the surface of Bradford Island; the other half will be distributed upon the Oregon shore.

One of the principal problems encountered by Mr. Grimm and his associates was that of rapid employment. It required about nine months after the job was authorized to reach an employment of 3000 at Bonneville, which was estimated to be the normal rate of employment. The work will continue at about this rate for two years at which time it will be gradually decreased.

Mr. Grimm concluded his very instructive talk by answering questions. After hearing this lecture, we have some excuse for feeling that we know something about the Bonneville Dam Project.

Our Next Lecture

The Geological Society of the Oregon Country is to be honored by a lecture on June 6, 1935 by Dr. Warren D. Smith. It will be given in the auditorium of the Public Service Building at eight o'clock p.m. Dr. Smith will speak and present slides of Crater Lake National Park. All members and friends of the society are invited. The lecture promises to be one of note, for not only is Crater Lake of scenic interest and geological importance, but Dr. Smith is the man best fitted to tell its story.

Two Day Exploration Trip Scheduled For Members

"The Settlements and Battlements of
Ancient Man in the Columbia Gorge"

Mrs. Randolph's Resume of Trip

An exploration trip such as has never before been undertaken in the states of Washington and Oregon has been specially arranged for members of the Geological Society of the Oregon Country. In fact, such an expedition never could have been made before for the reason that many of the sites to be studied were only very recently scientifically described by Dr. Herbert Krieger, Curator of Ethnology of the Washington Museum, when under the auspices of the Smithsonian Institute, he made a thorough survey of the evidences of the early settlements and battlements of ancient man in the Columbia Gorge. Mr. Wayne Felts, who was associated with Dr. Krieger during the summer of 1934, and who has carried on further intensive study of the area, will conduct the party.

The group plans to leave Portland about Saturday noon, May 25th, visiting Bradford Island and the scenes of numerous Indian conflicts and will have the opportunity of seeing a large number of Hudson Bay Company trade articles found on the island. Cascade Locks, Hood River, Mosier Slide, Memaloose Overlook, the Game Run at Hog Canyon and work shop at Rowena will all be included in the afternoon schedule.

An overnight stop will be made at The Dalles. The Wakemap area will be visited and studied, and also points of interest will be shown at Bingen, White Salmon and North Bonneville, including Greenleaf Slough Village and Workshop, Burials on Table Mountain, etc. The villages at Skamania, Archer Mt. and Prindle will also be pointed out.

For full details as to accommodations and transportation members are advised to communicate with Mr. William McKenzie, 1632 SW 12th street, Portland, Oregon - Telephone: BE 8772.

The editor and staff of this paper solicit material and articles of interest from the members of the society. Any suggestions as to policy, form, etc. will be most gratefully received. The deadline for receivable, typewritten material is the Thursday previous to the next issue.

Last Sunday, May 19, 1935, the Geology Class of the University Extension enjoyed a field excursion under the supervision of Dr. E. T. Hodge. A group of about fifty people visited the Bonneville Dam Project and adjacent points of interest, including Ruckel Slide and Cascade Locks. The party returned home with abundant knowledge and specimens, including sore feet and sunburned faces. Among the many and varied specimens was a certain species of dog brought back by the MacFarnaghan Brothers.

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No. 2

Portland, Oregon

May 28, 1935

ACTIVITIES OF COMMITTEES

Permanent Location Sought

The Committee on Club Rooms has been busy collecting data for a permanent location and some preliminary contacts have been made. While our need is great, it is believed that a little extra time taken now will be of great value later.

If any member has a suggestion to make, please contact the Committee on Club Rooms.

Mr. A. D. Vance, Chairman
5516 NE Rodney Avenue
Walnut 5204

Where Shall We Go? - And When?

Do you have some place in mind for the Society to explore? Tell the Exploration Committee about it. To have a well rounded program of Field Trips and Explorations, we feel that the Society at large should take advantage of their privilege of submitting suggestions. If you know of one geologically interesting place or two dozen, please tell the Exploration Committee. Give the location and the best time of the year to visit the spot.

You don't have to know the history of the spot. Let the Exploration Committee go there and study it; or if you know about its history, let the rest of us go there and you can tell us about it. Any place will do: a mineral deposit, a fossil bed, an interesting formation, or a project involving geologic methods and interpretation.

Don't be afraid to suggest a trip and don't wait for some one else to do it. They might do the same thing.

Mr. Harry L. Clark, Chairman
2433 NE 59th Avenue
Trinity 5776

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Across the Editor's Desk

Our club has progressed and will progress. It will progress just as surely as we, who have lent it impetus, maintain our original interest and good intentions, of helping in some little way those in whom we have vested the bulk of responsibility and endeavor. Our committees have begun their activities. Suggestions to those committees would prove of great help.

Any idea pertaining to the activities of the Society, if conveyed to the proper Committee, will make you a true member of a wide awake and active society. Let's do our bit!

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The names of prospective members should be given to Mr. Tracy Wade, Chairman of the Membership Committee, so that extra copies of this publication may be given to them. Any non-members desiring copy of this paper, may obtain same for ten cents an issue.

Emblem Prize Offered

A prize consisting of a membership in the society free of dues for a period of five years is offered for the best and most acceptable design of an emblem for this society.

We hope that a design may be discovered that will suggest not only the nature of the society but also, if possible, some characteristics of the geology of the "Oregon Country".

The design should be suitable for use on stationery or on a pin.

Anyone may submit one or more designs.

Mr. Geary Kimbrell, Chairman
2522 NE 57th Avenue
Garfield 9995

"ELEPHANT HUNTERS" REPORT NEW FINDS

A search of the area from which the huge elephant bone, exhibited at a recent meeting of the Geological Society, was said to have come, was made last week by Tracy Wade and Paul Randolph. The reconnaissance proved successful and new zest was added to the project by the recovery of a large portion of a jaw bone and a tusk, the latter, however, in a poor state of preservation. A group of willing "diggers" will soon be organized with the hope of finding the complete skeleton of the mammoth creature which once roved our Willamette Valley. The location of the "finds" is but a short distance from Portland and easily accessible by car and boat.

WEEK END GORGE TRIP

The trip "Battlements and Settlements of Ancient Man in the Columbia Gorge" conducted by Mr. Wayne Felts was made over the week end of May 25 and May 26. A part of sixty-one composed of members and friends spent Saturday afternoon viewing points of interest at Bradford Island, Cascade Locks, Hood River, Mosier Slide and Rowena View Point. All gathered around a bonfire Saturday evening at the camping place at The Dalles, at which time Mr. Felts gave a brief resume of the findings of the Smithsonian Institute's research expedition in the gorge last summer. Mr. L. F. Simon gave a short talk on the wild flowers seen on the trip and Mr. Carl Richards spoke briefly on astronomy.

Early Sunday morning the party crossed the ferry for Grand Dalles and spent the morning in the vicinity of Wakemap, viewing Indian paintings and carvings and searching for arrowheads. Sunday afternoon stops were made at Bingen, Fort Rains and North Bonneville, viewing former Indian villages and searching for Indian artifacts.

Quite a number of wood arrowheads and spearheads were found during the trip. One Indian axe was discovered.

At each stop Dr. Hodge spoke briefly on the geology of that particular point and mentioned points of interest to be seen between stops.

More complete material covering this trip, as well as the trip to Bonneville Dam, will appear in a future issue.

A REAL OPPORTUNITY FOR MEMBERS OF THE SOCIETY

The attention of the members of the society is called to a publication entitled SCIENCE NEWS LETTER, a weekly summary of current science. It is published by Science Service, an institution for the popularization of science, organized in 1921 as a non-profit organization with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession. The subscription rate for this weekly is \$4.00 per year; however, if a club of ten or more is formed, the publication may be obtained for

five cents a copy, or \$2.60 a year, provided they are all mailed to the same address. The Secretary has indicated that he is willing to have the bundle addressed to him and distribute them at the meetings of the Society, provided ten or more wish to subscribe to it. Copies will be displayed at the next meeting for examination by those interested. This weekly contains much geological information, including book notices. A number of the members are already subscribers and the intention of this notice is to pass a good thing along.

Editor's Note: Any member subscribing to a science magazine dealing, even in part, with material applicable to our interests, please contact the Editor.

SOCIETY TO HAVE SUMMER FIELD TRIP

The Geological Society of the Oregon Country will hold a summer camp program in conjunction with Oregon State College, under the direction of Dr. Wilkinson, from June 11 to July 20. The time will be divided as follows:

From June 11 to June 23 - Geologic Mapping
From June 24 to July 9 - Geologic Mapping Suplee Quadrangle
From July 10 to July 16 - Trip (See details below)
From July 17 to July 20 - Completion of maps, notes and report at Corvallis.

The trip from July 10 to July 16 will include such places of interest as:

Pauline to Albert Rim--Fremont Highway--Fossil lake--Lava bed--Ice caves--Newberry Crater--Cinder Cone--Lava caves--Pilot Butte--Smith rocks--Crooked River bridge--Madras--formations--Clarne--Maupin--Wapinita cut off--Portland.

The Distance is approximately 700 miles and will take about six days' time. Those leaving Portland will have about a 1000 mile trip. The trip is the only portion of this outing open to women.

The Suplee Quadrangle area, which is to be studied occupies the center of the State of Oregon.

The expenses of the trip will consist of a fee of \$5.00, plus a \$5.00 living expense charge each week of attendance.

Further details will appear in this publication at an early date.

List of the Members of
THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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MCCARTNAGHAN, ROBERT M.	WA 4294	229 N. Shaver Street
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SMITH, MABEL C.	SE 0916	1350 SE Flavel Street
TRETERS, GLENA M.	TA 5091	2213 SE 52nd Avenue
VANCE A. D.	WA 5204	5516 NE Rodney Avenue
WADE, TRACY	TR 6060	4204 NE Broadway
WILKINSON, DR. W. D.		345 N. 25th St., Corvallis, Ore.
WINESTONE, ROBERT L.	SE 4860	2613 SE 28th Place

This list of members is a temporary and incomplete one. Omissions and errors should be called to the attention of the Secretary. Temporary changes of address should also be reported.

CRATER LAKE LECTURE

Remember: -- on June 6th at the Public Service Building Auditorium, Dr. W. D. Smith will lecture on Crater Lake.

PITTSBURG LANDING FIELD TRIP

On June 9th Dr. Earl C. Packard will lead a field trip to the fossil beds on the Nehalem River. Here is your chance to start to increase that fossil collection. For details and arrangements,

call: Harry L. Clark - TRinity 5776

THE GEOLOGICAL NEWS LETTER

Official Bulletin
of the

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Vol. 1 - No. 3

Portland, Oregon

June 5, 1935

SETTLEMENTS AND BATTLEMENTS OF ANCIENT MAN
IN THE COLUMBIA GORGE

.....

Gladys C. Randolph

The Columbia Gorge area soon to be flooded by the Bonneville Dam may drown for ages many of the secrets of the pre-historic inhabitants of the Northwest, and a study of portions of this region, long intriguing to scientists, was the object of a two-day exploration trip taken by the Geological Society of the Oregon Country.

We are told that in the valley of the Columbia dwelt intelligent human beings possibly many ages before man is known to have lived in the eastern states, perhaps centuries before the Mound Builders were in Ohio and the Mississippi Valley or the ancestors progressive Mayas entered Central America. "An ancient land of ancient peoples" is the valley of the Columbia and an exploration trip for the purpose of unraveling the tangled threads of a story that has long been discussed and to scientifically describe and definitely report ancient remains and cultures said to have existed there, was undertaken in 1934 by Dr. Herbert Krieger, Curator of Ethnology, Washington National Museum, (under the auspices of the Smithsonian Institution, supplemented with P. W. A. Funds) with Mr. Wayne Felts as an associate.

Dr. Krieger reports that during their six months' study, from June to December, "former Indian villages, camp sites and burial grounds were excavated in the immediate vicinity of Bonneville, downstream as far as Prindle, Washington, and upstream from Bradford Island as far as The Dalles. Each former village site was mapped, and its location, when possible, was identified from notes contained in the Journal of Lewis and Clark. Representative house ruins were either trenched or excavated in toto, and in each case an attempt was made to identify its character and type of construction".

The Geology Club members, under the leadership of Mr. Felts, followed along the paths opened by these investigations in order to learn at first hand about the surprising "finds", to visit

(Mrs. Randolph's write-up - continued)

The Geological News Letter
Official Bulletin of the
Geological Society of the Oregon Country
Secretary - A. F. Pratt, City Hall, Portland, Oregon.

Russell R. Norton.....Editor and Manager
Margaret Danks
Charles J. Emerick
Eleanor Hann
Lillian Neff

Across the Editor's Desk

Our Publication

It has been suggested that our publication be changed from a mimeographed weekley to a printed monthly paper. Our mimeographed weekly paper serves a definite purpose and possesses advantages over a journal published but once a month. The Geological Society of the Oregon Country has been recently formed and is in need of a frequent medium of common interest. Unlike societies maintaining few, if any committees, our society functions through many committees with but one way of communicating their activities to the members at large - through a publication, if only a page, issued frequently. This weekly inter-communication shall continue until such time as necessity demands a change.

How can we make our publication a better one? Very few people realize the work attendant to such a paper,-the amount of material necessary for the compilation of such a communication. If anyone, while reading, finds an article or item, or thinks of something applicable to our paper, please call the editor's attention to it. A card mailed to R. Norton, 1934 NW 29th avenue will be appreciated. Any items or articles to be printed in the issue should be mailed so as to reach the editor the Thursday before the press date of the paper.

For the convenience of the members of the Geological Society of the Oregon Country, our paper will hereafter have numbered pages, allowance being made for those already mailed. It is suggested that the left hand edge be punched for convenience in filing in a loose leaf binder. If enough requests are received, the staff will consider perforating the copies before they are mailed. Lets make our paper an interesting one - give your ideas to the editor - we can each do our bit.

SETTLEMENTS & BATTLEMENTS - Cont.

ancient camp sites and fishing grounds, to inspect artifacts and implements of warfare and to actually see the settlements and burial places of these early Oregonians.

For many miles the mid-Columbia Valley region is veritably a neropolis, remains being so abundant, and the absorbing and sometimes difficult task of the archeologists was to distinguish the historic from the pre-historic among the varied articles exhumed. Many of the Indians who formerly occupied much of this portion of the valley were apparently tribes of hunters and fishermen, for the most part being the direct ancestors of the Chinookan and Salish tribes who occupied that territory within historic times. Many of the habitation sites observed were obviously camps used mainly during the salmon fishing season and the presence of ashes, charred wood and blackened stones from camp fires marked the locations. Fishing implements such as bone fish gigs and grooved stone weights for holding nets in position across the mouths of tributary streams, told of the purpose.

On Bradford Island there were two distinct types of remains noted - those of the late Indians, practically the same as those now occupying the gorge, and the Unknowns, an ancestral race which may date back perhaps into the Pleistocene. It was revealed that these older people practiced cremation, wore stone beads and used stone implements as compared with the relics of copper, glass beads and various Hudson Bay Trade articles associated with the later tribes.

This whole island was evidently the scene of conflict between the whites and the natives as is borne out by the discovery of bayonets, as well as various spear and arrow heads and other implements of war scattered over the entire island. Apparently no real village was situated here although one large Hogan pit, or central fire pit, 18 feet by 24 feet, into which waste of all description was thrown, proved a rich source of material. The cedar bark houses were of a later period, and a peculiar square type of pit represented still another kind of habitation.

At Hood River appeared a good example of the semi-subterranean house, dug into a bank and covered with logs topped with dirt. The excavation showed several levels representing different periods of occupation. A number of families were evidently accommodated by the larger types of these underground homes. It would appear that this type of dwelling was transitional to that of the Indians of the Southwest who built homes on a more advanced apartment house plan.

How many times we have driven along the Columbia River Highway and glanced at the great slides of talus material and probably wondered just why it appears to be trenched and pathed and mounded, but speeded along and turned our attention to something else! But, upon closer observation it will be discovered that Mosier slide presents a real problem, an intriguing and interesting one, affording much speculation; in fact, one person's guess is as good as another's for solving the mystery. However,

three general explanations or uses are offered for the well defined mounds, deep trenches and winding paths in the talus material now covered with moss and lichens. Old members of the Wishram tribe, when closely and persistently questioned, claim that years ago these slopes served as a kind of "proving" ground for the bravery of their young men. In fact, to spend a night alone in the darkness on these rough talus slopes was a test of manhood for the young Indian. Perhaps the building operations were a sort of "work out" in preparation for the ordeal, or a gymnasium to develop the muscles of the young braves and harden the soles of their feet! Another motive suggested was that they were used as game blinds, and a third that they served as fortifications. From the mounds of rocks, complete skeletons have been retrieved but since there was a notable absence of ornaments and personal possessions interred with the bones, it may be assumed that these were the tombs of the enemy. Perhaps after a massacre or battle, the bodies of the victims were placed in the stone sepulchres and wierd ceremonies performed about the tombs of vanquished.

The pictographs or paintings on the rock cliffs in the Wakemap area showed various phases of the sun disk, chieftains in conference, elaborate feathered headdresses and other designs. Red, blue, yellow, ochre and white paints predominated. The red was analyzed as Fe_2O_3 and the blue as manganese dioxide but the white was not definitely determined. The entire flat below the cliff appears to have been a village and workshop. The present-day Indians seem to know nothing of the ancient artists nor of the people who carved the petroglyphs which decorate the cliff pillars closer to the river. There the mountain goat and elk, a bulbous and wise old owl, a devil with buck teeth, a figure resembling a modern hula dancer appear with many others - all grotesquely but clearly carved into the precipitous columns.

Memaloose Island yielded much material, in fact from twelve pits, the largest 22 feet deep, seventy-five skeletons were retrieved and two and one-half gunny sacks of beads were taken out, ranging in size from the coveted big blue glass variety to thousands of small moccasin beads. All the material taken from the island was modern, 200 years probably the oldest, and some burials so recent that particles of flesh still clung to the bones. Indian dice, similar to ours but with an elongated axis, red and green blankets, muskets, and even some \$2.50 gold pieces were among the many articles found. The burial pits averaged from 6 feet to 20 feet in depth, and in some the skeletons were piled up like cordwood on shelves. Only the highest portions of the island will be above water when the dam is completed so the material was salvaged none too soon. The various relics have been sent mainly to the Smithsonian Institution for assorting, further study and exhibition.

On the lower portion of the Red Bluff slide near North Bonneville on the Washington side of the river, Dr. Krieger reports that, "the Indians had taken advantage of the hummock and

hollow topography in building at Moffett's Hot Springs one of the largest villages in the area, with circular pits of thirty-five houses clearly distinguishable. The hummocks form a wind break around the old hollow, which has become filled to a level flat of several acres extent".

This slide, of comparatively recent geologic time, caused the temporary blocking of the Columbia River and no doubt was the source of the legendary Bridge of the Gods. At certain places in the river at low water can still be seen remnants of the forest which once grew on the slide, the same submerged trees which were noticed and recorded by Lewis and Clark in 1804.

Scientists have made the mute relics of the ancient inhabitants tell many tales for it is clearly revealed by the grim remains of these original settlers what they wore and ate, the weapons they used and their modes of burial. Indians of historic times placed their dead in houses and pits but in the deeper past, cremation was practiced. Many rock slides at the foot of the rimrocks along the river and talus slopes were genuine cemeteries. These early people placed with their dead carved bones and ornaments, ear plugs and lip plugs, all of which serve as valuable bits of information. A complete absence of pottery is noted but an occasional piece of basketry of ancient design has been recovered. West of the Cascades aboriginal inhabitants of the area expressed a distinct type of culture, based on wood, in their arts and crafts, and whole tribes occupying the middle and upper river section were expert in the fabrication of stone, horn and bone.

The early inhabitants were evidently not agriculturists and must have subsisted on fish and game, roots and berries. They made baskets of bark and fiber and clothed themselves with blankets woven of rabbit skin cut into strips or of the hair of mountain goats. Some wore sandals on their feet instead of the traditional moccasins which our stories have lead us to believe are the proper footgear for Indians. They smoked pipes, wore necklaces of claws and decorated themselves with crude ornaments, shells and beads and were partial to elaborate feathered head-dresses. They tipped their spears and arrows with obsidian, chalcedony or any flinty stone available, and it is said that some of the most exquisite arrow points in the world have been picked up in the Columbia region - real gems of the art.

"Occasionally, beautifully shaped and symmetrically worked stone bowls or a stone pestle of worked basalt, granite or andesite, sometimes with an animal fetish or figurine of carved stone much like those fashioned by the Pueblos, furnished evidence of the artistic ability of this prehistoric race of early Americans", states Dr. Krieger.

The Pueblos of the Southwest and the Mound Builders of Ohio, although newcomers as compared with the prehistoric people of the Columbia, have presented more alluring fields of research to archeologists because they were further advanced in culture.

Their monuments were more easily and satisfactorily investigated than the illusive traces left by the early Columbians who until recently have been neglected as far as a thorough study is concerned. Such mute evidences of ancient occupancy of the old Oregon Country and vicinity, as the "Nampa Image" found in 1880, the Calaveras Skull from the gravels of Bald Mountain, California, and the obsidian implement retrieved from a depth of 25 feet in a silt deposit in Nevada, have been disputed and argued about by scientists since their respective discoveries, but if proven authentic would offer real evidence that Oregon and neighboring states were inhabited by human beings when the Java man had not yet developed!

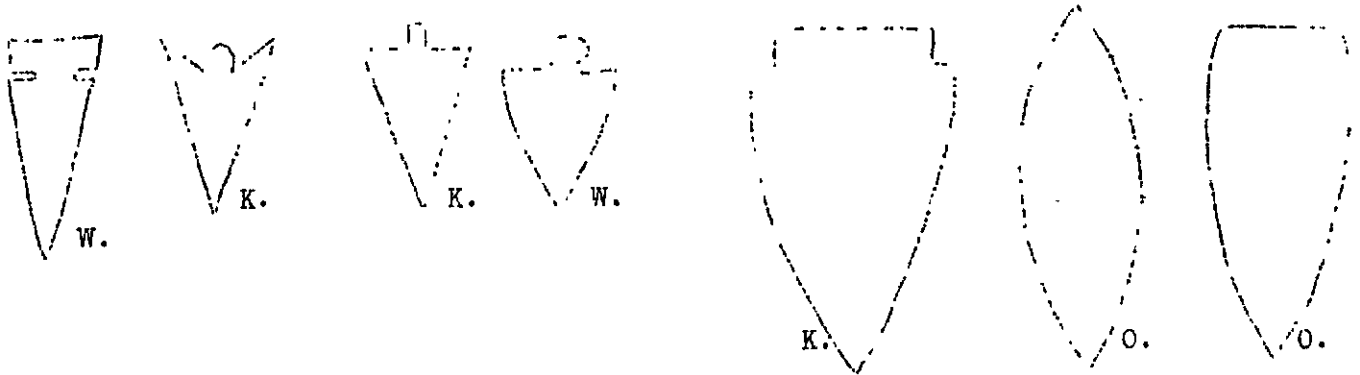
But at any rate, even if the apparent great age of various notable relics is disagreed upon, and even if the questions of "whence, why and how did they come" and "whither did they go" remain unanswered (but furnish good camp fire discussion), it is generally accepted nevertheless that the valley of the Columbia is one of the earliest homes of human kind in North America. And it is very fortunate that a systematic investigation and report on the Gorge Region has been undertaken by Dr. Krieger and his associates before a portion of the valley will be inundated by the waters of the Columbia and the traces of the ancient inhabitants obscured still deeper into the past.



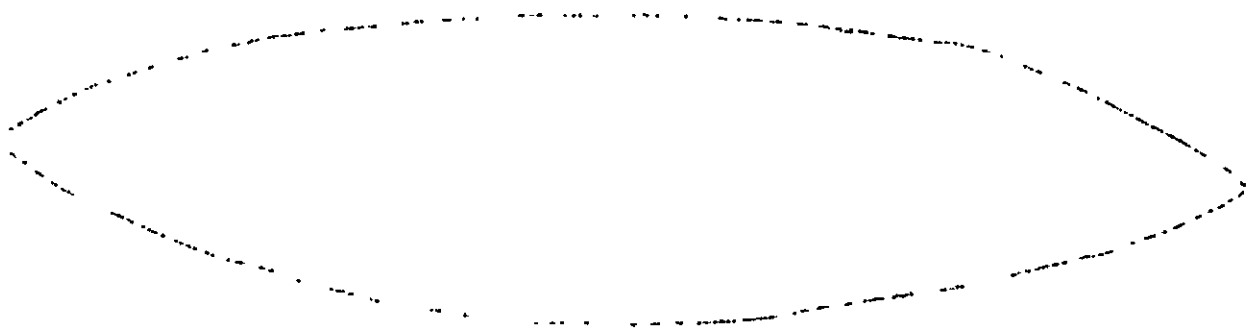
List of Common Artifacts Found in Columbia Gorge

Compiled by W. M. Felts

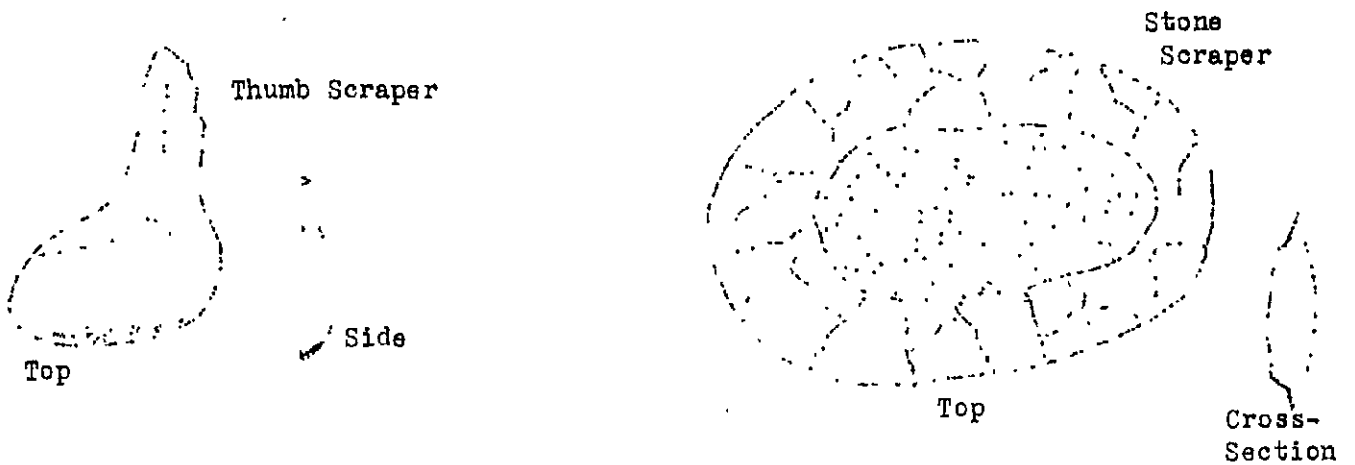
Outline drawings of: Arrowheads, dominantly of Klickitat and Wishram manufacture



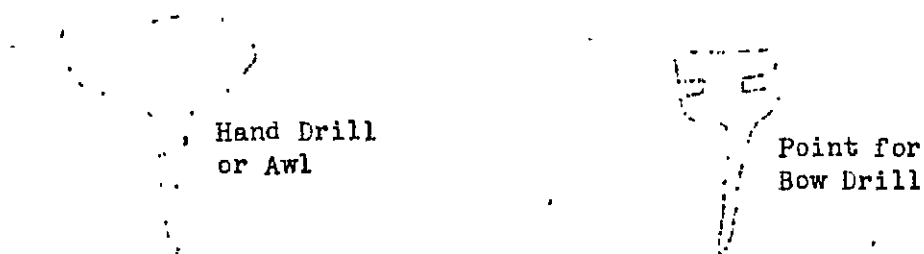
Knife (California Type)



Scrapers



Drills



The material from which the sharp edged instruments such as arrow points, knives, scrapers, and drills were manufactured is of several kinds. Almost any conchoidally fracturing hard rock or mineral occurring within or near the Gorge area was utilized. For example, we find arrow heads made out of chalcedony, opal, obsidian, tachylite, and fine grained glassy basalt. The chalcedony ranges thru almost every known variety from dense opaque jaspers to varieties of agate and even chrysoprase. The opal is usually from opalized wood. Scrapers of the thumb type and drills were made out of similar materials as the arrow heads. The larger scrapers were made of small flat, circular, or oval pebbles of almost any rock occurring in the river gravels. These rocks ranged from quartzites and light colored, usually coarse grained igneous rocks such as granite, to basalts and pyroxenites.

In addition to the very few illustrated on the preceding page, other artifacts are very common in the village and burial ground sites in the area traversed by the field trip. These include decorations such as beads made of stone, shells, bone, or wood, belt plates, and dentalium shells. Household tools consist of stone mortars, pestles, hammerstones and fragments of matting and basketry. Tools used in the procuring of food or in war activities consisted of net weights, root diggers of bone, horn, or wood, stone "axes" and "spades", and war or fish clubs of both wood and stone. "Luxuries" consist of pipes of clay or wood, and gambling sticks or "Indian Dice".

Practically all of the artifacts found so far in the area visited on the field trip belong to the latest or true Indian culture. Older cultures are represented by a few more crude artifacts found mixed with those of the later dates, by structures erected on the talus slopes in the Gorge, and by petroglyphs and pictographs at certain localities near the Grand Dalles and elsewhere.

Influence of the white man is evidenced by copper and iron tools, and the trade articles of The Hudson Bay Company. Glass trade beads of all descriptions are especially numerous.

Geological supplement on field trip Settlements and Battlements of Ancient Man in Columbia Gorge

(Note: The following material relating to the geology of the trip of May 25th and 26th is from notes taken in the field during Dr. Hodge's talks at the various stops.)

No comment was made on the geology of Bradford Island since it will be fully covered on the write-up of the trip on May 19, which will be published shortly in this paper.

High up on the hills south of Cascade Locks yellow patches could be seen. These patches were of bedded gravel and are Troutdale formation. This formation is prominently displayed at the Automobile Club bridge over the Sandy River just east of Troutdale. Needle Rock, which is a little east of the Cascade Locks High School, is a fine example of an intrusive dike. Numerous dikes of this kind can be seen on the highway.

Opposite Hood River on the Washington shore, lava flows at steep angles show series of folds. The Hood River Valley, which can be traced northward, perhaps as far as Mt. Adams, is very ancient. This old valley, which is much broader than the Columbia Gorge, is cut at right angles by

the younger gorge. The stream in this ancient valley had a southern outlet in the ancestral Columbia River. Underwood Mountain spued lava, which flowed south as far as Odell. The stream cutting it and flowing southward made a smaller valley in the same old hills. More lava filled the valley thru which the Columbia River later cut its gorge. It has left stranded terraces which have quartzite deposits. The Indians located near these deposits as the quartzite was a source of material for the making of their implements and artifacts. There are some terrace deposits east of Hood River, which can easily be seen from the highway. Considerable foreign gravel is to be found there.

To the east lie a series of folds: Bingen Anticline, which is the best example of anticline formation in the world; Mosier Syncline; Ortley Anticline; and The Dalles Syncline. While the folding causing these anticlines and synclines is state wide, its greatest point of compression was at Hood River. The folds extend into Washington as far as the Horse Heaven Hills. The folds lie in a general Northeast-Southwest direction.

Near the Mosier Slide the river flows in the axis of the Mosier Syncline. East of the slide there is a fine example of a cuesta.

Side valley spillways are very common along the gorge and are more numerous toward the east.

Prominent breaks seen in the anticlines are the result of easily eroded material. The Dalles beds can be seen as residual remnants on top of the hills.

Rowena Viewpoint is located at approximately the crest of the Ortley Anticline. It is a good location from which to view folds as the folds in Washington are clearly outlined from this point. Rowena is very close to the place where Condon Lake overspilled. The overspilling occurred in various places before the present gorge was cut. The numerous canyons are remnants of the overspilling. Small humps on the soil surface at this location are similar to those at Tenino, Washington.

The Dalles lies in The Dalles Syncline. Chenoweth Creek enters the river at a barbed angle. After the folds were made this syncline during volcanism was filled with volcanic breccia, ashes, etc. which make up The Dalles beds. These beds were later overlain by andesite.

The Arlington beds which lie to the east of The Dalles are lake beds, which are sediments of Condon Lake. These former lake beds form valuable orchard and farm lands.

The Columbia River makes a big bend at Grand Dalles and the land above the ferry landing, which is old river bottom, is now scabland surface and the undrained potholes are now swamps. The erratics found there were stranded by melting icebergs. Grand Dalles is located near the beginning of the Columbia River fault which extends eastward for eighty miles. It is believed the fault, which can be seen very clearly at Rowena, is at the western end of the Columbia River fault.

The basalt which is displayed as lava flows in the Columbia Gorge was poured forth about the middle of the Miocene age. It is estimated that approximately 200,000 square miles of lava was poured forth forming the largest lava surface in the world. It was highly liquid and can be traced

five or six miles, displaying uniform structure. The lava flows were spasmodic, allowing the formation of sedimentary beds and growth of foliage.

At Wakemap in the Wishram Area numerous by-passes of river canyon can be seen. These are narrow and easily jammed by ice which diverted the water. The by-passes are found at various elevations. Eratics from the Coeur d'Alene and Spokane area can be found. Some large boulders in the flat contained tachylite, which the Indians used in making their artifacts. Tachylite bears the same relation to basalt as obsidian does to rhyolite.

Mt. Defiance, which is in Oregon and almost directly across the river from Bingen, has a blow hole or crater at its top. Lava poured down westward and covered the sediments. The andesite flowed against the folds from the North. There is abundant andesite in Oregon but very little in Washington.

High on the rock cliffs at Bingen there is a radial columnar structure resembling an Indian headdress. This is due to the peculiar type of cooling in this particular vicinity. The vents thru which the gas escaped were filled with lava which cooled in that manner.

From Bingen to North Bonneville the river covers a forest. Tops of trees can be seen during low water. The Lake of the Gods which was formed by the landslide at Bonneville extends east from that point as far as Bingen.

It is with true appreciation that the members of the Geological Society of the Oregon Country extend thanks to Mr. Wayne Felts, Dr. E. T. Hodge, and Mr. William MacKenzie for their efforts in making this trip an enjoyable and unforgetable one and we look forward to more explorations in the future.

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Numerous photographs were taken on this trip to illustrate the geological formation. Mr. O. E. Stanley presented one complete set of his prints to the society. These are now in the hands of the Secretary. Mr. Davis is also exhibiting some prints. Anyone wishing prints from Mr. Stanley's films or others may do so by getting in touch with the Secretary, who can arrange for prints at a small remuneration. Others who had good films in addition to the above named are requested to arrange with the Secretary to display them.

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PITTSBURG LANDING FIELD TRIP

Dr. Earl C. Packard will lead a field trip to the fossil beds on the Nehalem River on Sunday, June 9. This will be a very interesting trip and will enable the members of the trip to obtain fossils for their collections. For further information and arrangements

Call: HARRY L. CLARK - Trinity 5776

OUR FUTURE MEMBERS

We now have seventy members and a substantial list of prospective members to whom a form letter will be sent as soon as our stationery is available.

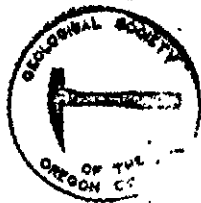
Included in your copy of the News Letter is an application form. It will be of considerable assistance to the Society if you will sponsor some personal friend or acquaintance who is interested and have the form filled in. Additional application forms are available.

The initial membership of our Society will be made up principally of personal friends and acquaintances of the present members and the Membership Committee earnestly requests every member to assist in the selection of this group. Many desirable and interested people may be entirely neglected if we depend only upon a comparatively small committee for this selection. Should you desire a personal rather than the form letter to be sent out, submit the name to a member of the Membership Committee.

TRACY WADE, Chairman
4204 NE Broadway
TR 6060

CRATER LAKE LECTURE

On Thursday, June 6, Dr. W. D. Smith will lecture on Crater Lake. The lecture will begin at 8:00 o'clock P. M. in the Public Service Building Auditorium.



PITTSBURG BLUFF TRIP

June 8

The Geological Society of the Oregon Country

Conducted by Dean E. L. Packard, School of Science, Oregon State College

<u>Time</u>	<u>Itinerary</u>
9:00 A.M.	Forest Grove, west side of College Campus. Mileage--00.00
9:15	Quarry at Scroggins Creek. Marine fossiliferous sandstone. The type locality for characteristic fossil species.
9:55	Leave meeting point at College, Forest Grove, for Vernonia. The route follows up Gales Creek. Occasional roadcuts show weathered shales and tuffaceous sandstones especially at mileage readings of 2.6, 4.2, and 4.6 miles.
10:30-- 10:45	A quarry in igneous rocks developed within a fault zone. Excellent example of slickensided surfaces with surfaces with conspicuous striae. Fault breccia blocks have been surfacibly altered to serpentine. 10.4 miles.
10:50-- 11:00	Road cut showing shales with occasional fossils. 17.9 miles.
11:05-- 11:15	Road cut exposing shales with Oligocene Gastropods and Pelecypods. 18.8 miles.
11:15	Exposures of weathered marine sediments that show little except characteristic weathering at 25.9 miles, is a U.S.G.S.B.M. in bluff on the right and 10 feet from the road bed. 25.9 miles.
11:30-- 11:40	Road cut showing fine examples of calaceous dandy concretions in Oligocene beds. They contain fossils as frequently the case elsewhere. 26.4 miles.
11:50-- 12:45	Arcadia Park. Lunch stop. 25¢ charge per car for use of park, tables, stores, and other privileges. Short order lunches and refreshments available. Luncheons can be arranged for by addressing Miss Anna Lord, Vernonia. 31.4 miles.
12:45-- 1:15	Follow down Nehalem River where valley has cut in Oligocene shales and sandstones and associated volcanic rocks. These sediments have never been carefully examined for fossils.
1:15	Pittsburg Bluff. On the banks of Nehalem River at fork of roads leading left 21 miles to Clatskanie and right to St. Helens. 41 Mi.
3:00 P.M.	Party disbands. Choice of return route to Portland:
A. Via -	Mist, Clatskanie, Columbia River Highway. Marine Oligocene fossils on left hand in bluffs exposed about 3.2 miles from Clatskanie
B. Via -	Right hand road to St. Helens and Columbia River Highway. Shales of probable Miocene Age. No known fossil localities.
C. Via -	Vernonia, Buxton, Forest Grove. Marine Oligocene with fossil localities known in the region to Buxton. May be expected in any cut along railroads or highway.

THE GEOLOGICAL NEWS LETTER

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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Vol. 1 - No. 4

Portland, Oregon

June 14, 1935

LAST CHANCE MINE

June 23rd, 1935

This is our first joint trip with another club or Society. We are to go with the Mazama Club to three abandoned mines on the West Fork of the Washougal River - Skamania Mine, Last Chance Mine, and Rainbow Mine. Several rather unusual minerals for this part of the country have been found in this area so that each of us should return with new specimens for our collections. The following have all been found near the mines: Covellite, Chalcocite, Chalcopvrite, Pyrite, Chrysocolla, Bournonite, Malachite and Amethystine Quartz Crystals. Also there are a half dozen or more varieties of rock in this vicinity.

A competent mining engineer of our party is to tell us of mining methods used when these mines were in operation and also of recent advances in the mining industry. The use of the many large pieces of machinery scattered about will also be explained. Dr. Hodge will discourse on the geology and formations of the surrounding territory at various spots along the trail.

Mr. Leo Simon, a member of our society and an authority on flowers, plants and birds, is to identify the flora of the region. More than thirty years ago a great fire swept this section and it will be quite interesting to notice what plants and flowers have been successful in gaining a foothold in the burned over area.

Drive out the Washington side of the Columbia River to the outskirts of Washougal, turn to the left and follow the Washougal River to Camp Bear Prarie, make another left hand turn on a dirt road leading directly to the first mine. After a brief examination of the first mine encountered, we hike over an easy trail with very little climbing to the other mines. We shall have lunch at Rainbow Mine, about four miles from our starting point. The driving distance is approximately 40 miles from Portland each way. Suggested transportation charge - 80¢ Mazama Local Walks fee 10¢/ Bring a cup along as either coffee or lemonade will be served, depending on the weather conditions.

Members of the Geological Society will meet in front of the County Court House on Fourth Avenue and will leave at 6:25 A. M. At that time we will drive to the Pacific Building where we will

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Russell R. Norton.....Editor and Manager
Margaret Danks
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Eleanor Hann
Lillian Neff

Across the Editor's Desk

Trail Rules

Inasmuch as our Society is by now active upon Oregon Trails, it would be well to list, for the benefit of those who do not know them and might unwittingly break them, briefly several rules of the trail. These rules are observed by all users of woodland trails and should be followed as closely as possible. Ranging in importance, they are: Follow your leader, do not precede or abandon his guidance unless so instructed; follow the trail even tho it is shorter to cut corners; do not drop refuse on or near trails; be careful of fire at all times; and of course do not mar trees, pull up shrubs, flowers, etc.

Each of our field trips has and probably will be partly accomplished by auto caravan. There is a rule concerning caravans, too, that is worthy of mention. It is: wherever possible draw completely off the highway and park as nearly as possible bumper to bumper. This is possible because no one car in the caravan need change his position in regards to the other cars and can therefore stop and start in order with no space wasted. Let us resolve henceforth to abide by such simple rules and deserve the commendation of other trails organizations, not their condemnation.

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LAST CHANCE MINE -- Continued

Join the members of the Mazama Club and start for the mines at 6:30 A. M.

For additional information call Mr. H. B. Schminky, Tr. 2168 after 6:30 P. M.

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HURRY! HURRY!

WHO WILL WIN THAT 5 YEAR MEMBERSHIP FREE OF DUES BY SUBMITTING THE BEST EMBLEM or THAT ONE YEAR MEMBERSHIP FOR THE MOST ACCEPTABLE NAME FOR OUR PUBLICATION?

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CRATER LAKE LECTURE

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Dr. Warren D. Smith delivered his intensely interesting lecture on Crater Lake Thursday evening in the auditorium of the Public Service Building.

Dr. Smith is a finished lecturer and his enthusiasm for his subject was reflected in the close attention his audience gave to his discourse.

The geological history of Crater Lake, Oregon's world famous scenic marvel, was clearly outlined, and the lantern slides with which his lecture was illustrated were beautifully colored by an artist who had spent months of study in order to faithfully record the wonderful shades so amazing to every Crater Lake visitor.

Dr. Smith explained the two principle theories advanced by scientists to account for the formation of Crater Lake. He fully presented the collapse theory, advanced by Dr. Diller, who made his studies beginning in 1883, and the explosion theory, which has gained favor since improved opportunity for study had been made available through the developments carried on by the National Park Bureau and the Bureau of Public Roads.

One of the slides shown by Dr. Smith pictured Mt. Mazama, the ancestral mountain of Crater Lake as reconstructed by Dr. Diller from his study. Superimposed upon the present rim of the famous Crater, the ancient peak rose to 15,000 feet above sea level. Majestic glaciers glistening in the sun moved slowly, carving their "U" shaped valleys in the hardened lava. Dr. Smith estimates that about 20,000 years ago the old mountain awoke, a tremendous explosion occurred, and fifteen cubic miles of ashes, pumice and pyroclastic materials were thrown into the air, the heaviest fell on the slopes first and were buried by the lighter pumice and ash which settled afterwards. Much fine ash carried in the upper currents of the air drifted far and wide, crossing the Rocky Mountains and settling on the great plains, and even falling into the Atlantic ocean.

Dr. Smith has traveled widely, and during his wanderings has visited all but one of the continents of the earth, but, he told his audience, he had never found in a like area as much scenic grandeur as lies in the 96,000 square miles contained within the boundaries of the State of Oregon.

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REVIEWS OF RECENT PUBLICATIONS

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By Kenneth Philips

The First of a Series of Reviews to be Published
in this Paper from Time to Time

Quicksilver Deposits of Southwestern Oregon, U. S. Geological Survey Bulletin 850, by F. G. Wells and A. C. Waters.

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REVIEWS OF RECENT PUBLICATIONS--Continued

The quicksilver deposits of southwestern Oregon lie along the boundary between the Miocene (?) volcanic rocks of the Cascade Range and the folded Tertiary sediments and older metamorphics of the Coast Range and Klamath Mountains. The southwestern part of the area lies within the Klamath Mountains, an area of folded and faulted rocks ranging in age from Devonian to Upper Cretaceous. In the northwestern part of this region, the gently folded sediments and intercalated basalt flows comprise the Umpqua formation (Eocene), which near Roseburg attains a total thickness of about 12,000 feet. Volcanic conglomerates, tuffs, breccias, and flows crop out in the eastern portion.

Quicksilver deposits of attractive size and quality have been found along the western edge of the Cascades from Blackbutte, near Cottage Grove, southward to Rogue River. Ore minerals include cinnabar, a very little metacinnabar and native mercury, marcasite, and pyrite and are accompanied by Chalcedony, calcite, siderite, and ankerite. Five bearing areas are described in this paper which included 56 pages of text, and numerous plates and maps.

The bulletin may be inspected at the local office of the Geological Survey.

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GEOLOGIC SOCIETY OF THE OREGON COUNTRY FIELD TRIPS

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The two forthcoming field trips in which members of the Geological Society of the Oregon Country will participate are:

June 23, with the Mazamas-abandoned copper mines.

July 10-16, students summer camp in Central Oregon.

Tentative Trips

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Other trips that are being considered, but have not as yet been definitely scheduled are :

Cougar Rock and vicinity of the Trails Club Cabin
Gordon Creek and Buck Creek, Fossil leaves in clay
cuts along the creek banks.

Wildwood Golf Course, Fossil marine shells, etc.
Glacier rip, to one of the larger accessible glaciers
on Mt. Hood.

Coast Trip - to Nelscott, Roads End, etc.
Red Bluffs and Cascade Slide near Table Mt. and Green-
brair Peak.

Lava Caves and the washout on Marsh Lake near Mt. St.
Helens.

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Tentative Trips--Continued

John Day Region and Fossil Beds.
Soils trip for determination of soil composition about
Portland.
Ariel Dam
Nickel Mountain near Riddle, Oregon.

This list is being submitted for your approval. Suggestions are earnestly solicited and your comments on these trips and others will be appreciated.

Address all communications concerning trips to Exploration Committee, Harry Clark, chairman.

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A CALL FOR GEOLOGICAL MAPS

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While the Society has no home where maps might be kept for the use of its members, we should all be on the lookout for quadrangle sheets, geological folios, and other special maps that may be of use in planning trips or lectures for our society. Any member having such material to donate or knowing of someone who would donate such maps to our society please call--

Rabbi ~~Mr.~~ H. B. Schminlsy, Curator of Maps
TR 2168--evenings

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THE GEOLOGICAL NEWS LETTER

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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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June 21, 1935

PITTSBURG BLUFF TRIP, June 9, 1935

By K. N. Phillips

"The southern part of Columbia County, taken in connection with the adjoining portion of Washington County, probably affords the best ground in the State for studying the relations of the Eocene, Oligocene, and Miocene."

The above quotation is credited to Dr. J. S. Diller, after he had completed his trip by pack train, about the year 1895, to the fossil beds of Gale's Creek and the upper Nehalem River Basins. These beds have continued to attract the interest of scientific men or groups from Diller's time to the present; and some of these same fossil-bearing formations were made the object of a field trip by the Geological Society of the Oregon Country, Sunday, June 9, 1935.

The party was fortunate in having as a technical leader Dr. E. L. Packard, dean of the School of Science, Oregon State College. He spoke briefly at each stop concerning the geology of the territory covered, and identified fossils as they were discovered by members of the group.

In Oligocene time, the northwestern portion of Oregon, north of Vachats and west of the Willamette Valley, were covered with a shallow sea in which lived the fauna whose skeletal structures are now preserved in the sediments of that age. These sediments are chiefly tuffaceous sandstones, and sandy or calcareous shales. In places there are found egg-shaped or irregular calcareous sandy concretions, much harder than the beds in which they are embedded.

At Scroggins Creek quarry there are exceptionally tough sandstones which are used for road metal. This is the type locality for *Tivela gastronensis*, a bivalve of markedly triangular shape, whose fossil remains are plentiful at this site.

At the Gale's Creek quarry there is an igneous intrusion marked by faulting, with prominently slickensided surfaces. Specimens of carbonaceous shale were found which had been baked by the heat of the intruded lava.

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Russell R. Norton.....Editor and Manager
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Eleanor Hann
Lillian Neff

Across the Editor's Desk

Here is a bit of information that should be of interest to everyone in the Society. The Public Library has found our Geological News Letter to be of such importance and interest that they have requested that we send them copies of each issue for their permanent files. All copies of this paper may now be found in the Technical Room of our main library.

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ANNOUNCEMENTS

* ___ *

Mt. Hood Climb---

June 28 and 29, 1935 is the date of the annual south side Mt. Hood climb of the Mazamas. Members of the Geological Society who are interested in the geology of Mt. Hood are welcome on this climb and will have ample opportunity to study the mountain at first hand. A fee of \$4.00 covers your meals and transportation. For further information call Mr. Russell Collins, EA 9831-evenings.

Meeting on the 27th---

There will be a general business meeting of the Geological Society on Thursday evening, June 27, at 8:00 P.M. in the Public Service Auditorium. Will all committee chairmen be prepared to give a report on their activities.

We are still looking for more field trips so don't fail to turn in any information regarding places of interest that you have visited recently. Address all communications to the Exploration Committee, Harry Clark, chairman.

All committee chairmen who have announcements they wish published in the bulletin please get in touch with Eleanor Hann--TR 6849. They should be in by the Friday preceding the week the publication comes out.

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PITTSBURG BLUFF TRIP--Continued

Luncheon stop was made at Arcadia Park, where the beach gravels of Nehalem River were the source of agates, an arrowhead, a concretion containing the carapace of an Oligocene crab, and a mass of quartz crystals pseudomorphic after the calcite from which it had separated.

At Pittsburg Bluff, below Vernonia, is one of the finest examples of Oligocene strata in the region. Here there is a layer of about 30 feet of soft gray sandstone, below which are shales of about 20 feet in thickness, the whole series dipping slightly northeast. Some layers of sandstone, and the calcareous concretions contained therein, are so indurated as to make tough slabs, thickly set with well-preserved fossils. The fossils are so abundant, and so readily obtained, that collections were limited only by the ambition of the collectors.

At 3 p.m. the party disbanded, various groups going in search of fossils at other localities. In the low bluffs behind the golf course above Vernonia, and river bank and road cuts further upstream, were found numerous concretions containing the legs or carapace of crabs, Orthoceras, and fossil wood. The only untoward incident of the day was Schminky's failure to start a fire from fossil wood, requiring the indefinite postponement of the Society's Oligocene clam bake.

The exploration committee deserves special credit for its efficient handling of traffic on this trip, a considerable problem where a caravan of 25 cars is taken over heavily-traveled highways.

Dr. Packard is preparing a list and brief description of the more common fossils of this region, and a bibliography of literature on the subject, for early publication in this bulletin.

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AN APPRECIATION

by Mr. Davis

The Geological Society has been functioning for a sufficient length of time that it is permissible to throw at it a few bouquets of skunk cabbage or roses.

In this case it is to be roses. Every trip thus far seems to be better than the one before and there is a keen interest and anticipation always in the forthcoming excursion. One of the finest things about our trips is the wonderful cooperation of the field lecturers in giving freely of their knowledge to all members who seek it. Our group is much more than a mere outing group, we must know our stuff or interest and appreciation cannot be maintained.

Many are asking questions such as this about us, - "How do I hook up with this Geological Society? I don't know a thing about

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AN APPRECIATION -- Continued

the stuff but I certainly would like to know." They too would like the scales removed from their eyes so that in looking about them on the wonders of the geology of the Oregon country they really see. This spirit augurs well for the proposed instruction work which it is proposed to carry on in the class room with the coming of fall, and already much interest is being shown in this phase of activity.

Adult education is becoming more and more important in the educational curricula of the country, particularly along cultural lines; and geology, as a subject of study here in Oregon, is of intense interest. Let us hope that the enthusiasm and interest in our study is maintained and that others who are really interested in it will identify themselves with us.

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All members of the Geological Society whose mailing address has been changed or who are not now getting the paper and should be please notify Eleanor Hanr--TR 6849, evenings-- so that we may correct our lists. This is the only way we have of knowing whether you are getting the bulletin or not.

THE GEOLOGICAL NEWS LETTER

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June 28, 1925

MARINE OLIGOCENE IN NORTH WESTERN OREGON

By Dr. F. L. Packard

An Oligocene sea, or several seas, once covered much of North Western Oregon. It apparently flooded the present Coast Range region north of Alsea River and the Willamette Valley as far south as Eugene, as far east as Coburg, the Cascade foothills east of Salem and possible as far as Portland.

The most complete section of Oligocene in Oregon is exposed along Yaquina River from Toledo to Newport. There several thousands of feet of sediments occur in a westward dipping monocline. They have been divided into the Toledo, Yaquina, and the Nye formations.

A body of shales, called the Moody shale member, occurs in the lower part of the Toledo formation. It has yielded a small marine fauna that appears to be contemporaneous with one obtained from the Keasley shales of Columbia County and at Bassenforf Beach Coos Bay.

The Yaquina formation has yielded the most extensive fauna and its equivalent is found near Eugene and is apparently of the same age as that found in the McCoy Hills west of Salem at Croggins Creek and at Pittsburg Bluffs.

A correlation table, based upon the work of Schenck, Clark, Tegland, and other, will show these relationships in a graphic manner.

OLIGOCENE

<u>Oregon</u>	<u>Washington</u>
Lincoln-Lan. Co.	Columbia
Nye	(?) Twin River
Yaquina-Eugene	Pittsburg Bluff Blakely
(sandstones	(?) Townsend Bay
Toledo {	
Moody shales	Keasley shales Lincoln-Porter

The fauna of the older division of Oligocene recognized in Columbia and Washington County is that of the Keasley shale exposed along Fock Creek, a tributary of Nehalem River. This fauna appears to be the equivalent of the lower-most Toledo. The known fauna, as reprinted principally by Schenck, included:

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Fleanor Hann
Lillian Neff

Across the Editor's Desk

Our Car Markers

The red hammer on our car markers is hand painted. Most of the work in making these cards was done by Mr. GFARY KIMBFLL, chairman of the Emblem Committee. The whole idea was evolved rather hurriedly before our caravan to Pittsburg Pluff. It is the hope of the Exploration Committee that these markers, together with the "Lead Car" and "Last Car" idea, will help to keep our caravans orderly on the highway. They will also serve to identify cars of fellow members that one may meet when on trips not connected with the society. So keep your markers on display in your car until such time as we have a society emblem to replace them.

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All members of the Society going on any of the field trips are requested to register with some member of the Exploration Committee prior to the trip. It is very important that those members who desire transportation, and those who have room in their cars for extra passengers, register as early as possible.

It is now time to register for the trip of July 10 to 16, in connection with the University summer camp. Call any of the following:

MR. J. F. COLLINS	EA 9831
MR. HAPOLD B. SCHMINKY	TR 2168
MR. LEO F. SIMON	AT 0438 EK

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All members who are competing in the emblem contest are asked to communicate at once with MF. GFARY KIMBFLL, 425 City Hall--AT 6141 or 2522 N. F. 57th Ave--GA 9995.

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Any member desiring an announcement in the bulletin or who has material for same please communicate with MISS FLEANOR HANN, 3171 N. E. 35th Place--TP 6849.

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The Mazamas have invited the members of the society to join them on an easy hike on Sunday June 30 to Falls Creek. The trip covers about 8 miles on a good trail. There are several good rock pinnacles along the trail if any care to try their luck. Meet on the COLUMBIA RIVER HIGHWAY just past the 49 MILF POST and about 1/2 mile beyond the Hermon Creek Fanger Station at 8:30 A.M. Transportation costs will be 90¢ plus 10¢ local walks fee. Bring a cup as coffee and tea will be served.

PARTIAL FAUNA OF KEASLEY SHALES
along
Rock Creek, a Tributary of Nehalem.

Foraminifera:

Lenticulina crassa (d'Orbigny)
Lagina sp.
Guttulina problema (d'Orbigny)
Sigmoidella elegantissima (Parker and Jones)
Nonion umbilicatus (Montagu)
Plectofrondicularia packardi (Cushman and Schenk)
Bulimina sculptilis (Cushman)
Uvigerina cocoaensis (Cushman)
Eponides duprei (Cushman and Schenk)
Epistomina eocenica (Cushman and M. A. Hanna)
Cibicides hodgei (Cushman and Schenck)

Pelecypoda: (Clams)

Cardium weaveri (Anderson and Martin)

Gastropoda: (Snails)

Turriculus columbianus (Weaver)
Galeodea fax (Legland)

The Yaquina-Fugene formations contain a fauna which occurs widely over North Western Oregon and is well represented at the Scroggins Creek Quarry and at Pittsburg Bluff. This following list has been compiled from the works of Schenck.

Partial fauna for Scroggins Creek locality.

Pelecypoda:

Antigona of Mathewsoni (Gabb)
Spisula packardi Dickerson
Linella gastronensis Clark

Gastropoda:

Molopohorus gabbi Fall
Futhrio-fusus lincolnensis (Van Winkle)

The known fauna for Pittsburg Bluff, as reported by authors, is listed below. It represents but a small proportion of the actual fauna.

Partial fauna list for Pittsburg Bluff

Pelecypoda: (Clams)

Macrocallista pittsburgensis Fall
Spisula pittsburgensis Clark
Tellina pittsburgensis Clark
Acila shumardi Fall
Leda washingtonensis Weaver

Gastropoda: (Snails)

Polynices washingtonensis (Weaver)
Molopohorus gabbi Fall S trepsiduria washingtonensis
Agasoma columbianum Anderson
Futhrio-fusus lincolnensis (Van Winkle)

THE GEOLOGICAL NEWS LETTER

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July 5, 1935

SOCIETY TO HAVE SUMMER CAMP AND FIELD TRIP

By Gladys C. Randolph

The Geological Society of the Oregon Country will have a summer camp and field trip program in conjunction with Oregon State College, under the direction of Dr. W. D. Wilkinson, from July 10th to July 16th. The area to be studied and explored is in south central Oregon where sites of former great lakes, recently active volcanoes and some of the largest fault scarps in the world will be seen. Those leaving from Portland will travel about 1000 miles.

The trip begins at Paulina where cross sections of the Mississippian, of the Paleozoic, and the Triassic, Jurassic and Cretaceous strata are exposed, brought to the surface by a great domal fold. From here the party will go south across a desert region where fine exposures of the late Tertiary volcanics are shown including the well-known Rattlesnake formation.

Fossil Lake, a dry remnant of a great series of lakes that covered all the southeastern part of the state in Pleistocene times will be visited. At this lake evidence will be found proving that when these bodies of water were in existence the climate was warm enough and the food abundant enough to support a dense population of horses and semi-tropical birds. Still further south we find Abert Rim, a very recent fault scarp and yet older than these lakes because at its foot are found the 200 ft. shore lines of the lake.

The ice caves on the south slope of the Newberry Crater will be visited. This crater is a compound Mt. Mazama, surrounded by vivid evidence of vulcanism, containing two crater lakes inhabited by large showy trout. The party will then traverse northward through numerous lava domes and cinder cones and over the slaggy surface of recent lavas to Pilot Butte. Pilot Butte is the Mt. Tabor of Bend and illustrates how much that city appreciates its volcano in contrast to Portland's neglect of Mt. Tabor.

Farther north the recent lavas are underlain by the Madras formation which in turn lies with a great unconformity on top of the highly folded Clarno rhyolites. The Clarno formation is made up dominantly of great thick rhyolite flows with enormous bubble holes and in places containing geodes lined with beautiful crystals and in a few cases filled with rare bitumens, mineral pitch or asphaltum. (See Dana) Some fine spherulites may also be found. In

(Continued on Page 45.)

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Across the Editor's Desk

Ted Howser, one of our Charter members, has always wanted to find a good arrow point but had never been able to satisfy this ambition until he joined our society and planted a lawn in his front yard. He carefully ploughed, harrowed and rolled the soil and then while he was scattering the seed, found a fine obsidian point lying on the surface. We trust that he will give his membership in the society due credit.

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We would like to see more of the members of the Society contribute to this paper of ours. Anyone having an experience or trip which he thinks might be of interest to the Society please do not hesitate to write it up and send it in. We will be glad to receive and publish any and all material. Mail them to MISS ELEANOR HANN, 3171 N. E. 35th PLACE.

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S.O.S.

We are still looking for a more fitting and appropriate name for our paper. Won't some of you good members please help us out. All names should be submitted to MISS LILLIAN NEFF, 708 WILCOX BLDG., MISS ELEANOR HANN, 3171 N. E. 35th PLACE, or to MR. A. F. PRATT, c/o CITY HALL.

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CONTINUED FROM PAGE 44--Summer Camp and Field Trip

addition to rhyolite, the Clarno contains basalts, andesites, dacites and many highly colored tuff beds.

Between the Clarno and the Madras are the exposures of the John Day formation and you may be lucky enough to find there an interesting fossil specimen. At Maupin one sees where the inter-canyon lava spilled over and filled the Deschutes River canyon. Northward one traverses over the great Shaniko surface, thence up through the Pleistocene andesite lavas, volcanic and glaciated areas of the high Cascades to Portland.

The expenses for this exploration trip will be a \$5.00 fee payable to the Society and \$5.00 for food to be furnished by the commissary. Those taking the trip should be equipped with sleeping

-45- (Concluded on next page)

bags, arrange for their own transportation and arrive at Paulina the evening of July 9th. For any further details please communicate with MR. HAROLD B SCHMINKY, TR 2168 - evenings.

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Continuation of last week's article by Dr. E. L. Packard

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THE GEOLOGICAL NEWS LETTER

Official Bulletin
of the

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Vol. 1 - No. 8

Portland, Oregon

July 12, 1935

ABANDONED MINES VISITED ON JOINT TRIP

By Gladys C. Randolph

On June 23rd a large group of Mazamas and members of the Geological Society of the Oregon Country made a joint trip to the west fork of the Washougal River in Washington to visit several abandoned mining projects.

These mines, Skamania, Rainbow and Last Chance, were worked in the early 1900s and have been deserted for many years. Huge pieces of rusting machinery still remain as mute evidence of former activities. Tunnels at the Skamania and Last Chance mines are about 1000 feet in length, wet under-foot and dripping, but various good specimens of copper ores were obtained. The Rainbow holdings have no tunnels but there are some shallow shafts near the Gibson Cabin.

Among the minerals picked up on the dumps by members of the party were covellite, bornite, chalcopyrite, malachite, chrysocolla, amethystine quartz and numerous others. Mr. Gibson, owner of the first mine, stated that copper, lead and some gold and silver had been taken from his mine and also considerable quantities of vanadium. Mr. Beldon, mining engineer, mentioned that the copper from the other two mines was of good character, and if enough gold could be found to go with this to help pay for the mining, it would probably be a worthwhile project.

The geologic formations of the country traversed and types of rocks encountered were in marked contrast to the usual andesites characteristic of the Columbia River region. The whole area is interesting because it is the first place north of Ashland where granitic or deep-seated rocks are shown up at the surface. This point marks the edge of ancient lavas and from here north at intervals these rocks occur until they become the dominant thing. No definite outcrop appears but large boulders of the material are much in evidence. They have smooth outlines and it may be possible to find places where they have cut through later rocks. These represent a mass that has forced itself, through long periods of time, close to the surface--about 2000 or 3000 feet. Since that time the country has been eroded and the rocks exposed. An endeavor was made to determine whether or not these rocks cut through the Eagle Creek formation, but to come to that conclusion they would have to be folded as is the Eagle Creek formation. Lavas, including the Eagle Creek that lie on top were not greatly folded, however. The granites have apparently been weathered a long time. They were evidently granite hills when volcanic activity was taking place in the Columbia

The Geological News Letter
Official Bulletin of the
Geological Society of the Oregon Country
Secretary - A. F. Pratt, City Hall, Portland, Oregon

Russell R. Norton.....Editor and Manager
Margaret Danks
Charles J. Emerick
Eleanor Hann
Lillian Neff

ABANDONED MINES TRIP (Continued from Page 48)

region. Some of the soil is without doubt weathered granite.

Granites are always of particular interest to the geologist and mining engineer because it is with these deep seated rocks that ore deposits are associated. The white soil along the trails between the mines is composed of quartz, hornblende and orthoclase. The dark types are made up almost entirely of hornblende in a granitic rock. Traces of the green mineral, epidote, were observed and interesting specimens of granite showing dikes were found. Specimens of grano-diorite which takes a beautiful polish were picked up on the trail between the Rainbow and Skamania mines.

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ANNOUNCEMENTS

OIL POSSIBILITIES TO BE DISCUSSED

The Geological Society of the Oregon Country will hear Claire P. Holdredge discuss the oil possibilities of Oregon and Washington on Thursday, July 11th, at 8 P.M., in the Auditorium of the Public Service Building.

This is the first time that a lecture on this subject of vital importance has been presented from a purely geological standpoint and Mr. Holdredge, by training, experience and association is exceptionally well qualified to speak authoritatively. Born and educated in Oregon, Mr. Holdredge has maintained his intense interest in the state and its great possibilities. For a long time and until recently, he was a geologist with the Shell Oil Company.

Bring any and all your friends.

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The Department of the Interior, Geological Survey, Washington D.C., will send monthly, without charge, a list of their new publications to those requesting same. Bulletins dealing with the geology of various sections of the country, oil resources, mining districts, maps, etc., are usually included in the list.

POISON OAK INFECTION

The following abstract was prepared by F. L. Davis from a bulletin issued this year by Frank T. Kochler, State Safety Director to the State Emergency Relief Administration of Oregon.

The plant in some locations is a shrub and in others a vine which can be found encircling trees sometimes for a distance of fifty feet or more. During the winter the plant sheds its leaves and may not contain the dried white berries adhering to the stalks. In the early spring the plant puts forth dark red leaves which eventually change to green and are similar to an oak leaf, being tri-foliate in shape.

The berries develop during the summer and the plant in the fall turns a beautiful golden red and has often been gathered as a spray of fall foliage. Later the leaves drop off leaving the bare stem with tendrils, any of which may cause infection. The ashes from poison oak when burned may carry infection to anyone within the poison zone, and if the person is exposed to the direct heat very violent infection may occur.

The way to treat poison oak is to prevent the infection rather than to affect a cure after poisoning. The remedies usually applied in the field have not been very effective, and all aggravated cases should be referred to a physician for treatment.

The poison causing the irritation is contained in the juice of the leaves, twigs and roots of the poison oak plant. Poisoning may be by contact and by touching plants, clothes, tools or other persons who are infected. Most injuries reported affect the skin between the fingers, on the wrists and often the tender skin around the eyes. In some cases the ankles and legs are affected.

In order to prevent this infection, the parts of the body which might come in contact with any of the poison should be covered with ferrous sulphate solution before going into poison oak localities. The trousers should be tied over the shoe-tops unless the ankles and legs are bathed with the solution. The solution is not injurious to the skin and can be applied freely to the face or other parts of the body. Its action is to neutralize the poison itself so that the neutralized solution can be washing off at lunch time with soap and water.

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Claire P. Holdredge--Leader

6:00 A.M.	Leave SW. 6th and Yamhill	0 Miles
6:15 " "	Leave Vancouver after picking up Washington 8 cars at 22nd and Main. Take road for Battle Ground, by way of Manor, just beyond the Military Cemetary. This road traverses a region containing some interesting sink holes	
	Battle Ground	23 "
6:45-7:15 A.M.	Battle Groud Lake. This is a minature Crater Lake.	25 "
	Heison. Cross East Fork of Lewis River. Turn right.	26 "
7:30-7:45 A.M.	Big Tree Creek. Here we see some interesting intracanyon flows topped with slightly auriferous gravels. A possible damsite.	31 "
	Yacolt	34 "
	Ambay After leaving here the road crosses Chelatche Prairie which was probably an old lake bottom.	37 "
8:30-8:45 A.M.	Yale Bridge. Cross old canyon of Lewis River Pause to notice outcroppings. A damsite location lies about two miles up stream.	43 "
	Cougar	48 "
9:15-3:15 P.M.	Pandemonium Creek. This creek was formed in December 1933, when impounded water broke out through gravel lying beneath recent lavas and cut a huge canyon in a few hours. Hiko to head of Christmas Canyon - about one mile. Lunch.	54 "
	Visit lava beds and caves at Ole Peterson's	60 "
4:00-5:00 P.M.	Ariel Dam. Officials of the Northwest Electric will tell about the building of the dam. Study outcroppings. Party is free to break up at 5:00 PMM.	73 "
	Woodland	84 "
	Vancouver	110 "
	Portland	118 "

Suggested Fee for trip - \$1.20. Please call Exploration Committee for transportation and registration.

THE GEOLOGICAL NEWS LETTER

Official Bulletin
of the

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Vol. 1 - No. 9

Portland, Oregon

July 22, 1935

PHOSPHATE AND ALUMINUM RESOURCES OF THE NORTHWEST

Subject of Lecture - July 25, 1935

RAYMOND M. MILLER will talk on the phosphate and aluminum resources of the Northwest and their industrial significance to the Northwest and the Lower Columbia River Valley on Thursday evening, July 25th, at 8:15 o'clock, in the Auditorium of the Public Service Building.

Mr. Miller is highly qualified to discuss this problem having conducted much research work along these lines for the Soviet Government of Russia and was also connected with the State of Washington Planning Board in similar activities. He is now associated with the U. S. Engineers investigating the electro-metallurgical treatment of ores.

All members of the Society and their guests are invited.

SCIENCE NEWS LETTER AVAILABLE AT CLUB RATES

SCIENCE NEWS LETTER, an excellent weekly summary of current news in the field of science, may be had by Members in groups of ten, mailed to one address, at \$2.60 a year. The regular subscription rate is \$5.00 a year, two years for \$7.00.

The Secretary, A. F. Pratt, has agreed to act as intermediary and have the copies delivered to him and will see that they reach the subscribers.

Several members are desirous of having the publication but are held back for lack of a few more subscriptions. If you are interested, please communicate with the secretary immediately.

ALL who wish to submit designs for the Society Emblem, please communicate without delay with the Chairman of the Committee on EMBLEM AND INSIGNIA -- Geary Kimbrell, 425 City Hall - Atwater 6141, Residence - 2522 NE 57th Avenue - Garfield 9995.

LOG OF THE SOUTH JETTY OF THE COLUMBIA RIVER TRIP

LEADER - H. B. SCHMINKY

Saturday, July 27, 1935

- 0.0 miles - Leave Portland at your own convenience the afternoon of July 27.
- 105.0 " - Astoria. Those who do not desire to camp out may spend the night here. The Chamber of Commerce at Astoria states that there is only one auto camp there and that it is usually filled; but the hotels will reserve rooms on three days' notice. Some of the hotels will make special rates to our group.
- 112.4 " - Road turns off to the right for Warrenton. There are some auto camps in this vicinity, but they say they are usually well filled and cannot make reservations on short notice.
- 114.4 " - Warrenton.
- 118.4 " - Hammond. Follow road towards Fort Stevens.
- 118.6 " - A road turns to the left for Coffinberry Lake.
- 120.6 " - Coffinberry Lake. Camp in grove of alders along side of the lake. This camp has no conveniences, but we are told that it is a nice place (Mazama recommended). Water for cooking and drinking may be obtained about a mile away. The lake is fresh water and may be used for swimming. We will have a bon fire on the ocean beach (about 500 feet from the camp) at 8:00 P. M.

Sunday, July 28, 1935.

5:00 A. M. We have made special arrangements to have a -0.5 ft. tide at this time for those who would like to go clamming.

8:00 A. M. We leave on a train provided by the contractor for a ride out on the jetty. The trip will take about two hours.

On our return from the jetty we will head south, stopping to study sand dunes enroute.

140. miles - Seaside. Stop to see gravel barrier bar.
149. " - Cannon Beach. Lunch. Study rocks.
185. " - Nehalem Beach. Recent volcanoes.
204. " - Barview. View entrance to Tillamook Bay. Break up caravan.
227. " - Tillamook.
247. " - Hobo.
337. " - Portland.

PLEASE REGISTER EARLY.

Call H. B. Schminky for hotel rates at Astoria.

Suggested fee is \$3.50.

Trip is open to members and invited guests.

FIELD TRIPS SCHEDULED FOR AUGUST AND SEPTEMBER

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The following trips are listed now so that all those interested in going may plan accordingly. Complete details will appear in a later issue of the Bulletin.

All members of the Society are requested to register for the trips with some member of the Exploration Committee.

It is very important that those who desire transportation and those who have room available in their cars for extra passengers, register as early as possible.

Please call any of the following for registration and further details:

Mr. Harold B. Schminky -- TRinity 2168
Mr. Leo F. Simon -- ATwater 0438
Mr. J. R. Collins -- EAST 9831

August 10th and 11th.

ROADS END AND NEWPORT - We will leave early Saturday morning for Roads End, where interesting dikes will be studied. Agates may be picked up here. We will work our way down the coast to our camp and will have a bonfire and informal talks on the beach Saturday night.

Sunday morning we will visit the fossil beds near Newport.

Plan to take Saturday off now. Send in your registration stating if you want a cabin or will camp out; the number in your party; if you have room for extra members; or if you are looking for transportation.

Please remember that everyone must register. Do it early.

.....

August 31st, September 1st and 2nd.

CLARNO BASIN - PAINTED HILLS - OCHOCO MINES - This will be the "big trip" of the year. We plan to leave early Saturday for Clarno where we will look for fossil leaves and nuts and see the drilling of an oil well. Camp will be made in the mountains east of Clarno.

The second day we will visit the Painted Hills where leaf prints may be found; then on to the mines where we will camp.

Monday we will explore the mines.

Bring complete camping equipment, and food for three days.

Autos must be in first class condition to travel mountain roads.

Make your plans to go now.

Register Early.

.....

September 15th

MOUNT HOOD AND ITS GLACIERS

.....

September 28th and 29th

WARM SPRINGS INDIAN RESERVATION

Harold B. Schminky

BUSINESS MEETING REPORT

A meeting of the Executive Board and Committee Chairmen was held at the home of Dr. Edwin T. Hodge, President of the Society, on the evening of July 18, 1935. The main subjects under discussion were the finances of the Society and the Publication.

The management and editing of the Bulletin has been placed under the direction of Tracy Wade, Gladys Randolph and Lillian Neff. Eleanor Hann and her father will have charge of the mailing. The Executive Board has allowed Mr. Wade 85¢ per member for the completion of the year 1935 as a budget allowance for the Publication.

L. B. Macnab replaces Tracy Wade as Chairman of the Membership Committee.

Geary Kimbrell was commissioned to place a plaque at the Crater of Mt. Tabor.

The following report of the Treasurer was read:-

July 18, 1935

TOTAL RECEIPTS \$205.00

The following disbursements have been made:

Entertainment - Dr. Smith		.65	
Publication Account - Stencils and Paper		19.75	
Stamp Account			
Publication	\$7.50		
Miscellaneous	3.50	11.00	
Stationery Account			
Paper and Stencils for Membership			
blanks		.95	
Membership cards		2.00	
Letterheads		9.15	
Envelopes		4.50	16.60
TOTAL DISBURSEMENTS			48.00
BALANCE IN BANK ACCOUNT - United States National Bank			\$157.00

Respectfully submitted,
Lillian Neff

THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY now has an even hundred paid-up memberships. LET EACH MEMBER BRING IN A MEMBER.

Please send all announcements and any material you wish to have appear in the Bulletin to: - Gladys C. Randolph, 2726 NE 63rd Avenue, or Phone - MURdock 2411.

OIL POSSIBILITIES OF OREGON AND WASHINGTON

, Abstract of Lecture by C. P. Holdredge

Presented before The Geological Society of the Oregon Country

.. July 11, 1935. ..

.....

Introductory remarks dealt with the origin of oil in beds containing partially decayed organic material, migration to adjacent porous strata and its concentration in anticlines and other favorable structures. Its original discovery in seeps and surface accumulations, and the development of geological technique for prospecting deeper occurrences were explained. It was then pointed out that its occurrence was not limited to any particular geological age.

It was shown that rocks of the required nature for source and reservoir rocks exist in Oregon and Washington; that favorable structural conditions for concentration of oil exist and that much of the vulcanism, which has usually been the chief cause of condemnation in the past, is of such a nature that adjacent rocks were probably but little altered.

Certain impossible areas were mentioned such as those underlain by granitic rocks like parts of the Olympic, Siskiyou and Blue Mountains and those beneath which the source and reservoir rocks were buried to such depth that they could never be reached by the drill, as the Cascade Mountains.

It was stated in conclusion that improved drilling methods had so extended the depth from which oil could be produced that many areas heretofore considered impossible could be included as possible areas; and that in view of this, and of recent geological discoveries in the northwest, the region assumed such a promising status that should the demand for new production become sufficiently acute, oil very probably will be discovered.

THE GEOLOGICAL SURVEY OF THE UNITED STATES

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THE GEOLOGICAL NEWS LETTER

Official Bulletin
of the

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Vol. 1 - No. 10

Portland, Oregon

August 5, 1935

GEOLOGY OF OREGON AND WASHINGTON SHORE LINES

Subject of Lecture - August 8, 1935

DR. EDWIN T. HODGE will address the Society at the meeting on August 8, at 8:00 P. M. in the auditorium of the Public Service Building. The subject of his talk will be,

"Geology of the Oregon and Washington Shore Line."

He will include an explanation of the scenic features or picture geology and a discussion of the geological problems involved in the evolution of the harbors, sounds, and inlets. Also a discussion of the geology in relation to economic developments such as bridges, harbor work and matters connected with navigation developments. The talk is particularly opportune at this time, as it will give the group a preview of the district to be covered by the trip of August 10 and 11.

PRIVILEGE OF CHARTER MEMBERSHIP CEASES OCTOBER 1st.

Members and applicants for membership to the Geological Society of the Oregon Country are reminded that the privilege of Charter Membership ceases October 1st. Charter Members will receive all copies of our News Letter; later members may obtain the early copies only by purchase which will materially increase the cost of membership.

The minimum age limit of 21 years for full membership is not intended to preclude admission of those who are "endowed" with adult mental capacity and who prefer to be known as "Members" rather than as "Juniors". At a business meeting on July 18th, the Executive Board agreed that the Membership Committee should be guided by the 21-year limit, but not bound by it. Prospective members nearing 21 years of age should not be discouraged from submitting applications for Senior Membership.

LOG OF THE ROAD'S END-NEWPORT TRIP

- A. D. Vance, Leader -

<u>August 10, 1935</u>	<u>Miles</u>
9:00 A. M. - The caravan will assemble Saturday morning, August 10 at 9:00 A. M. at Road's End	93.0
Take West Side Pacific Highway from Portland to Tillamook highway and Salmon River cutoff.	
One mile hike over good trail to high point for view of dikes, sills and lava flows; also beach walk. Leave Road's End at 11:30 A. M.	
11:40 A. M. - <u>NELSCOTT</u> - Between Nelscott and Taft notice road cuts through old sand dunes.	98.8
11:45 A. M. - <u>TAFT</u>	100.2
11:50 A. M. - <u>KERNVILLE</u> - Stop five minutes for view of Bay Bar which extends to Taft. Siletz River and Schooner Creek enter ocean over bar at Taft.	
12:00 Noon - <u>BOILER BAY STATE PARK</u> - Lunch and examine basalt and lava flows, caves, agglomerates and other interesting formations.	108.9
1:30 P. M. - <u>DEPOE BAY</u> - Bay may be old crater. Visit crevass, underground fresh water lake, spouting horns, etc.	110.2
2:35 P. M. - <u>WHALE COVE</u> - Two minute stop. View from car.	112.3
2:38 P. M. - <u>ROCK CREEK PARK</u> - Lava flow and kitchen midden.	112.4
3:20 P. M. - <u>OTTER CREST VIEW POINT</u> - Fifteen minute stop.	114.7
3:40 P. M. - <u>OTTER ROCK PUNCH BOWL STATE PARK</u> - See punch bowl, fossils on beach. "Patience, perseverance and a pick produce perfect pectens here."	116.5
5:00 P.M. - <u>OCEAN PARK (Spencer Creek)</u> - Probable camp site	118.5

Very important that you register AT ONCE so reservations may be provided. Two-party and four-party cabins available with or without bedding from \$1.25 to \$2.00 for the night. Twenty-five cents extra for bedding per bed.

Old dance hall will provide roof for campers in event it rains.

Miles

5:00 to 6:00 P. M. - Make your own supper. Hotel at Whale Cove. Restaurants at Newport. Beach campfire.

....

SUNDAY MORNING - AUGUST 11 - Eat your breakfast as early as you wish and hunt fossils on the beach, but be in your car at 9:00 A. M. to continue trip.

....

9:15 A. M. - IRON MOUNTAIN - Volcanic neck. Climb mountain for view. 121.7

....

11:20 A. M. - LIGHT HOUSE - Basalt shingle on beach. Lunch. 124.0

....

12:30 P. M. - NEWPORT BEACHES. - Fossils.

....

4:00 P. M. - Disband.

....

We are asking Dr. Packard to make the trip with us as he has studied this section of the coast line for years and knows the fossils to be found better than any other paleontologist.

....

Please call H. B. SCHMINKY, Exploration Committee, TRinity 2168 - for transportation and reservations immediately.

Suggested transportation compensation \$2.50

.....

ROUND TABLE LUNCHEON FOR MEMBERS

*noted
mid 1983.*

When the Geological Society of the Oregon Country was formed early this year, a few enthusiasts fell into the habit of getting together for lunch at the restaurant of the Sovereign Hotel, corner of Broadway and Madison, every Thursday noon. Since that time not a single Thursday noon luncheon has been missed.

Dr. Hodge presides and the discussions and talks are always impromptu and interesting with showing of photographs and specimens. Any member who has the 35¢ necessary for the meal is more than welcome to join in and bring a friend if he wishes to do so. Ladies are invited to attend as well. It is not a set meeting, and one may come or go as one wishes.

Try it sometime -- you will enjoy the talk and contacts with kindred spirits.

The EDUCATIONAL COMMITTEE of the Geological Society of the Oregon Country reports that the following courses will be given by the Extension Department of the State Board of Higher Education this winter at the Lincoln High School:

Fall and Winter Terms: - GENERAL GEOLOGY - 2 term hours each term.
Spring Term:- GEOLOGY OF OREGON - 2 term hours.

These courses are scheduled for Thursday evenings in Room 113.
Dr. Edwin T. Hodge will conduct the two courses.

.....

Fall Term: - ROCKS & MINERALS - 2 term hours. Dr. W. D. Wilkinson.

.....

Winter Term: - PHYSIOGRAPHY - 2 term hours. Prof. Allison.

.....

Spring Term: - ELEMENTS OF STRUCTURAL GEOLOGY - 2 term hours.
Dr. W. D. Wilkinson - Monday evening - Room 113.

.....

We are glad to recommend these courses to the Members of the Society especially to those who did not avail themselves of the courses last winter and to those who are contemplating joining the Society in the future. The courses will provide the necessary training in these subjects to qualify one for membership in the Society and fit one for enjoying to the fullest the activities of the Society. To these two classes of persons the courses offer a rare opportunity for gaining a knowledge of geology and at the same time carry University credit for those who desire it.

As the summer wears along many members of our group are considering next winter's educational possibilities along geological lines. It was the intention of the founders of our group that permanent quarters would be obtained and educational facilities set up in a modest but scientific way. This objective must needs wait for said permanent quarters and increased income. The only other alternative we have at present are the extension courses of the State Educational System at Lincoln High. Dr. Adams of the Educational Committee has a preliminary schedule of the courses that are proposed for that course. They are an interesting group of studies but not materially different from the courses of last winter. Those who took the courses last winter are looking for additional courses that will round out their basic and fundamental preparation to study and identify the geological horizons in Oregon. Such a course is one in elementary paleontology. It would be of inestimable value to those who wish to go into certain locations and work out the geology therein. It has considerable purely cultural value from the standpoint of those who like to know what a "plicatta stylus gregarius" is when they find it just

as one who finds a piece of "vesicular porphyritic andesite" likes to know the why and wherefore of it.

In this connection it might be pointed out that in New York State the New York State Museum which is under the control of the University of the State of New York has published a series of popular scientific handbooks for the use of those citizens who go into the state parks and into the mountains and wish to study the geology, paleontology, botany, fauna, insectivora, etc. of the state. So far nine handbooks have been issued and it is interesting to note that the first in the series relates to geology and the last is entitled, "A Handbook of Paleontology for Beginners and Amateurs". These are splendid texts but relate specifically to New York State.

If the growth and interest of the people of this state is to be likewise developed through our group so that they will awaken to the wonderful geological treasures in our midst, we must have the full assistance and cooperation of the state's educational facilities. It is by helping us that they will help themselves. We have all had the pleasure of seeing and hearing Dr. Packard, Oregon State College's only paleontologist in action. For thirty years he has been teaching paleontology at Oregon educational institutions. He is most erudite in his profession, as enthusiastic over his subject as any teacher could be, and our contacts with him indicate that he has the happy faculty of imparting his information, i.e., teaching. Therefore, in view of all these considerations it is felt that we want a full year's course in Paleontology and that Dr. Packard is wanted for the job. Some of our group were thrown in close contact with him during the week's geological tour through central Oregon. This was all argued over and over again around the campfires of the trip. Dr. Packard insists that his duties as dean and the lack of an assistant preclude the possibility of his coming to Portland once a week.

"But Dr. Packard, we want to tell you again that you will do more to develop your geological department and its appropriations if you will step out of your cloistered seclusion and make those most valuable human contacts offered to you at Lincoln High School. Surely your Budget Committee will appropriate the few hundred dollars that a young paleontologist just in possession of his doctorate would require to carry on in the few hours of your absence in Portland."

It is suggested that those of our group interested in such a course contact the editorial staff of the publication at the earliest opportunity. With that information collected by the editorial staff, Dr. Adams' educational committee can approach Dean Powers with something concrete.

Franklin L. Davis

TRIP TO LEWIS RIVER CANYON

C. P. Holdredge, Leader

*Conceded (2)
under Arise! Dam*

Left Vancouver, Washington, at 6:30 A. M., July 14th, via the Manor Highway. A few miles from Vancouver we noted numerous sink holes and hillocks upon a surface of the Troutdale sands and gravels. These land forms seem to be more or less aligned in a north-south direction and may be erosion forms carved by streams running in that direction before the Columbia River broke through the Cascade Range and formed its present course. Between us and the river were low hills which are also formed of sand and gravel. The low hills to the east are of lava which came out through and flowed out upon the top of the Troutdale gravels in many places. Some of the hills to the west might also be of this nature.

Our next stop was at Battle Ground Lake, which occupies the crater of an extinct volcano probably comparable in age to Mount Tabor and from which may have come some of the lava forming the hills east of the Manor Highway. Evidence indicating the origin of this crater was searched for. The flat low cone and the rockbound walls seemed to indicate a subsidence origin but an exit at a lower elevation (500') would be necessary and none is known.

Continuing northward we crossed the East Fork of the Lewis River and proceeded to Big Tree Creek. Our course up the East Fork was eastward over an intra-canyon flow of basalt which came down this canyon, partially filling it, and was then thinly covered with a veneer of gravels that are slightly auriferous. In the sides of the canyon we saw beds of sandstone and shale which may be of marine origin and in which we noticed fragments of petrified wood and even stumps of trees in a vertical position. These beds were folded into a low anticline plunging to the south. They resemble the beds of the Umpqua Formation of Eocene age but we found no marine fossils in them. The petrified trees suggest a relationship with the Warrendale or Eagle Creek Formation. These beds being older are covered unconformably by the younger lavas.

Turning north at Big Tree Creek we traversed the length of Yacolt valley out of which the stream flows as does a tributary of Cedar Creek. Following down the latter we crossed Cedar Creek at Amboy and entered the west end of Chelatchie Valley which may have been caused by a fault along the steep south side which suggests a fault scarp.

Yacolt Valley is bounded on the west by a range of hills probably composed of lavas of the same age as those which we saw near Battleground. Chelatchie Valley was probably once occupied by a lake since drained by cutting down its outlet. At the head of this valley is Tum Tum Mountain, a steep cone of volcanic origin probably composed largely of cinders and other ejecta.

Passing out of this valley near its east end through a low pass, we dropped down into the valley of the North Fork of Lewis River at Yale bridge.

After a short stop to see this modern suspension bridge over the upper end of Lake Merwin (the Ariel Dam Reservoir), some gray, fresh, andesitic terrace sands and gravels and more of the older, southward dipping (Umpqua?) beds, we proceeded over a ridge and came out into a broad, flatbottomed valley through which flows Speelyii Creek.

This valley is the old channel of Lewis River. The river valley above Ariel Dam was once filled with the andesitic sands and gravels to a depth of perhaps 500 feet. The stream then spilled over into the valley of its tributary, Soudixon Creek. When the source of supply of these gravels failed and the river began to clean out its canyon it was unable to get back into its old channel again. The source of material from which these gravels were formed was ejecta from Mount Saint Helens which rises a short distance north of the river. A final lava flow covering these sands and gravels in places and cessation of volcanic activity of Mount St. Helens were the causes of failure of this supply.

As we followed up the north side of Lewis River Valley we saw these deposits exposed in many places. We crossed Speelyii, Cougar and Pandemonium Creeks and stopped for lunch at Ole Petersen's Camp. Here we saw a stream loaded with silt from the melting glaciers on Mt. St. Helens. The stream from far above this point to the head of Lake Merwin is badly choked with gravel.

After lunch we returned to Pandemonium Creek, which we explored to its source about a quarter of a mile back from the river. The wide and deep wash down which this feeble stream flows was cut in a few hours on Christmas Eve, 1933. Near the mouth of the creek recent lava of intra-canyon age is exposed above andesitic gravels. Overlying the lava are similar gravels and sands of the valley filled to a depth of 500 feet or more. Capping these at the head of the creek is another lava flow similar to that below. A fall of snow followed by a warm heavy rain caused a lake to form in a depression on the surface of this lava flow about two miles back from the river. Water collecting in this area formerly descended through the lava into the gravels below and out through them to the river. But on this occasion the accumulation was so fast that the outflow channels would not carry it. Consequently as the water accumulated a hydrostatic head was built up. This pressure washed out the underlying gravels and a huge volume of water rushed out, tearing down the mountainside at a terrific speed and carrying with it thousands of tons of sand and gravel as well as huge boulders, logs and even large trees. A tunnel was thus formed in the gravels, which later collapsed and with it the lava capping. As the lake was drained the flow decreased and was eventually dammed by collapse of the tunnel until only a small stream again found its way where the torrent formerly raged and tore. We estimated that probably a million cubic yards of debris were carried down and dumped into Lewis River which, being at flood, scattered it along its lower reaches carrying large quantities of debris into the Ariel reservoir. We estimated that at its peak the gorge was carrying about 45,000 cubic feet per second of water.

From here we returned to Ariel Dam, stopping enroute near the mouth of Speelyii Creek to view the old filled channel of the river again and the steep escarpment which bounds it on the south and is suggestive of a fault; also a southward plunging anticline and syncline exposed in this escarpment.

At Ariel Dam we were met by Mr. Schoolfield and Mr. Somerset of the Northwestern Electric Company who most obligingly showed us through the project, explaining to us the workings of the gest, power house, spillway, fish traps and elevators and described to us the geological environment of the project.

According to them a submerged waterfall was found in the center of the channel. The rock in the bottom of the channel and on both abutments is a hard sound lava. The contact between two lava flows, marked by a thin bed of tuff, was found dipping down and across the stream and minor joints and fractures cut the rock in various directions. All of these were successfully filled with grout and no leakage has ever occurred along any of them. Pressure gauges show a negligible amount of uplift on the bottom of the dam.

They explained that adjacent to the northwest abutment of the wing wall section is an old filled section of an ancient channel parallel to the channel in which the dam is located and extending to a depth of 120' below the crest of the dam.

The party disbanded at this point at about 6:00 P. M. after a hot and dusty but withall a very interesting and highly successful trip.

The following is a copy of a summary of a geological report by the late Ira A. Williams on the Ariel Dam site. It should be noted that Mr. Williams calls the valley of the North Fork of the Lewis River a "glaciated channel". This view is not in accordance with that held by the geologist who accompanied the Society on their trip. However, Mr. Williams spent considerable time in the region and may have obtained data that has escaped the attention of the Society's geologists.

*checked
under
Ariel Dam
10/25/72
mst*

SUMMARY OF GEOLOGIC CONDITIONS AT ARIEL SITE

The broad canyon depression of the North Fork of Lewis River in which this site is located, was formed and its main characteristics given to it by a stream of moving glacier ice during the Glacial Period.

The general underlying rock formation of the region, exposures of which are to be seen in many places at and in the vicinity of Ariel site, and both far up and down stream from it, is a series of inclined layers of volcanic lavas and agglomerates and a lesser amount of the softer pebbly and shaly tuffs.

Ariel dam site is the result of the cutting by the North Fork of Lewis river of a deep rock-walled inner canyon into or across an upstanding ridge or body of these resistant rocks.

Between this inner canyon and the adjacent mountain sides which form the two walls of the main canyon, bedrock is covered by a fill of glacial materials underneath which, at the westerly side, drilling and shafts and electric prospecting have proved the existence of a buried parallel canyon, whose bottom is more than 100 feet lower than will be the top of the dam and the flow-line level of the storage basin.

Underneath the bed of the present river also is an old buried canyon or channel, whose rock bottom is over 125 feet below the present water surface, and which the ancestor of the present stream cut deeply into the country rock at a time when the general elevation of the region was at a higher level, and therefore the eroding ability of all streams greater than now.

This inner sub-channel is filled with gravels, sand, some silt, and boulders, all of which must be removed in order to place the central portion of the dam upon a solid rock foundation.

That the entire rock formation on which the dam will stand is inclined, or dips, 10 to 20 degrees in an easterly direction, crosswise, thus, of the canyon at the site, is brought out in all diagrammatic sections herewith.

At the westerly or Cowlitz county side of the site, the upper or surface rock layer is a massive andesitic flow-agglomerate (d), extending from the river to the summit of an upstanding rock ridge, and this agglomerate will be the foundation rock for the dam and spillway, and for the power house at this side.

Underneath this agglomerate, drilling has shown the existence at the westerly side, and in the channel bed, of a succession of equally substantial volcanic rock layers to as far down and farther than we are concerned from the present standpoint.

The foundation and abutment rocks whose cut off edges appear in the easterly side of the buried channel, where the dam will stand, are the equivalent or repetition of the series of layers occurring and just referred to as at the westerly side.

The upper easterly abutment, from the brink of the inner gorge to the top of the dam, consists of two heavy and substantial lava layers, (C) and (A), with a layer (B) of softer shaly tuff between; all however, inclined away from the river and in the general direction of the thrust to be transmitted to them.

The rock formation at this Ariel site is broken by a series of fault-cracks some half dozen known to run in general more or less parallel with the river, the position and course of the more prominent and probably more important set of which are evidenced at the westerly side by a sharp narrow gravel - and boulder-filled gulch that extends across the dam foundation and spillway areas.

Although earth movements, of probably minor actual extent, obviously occurred formerly along some or all of these faults, the breaks are in general now filled, or healed, with later secondary vein minerals. Oxidation and alteration of the wall rocks has proceeded to some depth along the more important ones of them.

The diversion tunnel, which pierces at prevailingly somewhat below river level the formation beneath and beyond the easterly end of the dam, passes through and hitherto opened to view an excellent section of the

four abutment rock layers all of which displayed characteristics similar to those shown in the excavation exposures; from up stream, andesitic agglomerate (D), basalt (C), shaly tuff (B) and the main top abutment andesite (A).

The same formation and series of volcanic rock layers as at the site, extend into and occupy the canyon sides and presumably the bottom of the storage basin throughout its extent.

(Williams, Ira A., Consulting Geologist; Geologic Report Ariel Dam Site, North Fork Lewis River, Washington; June 1930. PP 4 and 5)

OREGON FOSSILS EXHIBITED

The attention of Members is called to an exhibition of Oregon Fossils which will be on display in one of the cases in the lobby of the Central Library for a two-week period beginning August 12th. The specimens have been contributed by Members of the Society.

DO YOU KNOW that Diatomaceous Earth is composed of the glass skeletons of minute vegetable organisms so small that it takes from 20 to 75 million of them for a cubic inch of commercially valuable deposit? The Johns-Manville deposit at Lompoc, California, covers 5 square miles, is 1400 feet thick and is estimated to contain

16,000,000,000,000,000,000,000 skeletons. (16 trillion billion).

All of above facts, except number of skeletons from information furnished by Dr. A. B. Cummins, head of the Johns-Manville Celite Research Laboratory for an article beginning on page 14 of the Johns-Manville trade organ "The Power Specialist" for April-May 1935. (See also page 20)

$5 \times 5280 \times 5280 \times 1400 \times 1728 \times \frac{(20 \text{ million} + 75 \text{ million})}{2}$

= number of skeletons

Submitted by A. D. Vance

DOM'T BELIEVE IT - Riply says Shell Mountain rests on a mass of ice.

"STRANGE AS IT MAY SEEM" editor does not know that all members of the Geological Society of the Oregon Country know the origin of the drowned trees above Bonneville.

THE GEOLOGICAL NEWS LETTER

Official Bulletin

of the

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Vol. 1 - No. 11

Portland, Oregon

August 19, 1935

LECTURE ANNOUNCEMENTS

DR. CHARLES P. BERKEY, the geologist on the famous Roy Chapman Andrews Expedition into Mongolia, will give his wonderful lecture on the remarkable discoveries which he and his associates made in that region. Although we expect to have this talk at an early date, no definite time has as yet been arranged. Advance notices will appear in the newspapers.

.....

On September 12th, DR. FARRELL BARNES will tell the story of "How Mountains are Made". Dr. Barnes has spent many years in studying the growth of mountains and he comes to Oregon highly prepared to give us an insight into the modern facts and theories of mountain growth.

MAZAMAS EXTEND INVITATION

Members of the Geological Society of the Oregon Country are invited to join the Mazamas on their Mt. Hood climb scheduled for August 24th and 25th. This is a Mazama Acquaintance Climb and will be as safe and as easy as such a climb can be. The cost of the trip is quite nominal - transportation at 1¢ a mile and a climbing fee of \$2.00 which includes lodging for the night. Each climber is to furnish his own food.

Anyone desiring to join the party should either call at the Mazama Club Rooms in the Pacific Building - Beacon 2400, or write to Harry Clark, 401 Howard Street, Newberg, Oregon, for further details.

SPECIAL LECTURE ANNOUNCEMENT FOR AUGUST 22

In answer to the many requests for an advance lecture on the places that the caravan will visit over Labor Day, we have prevailed on Dr. Earl L. Packard to talk to us on the evening of August 22, at 8:00 P.M. in the auditorium of the Public Service building. The title of Dr. Packard's lecture is not available at this writing, but full details will appear in the local papers very shortly. This is a very interesting section of Oregon, and one that Dr. Packard has given considerable study. We are certain that this will be a lecture that you cannot afford to miss, if you are planning on making the trip or not.

LAST MINUTE ANNOUNCEMENTS ON THE LABOR DAY TRIP

It will be possible to have a bus to carry those who do not have their own transportation, providing that we have at least twenty reservations in before August 26. The fare will be \$5.00 per person for the trip.

If enough members request it, we will try and have a "chuck wagon" for this trip. The cost of this service cannot be given now as it will depend entirely on the number of people that will make the trip.

Every one intending to make this trip is requested to make written reservations. State on a postcard the number in your party, if you have your own transportation, or if you would like the services mentioned above. Address H.B.Schminky, 2200 NE 54th Ave., Portland, Oregon.

All those making the trip will find it of much interest to have a copy of the Geological Map of North Central Oregon and the Topographical Map of North Central Oregon. These maps may be purchased from the University of Oregon Press at Eugene, Oregon. The price is \$1.25 for the two.

EXTRA TRIPS AVAILABLE

Mr. Joseph Wimmer is anxious to make up a party of six willing workers to make a study of Iron Mountain. He plans to investigate the terrestrial magnetism and earth currents. Horizontal and dip measurements will be made at various contour intervals, and at hourly intervals. Those interested should get in touch with Mr. Wimmer at TA 0597, or write to 1261 NE 52nd Ave. Portland, at once.

Dr. Hodge will conduct a trip to study the Tenino mounds if enough people are interested. This trip must be made before the start of class work at Oregon State College. Call BE 4821, or write to 2915 NW Luray Terrace, Portland.

None of these trips will be made to conflict with the regularly scheduled trips of the society,

PHOSPHATE AND ALUMINUM RESOURCES OF THE NORTHWEST

Abstract of Lecture

by

Raymond M. Miller

.....

"Large deposits of phosphate rock in southeastern Idaho eventually will be the raw material for an important Northwest fertilizer industry," said Raymond M. Miller, metallurgical engineer, in an address given before the Geological Society of the Oregon Country, July 25, 1935, at the Public Service Building auditorium.

Mr. Miller, who has made a special study of phosphate industrial processes, believes that an electric furnace volatilization plant located in the vicinity of Bonneville to use Bonneville power, is an important industrial possibility.

"Tidewater plant sites where raw materials can be received and finished products can be delivered directly to ocean carriers, are of considerable importance to electro metallurgical and electro chemical industries," Mr. Miller said, "and when this is coupled with a large supply of cheap primary and secondary power, as will be available in 1937 at Bonneville, these heavy power using industries will lose no time in taking advantage of it, provided they are shown that these advantages exist, and raw materials are available."

Urging the people of the Northwest to study their mineral resources, and their industrial possibilities, Mr. Miller called attention to the tremendous phosphate rock resources of Idaho, which are estimated by the United States Geological Survey to be in excess of 5,000,000,000 tons, or 80 per cent of all the high grade phosphate rock in the United States, and over 48 per cent of the world's total.

Phosphate rock is a sedimentary, and in Idaho occurs in beds varying in thickness from thin seams to five or six feet, underlying an area of 2200 square miles, the richer deposits containing 65 to 75 per cent of tricalcium phosphate. The Idaho field is the largest of a phosphate rock region extending from Northern Utah, western Wyoming and southeastern Idaho, up through western Montana. Commercial rock exists in all of these fields, and in a small way is being mined. The Anaconda Cooper Co., at Conda, Idaho, and the Consolidated Mining and Smelting Co., which obtains its ore at Garrison, Montana, are the largest operators. These two companies produce concentrated superphosphate for the fertilizer market

Mr. Miller described the methods now in use in producing phosphoric acid and phosphate fertilizers and gave an interesting account of their development and application. The sulphuric acid method of acidulating phosphate rock is the older and standard method of producing superphosphate, but it is not suitable where the product must be transported long distances. To overcome this difficulty sulphuric acid was used to produce phosphoric acid and this was used to treat phosphate rock producing a highly concentrated "triple" superphosphate. Two other methods, the

electric furnace and the blast furnace methods are used to produce phosphoric acid from phosphate rock according to the speaker. In both, phosphorus is volatilized, burned to oxide and may then be hydrated to the commercial acid.

The electric furnace method is the most costly process due to high power costs and for this reason only is limited in its application to producing elemental phosphorus for matches, and phosphoric acid for chemicals, foodstuffs and medicinals.

The blast furnace method of volatilizing phosphorus for phosphoric acid has become a commercial success in the east, but this depends upon cheap coke that cannot be obtained in the Northwest; and considering this, the electric furnace presents industrial possibilities that should be carefully explored, especially in view of the probability that power costs in this area may be low enough to extend the market for electric furnace phosphoric acid to the fertilizer industry.

Concluding, Mr. Miller pointed out some of the requirements of the aluminum industry. The power necessary per ton of aluminum is approximately 22,000 Kilowatt hours so that a small reduction in power rate constitutes an appreciable saving. If it were commercially possible to utilize clay in the place of bauxite as an ore of aluminum, an important industry might be built at Bonneville or Grand Coulee; but as yet this has not been proven. Metallurgically, it is possible, but a metallurgically possible process may not be economically possible. Therefore, much experimental work and study must be applied on this problem.

Other ores of aluminum available are the leucite of Wyoming, reported by government authorities to contain 200,000,000 tons of alumina, from which aluminum is produced, and several million tons of alunite in southwestern Utah. But both of these require experimental work equal to that required for clay.

NEW APPOINTMENT MADE

At a meeting of the Executive Board on August 8th, Mr. H. B. Schminky was appointed Chairman of the Exploration Committee replacing Mr. Harry Clark who resigned the office due to his absence from the city.

TESTING LABORATORY ESTABLISHED

One of our members, Russell R. Norton, has established a laboratory for the determination of gasoline and oil excellence and the lasting qualities of lubricants, water in radiators and air in tires. Russell will be glad to discuss his experiments with any Society member or friend stopping at 26th and Gladstone.

RECENT PUBLICATION REVIEWED

Maiden Peak Quadrangle Map.

This is the most recent sheet of the topographic atlas to be published for Oregon by the U. S. Geological Survey. It covers an area in central Oregon, in Deschutes, Lane and Klamath Counties, with a scale of 2 inches to a mile, and a contour interval of 100 feet. The portion of the Cascade Range shown is a broad upland, above which rise numerous buttes and peaks of moderate size. The altitude along the divide ranges from 5,400 to 7,600 feet above sea level; the highest crest being Bachelor Butte (9,060 feet), a few miles east of the divide. Most of the peaks and buttes are volcanic cones, some of them with craters that are plainly shown on the map by the depression contour lines in the center of the cone. From these cones lava flows have spread in various directions and now form fairly smooth tracts of considerable extent which slope eastward to altitudes of 4,200 to 4,300 feet near the branches of the Deschutes River. The topography is very young; the streams having accomplished but little erosion east of the crest of the Cascade Range since the most recent of the lava flows. One such flow dammed the Deschutes Valley near Lava Butte and Benham Falls, 10 miles northeast of Bates Butte, beyond the quadrangle boundary, forming a large lake which has since been drained but left its traces on the flats in the eastern part of this quadrangle. Another lava dam caused Davis Lake to form and water percolating through this dam issues as springs at the head of Davis Creek. The glaciers that headed on the upper slopes of the Cascade Range during the Ice Age scoured out basins and deposited terminal moraines. Some of these morainic dams formed other lakes, such as Odell Lake and Crescent Lake, just southwest of this quadrangle.

The surface of most of the area is covered by a layer from 1 to 4 feet in thickness of coarsely granular pumice, which was probably deposited during a post glacial eruption in the Crater Lake region to the southwest. On account of the porosity of the pumice and the underlying lava, surface water seeps into the ground and there are few small streams. The map shows a few villages, scattered ranch houses, branches of the Great Northern and Southern Pacific railroads in the southern and eastern parts of the quadrangle, The Dalles-California Highway, Century Drive and other roads and trails. Published also with green overprint showing woodland which covers most of the area.

The map may be obtained from local dealers for 15 cents (2 for 25 cents)

PLEASE SEND all announcements and any material you wish to have appear in the Bulletin to:- Gladys C. Randolph, 2726 Northeast 63rd Avenue, Portland, Oregon. Phone MURdock 2411.

GEOLOGY of the SKAMANIA MINING DISTRICT

By

Allyne F. Pratt

.....

The country surrounding the Skamania Mines recently visited by members of the Mazamas and the Geological Society of the Oregon Country presents an interesting study in geology. Why Silver Star and Little Baldy? Why the amphitheatre between them? Did you notice that the topography of the west slope of Silver Star resembled that of the east slope of Little Baldy, and the same for the slopes facing each other, or that the east and west slopes of either differed in their topography? I will give you a brief description of the geology of the district, as I see it, and let you draw your own conclusions.

....

Going back to Eocene or possibly late Cretaceous times, we find the beginnings of a series of sediments being formed that continued into the Miocene. These sediments, consisting in the main of sandstones capped by a shell marl, are approximately two thousand feet in thickness. Subsequent to the laying down of these beds an intrusion of granodiorite occurred, forcing itself under the sediments and uplifting them in the form of a quaquaversal. The up-lift became so great that a rupture of the sediments occurred along a north and south zone of weakness. The sediments on the west of the zone of rupture were forced up into what became Silver Star Mountain, and the sediments on the east of the zone of rupture formed Little Baldy, a gigantic amphitheatre some two miles in diameter, floored with granodiorite, being the final structural feature of the district. Subsequent erosion has formed the topographical features as we see them today.

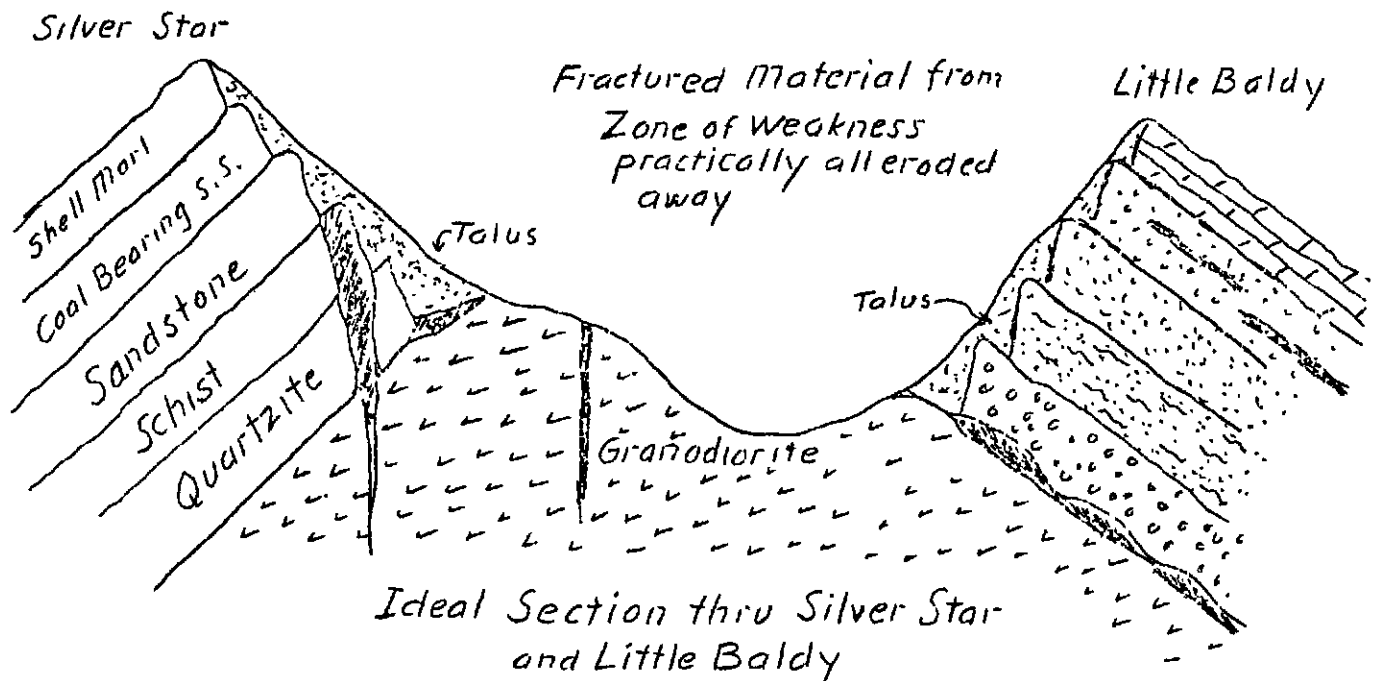
There are several physical as well as lithological features of the district that are of interest such as the chimneys or pillars which are remnants of portions of the intrusive igneous magma that found zones of weakness in the over lying sandstone and so was able to force itself further into the sediments; also the pegmatites which are the product to magmatic differentiation. If we study the sedimentary material just above the intrusive granodiorite, we find it no longer sandstone. It has become quartzite. We will find the quartzite grading into schist and the schist to the original sandstone - an excellent example of metamorphism. If I am not mistaken in my correlation, the uppermost stratum of the sandstones should be carbonaceous and of the same stratigraphic position as that existing in the hills southeast of Castle Rock.

The mineral deposits of the district consist of three types: - first, the contact deposits lying between the granodiorite and the quartzite; second, vertical or nearly vertical veins in the stratified rocks; third, veins in the granodiorite. The minerals of the first group consist chiefly of chalcopyrite, with marcasite and pyrrhotite. On the contact occur epidote, garnet, molybdenite and realgar. The

veins of the second group occupy a shear zone of considerable width in the sedimentaries but become very narrow as they pass into the granodiorite, the principle minerals being galena, pyrrhotite, marcasite, pyrite, lollingite and sphalerite. The veins of group three are narrow and have well defined walls, the chief minerals being chalcopyrite and bornite. Small amounts of galena, sphalerite, and micaceous hematite constitute the minor minerals of the group. A study of the above shows that one may determine the type of deposit from which a hand specimen has been obtained by the minerals contained therein.

The most interesting feature of the district is the granodiorite. What appears to be the same rock occurs on the East Fork of Lewis River, large exposures being found north of Spirit Lake and also in Snohomish and Skagit Counties. In Oregon, we find granodiorite underlying the Eocene sandstones in the Rogue River Valley. This great mass of igneous rock appears to be an enormous batholith extending under the Cascades thruout the breadth of Oregon and Washington and probably into British Columbia, the exposure in Skamania County being a portion that was able to find its way thru to the surface.

Those of you who have a copy of Dr. Condon's "Two Islands", or the later edition "Oregon Geology", will find on Plate I a picture of a "Fragment of Miocene Beach". This greatly resembles a specimen which the writer has at hand that came from near the top of Little Baldy on its east slope.



THE FACE OF THE DRIFT

By

Franklin L. Davis

.....

One of the interesting high points in the Skamania Mines trip was that of the talks by Dr. Hodge and Dr. Read at the face of the 1100 foot drift of the Last Chance. In the particular group of about fifteen with whom I waded in through the old muck to the face, few had ever been in a mine before. But to the "miner" born, it awakened a flood of memories and started a chain of mental reminiscences.....

"We've lost the vein at the face -- Here come the "big collars" to the working face to check it up -- We've hit a big flow of water at the face -- The end of the month and in we come with dragging chains to measure up the progress from the paint mark a few hundred feet back which marked the end of last month's progress -- Endless argument with the entry contractor and his crew as to rock work, timber sets, and pipe work....."

But in all these incidents at the face and many others just as at Last Chance, the thing that remains as a mental picture to me is the flickering light on the group of faces seen darkly. Grotesque shadows and distorted forms are registered by the imaginative mind, instinctively filling in the portions of darkness and obscurity, creating a weird modernistic painting.

And so, at the old working face of the Last Chance, I again saw that picture. Dr. Hodge, with the same earnestness and skill which he so characteristically uses in the quiet of the lecture room, described the fault along which the drift advanced; the hanging wall; the fact that a fault is never a clean cut fracture, but a crushing, tearing and twisting that involves a certain region; and that it was along this region that the entry was driven more than twenty years ago. And as he enumerated these salient points it was a most unusual picture to slowly change the glimmer of the old acetylene miner's lamp I carried to cause it to chase the half lights around the confines of the narrow entry, and to imagine the attentive faces before me those of queer subterranean gnomes who inhabit underground workings and walk with humans who venture into their abode.

Dr. Read, the visiting geologist from Visalia, California, as he talked of his impressions of the Last Chance, and as he told of the old miner's saying that "two cents worth of copper will turn a whole mountain green", was transformed by the shadows into a Fra Savonarola with cowl and cassock.

.....

....."And, Buddy, it's about time for we 'uns to go off shift, so take that tobacco from your pipe while I open this keg of black powder for a shot off the face of the drift."

.....

FLORA OBSERVED ON SKAMANIA MINES TRIP

Leo F. Simon

In 1902 a devastating forest fire ravaged the Skamania mines region and more than 300,000 acres of fine timberland were practically destroyed. Few old trees were left for re-seeding purposes and the several fires which followed, the most notable being in 1927 and 1929, took a final toll of the remaining old trees and most of the new growth. The Douglas fir has been nearly exterminated in this area as it requires about 25 years to mature and bear seed. The deciduous trees, mainly alders, maples and willows have made the greatest come-back. Shrubs, flowers and grasses were quite profuse, over 40 varieties being found in bloom.

Among the best known of the blooming plants observed on the trip were pentstemon, linnaea or twin flower, paint brush, goat's beard, mimulus or monkey flower, fireweed, fairy bells, tellima, youth-on-age, spiraea, ocean spray, wild rose, hawk-weed, blue elder berry, salmon berry, thimble berry, lotus, lupine, golden pea and Oregon sunshine.

Mr. Simon, with an armful of flowers and plants named and described each specimen as he held it up for the attentive group to see. When he mentioned "Oregon sunshine", Mr. Vance, glancing up at the overcast sky suggested drolly, "That's quite rare, isn't it?"

Completely absorbed in his subject, Mr. Simon quickly and earnestly responded, "No, no - it's quite abundant. Why, in some parts of Oregon, we have lots of it!"

Many more interesting varieties of plant life were probably available on the higher ridges and squaw grass and arnica could be distinguished plainly on the distant slopes through binoculars.

Common names of flowers, while easier to remember, are mostly local and often misleading, the scientific names being their only true means of description.



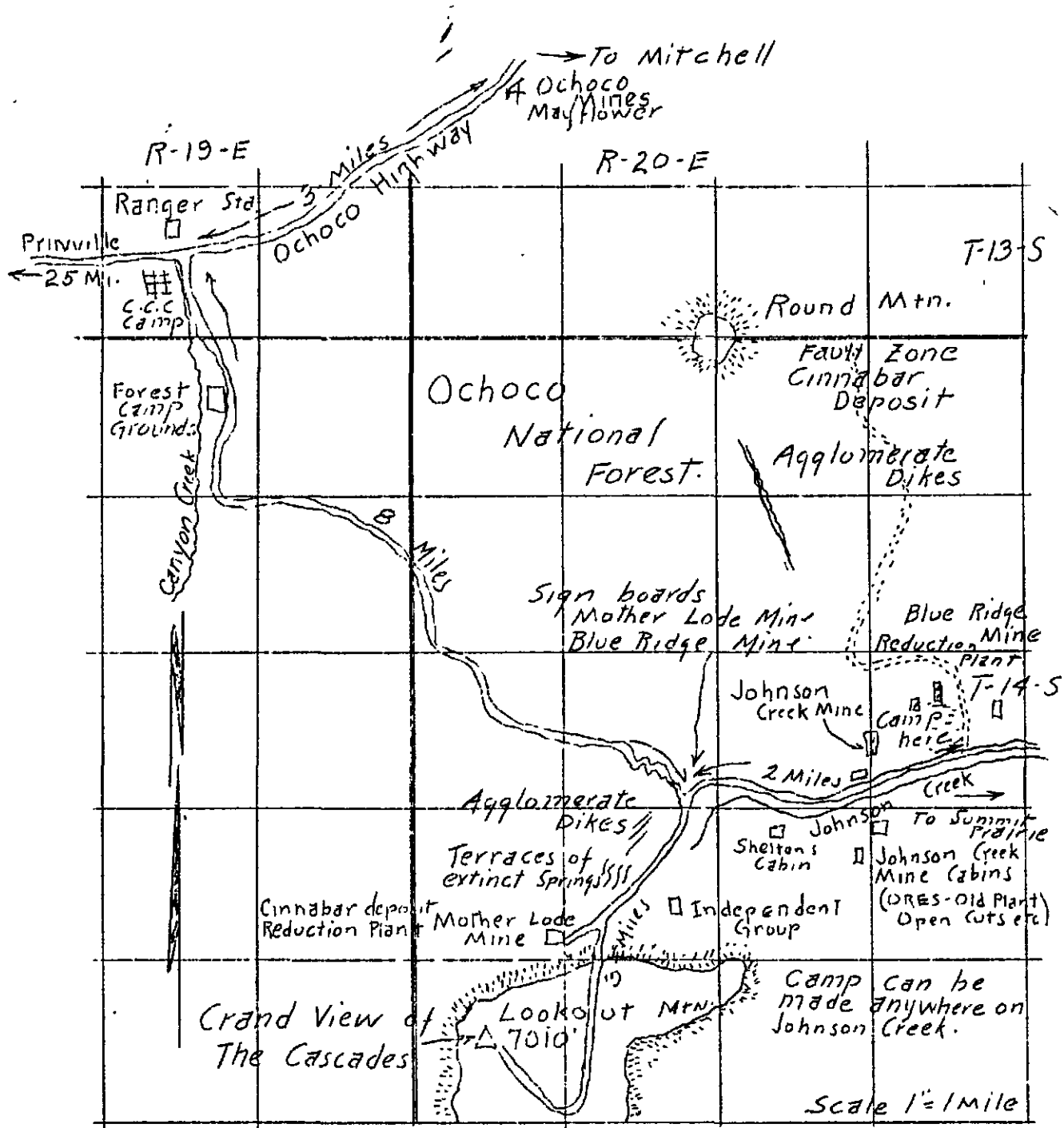
THE LABOR DAY TRIP

Aug. 31st, Sept. 1st and 2nd

Clarno, Painted Hills, Ochoco Mountains

Aug.31	Portland.....	0.0	6:00AM
	Maupin (Deschutes River).....	100.0	8:30-8:45
	Junction Sherman Highway (turn left).....	122.0	9:15
	Shaniko.....	134.2	9:35
	Antelope.....	141.7	10:00
	Moss Agate Hill on right.....	141.9	10:00-10:30
	Hill with crystals on the left.....	143.7	10:40-11:00
	John Day River-Clarno.....	157.7	11:30
	Clarno Basin, drilling for oil, fossil nuts and leaves.....	159.7	11:45-3:45PM
	Castle Rocks on the left.....	159.9	3:50-4:00
	Hoodoos on the left, crystals.....	163.7	4:15-4:30
	Junction Road to Fossil-keep right... ..	167.7	
	Junction Twickenham Road-keep right. ..	171.7	
	Camp ground on left of road.....	172.7	5:00PM
Sept.1	Twickenham-cross John Day River- turn right.....	187	9:00AM
	Bridge Creek School,turn left.....	199	10:00
	Painted Hills-farm road to right.....	203	10:15
	In and out of the Painted Hills.....	211	10:30-1:30PM
	Ochoco Highway, turn right.....	217	2:00
	Ochoco Forest Camp, Canyon Creek Road-turn left.....	242	3:00
	Camp Ground (Blue Ridge Mine).....	252	3:00
	Side trip to top of Look Out Mt. (eight miles for round trip).....	-	-
Sept.2	Johnson Creek, Independent and Con- solidated Mining Properties (six miles for round trip).....	-	-
	Break camp at Blue Ridge Mine.....	0.0	1:00PM
	Portland.....	235	8:00PM

Total Mileage.....501



The above sketch shows the territory in the Ochoco Mountains to be covered by the Labor Day trip. We have the permission of Mr. William Endicott, owner of the Blue Ridge mine, to use his property for our Sunday night camp. We also have permission from the Forestry Department to camp anywhere along Johnson Creek.

All rules and regulations of the Forestry Department must be observed. A shovel, pick, and bucket should be carried in each car. Clothing for cool evenings should be taken. Food CANNOT be purchased in the vicinity of the camp. Cars should be in good shape. There is some low gear work, but the roads are in good condition. Maximum elevation is 7000 feet at the lookout ranger's station.

Register as soon as possible. This trip is full of geology and fossils.

THE GEOLOGICAL NEWS LETTER

Official Bulletin
of the

GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Vol. 1 - No. 12

Portland, Oregon

September 9, 1935

LECTURE ANNOUNCEMENTS

Members of the Geological Society of the Oregon Country have a very special treat in store for them when arrangements for a lecture by DR. ALES HRDLICKA, world-famous anthropologist, are completed. We hope to schedule this talk at an early date.

.....

DR. CHARLES P. BERKEY, the Geologist on the famous Roy Chapman Andrews Expedition into Mongolia, will give his lecture on the remarkable discoveries which he and his associates made in that region before our members in the near future. Advance notices will appear in the newspapers.

.....

MR. C. FOWLER will address the Society on the subject of "The Geology of the Mount Adams Country", at a date to be announced in the newspapers. Mr. Fowler will tell us many facts concerning this little known area, for due to the ruggedness and inaccessibility of the region, very little detailed study has heretofore been attempted.

Mr. Flower has spent considerable time upon a thorough investigation and is well prepared to present many interesting and new facts about the Mount Adams country both from a geologic and an economic standpoint.

.....

LECTURE BY DR. FARRELL BARNES

On Thursday evening September 12, at 8 o'clock, Dr. Farrell Barnes will address the members of the Society in the auditorium of the Public Service Building. The subject of the talk will be "How Mountains are Made" and will include many enlightening facts which will be of particular interest to those planning to go on the Mount Hood Trip on September 15th.

Dr. Barnes has spent many years in studying the growth of mountains and he comes to Oregon highly prepared to give an insight into the modern facts and theories concerning mountain growth.

.....

Those interested in the Tenino Mound Trip should read "Glaciation of the Puget Sound Region", by J. H. Bretz. Bulletin #8, 1913, Washington Geological Survey, to be found in the Portland Public Library.

.....

If you are planning to take the proposed course in Paleontology this Fall, kindly 'phone Gladys C. Randolph - MURdock 2411 immediately.

GEOLOGY OF THE OREGON AND WASHINGTON SHORE LINE

Subject of Lecture by

DR. EDWIN T. HODGE

Dr. Edwin T. Hodge, President of the Geological Society of the Oregon Country gave a talk before members and their guests on the geology of the Oregon and Washington shore line on August 8, 1935, in preparation for the Newport-Road's End exploration tour taken the week-end following.

Dr. Hodge described the evolution of the many scenic features of the Oregon and Washington coast tracing the various geologic phases of our changing coastline through periods of upheaval, submergence and erosion. In his usual highly instructive and entertaining manner he pictured with words and sketches the geologic drama which created the scenic cliffs, stacks, bars and river courses.

A discussion of geologic problems in the evolution of harbors, sounds and inlets and geologic facts in relation to economic developments such as bridges, harbor work and matters connected with navigation and also brought out.

A large and enthusiastic audience expressed their keen interest by numerous questions and by their attendance on the beach trip to learn more of the story told by Dr. Hodge.

.....

FIELD TRIPS SCHEDULED

A trip to study MOUNT HOOD AND ITS GLACIERS is scheduled for September 15th, and a two-day exploration of the WARM SPRINGS INDIAN RESERVATION is planned for September 28th and 29th.

.....

MAPS OF NORTH CENTRAL OREGON WILL BE USEFUL

Members contemplating the Warm Springs Field Trip and those who want to study the area traversed on the Clarno Trip, will find very useful the Geological and Topographical Maps of North Central Oregon.

The geological map represents the largest piece of geological mapping done in the State of Oregon and contains all the features of the topography, geology and structure of the region. A pamphlet describing the formations and features distinctive of the area is included. With the topographic map is included a discussion of the geology, topography, drainage and a complete history of the human occupation of this part of the state.

Both maps and pamphlet may be purchased from the University of Oregon Press for \$1.25.

Geological Map of North Central Oregon and Pamphlet - by Edwin T. Hodge - Vol. 1, No. 5; and Topographic Map of North Central, Oregon - Vol. 1, No. 4, June 1930, Geology series.

.....

NOTICES OF LECTURES APPEAR IN ALL PAPERS ON WEDNESDAYS.

ROADS END - NEWPORT TRIP

By

A. D. Vance, Leader

.....

Members of the Geological Society of the Oregon Country who gathered at Road's End Saturday morning, August 10th, crowded so much geology into two days that the general character of the formations along this section of the coast was all that could be studied.

The starting whistle blew at 9:30 A. M. and a short climb brought the party to the top of the high point between Road's End and the mouth of the Salmon River. Dr. Hodge called the attention of the group to the general westward dip of the formations and reviewed the history of the Oregon Coast line. He told of how the land rose from the sea to at least 4000 feet above its present elevation as evidenced by the deep canyon cut in the continental shelf off the mouth of the Columbia River. Then followed a period of submergence when the land sank some 5500 feet and the ocean built a beach and carved sea cliffs. Mother earth then took a deep breath and the land rose again to leave that ancient beach hidden in the timber 1500 feet above the present sea level.

A period of volcanism occurred and lava and agglomerate flows formed the prominent headlands of more resistant rock which furnish the rugged beauty of the Oregon shore.

The sand bar built out from south to north closed the mouth of Salmon River except for a narrow channel against the cliff on the river's north shore. This is characteristic of our coast rivers and is due to the current set up along the coast by the severe winter storms from the southwest piling up the sands faster than the tide can carry them out to sea.

The dikes, faults, tilted bedding planes and agglomerates so profusely exposed at Road's End furnished a mass of geological detail so great that the group could have been content to spend the entire day at this location. The Itinerary, however, called for many other stops before night and after a short walk on the beach to examine the agglomerate cliff and a narrow dike and to discuss the history of some old tree trunks which had evidently been buried by an old land slide and again are slowly being uncovered by the sea, the party started for Boiler Bay .. just one hour behind schedule.

At 1 P. M. lunches were opened at Boiler Bay Park and during the hour allotted to the important business of stoking the human furnaces, time was found to examine the agglomerate sea cliff into which a spouting horn had been cut by the sea.

The next stop was at DePoe Bay where a most interesting crevice was studied. This fissure cut almost half way through the head land on the north side of DePoe Bay, extends from north to south and starts from a small embayment where it is sheltered from the force of the southwest storms. Dr. Hodge considered this crevice to be an important footnote in the history of our coast. The straight, smoothly cut, almost vertical walls seemed to indicate a gorge formed by some prehistoric stream which had its course almost parallel to the present coast line. At some period of sub-

morgence, the gorge had been filled with sediments and it is these softer deposits which the sea is carrying away.

In the inner bay of this beautiful beach resort, fish races were being held and parking space in the town was at a premium. The inner and outer bays with the narrow connecting channel were found to be deserving of more careful study than our trip would permit and Mr. Sands, proprietor of Sandy's Goofy Shop, and Mr. Collins of the DePoe Bay Aquarium, very kindly located a chart of the bay which Mr. Wimmer photographed so that future study of the depths could be undertaken.

Mr. Collins then invited the Society to visit the Aquarium as his guests and if it had not been for Schminky's whistle it is possible that many of the caravan members would have stayed until the doors closed for the night. The DePoe Bay Aquarium is owned by Mr. Collins, Mr. Newman and Mr. Bradford and all specimens are taken from local waters. The collection of sea anemones which has recently been added to the many wonderful specimens of marine life already in the tanks, helps to make this aquarium the credit to the Pacific Northwest which it most decidedly is. If passing tourists could all know what lies beyond the entrance to DePoe Bay Aquarium, the admission tickets would serve as an accurate tourist traffic count.

The fish races previously referred to sadly disrupted the schedule again. The gambling instinct which lies dormant most of the time in all of us, glued the Society members to the bridge rail from the humblest amateur to the most distinguished geological authority in the caravan. Strango as it may seem, the interest in the fish appeared to be in direct proportion to the geological knowledge of the spectator. Repeated blasts from Schminky's whistle at last got the cars on the move again and after a short stop at Rocky Creek Park to view a kitchen midden, the caravan moved on to the Punch Bowl at Otter Rock. The late hour and the fact that our camp ground for the night was only two miles away shortened the stop at this point to barely enough time for a hasty examination of the Punch Bowl and the cliff formation. Working back along the beach from Ocean Park the camp grounds were reached about 5 P. M. and tents were pitched, cabins occupied and dinner served. Several of the party collected fossils until darkness fell.

At about 8 P. M. the party assembled around a camp fire built in the open fireplace before the cabins. The Social Committee took charge of this part of the program and Mr. Henshaw acted as "Master of the Toasted", each speaker standing before the welcome heat of the fire until he was "done".

Miss Mary C. Anderson, who is making a special study of the Miocene Pelecypoda, gave a very interesting talk on the fossils which the party could expect to find along the beach at this location and explained the particular points to examine for the distinguishing features of the different species.

Miss Anderson very kindly furnished the list of fossils here inserted which were found on this trip. The identifications are as complete as the limited time for examination would permit.

- | <u>PELECYPODA</u> | | |
|----------------------------|--------------------------------|---------------------------------|
| 1. - <i>Acila conradi</i> | 4. - <i>Nucula</i> | 7. - <i>Pecten</i> |
| 2. - <i>Arca devincta</i> | 5. - <i>Panope (Glycinæis)</i> | 8. - <i>Solen</i> |
| 3. - <i>Macoma arctata</i> | 6. - <i>Paphia</i> | 9. - <i>Tellina Oregonensis</i> |

SCAPHIPODA

1. - Dentalium conradi.

GASTROPODA

- | | | |
|-----------------------------|-------------------------|---|
| 1. - Cylichna (?) | 4. - Murex | 7. - Sinum (?) |
| 2. - Dolium or Endolium (?) | 5. - Crepedula | 8. - Sycum (at least one of family Fusidae) |
| 3. - Fusus | 6. - Natica (Polinices) | 9. Turretella oregonensis |
| | | 10. - Turris (?) |

.....

Leo Simon gave one of his interesting talks on the flora of the locality and then "took to the sky" and pointed out the various planets, stars and constellations which were all vying with the brilliant moon in an effort to make a perfect night still more perfect.

Kenneth Phillips told the group about his recent trip to Glacier National Park and if it hadn't been for his modesty and the fact that he bears a reputation for truthfulness, he might have been persuaded to enlarge upon the excellent fishing he enjoyed. Some short stories were then told and thus ended the first day.

.....

Sunday morning the schedule provided for independent fossil hunting along the beach cliff until 9 A. M. Some of the party were breakfasting at 5 o'clock to permit an early start. A light fog lay along the beach as the swinging picks began breaking concretions and some excellent specimens were secured before it was time to return to camp. Some fine peccens and agatized casts of gastropods and many other Miocene mollusca were found.

Early in the morning Dr. Packard and his family drove into camp from Corvallis and those returning from the beach late found him lecturing on Cephocetus oregonensis, to a group of intent listeners. This fossil was discovered in situ by Dr. Packard in 1920 near the high water mark on the ocean beach about 1000 feet northwest of the old coast guard tower #128 at Newport. The doctor used a large chart showing the head of this new cetothere to illustrate his talk and explained in detail the distinguishing characteristics of this new species.

A complete description of this whale, written by Dr. Packard and Dr. Kellogg may be found on pages 1-62 - Publication #147 of the Carnegie Institute of Washington, D. C.

After the lecture, the caravan group divided. Some of the party went to the beach with Dr. Packard for a further fossil hunt which netted at 12' section of the posterior portion of the lower jaw of Cephocetus oregonensis in addition to many shelled invertebrate fossils.

The rest of the party, under the leadership of Dr. Hodge, climbed to the top of Iron Mountain for a general view of the topography of the region and to study this interesting peak. Two compasses carried by members of the group indicated very strong local attraction which Dr. Hodge attributed to the magnetite in the basalt which capped the mountain.

The view from the peak was magnificent and afforded such an excellent opportunity to study the surrounding country that an hour was spent at the summit. Dr. Hodge called the attention of his listeners to the remnants of a tilted sill which could be seen in the exposed off shore reefs and to the north of Iron Mountain. The surface slopes of these exposures pointed generally toward the elevation of Iron Mountain and the mountain itself dropped abruptly to the east while its western slope was more gentle. The rock forming the mountain top was aphanitic in texture indicating that it had solidified under pressure.

From these facts, Dr. Hodge formed the conclusion that Iron Mountain was capped by a remnant of the same great sill of which the off shore reefs had been a part.

The return trip was completed at 1 P. M. much more than an hour past lunch time, if hunger stimulated by the climb could be classed as a far chronometer.

After lunch the reassembled caravan drove to Yaquina Head where geology was forgotten for a short time while some of the members "hung by their toes", almost literally speaking, to watch the cormorants feeding their young in nests on the face of the sea cliff. A kitchen midden at the top of the cliff indicated a recent uplift of the shore line.

From this point a large part of the group, headed by J. C. Stevens, took advantage of an invitation extended to the Society by M. E. Reed, resident engineer, through Mr. Stevens, to visit the Yaquina Bay Bridge and view the progress of the work on this great structure.

Those who did not make the bridge trip joined Dr. Packard at Agate Beach after a short inspection of the beach shingle and marine gardens at the light house.

at 4 P. M. the caravan disbanded and the cars were soon homeward bound, the occupants much enlightened by two glorious days of geological investigation. Sixty-six signatures were on Schminky's register of the trip.

Enough cannot be said of the generous willingness with which Dr. Hodge and Dr. Packard as well give of their store of geological information to the Society members. The organization is indeed fortunate in having them as members. It is earnestly hoped that as time goes on the Society can return a measurable value to them.

Please send all announcements and any material you wish to have appear in the Bulletin to:-

Gladys C. Randolph
2726 NE 63rd Avenue
Portland, Oregon
PHONE: MURlock 2411

RETRACING DR. CONDON'S GEOLOGICAL TRAILS

Subject of Lecture by

DR. E. L. PACKARD

On August 22nd, 1935, Dr. E. L. Packard, Dean of Science at Oregon State College, gave a lecture before a large group of members of the Geological Society of the Oregon Country and their friends in the auditorium of the Public Service Building. The subject of the talk, "Retracing Dr. Condon's Geological Trails", was one of special interest to those contemplating the Labor Day Trip of the Clarno region and served to furnish them with information for the better understanding of the area to be covered. The talk was well illustrated with lantern slides.

Dr. Packard spoke briefly of the life and works of Oregon's pioneer geologist, Dr. Thomas Condon, traced the trails he blazed back in the 60's and described his many important "finds" so valuable in the geologic story of Oregon. The geology of the north central part of the state was thoroughly discussed and the various beds, the Clarno, John Day, Columbia River basalt, Madras, Cascade, recent basalt and inter-canyon basalt formations and Arlington Lake Beds were described as to their character and formation and as to their relation in the geologic time column. Dr. Packard's vivid descriptions and pictures of various fossil forms available in the area created a keen interest in the Clarno trip and also aroused in many a desire to investigate further the region teeming with fossils and exhibiting so many geological features.

Dr. Packard's illuminating lecture also served to increase the growing interest which many members of the Society have evinced in the subject of Paleontology and it is earnestly hoped that Dr. Packard himself will present such a course in Portland during the coming University Extension session.

GEOLOGY COURSE BY DR. HODGE

The course in General Geology which Dr. Hodge is scheduled to give under the direction of the University Extension Division at Lincoln High School during the coming session, while covering the necessary fundamental principles of general geology, will include lectures showing the application of such principles to Oregon's many and varied geological formations.

The lectures will be entirely different from those presented last year and while arranged so as to include sufficient general geology for the understanding of new students, will yet offer enough new material to be interesting and worthwhile to those who took Dr. Hodge's course in General Geology last year.

The class will meet at Lincoln High, on Wednesday evenings, and will therefore not conflict with our Society's Thursday evening programs.

THE FOSSIL LURE OF OREGON

By

Dr. W. Claude Adams

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We who live in Oregon have much more to be thankful for than our scenery and climate for in addition, there are deep gorges with multi-colored stratification in which is inscribed the geological and animal history of the ages and the rugged cliffs which retain evidence of prehistoric sea life. Speeding over our splendid system of highways one sees an ever changing panorama. Few motorists realize that the roadside teems with the mute but none the less eloquent inscriptions by which Nature tells the story of countless generations of life that flourished, had their being many centuries ago and then were enshrined in morass or dust of the ages so that savants of the nineteenth and twentieth centuries might comprehend in some degree what those past periods were like.

Oregon abounds in fossil remains of the early life of land and sea and to the writer this is the most fascinating feature of an outing whether it be to the coastal region or to the bountiful deposits of the John Day and other sections. With the exception of those regions where so much of the surface has been covered by the immense flows of lava that poured from various volcanic eruptions, the whole expanse from the Columbia River to where the Klamath has carved its deep gorges through the southern reaches of the Oregon mountain ranges, is filled with interesting records of past ages.

Looking backward, in imagination we can visualize the periods when the three, four or five-toed horse roamed the valleys and browsed upon the luxuriant grasses nurtured in a moist climate and warmed by tropical sunshine, while countless creatures found the cooling shade of olive and date trees near the shores of ancient lakes.

The saber-toothed tiger, lying in wait where other animals now also extinct, came down to drink, may sometimes have encountered the ferocious and fearless entelodon and been obliged to wait for "second table"; while in some of the shallows of the stream or at the border of the lake some of the seven species of rhinoceros wallowed in enjoyment. There were mammoths, mastodons and in another period, the elephant, all of them enshrined in the formations that today are a part of the great deposits of the John Day and Willamette Valley regions that have so fascinated geologists ever since Dr. Condon brought them to the attention of the scientific world. The giant sloth loomed large in that galaxy of stars in a world teeming with animal life, and the oreodon, a sheep-like animal not found elsewhere than in this part of the world, was quietly feeding on the hillsides, where it might seek shelter in the heavily wooded areas should the ravenous giants of the primeval animal kingdom approach.

But our imagination should not be permitted too much latitude. There may have been intermissions of some centuries or in some cases an age between the periods in which these animal denizens of ancient

Oregon roamed over the same region. What we know as a fossil bed is in fact a sepulcher of the ages where has been entombed for the edification of the student, the life story of countless creatures that have been a part of the physical being and participated in making history of this region.

The names of Thomas Condon and Oregon geology are synonymous, for it was Thomas Condon who brought the geology of this part of the country to the attention of the scientific world. More than 75 years ago he discovered the little three-toed horse, the oregon, brachiopod (shelly hematite) and fossil whales. Dr. Condon named some of the eighteen beaches of the geological sea that extends from the Willowa Mountains in the northeast corner of the state to the Siskiyou Mountains at the California line, across the central section of Oregon, and again from Eugene northwest to Astoria in the western portion. Dr. Condon's discovery of the prehistoric horse was epochal for until that time it was not known that the eohippus had ever existed in North America. Scientists have revised their ideas since that revelation so that it is now believed that the horse originated in this region and migrated to Europe. Of greatest concern to us regarding Dr. Condon's accomplishments is the fact that he made Oregon geology understandable to the average individual so that whoever evinces an interest in the geological history of the Pacific Northwest may read with understanding and satisfaction.

There have been two international geological parties which have come here to study Oregon's geological structures - one in 1921 and the other in 1933.

Those who begin to delve into the mysteries that have been concealed in the fossil beds, or covered by the dust of ages, will find a new interest in the whole Oregon Country. They will be amazed at the wealth of material that is encountered wherever they may go on highway trips and it all increases the lure of Oregon. There are fields of investigation along every stream, in the formations cut where highways have been constructed, around the shoulder of a mountain or through a ridge that was in some bygone age the bed of a stream or the border of a lake or a seashore. The animals of that early epoch also had their own highway systems. With progress of research, the fascination grows and each new discovery of some fragment creates zest for further investigation and study.

SCIENCE NEWS LETTER AVAILABLE AT CLUB RATES

SCIENCE NEWS LETTER, an excellent summary of current news in the field of science, may be had by Members in groups of ten, if mailed to one address, at \$2.60 per year. The regular subscription rate is \$5.00 a year, two years \$7.00. Our Secretary, A. V. Pratt, has agreed to act as intermediary and have the copies delivered to him and he will see that they reach the subscribers. If you are interested please communicate with him at once.

Will those who have already given their names to Mr. Pratt please remit the \$2.60 immediately so that the subscription list may be sent in without further delay?

THE COLUMBIA RIVER JETTY TRIP

By

H. B. Schminky

...

When a river the size of the Columbia pours great quantities of sand and silt into the ocean, these materials have to be disposed of in some way. Where the sea is not very deep and there are no strong shore currents, a large delta would result such as the Mississippi and the Nile have made. The mouth of the Columbia does not have these conditions so no delta exists. What then becomes of this waste? The question was answered by Dr. Hodge as the members of the caravan lolled comfortably around the camp fire Saturday night.

For the geological setting of the story, we were told that the original Columbia River once entered the ocean 30 miles farther west than the present shore line. A subsidence of the land next took place, and the ancestral valley was occupied by the ocean as far eastward as the Bonneville Dam. A large bay then lay between North Head on the Washington side and Tillamook Head on the south. Another bay was formed between North Head and Campe Shoalwater in Washington.

In the course of time the Columbia filled its old submerged valley and again had material to dump into the ocean. It filled in the bay within the area that was protected by the headlands, but from there on it was opposed by littoral currents. These currents threw part of this sand back into the river's mouth and started forming Clatsop bar that so nearly prevented the discovery of the river itself.

The sand that does enter the ocean is partly carried away by the shore currents and some probably settles into the old river valley that still remains below the surface of the water. The littoral currents on this coast are set in motion by the two prevailing winds: - the northwest in summer and the southwest in winter. Of the two, the winter winds are the stronger and blow for a longer period. Therefore most of the sands are moved northward. But with North Head acting as a Breakwater for the bay to the north, the sand moving along nearest to the coast line soon met with comparatively still water and were dropped, building up the spit that incloses Willapa Bay and forms the North Beach play grounds. In summer these sands moved southward with the wind's change in direction, and as the spit grew and built up above sea level a series of parallel sand dunes developed. In the North Beach area there are five of these sand dune chains.

During the northwest wind season, the Columbia usually has its maximum floods. One would therefore expect that the bay which was formed by Tillamook Head would receive most of the Columbia River sands. This is partly true, but the winter currents are so much stronger that they carry most of the deposit back across the mouth of the river before it is cast up on the beach. Therefore we find only two lines of dunes along the Oregon side of the river. Tillamook Head does offer enough barrier so that any of these sands which may pass it on their wouthward journey are turned so far out to sea that they do not appear on Cannon Beach or on any of the beaches to the south. The northbound currents built a spit northward from Tillamook Head that at one time inclosed a small bay which is now filled with sand.

After man settled in the valley of the Columbia and river traffic began, the bar and the constantly shifting channel at the mouth of the river became a problem for engineers to eliminate. A jetty was consequently built out into the ocean along the south side of the river. This worked well. The bar was washed away by the current of the river and a channel opened to the sea. Then the unexpected happened. The sands were carried so much farther out to sea that they no longer washed up on the Seaside beaches. The winter littoral current still scoured the shore, but now it had only the old sands to carry away. The beach began to disappear and the jetty was being undermined. The north jetty was built in the hope that if all the material that the river carried was prevented from moving northward until it reached the outer end of the south jetty, enough of it would be carried southward to save further erosion of the beach and prevent the entire destruction of the south jetty. This plan worked so well that the beach is now rebuilding rapidly and it has become necessary to control the drifting sands. This is done with wind breaks and by planting sand-loving grasses.

The construction work that is now being done on the south jetty is really repair work on the original jetty. Tracks are laid on a timber trestle that is built on the old rocks. After the piling has been driven into place all the work of cutting off the tops, putting on the cross braces and placing the caps is done from swinging platforms lowered in front of the pile driver and under the first bend. When heavy seas are running this is very dangerous work, and all possible safety measures are taken to avoid accidents. The trestle is pushed forward five bents before any rock is dumped. The lightest rocks are used first to build up around the piles to protect them from damage when rocks weighing six tons and over are dumped.

When the rock trains from the quarry arrive at Fort Stevens, each car is weighed before it goes on the jetty for unloading. The trains are made up so they may be split into sections, each section having a car of the smallest rocks at its seaward end. It takes from four to ten minutes to unload a car the rock being pushed off by steam shovel first on one side and then on the other. The dumping continues until the rock reaches the height of the track which is about thirty feet above the water. The completed jetty will extend about three miles out to sea and the last mile will be double width.

Major Milo P. Fox, District Engineer of the United States Engineers, made it possible for the Society members to make the trip. The contractors made up a special train to take the group out on the jetty. If you were not fortunate enough to be present, any of the forty people who took the trip will tell you that you missed a real treat.

On the return from the jetty, the party visited Fort Stevens. The original fortifications which are completely surrounded by a water-filled moat and which were entered by a drawbridge, were a feature attraction. The disappearing guns of Battery Butler held a big appeal for Dr. Hodge and he probably would have had one of them in his rock garden now if he would have had enough two-bit pieces to pay for having it carried to his car.

On the way to Seaside, the party stopped to notice the fresh water lakes that lie in back of the sand dunes. When the dunes are forming, the very finest of the material carried by the wind is often transported over the crest of the dune and dropped some distance away. This material forms an impervious layer that holds any seepage water or blockaded streams wherever low places occur. At Seaside, the Necanicum River furnishes a

good example of a stream that is being forced to flow parallel to a barrier dune for a considerable distance before it can enter the ocean. The Necanicum has also been the cause of the southern portion of Seaside to be a vast gravel barrier bar. The basalt rock material carried by this stream was dropped at its mouth, where the waves caught it and threw it back, building a bar that grew northward to meet the sand moving south from the Columbia. This gravel bar meant much to the men with Lewis and Clark, for it furnished the only rock on the entire coast, between their camp at Fort Clatsop and Tillamook Head, for building their furnace for the evaporation of sea water for its salt content.

The next important stop was for lunch on the beach at Haystack Rock. Both Dr. Hodge and the writer profited by the absence of Mr. Davis on this trip, for they received a share of the good things in all the lunch baskets. After lunch, Dr. Hodge read us the geological diary of the Cannon Beach area as revealed by the rocks.

The basement rock exposed near Haystack Rock appeared to be of a sedimentary nature but showed some agglomerate. This was capped with a basalt flow that showed a decided inland dip. This flow probably came from a volcano of which Haystack Rock is now the only remnant. On the lava lies another sedimentary deposit. Above this and farther inland is a sea cliff showing that the beach has been elevated. Above this cliff are the sand dunes of a still older beach level.

In the vicinity of Hug Point we found some very fine agglomerate. Here the basement rock is a very definitely stratified shale. A basalt flow broke through this rock and carried the shattered fragments with it, finally cooling as agglomerate. Above this is another basalt flow with an inland dip. Then comes more shale, with all signs of the elevation of the land as noted before. We also learned that faulting and folding had taken place.

At Arch Cape we found the sea still working on the shoreward side of one of the many volcanoes that lined this section of the coast. All the rock on this cape has a very steep inland dip. It also shows that folding has occurred. As the ocean destroyed the softer sedimentary rocks that the volcano had built upon, it was finally able to attach the basalt from two sides. As the center of the volcano was probably of cinders or other soft material, it was soon carried away once the waves could reach it. This left the harder surface flows standing in the ocean as stacks, or as a buff on the land side. It is in the landward flow that the arched passage which gave the cape its name, has been eroded. The rock above the volcanic structure is apparently sedimentary. At this point the ancient sand dunes lie between one hundred and one hundred and fifty feet above the present beach.

So ends our story in sand and rock.

GEOLOGICAL SOCIETY GLACIER TRIP SEPTEMBER 14-15

The trip to Elliott Glacier on Mt. Hood promises to be one of the most interesting that the Society has taken. It will be different than any previous trip. The rugged precipitous north side of Mt. Hood, with all its glaciers, is most beautiful. Ice falls, serracs, moulins, crevasses, and many other geological features will be seen and explained.

The group will meet at the Mazama Lodge which is located on the Timberline Road, approximately one mile east of Government Camp on Saturday P. M., September 14. It is planned to spend the night here where there is shelter, good beds, hot and cold water and good cooking facilities.

It is also intended to have a pleasant evening by the fireside. Dr. Hodge, Mr. Phillips, and Mr. Collins will talk about Mt. Hood, and some of the research work which has been done in the past.

About 6:00 A. M. Sunday, we will leave in a caravan for Cloud Cap Inn. There are many interesting geological features to be seen on the way, including the White River Glacier flood plain. Dr. Hodge has some interesting things to tell us about the country.

From Cloud Cap Inn we will take a short hike up on Cooper Spur Ridge, and on to Elliott Glacier. There is a good, easy trail.

It is planned to spend some time on the glacier and instructive talks will be given.

Lunch will be eaten on a high place where the whole Hood River Valley and surrounding country can be viewed.

Bring your blankets or sleeping bags and food for Saturday dinner, Sunday breakfast, and your lunch on the mountain. It is not necessary to bring dishes or cooking utensils as there are plenty at the Lodge.

It is advisable to wear hobnailed or caulked boots on the glacier, but inasmuch as they are not permitted in the Lodge, please bring change of shoes.

Bring your dark glasses and sunburn lotion and an alpine stock if you have one.

Round trip distance about 200 miles on good roads.

Suggested transportation charges \$2.00.

Lodge fee - 75¢.

Please registered with Mr. Schminky or Mr. Collins by telephone or at the meeting on September 12th.

Leader: J. Russell Collins - East 9831 (Evenings)

THE GEOLOGICAL NEWS LETTER

Official Bulletin
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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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September 24, 1935

GEOLOGY OF THE WARM SPRINGS AND HAY CREEK AREA

On Thursday evening, September 26th, at 8 o'clock, DR. EDWIN T. HODGE will give a talk on the geology of the Warm Springs and Hay Creek area. This will serve as a preparation for the two day caravan to be taken to that region on Saturday and Sunday, September 28th and 29th, and Dr. Hodge will discuss in detail the country to be traversed and studied.

Some of the most significant fossils of the state have been found in the Warm Springs area and the canyon of the Deschutes River presents real "picture geology". There is more structural geology represented here and more gorgeous coloring shown in the rock formations than in the well known John Day region.

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MOUNT ADAMS EVENING SCHEDULED

For the meeting following Dr. Hodge's lecture, the Geological Society of the Oregon Country is planning an evening devoted to the Mount Adams country. Very little information is available from published material on the geology of the Mount Adams region and due to the ruggedness and inaccessibility of the mountain very little detailed geologic mapping has been done.

Mr. C. Fowler, who has spent several summers studying Mount Adams, will present many new and interesting facts in his lecture on "The Geology of the Mount Adams Country", and the mineral deposits will also be discussed. Specimens of the material obtained from the region will be exhibited.

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EMBLEM AND INSIGNIA CONTEST TO CLOSE

October first is announced as the closing date for submission of competitive designs for an Emblem for the Geological Society of the Oregon Country. The price for the best acceptable design is a membership in the Society, free of dues, for five years.

Please present or mail your entry to the Chairman of the Committee on Emblem and Insignia - Geary Kimbrell, 425 City Hall, Portland, Oregon, BEFORE FIVE O'CLOCK P. M., OCTOBER 1st, 1935.

HOW MOUNTAINS ARE MADE

On September 12, 1935 - Bu Dr. Farrell Barnes

Study of many mountain ranges in all parts of the world shows that they are of several different types, distinguished by whether vulcanism, erosion, intrusion, faulting or folding dominated in their origin.

Numerous explanations have been given of the forces which are the underlying cause of mountain making. The theory of a gradually cooling earth with wrinkling shell is based on the molten earth hypotheses of earth origin. The theory of drifting continents has received support from such observations as the lower density of the continental masses, the similarity of opposite shore lines, particularly of the Atlantic Ocean, and from the unlimited possibilities it offers for accounting for the tremendous amount of crustal shortening interpreted from Alpine structure. However, certain mechanical difficulties and the untenability of major assumptions of the theory have hindered its general acceptance.

The principle of isostasy assumes lighter segments of the crust to be buoyed up above the heavier blocks with which they are in equilibrium. Through unquestionably a factor in the dynamics of the earth's crust, this "tendency", in view of the evidence indicating great crustal strength, is not believed adequate to account for the rise of great folded mountain ranges.

A more recent theory postulates an alternately expanding and contracting earth, which subjects the crust to repeated periods of tension and compression.

The theories of a cooling earth with continual compression and of alternate tension and compression were compared in the light of certain important observations of mountain structure. The double history of folded ranges, including an earlier down-sinking phase followed by uplift and folding, is a necessary consequence of the "breathing" earth theory.

The observation of folded belts of different ages intersecting at various angles is difficult to explain by continuous compression. When a tensional phase is included, it seems reasonable to expect a sinking trough (geosyncline) to occasionally develop across an earlier folded belt, and give rise, with renewed compression to a new folded belt at an angle to the older one.

The great amount of apparent crustal shortening indicated by intense deformation of the geologic substructure of all continents, though probably too great to explain by a cooling earth, is readily accounted for by repeated periods of tension and compression effecting belts which have shifted throughout geologic time.

A series of laboratory experiments on a variety of hollow spheres with a wide range of brittleness, showed that in each case and under conditions of tension, a fracture pattern was obtained which corresponds in general plan to the pattern of folded mountain belts on the earth. This suggests that the mountains inherited their present trends from an earlier period of tension.

In conclusion, it was emphasized that regardless of the theory accepted, existing evidence shows that mountain ranges throughout geologic time have been active, constantly changing and relatively temporary features of the landscape.

MOUNT HOOD - ELLIOT GLACIER TRIP

September 14th and 15th

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Despite the unsettled weather conditions, Saturday evening found a group of enthusiastic members gathered comfortably around the fireside of the Mazama Lodge, listening to Dr. Hodge's geologic story of Mt. Hood.

Dr. Hodge contends that Mt. Hood, as we see it today, is the second mountain to occupy the present location; that there existed a Mt. Hood, the Elder, before Mt. Hood, Junior, came into being. The younger volcano built up after the original peak, much higher than the present mountain, had been eroded away. He pointed out that Mt. Hood is now surrounded with a defined circle or ring of peaks which present precipitous slopes on the side toward the existing Mt. Hood with their gentler incline on the far side. A study of the Mt. Hood Quadrangle sheet will show this in a pronounced manner in such elevations as Shellrock Mountain, Lockout Ridge, Gunsight Butte, Bonny Butte, Devil's Peak, Hunchback Mountain, Last Change Mountain and Sentinel Peak. Sectors made on the outer slopes of these peaks give slopes which meet very uniformly at a point located near the present peak in plan, but, of course, very much higher. All the lava flows appear to have come from the same central vent.

The high Mt. Hood, Senior, had mighty glaciers on its slopes which extended long distances from its base. Glacial moraine deposits are found near Hood River and Troutdale and far down the White River valley. These glaciers finally carved the heart out of the old mountain. Drainage was established with streams flowing radially, these cutting valleys and canyons through the lava flows which together with glacier action eroded the mountain away. The ridges that extend from its base separated the streams made by the melting ice, and now remain as spokes of a wheel with the hub removed.

Then vulcanism played its role and Mt. Hood, Junior, came upon the scene. The newcomer grew into a mountain much higher than we see Mt. Hood today. With a perfect mountain or volcano the crater should be at the top but the peak of Hood was eroded away and then an explosion blew out the whole side. A vent still exists above Crater Rock which emits gases and hot steam at this point as well as at the snout of White River Glacier.

Between the two periods of glaciation, forests may have grown with trees much higher than they will now grow, for at the timber line the remains of one tree 18 feet and another ten feet in diameter, have been found. Perhaps the whole country was then at a lower level.

Dr. Hodge reminded us that volcanoes have three periods or stages of existence - active, dormant, or solfataric, which is applied to volcanoes quiescent or drying. Mt. Hood is in the latter stage, solfataric, or fumarolic (emitting fumes), and while it may be on its way to dormancy, never to blow up again, on the other hand, it is possible that it may once more convulse the earth with mighty tremors and bury the region for miles around under heavy flows of lava and ash.

As an historical parallel, Dr. Hodge cited the case of Mt. Vesuvius which erupted violently in the year 79. The ancients apparently believed the mountain to be an extinct volcano, for even Pliny, the Elder, in his

profuse notes, made no mention of any activity. It was during this violent eruption, in fact, that the old writer, philosopher and scientist, so fascinated and absorbed in the tremendous spectacle, lost his life. Since that notable eruption of 79 the volcano has been active almost continuously with the last great explosion in 1906.

The picture of Mt. Hood suddenly eruption and burying the Mazama Lodge with its fireside group, beneath tons and tons of debris and flows of lava, was not an altogether encouraging thought.

Mystery has surrounded the majestic peak ever since the white man has looked upon its snowy heights and there have been many stories told of strange lights playing about Crater Rock. Sometimes these reports were from soldiers, sometimes from shepherders or from those living in the vicinity, but scientists have tended to discredit such rumors.

Russell Collins gave an interesting and informative talk on the history of Mt. Hood telling of its discovery and the various climbers who succeeded in reaching the peak as well as those whose efforts had been in vain. Apparently some of the adventuresome ones of past years were not as hardy as those of today for to many of the climbers, the mountain seemed much higher than its 11,225 feet. Reports from the early explorers assigned to the mountain an altitude of 25,000 or more feet and one intrepid party told a gory tale of frightful difficulties encountered and agonies suffered in scaling the peak. They related that blood streamed from the very pores of their skin, and from their eyes, ears and noses, as they struggled upward!

Leslie Newell, on the Social Committee, concluded the evening's program with a talk explaining how, through a dream the geology of the Oregon Country was all made clear and simple to him - a much easier and more comfortable method of gaining knowledge than by reading books, attending lectures and going on exploration tours. For "Geology Made Easy", get Leslie's recipe for a good dream!

But whether our dreams were about geological revelations or the terrors of an active Mt. Hood, they were interrupted at about 5 A. M. by the cheery voice and infectious laughter of Leo Simon arriving at the Lodge.

The party got under way somewhat behind schedule due to a heavy mist and fog which hung low over the mountain. The first stop was at White River bridge. Dr. Hodge explained that the White River is an aggrading stream - really a saturated mud flow - and the waters were forced to drop their load because of the great pressure of this mud and accumulated debris. The whole valley is glaciated, characteristically U-shaped, but where the canyon begins the glaciated valley ends. The rocks observed were andesitic, some glassy but with porphyries predominating. The andesites graduated from the spongy to glassy types. The boulders noted were fairly well rounded but not as a result of stream work for they break up too readily to become worn smooth by water or glacial action. Andesites are so brittle that when they are gripped in a bed of glacial ice instead of becoming polished and striated as do granites, they simply break up. Gold on Mantle squirrels, tame enough to eat from the hand, and very curious, appeared almost as interested in the lecture at the bridge as members of the group.

The caravan proceeded to Cloud Cap but was delayed en route by the leader's car being out of gas. Jess Henshaw came to the rescue, and hitching Dr. Hodge's car to his, hauled it up the steep grade to the nearest filling station.

On the trail up to Elliot Glacier, the party met several members of the Mazama research committee on the measurements of glacier movements. Mr. Phillips and Mr. Richards gave short talks about their work. Elliot Glacier, it was learned, moves from only a few inches to over three feet a week. At several points along the rocky trail, interesting geologic features of the surrounding country were pointed out and discussed. As the party ascended, under the guidance of Russell Collins, Harry Clark and Joe Wimmer, occasional short but terrific gusts of wind and light showers engulfed the climbers.

Grouped in the somewhat meager shelter of the rocks, the party ate their lunch, after which, Dr. Hodge gave a talk preparatory to going on the glacier itself. He explained the various terms applied to glaciation, such as crevasses, cirques, seracs, bergschrund, neve, etc., and described the formations typical of glaciers and the processes of glaciation. On the ice it was necessary to use ropes and at times the wind blow with gale velocity and hail and mist made the party realize that to be lost on the glacial slopes with gaping, though awesomely beautiful crevasses, waiting to receive them, would not be an exactly pleasureable experience!

The caravan disbanded about 4:30 P. M., Sunday, after a week-end of variable weather but interesting and worthwhile experiences and with the customary agreement that "a good time was had by all".

Gladys C. Randolph

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Preceding Dr. Barnes' lecture, the Society had the special privilege of viewing an extremely interesting reel of pictures taken by Mr. Ray Conway. These showed the White River on a rampage and clearly illustrated the remarkable erosional activity of flood waters, depicting how the banks were undercut and trees thereon toppled into the raging stream, and how boulders and rocks were hurtled along violently, gouging out the river bed.

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ARGILLITE FOUND ON CLARNO TRIP

A sample of the core taken from the 3450 feet level of the Clarno oil well was sent to Dr. Goodspeed of the University of Washington. Dr. Goodspeed made a Micro photo and reported as follows:- "I find the specimen to be indurated, fine-grained sedimentary. Could be called argillite."

The Society visited the Clarno Oil well, located near Clarno, Oregon, when on their trip to the John Day Valley over Labor Day.

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GEOLOGY AND GROUND WATER RESOURCES OF THE ISLAND OF OAHU, HAWAII

By H. T. Stearns and K. N. Vaksvik

This report was published in May, 1935, by Maui Publishing Co., Ltd., Wailuku, Maui, T. H., as Bulletin No. 1, of the Territorial Division of Hydrography, in cooperation with the U. S. Geological Survey. It describes briefly the geography, climate, history, industries, fauna, and flora of the island, as well as its geology. Owing to the fact that water supplies for municipal use and for irrigation of the numerous plantations are derived almost wholly from springs or artesian wells, the study deals particularly with those geological features which affect the occurrence of ground water or its amount.

Geologically, the island of Oahu is young. It consists of the Waianao Range in the western part, and of the Koolau Range in the eastern part, both of Tertiary and possibly early Pleistocene age, with the latest eruptions in Recent time. Both ranges are built up of basaltic lavas, with numerous cinder cones and beds of ash and tuff. These ranges were greatly eroded during the Pleistocene, the master stream shaving deep amphitheaters near their heads. These valleys were later drowned by the submergence of the island, 1,200 or more feet below its present level, giving rise to reef limestone, intercalated with valley sediments. Strand lines along the coast indicate numerous recent changes in the relation of the island to sea level.

Rainfall varies greatly, reaching a maximum of about 300 inches per year. Since the lava rocks are highly permeable, they carry much ground water, which is in places confined between restraining layers of ash or tuff as artesian water. In other places the water is perched upon beds of ash. In still other places the basal ground water floats upon the heavier sea water, which rises about 40 feet for each foot that the upper surface (water table) is lowered by pumping. The depth of potable water is somewhat less than 40 times the elevation of the water table, owing to diffusion and mixing.

The similarity between the later geologic history of Oregon and that of Oahu makes the report one of particular interest. The author of this geologic section (Stearns) is a recognized authority on volcanology and associated petrography. A copy of the report has been requested for the library of the Society.

Reviewed by K. N. Phillips.

LOG OF WARM SPRINGS TRIP
Sept. 28th and 29th

Saturday - Sept. 28th

- 0.0 miles - Leave SE 82nd and Division at 8:00 AM. Those taking passengers are requested to arrange for picking them up in advance.
- 65 " - Stop on Wapinitia Cut-off to look for roche moutonee or glacial sheepbacks along Salmon River.
- 70 " - Stop at Frog Lake.
- 80 " - Bear Springs Camp Ground. Road turns off to right for Warm Springs.
- 95 " - He He Butte
- 106 " - Boulder Corral and Miller Flat. Mysterious soil humps.
- 118 " - Grand view of the Deschutes canyon. The key view to the geology of the region.
- 123 " - The John Day and Clarno hogbacks.
- 128 " - Warm Springs Camp. Lunch.
- 129 " - Hell Gate Pass. Volcanic necks.
- 140 " - The buried slopes of Mutton Mountains - Giant Spherulites.
- 150 " - Fossil beds on Schoolie Flats.
- 160 " - Return to Warm Springs. Prepare camp. Campfire in the evening - a big surprise awaits us.

Sunday - Sept. 29th

- 171 " - Down Skookum Creek to the Painted Gorge of Oregon. "A canyon with the color of the Grand, but with the addition of pure running water and green trees". On to the White Horse Rapids and Middle Miocene exposures. Return by way of the John Day fossil location. We will learn the answer to a 50 year old riddle.
- 182 " Back to Warm Springs.
- 197 " Cross the Deschutes at the Mecca Bridge.
- 201 " Agency Plains. The question of irrigation.
- 204 " The Madras Bluff - fossil fish. Bring fossil worms along.
- 215 " The Hay Creek hogback. Lunch.
- 240 " Cross the Shaniko surface. A view of the Columbia fault.
- 250 " Maupin
- 350 " Portland

Be prepared for cold weather. Bring food for two days. Have autos in GOOD mechanical condition. In case of changes in itinerary due to weather conditions, word will be left at the Warm Springs camp for the benefit of those leaving later on Saturday.

For more details call R.E.Thorne, leader, GA 6136 - or H. B. Schminky, TR 2168.



THE GEOLOGICAL NEWS LETTER
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October 15, 1935.

LECTURE ANNOUNCEMENT

On Thursday evening, October 24th, at eight o'clock, DR. EDVIN T. HODGE, President of the Geological Society of the Oregon Country, will address the members and their guests at a meeting in the Auditorium of the Public Service Building.

The subject of Dr. Hodge's lecture will be the "Mines and Minerals of Oregon," a topic of popular interest and appeal. Many new and interesting details will be brought out.

MOUNT TABOR COMMITTEE MAKES INTERESTING REPORT

The Mount Tabor Committee, consisting of R. E. Thorne, Chairman, J. C. Stevens, Dr. C. L. Booth, L. F. Simon, and J. R. Henshaw, gives the following interesting report:

"This committee was instructed by Dr. Hodge to make an examination of Mt. Tabor and its cinder cone to determine, if possible, the construction of the mountain, and to make plans for the preservation of the cone that it be not destroyed more than has already been done; also, to devise a plan of education for the public and to advertise Mt. Tabor to the world, making it an asset to the state of Oregon.

"Our first task was to determine the physical construction of Mt. Tabor, Dr. Hodge being of the firm conviction that it is of solid rock even though there are no outcroppings to verify this belief. This was found to be the case, for the Water Bureau's records show that the stone used to construct the wall around the reservoir at S. E. 60th and Division Street was taken when they excavated for this reservoir, the rock being andesite.

"Drillings made around and in the cinder cone showed sands, gravels and clays at about 130 feet below the present road level in the crater. This seems to indicate that the cone was formed over the Troutdale Formation that mantles the mountain, and that it was formed at a much later date than the mountain itself.

"At the committee's first meeting, September 8th, held in the crater of the cone, it was decided to call upon Mr. C. P. Keyser, Superintendent of the Bureau of Parks, to enlist his cooperation. Mr. Stevens called upon Mr. Keyser and received his assurance that no further digging would be allowed until we devised a plan of constructive excavation to better display the cone.

"Mr. Leo Simon photographed the cone, as it is at present, to be used for future reference. Drawings have been made showing a possible plan of excavation and these will be taken up at the next meeting of the committee when a further report will be issued."

Mount Tabor Committee, R. E. Thorne, Chairman

THE CLARNO, JOHN DAY, MITCHELL AND OCHOCO MOUNTAINS TRIP

By A. F. Pratt

Fifty seven members of the Geological Society and their friends retraced a portion of Dr. Condon's trail under the leadership of Dr. Packard. The trip was made over Labor Day, leaving Portland the morning of August 31st, and arriving home the evening of September 2nd.

The first stop was made at Maupin where members of the party were shown the Deschutes River still cutting its way thru the Columbia River Lavas. The climb from the canyon at Maupin brought the party out on the Shaniko Surface, where the Columbia River lavas or basalts are the most prominent and conspicuous of the geologic series. Between Shaniko and Antelope an exposure shows the contact between the Columbia River Basalts and the John Day, the basalt capping the John Day.

A brief stop was made on the outskirts of Antelope where the members gathered chalcedony and rock crystals. A beautiful view of the miniature "Grand Canyon" of the John Day River was obtained as the cars passed over the summit between the Deschutes Canyon and the basin of the John Day. Dr. Packard explained the relationship of the John Day and Clarno formations, the former overlying the latter.

At this time, in order that the reader may more easily understand what is to follow I will insert a table of Geologic sequence covering the territory to be traversed. This table has been taken from Guidebook 21 of the XVI International Geological Congress, which made a trip thru Central Oregon in 1933.

	AGE	FORMATION	LITHOLOGY	
	Recent	Alluvium and terrace deposits Glacial deposits	Sand and Gravel	
CENOZOIC	Pleistocene	Madras formation	Andesitic & rhyolitic flows, dactes, & tuffs of Cascade Range Sand, Gravel, and lava flows	
	Lower or middle Pliocene	Rattlesnake formation	Tuff, gravel, and rhyolitic flows	
	Middle Miocene	Mascall formation	Tuff, ash, and possibly gravel	
	Lower Miocene	Columbia River Lava	Olivine Basalt, tuff, and gravel	
	Upper Oligocene	John Day formation	Tuff, ash, & rhyolitic tuff and flows	
	Upper or Middle Eocene	Clarno formation	Shale, tuff, & rhyolitic & andesitic flows	
	Upper Cretaceous	Chico formation	Sandstone, conglomerate and shale	
	Lower Cretaceous	Horsetown (?) formation	Dark fine-grained shale and sandstone	
	MESOZOIC	Middle and Lower Jurassic.	Silvies River Beds; unnamed beds in Ochoco Mountains and on lower Silvies River	Red impure limestone, Batholithic intrusions; Granodiorite.
		Upper Triassic	Martin Bridge formation	Calcareous shale, limestone, agglomerate, basalt, andesite and tuff

Note: Evidence gathered by DR. EDWIN T. HODGE and his students show that the John Day is not Oligocene but Lower Miocene. This places the Columbia River Lavas in the Middle Miocene and the Mascall in the upper Miocene. The table however gives the correct sequence of the various formations. We hope in the near future to publish a more complete and correct table.

The temperature approaching that of midday the group tarried under the voluminous shade of a few scraggly unipers of the west slope of the John Day River and had their lunch. After the noon day meal the party drove to the Clarno fossil beds where some very interesting specimens of nuts, dates and leaves were found. After a brief visit to the well being drilled by the Clarno Basin Oil Company the party started east up the course of Pine Creek. Here was seen at first hand the evidence of a real cloud burst, and incidentally this same cloud burst wrecked the itinerary of the trip. A few weeks previously, Pine Creek had gone on a rampage, throwing a "thirty foot" wall of water thru its canyon, tearing out roads, buildings, and bridges. However, the great mass of Clarno rhyolite, known as the "Castle", along the "Hoodoos" were still intact and these were observed by the members.

The caravan was forced to abandon the regular itinerary because of a bridge that had been washed out and was forced to go thru Fossil instead of down the Dry Hollow Road. This proved an advantage to the group as the new route was destined to take them thru a country alive with geologic interest and very familiar to Dr. Packard. Stop for the night was made at the Pioneer Camp Ground. In the evening Mr. Lawrence McNary talked about Dr. Condon and the origin of the geographical names of the vicinity while Dr. Packard answered many questions.

Early the following morning, Sunday the 1st, the party took to the road. At Service Creek a complete exposure of the Columbia River lava, approximately twenty five hundred feet thick, was observed. The caravan then traveled up the John Day River toward Spray. Just before entering Spray the John Day Formation again came into view. Dr. Packard then took the members to Turtle Cove where two fine specimens of turtles were found, one by Mr. Stevens and one by Mr. Church. Some unidentified fossil bone was also obtained.

During the early afternoon Davis Dike was passed. This dike's claim to fame lies in the fact that it was the first real concrete evidence studied by geologists showing that great lava beds are not formed by the violent dispelling of lava by volcanoes but rather by more or less quiescent flow of lava from fractures in the earth's surface, the lava welling up thru the crevices and flowing out over the surrounding surface.

At Sheep Rock, the John Day River has completely exposed the Columbia River Lavas, the John Day formation, and the Clarno, and has cut into the late Cretaceous. The sequence of the formations was observed by the members and explained to them by Dr. Packard.

The trip was continued thru Picture Gorge, a section of the John Day Gorge cut thru the Columbia River Lavas, to the Mascall Ranch where the Mascall formation was studied. This formation was formed after a partial erosion of the Columbia River Lavas had taken place. They are composed of light colored ash, with some sand and conglomerate which accumulated in river valleys and lakes. A formation of rhyolitic flows with associated gravel and tuff lies unconformably on the Mascall. This latter formation is known as the Rattlesnake formation.

Dr. Packard then led the group to one of his favorite ammonite beds. About two miles west of Mitchell there exists an exposure of Cretaceous rich in ammonite fauna of which Dr. Packard has made a special study. Due to the lack of time every one was not able to obtain a good supply but several very fine fossils were taken out.

Thus ended the second day of field work, the remaining daylight being required to drive thirty five miles to camp in the heart of the Ochocos.

The Itinerary called for a trip to the top of Lookout Mountain to see the sun set behind the Cascades. This is really a marvelous sight and is well worth the effort required. On a clear day the view includes a panorama ranging from St. Helens on the north to Diamond Peak on the south. Of course, for pictures, early morning is the best time to be on top. Owing to the change that had to be made in the itinerary the caravan did not reach their base in the Ochocos until after sunset. Under conditions that were not ideal, the members brought forth that spirit of good sportsmanship that has prevailed on all the trips of the Society and soon made camp by the light from their cars and a myriad of small fires. Due to the dryness of the forest the usual evening camp fire was dispensed with.

The morning of Labor Day broke clear but a little hazy. The cars left camp one at a time so as to avoid as much dust as possible. The six mile climb was made without mishap. The haze partially obscured the view and ruined the chance of good pictures. Dr. Packard gave the known geology of the Ochocos, although little work has actually been done on the geology of the Ochocos themselves. What is known has come to light thru the study of the surrounding country. The Ochocos are Clarno in age and are remnant of the Hay Creek anticline. Lookout Mountain still retains a residue of Columbia River Basalt as a capping. Every where else the basalt has been eroded away and leaves the Clarno andesite and rhyolite exposed.

On the way down the Mountain a stop was made at the only working mine in the district. The Mother Lode Mine has been known and worked intermittently for a great many years but it has been left to Cron's Incorporated to install modern methods and machinery. Here the members on the trip were able to see the method of mining cinnabar and extracting the mercury therefrom. In operation was a new Gould furnace of the toary type to which was attached the latest Gould condensing system.

The caravan disbanded at the mine. One by one the cars dropped down the hill on their two hundred and thirty five mile trip to Portland.

As to the agglomerate dikes, the horizontal flows of andesite on the sides of Lookout, the vertical dikes of the same material that built up Round Mountain, the faults at the base of Round Mountain, and other geologic features too numerous to enumerate, along with the sunset from Lookout and the beavers at work, all I can say is, that there is another year coming. I hope some day we can all get back into the Ochocos when we have the time to do a little justice to the Geology that exists there.

Note: In the very near future a detailed article on the geology of the John Day region covered by the caravan will appear in the Bulletin.

GEOLOGY OF THE WARM SPRINGS AND HAY CREEK AREA

Subject of Lecture by DR. EDWIN T. HODGE

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On September 26th, 1935, Dr. Edwin T. Hodge, President of the Geological Society of the Oregon Country, gave a highly instructive as well as entertaining lecture on the geology of the Warm Springs and Hay Creek area of Oregon. This served as an adequate preparation for a better understanding of the region traversed on the field trip to the Warm Springs Reservation the following week end.

Dr. Hodge mentioned that when he first came to the Pacific Coast that grand feature of the Oregon Country - the Cascade Mountains - presented the first real problem to be solved, as practically no geologic work had been done in that direction at that time. It was in the Warm Springs area that the key to the Cascades was discovered which explained the fundamentals of the whole geology of that part of the country.

With many explanatory pictures and diagrams on the blackboard, Dr. Hodge illustrated clearly the story of the Mutton Mountains, traced the history of the Deschutes River and analyzed and explained the various geological formations.

"Nature has combined to bring about a series of events, so that one may stand on top of one of these hills and see a picture book laid open - every page slightly apart and separated - and read the geologic history of the distant Past", commented the speaker.

Dr. Hodge's usual large and appreciative audience was very enthusiastic about the description of the remarkable formations and interesting fossils to be found in the Warm Springs country and one of the largest groups of the season journeyed to the Reservation on the two day field trip to see at first hand what had been so graphically described.

For those who were not fortunate enough to hear Dr. Hodge's lecture, a study of Geological Map of North Central Oregon and the accompanying pamphlet, and also the Topographical Map with complete description, both University of Oregon Publications, prepared and written by Dr. Hodge, will be found very valuable.

MANY DESIGNS SUBMITTED FOR EMBLEM

Mr. Geary Kimbrell, Chairman of the Committee on Emblem and Insignia, reports that many interesting and attractive designs have been submitted for the Society's emblem and thanks the members for their contributions. No decision has as yet been made regarding the winning emblem but announcement will be made as soon as possible.

DO YOU KNOW that our Oregon Coast Range is formed of sediments 50,000 feet thick?

THE WARM SPRINGS FIELD TRIP

R. E. Thorne, Leader September 28 and 29

On Saturday morning, September 28, members of the Geological Society of the Oregon Country started on their field trip to the Warm Springs area, meeting at 82nd and Division Street and proceeding to Government Camp, the first stopping place.

On the Wapinitia Cut Off the glacial valley was noted with its characteristic swampy areas, U-shaped valley and roadcuts showing morainal material. An example of a "roche Moutonnee" or boss of bedrock smoothed and polished by glacial action, was pointed out. Frog Lake, which was formed as a result of a tributary valley being dammed by lateral moraine of the great glacier, was observed and discussed.

Leaving the main highway at Bear Springs, the caravan drove through the pines and brush of the eastern Cascades and out into the open plains of the Madras formation to the Indian Reservation. He HeButte, an isolated volcanic formation out of the main line of volcanoes, was compared with our Mt. Tabor, also a sporadic. The mysterious soil mounds on the broad flat formed by the Madras beds were inspected. Many speculations were made as to how they were formed, why they have remained and not eroded away and why they are comparatively uniform in size and shape.

After a stop for lunch at Mill Creek, the party travelled on to the east of Boulder Corral and to the edge of the lava cliffs almost directly above the Warm Springs Agency on Shitike Creek. The Agency lies in the valley below cut in the John Day beds by the small stream appearing lost in its wide valley. The floor of basalt upon which the group stood represents a great flow that is almost level, having been laid down over a deep bed of volcanic ash. It is evident from its level formation that there has been no lifting or faulting since it was formed.

From this view point the party observed the Three Sisters, that beautiful group of volcanoes formed from "Mt. Multnomah", a far mightier mountain than the existent peaks. An immense fault scarp, Green Ridge, was pointed out and Gray Butte, and Grizzly Butte to the southeast, the Deschutes canyon to the east, the tops of the Mutton Mountains to the north and Mt. Hood to the northwest presented a vast panorama of grandeur. To the northeast an immense land movement that shut off the flow of the Shitike and caused it to seek a new way to the Deschutes was also noted. This upper layer of fine volcanic ash rests on the Columbia River lavas which in turn overlie the John Day formation. It is the John Day powder-like formation that becomes saturated and actually skids out from under and lets these top lying rocks slide out far across the valley previously cut into the John Day formation.

The caravan journeyed on in search of some gigantic spherulites which were believed to be available in the heights of the Mutton Mountains, so the members proceeded up over a divide and down to the bluffs above the Hot Lakes on the Warm Springs River. Standing at the crest, on soil of vivid red, it was interesting to note that across the Warm Springs River, was more of the same kind of red soil topped by white, which was easily recognized as the John Day as is also the red soil. Water seeping down through the John Day beds carried down iron that was in the ash and deposited it in the lower levels, the bottom of the John Day formations

resting upon the Clarno. This red soil outcrops all around the vicinity and paints for us a colorful and beautiful picture.

The Mutton Mountains off to the north are mountains of red rhyolite, a material so tough that all the tremendous changes that the country suffered could not destroy them. The Columbia River lavas flowed over where they now stand, after which came great crustal foldings which formed the Mutton Mountains covered with Columbia River Basalt. The Basalt lavas were eroded away so that those old monuments of rhyolite emerged victorious - the Mutton Mountains - too hard and too enduring to be eroded away. The Deschutes River, rather than go around, deeming the job not too difficult, was forced to cut a deep gorge with beautiful and wild White Horse Rapids - our own "Grand Canyon".

Through Hell Gate pass the party travelled around the foot of two huge volcanic necks that at one time poured out great floods of lavas burying the surrounding country, much of this to disappear with the exception of the resistant necks and some great masses of volcanic glass. In that area some fine specimens of *Septeria* were picked up. A thousand feet higher the cars in second gear drove up onto the Madras formation, swung northward along the western base of the Mutton Mountains, and then up as far as possible, the last lap of the climb being taken on foot. Up on the "red tops" which cannot easily be destroyed, at about 4000 feet elevation, a scenic picture beyond descriptive words was viewed. Mt. Hood stood out in sunset glory, beautiful but not large or high enough to have formed those vast ridges, caused by lavas, that can be seen outlined in front and on both sides of the mountain. If the line of these slopes is followed up, we are forced to extend them to a common apex that would fit the top of a mountain - very much higher than the present Mt. Hood - the parent mountain, that must have existed and been blown and eroded away long before the present peak was formed.

The caravan arrived back at camp after dark and were greeted by a number of late-comers, the unlucky ones, who were not able to leave Saturday morning with the main group. The camping grounds were in charge of Dr. and M. S. Freeland whose hospitality and welcome was appreciated. Many of the members accepted the invitation to enjoy the hot mineral water baths from the numerous bubbling hot springs.

Grouped around a large crackling bonfire, an entertaining program was enjoyed after a day full of geologic wonders but with no giant spherulites. Mr. McNary, the first speaker of the evening, told of the famous immigrant caravan with which his parents came to Oregon, coming down to the Deschutes near the very place where our group was gathered; and how they camped at a spring near Gateway after having been deserted by their guide, stranded in a dry and seemingly waterless land; and of the finding of gold and the famous Blue Bucket mine and many more tales of real experiences during the early dates in the Oregon Country.

Leo Simon described the trees of the area and told of flowers we could expect to find in the vicinity and the birds common to the locality and Mr. Oberson pointed out the constellations and gave an informative and interesting talk on astronomy.

Dr. and Mrs. Freeland had arranged to have a band of Indians dance and sing around the camp fire, affording a real touch of "local color", but while our hosts accompanied our party on its futile search for the huge spherulites, the natives wearied of waiting and left for a pow wow else-

where. One lone Indian, however, Thunder Cloud by name, remained to represent his people and entertained the enthusiastic group. Bedecked in his fine feathered headdress, buckskin jacket and loin cloth, he stepped out the Round Dance, Rabbit and War Dances, singing and chanting and beating his drum. He also told the legend of the wise old Coyote who had taught his tribe so many useful things.

Mrs. Poppleton of the Social Committee and Leslie Newell, the dreamer of many startling geological dreams, furnished entertainment and Mrs. Newell lead the group in singing a few songs. A weenie and marshmallow roast concluded the evening's program.

Early Sunday morning the party hiked along the road and up into the hills digging, hammering and picking about and as a reward brought back a good collection of septaria, those concretionary nodules intersected with cracks formed in the cooling process and later filled with calcite and other minerals. Many good geodes were also picked up.

Journeying back through Hell Gate Pass again, Schoolie Flats was the next stopping place, a locality where the ground is paved with black rocks, which upon closer inspection are recognized as masses of chalcedony oxidized on the outside. Many broken geodes were found but the fossil fish which the members were so anxious to find did not seem to exist.

Stopping at the edge of the huge excavation at the bottom of which is Hell Gate pass, the cars were parked and the party hiked to the top of one of the lesser peaks of the Mutton Mountains to obtain a view across the Deschutes to Agency Plains. The road passes over a mighty hog back caused by an anticline which broke and weathered down to the John Day formation making Hay Creek Valley on its farther side.

The question is naturally asked: "Why should there be these immense beds of volcanic ash and dusts in this country while there are none to the west of the Cascades - this country that once held great lakes that have been filled with thousands of feet of sediment uncrusted?" Dr. Hodge offered one explanation - the fact of possible prevailing winds and that following almost immediately great flows of lava that sealed these beds against wind and rain. Much of the dust must have gone westward but the rains carried it away about as fast as it fell. Some day these Cascades will become mature mountains and rain clouds will again pass over the country and it will blossom "as the rose".

Due to the lack of time it was necessary to omit from our schedule the drive along Skookum Creek to see White Horse rapids and Gorge and after returning to camp for lunch the party hurried off to the Warm Springs Agency and across the Deschutes by the new bridge and on to the Agency Plains. A halt was made just before going down to Gateway to discuss the necessary irrigation project, and driving down the wall to Gateway torrential deposits and John Day cliffs, where many fossils were found, were noted.

Going by way of Mecca bridge across the Deschutes, a stop was made at Sagebrush Springs, two miles east of Gateway, where Lawrence A. McNary explained the historical background of the cooling springs. Mr. McNary's

father and grandparents were members of the immigrant train of 1845, coming to the south and west of the Blue Mountains, known as the "Meek Cut-off" party. They approached the Deschutes south and west of the springs, but having decided they could not cross the river at that point, turned northeast. Two hundred wagons, with perhaps one thousand people and eight hundred head of stock, camped two nights at these springs before proceeding to the Hay Creek and Trout Creek valleys; and thence over the plateau, past Shankiko, making a crossing of the Deschutes at the mouth of Buck Hollow creek. Thence they passed through Tygh Valley, and to The Dalles by way of 15-mile and 8-mile creeks. The arrival of the Geological party at Sagebrush Springs was almost ninety years to the day from the time when these pioneers stopped at the delightful springs to revive the weary bodies of themselves and livestock.

Back on the Dalles-California Highway, Dr. Hodge pointed out in the Hay Creek Valley the east side of the Hog Back the cars had just come "Through" for there is a natural gap, and explained how this great anticline passed up and over another of these mountains of sturdy red rhyolite and how it had broken down and eroded away leaving a long and easy slope on one side and abrupt cliffs on the other, part of the formation of the anticline still remaining further up on the sides of the rhyolite mountain.

Another talk on the fossil deposits of Hay Creek and Trout Creek valleys was given and then the caravan proceeded up Cow Creek Canyon and through the Columbia River lava flows on to the Shankiko surface. A stop was made on the bluffs above Maupin and the different flows noted and it was observed how the Columbia River flows were folded, and how after this folding had ceased, other deposits were laid down and again covered; but these coverings were nearly all level or showing but gentle anticlines. Maupin is built on a rounded point of land or shelf several hundred feet above the bed of the Deschutes but nevertheless in what was once the very bed of the river itself, as the torrential river bed is clearly shown by the huge boulders and gravel still to be seen at the edge of the town. Dr. Hodge called attention to the large springs there and to the fact that the flow of the Deschutes remains nearly constant the year around, explaining this by the fact that the porous Madras formation over the basalt acts like a sponge or reservoir taking up the over supply and giving it up later.

At this point the party disbanded and headed for Portland, tired but voting the trip a wonderful success with many new and interesting things observed and learned and with a good supply of worthwhile specimens.

U. S. G. S. QUADRANGLE SHEETS

Any member of the Society desiring to secure U. S. G. S. Quadrangle sheets at the 40% discount rate on large orders, please give me a list of maps wanted, together with cash for same, and I will send an order to Washington.

A complete set of Oregon Sheets will cost \$3.60
A complete set of Washington Sheets will cost \$3.90
Most individual sheets are available at 6¢ per sheet.

A small pro rata charge will be added to cover postage and money order.

H. B. Schminky, Curator of Maps

TRIP TO CORVALLIS - NOV. 23rd & 24th

This will be a four-star trip, and will probably be the most interesting of any.

* A visit to the college museum and laboratories. Many fossil and mineral specimens will be taken out of storage especially for our party. These could not be seen at any other time by individual visitors. Special work will be carried on in the laboratories Saturday afternoon for our benefit.

** A banquet at 6:30. This will allow those leaving Saturday afternoon plenty of time to see part of the exhibits. The plate cost will be 65 cents. Reservations must be made by November 18th.

*** A lecture Saturday night by Dr. Ralph Cheney on the "Fossil Forests of Oregon". Dr. Cheney is an eminent paleobotanist and a specialist on tertiary fossil forests. He was with Roy Chapman Andrews in Mongolia. Don't miss this.

**** A field trip Sunday - Dr. Hodge and Dr. Ira S. Allison in charge.

All-day party will leave at its convenience Saturday morning. We can provide bus transportation at one cent per mile if twenty sign up. The bus would leave about 8:30 a.m.

Bring your lunch. Coffee will be furnished by the college Saturday noon.

No reservations are being taken for hotels or auto camps.

This trip is entirely by registration.

ALL RESERVATIONS CLOSE NOVEMBER 18th.

MAKE IT A BIG TURN OUT

For registration, call evenings or write--

H. B. Schminky, 2200 NE 54th Ave.-TR 2168

R. L. Baldwin, 2725 NE 50th Ave.-GA 6055

R. E. Thorne, 5834 NE 26th Ave.-GA 6136

J. R. Collins, 3310 SE Caruthers St.-EA 9831



THE GEOLOGICAL NEWS LETTER

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December 7, 1935.

LECTURE ANNOUNCEMENT

December 12, "The Rivers of Oregon" by Mr. Kenneth N. Phillips.

Oregon has some of the most interesting rivers in the world. Every textbook of Geology refers to the Columbia River, Deschutes River and the Willamette River. Students of rivers from either the engineering, scientific or scenic point of view have given much attention to the Oregon rivers. The rivers are famed for their purity, their fine fishing and beauty and their enormous power possibilities. Mr. Phillips is a very interesting speaker and this lecture should attract the entire membership of the Society as well as numerous guests.

December 26, no meeting due to the Christmas holidays.

January 9, "Willamette Sound" by Professor Ira S. Allison Ph.D.

The greatest contribution of Professor Condon was the theory of the Willamette Sound. This theory has been discussed by many geologists and is probably better known than any other Geological feature than perhaps the Columbia Gorge. Professor Allison has spent many years in detailed study of the Willamette Valley and promises to offer very interesting conclusions regarding this theory.

January 23, "The Crystalline World and the World of Crystals" by Professor W. D. Wilkinson Ph.D.

No one in the Northwest is better qualified to discuss the world of crystals in which we live. Crystals are beautiful, universal and the foundation of life. Dr. Wilkinson in his exceedingly interesting style by means of lantern slides, exhibits and demonstrations will present a lecture that will be one of the best features of the year.

February 13, "Caves and Cave Dwellers" by Dr. S. M. Mayfield, Professor of Geology at Linfield College, Oregon.

The earliest man was a cave dweller and even today a very large portion of the world lives in caves. Caves are formed in many ways and all hold a deep mysterious attraction to every amateur Geologist. Dr. Mayfield has spent many years in the examination and the study of caves and his lectures should prove a great attraction to the people of Portland.

February 27, Annual Meeting. Mr. Joseph Wimmer and his committee have planned a banquet full of joy and surprises. Save that date!

The following lectures by authorities are being prepared and the dates of their presentation will soon be announced:

1. Map makers and maps of Oregon
2. Steens Mountains
3. Ancient Plants and Forests of Oregon
4. Underground waters of Oregon
5. Precious and semi-precious stones of Oregon
6. Florescent minerals of Oregon
7. Craters of the Moon
8. Mongolia

Special Announcement

In addition to the lectures, special educational exhibits of fossils, minerals, rocks and new "finds" will be exhibited and demonstrated from 7:30 to 8:15 P.M. before the lecture and after the meeting until you must reluctantly leave. Mr. A. W. Hancock is chairman of the committee and will arrange for various exhibitors to show their collections. Announcements will be made in the Bulletin. The one for December 12 is as yet a "surprise" exhibit.

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At each meeting hereafter there will be an exhibit of still or moving pictures on geological subjects. The well known photographer, Mr. Leo Simmon, is chairman of the photograph committee. He announces that on December 12 Mr. Harold B. Schminky will show his colored moving pictures of last summer's field trips.

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Field Trip December 15th

Mysterious and "Non-Sensible" Valleys South of Portland. A trip to examine a series of valleys that contain streams that flow where they should not and some valleys with no streams at all. Dr. Hodge will lead the trip and show some interesting features to the group but will not be able to solve the mystery. To do this much help is expected from the group. Professors Watson and Jones of Forest Grove, who are much wrought up over these strange valleys are planning to join the group and assist in the detective work. *Wear field clothes*. Itinery.*

- 9:00 A.M. Leave from in front of the New Federal Building.
- 9:15 A.M. Dunthorp road. View from Elk Point (An Indian hunting trip).
- 9:30 A.M. Old Oswego Iron Furnace 1857-1894. A splendid exhibit of how glass flows are formed and what happens to them. Collection of various types of glasses.
- 10:15 A.M. Outlet of Oswego Lake.
- 10:45 A.M. The Old Prosser Iron Mine site. Collection of limonite and other specimens and a view of the forgotten valley and a stinky upland.
- 11:40 A.M. Tualatin Bridge. The Great Tualatin Plain. Saum Creek. Tualatin Terraces.
- 12:30 A.M. Willamette Town. The "250 foot" level. Lunch.

1:25 P.M. Petes Mountain. The "750 foot" level.
2:15 P.M. Oregon City Bench.
2:25 P.M. Clakamas River. The misled stream.
2:30 P.M. The gravel beds.
3:00 P.M. The deserted valley.
3:10 P.M. Carver. A Troudale outcrop. The fractured pebbles.
3:25 P.M. Down the deserted valley. Landslide.
3:35 P.M. Rock Creek. Maybe fossils
4:00 P.M. Lone Pine Dairy. The "150 foot" level.
4:15 P.M. Milwaukee Swamp. The Springs.
4:45 P.M. Trip ends at Milwaukee.

Estimated mileage 50 miles. Copies of United States Geological Survey Topograph Sheets, Oregon City ***, Tualatin**, Portland* purchasable at Swender's Blue Print shop, Gills, Hansens, etc. for 15¢ a sheet will be very helpful.

Field Trips being planned

Jan. 19, 1936 Portland and vicinity.
Feb. 16, 1936 Newberg, the Nehalem and Parrett Mountain.
March 15, 1936 Vancouver and vicinity.
April 12, 1936 Mollala District
April 28-29 McMinnville and vicinity.

THE STORY OF SILT

Resumé of lecture presented by J. C. STEVENS, November 14, 1935

On Thursday evening, November 14th, 1935, at the Auditorium of the Public Service Building, Mr. J. C. Stevens, Consulting Engineer of Portland, presented an illustrated lecture, "The Story of Silt", before the Geological Society of the Oregon Country.

Mr. Stevens has been gathering data on the subject of silt and sedimentation for the past five or six years and told of the results of the sedimentation of nearly all of the reservoirs of the world where actual silt surveys have been made. He has also secured the results of practically all measurements that have been obtained on the sediments carried by all the rivers of the world.

A study of the control of silt on watersheds of silt-laden streams revealed many interesting facts. Methods of eliminating silt at the head of irrigation canals, the physical characteristics of river-borne sediments, the manner in which rivers transport sediment, both as suspended load and as bed load, together with data on the origin of silt were presented. The heights of the River Nile during the past 14 centuries were given and it was shown how the valley of the Nile has been raised during that period by sedimentation.

Among the salient points brought out by Mr. Stevens was the fact that the construction of large storage reservoirs for irrigation and flood control on some of the silt-laden streams of the West is riveting the attention of thinking people on the part that sedimentation is to play in the future history of western civilization. For example, below

the Elephant Butte dam on Rio Grande there has grown up an empire - a substantial unit of civilization - whose very existence hangs upon the integrity of a reservoir to store and deliver water so vitally necessary to its existence. That is the largest artificially created storage reservoir in the United States today and its capacity is being reduced every year by silting so that within two or three generations the civilization dependent upon it will have to seek other sources of water storage.

When Boulder Dam on Colorado River is completed the reservoir it creates will have the largest capacity of any in the world, twelve times that of Elephant Butte. Upon it will depend not only the security of the entire Imperial Valley against flood damages and the irrigation of millions of acres of land, but also the domestic and irrigation supply for the Metropolitan District of southern California. The power sources of the peoples in seven states will depend upon its proper functioning. Unless something is done to halt this insidious march of sedimentation this reservoir will become virtually useless before the fifth generation has passed on.

Fortunately, on both these streams there exist other storage sites. There is also the possibility of raising the height of dams to increase storage capacity. Such measures, however, only postpone the inevitable day. Ultimately, within some definite number of generations, western civilization must face the fact that reservoirs on the silt-laden streams will become useless for storage purposes and that the populations dependent upon them must then diminish to those that can subsist on the areas the unconserved flow of the river will irrigate. The favored agricultural areas of the world where civilizations have reached their highest state of development have been created largely by sedimentation. Must this same phenomenon also sound the death knell of those same social systems?

"It is not the intention to paint a dark picture", stated Mr. Stevens, "but rather to stimulate a more intensive study and intelligent research that will ultimately effect a practical solution of these problems. The menace exists; it is real; and unless something constructive can be evolved, civilization in these regions must eventually decline. The solution of this problem is a cooperative task for the engineer and the geologist, and they should be at that task now."

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RAINFALL

Joseph Wimmer

To the geologist rainfall is of economic as well as geological importance. As an erosive agent it does much in shaping the earth's surface.

Rainfall is the direct result of clouds which are a product of ocean evaporation and solar radiation. Therefore, to investigate a period of rainfall one must look back to the changes that have taken place both in ocean evaporation and solar radiation.

Rainfall records of the Pacific Coast as compiled by the U.S. Weather Bureau unfortunately cover but a short period of time when compared with historic times. It is therefore impossible to draw definite conclusions or make prophecies of future occurrences or tendencies in rainfall.

A study of climatological records indicate that changes are being experienced in the various components making up the weather. Whatever the cause of these changes may be, they have not manifested themselves as sudden changes, and correlation with known changes between the various components do not offer a satisfactory solution.

The known changes in topography of the earth, the composition of the atmosphere, sun's radiation and the motions of the earth do not fully explain the sudden changes in rainfall. They may be contributory though of secondary importance.

In the study of rainfall data it is advantageous to use the records of individual stations because when records from several stations are combined, an untrue picture is obtained which is not easily analyzed.

It is very probable that a change in the time scale used in determining annual values, if changed to meet with seasonal changes, as for instance starting the year with November instead of January, may result in a record that would be more applicable in comparative studies.

Investigators of periodic data seem to be in doubt as to the reality of definite recurring periods. Some feel that the periodicities noted in some of the data may be fortuitous.

Jeffreys (1) infers that the climates over most of the earth appear to be becoming warmer and drier. Pack (2), however, has shown that precipitation occurs in cycles and that precipitation for many different localities shows significant changes between periods. Strieff (3) believes that precipitation will increase about 30% in the period of 1940 to 1950, similar to the excess recorded for the years around 1880. He has pointed out that a minimum occurred in 1929 which is true for both Seattle and Portland and that a maximum is due about 1939. Clough (4), on the other hand, believes that we are due for a series of mild winters about 1940. He bases his opinion on the Bruckner cycle of 37 and 38 years respectively.

A study of the precipitation records (6) for San Francisco, Portland and Seattle, as representative of the Pacific Coast, reveals a series of interesting and varying relationships. These cities were selected because of their geographical location, accuracy of records and permanency of gauging stations as well as their proximity to the ocean. The locations of each of these cities is as follows:-

	<u>Longitude</u>	<u>Latitude</u>	<u>Air Line Miles to Ocean</u>
San Francisco	122° - 25' W	37° - 47' N	0 to 10
Portland	122° - 40'	45° - 31'	100
Seattle	122° - 18'	47° - 39'	40

The San Francisco record starts with the year of 1850, that of Portland with 1872 and that of Seattle in 1878.

For comparative purposes, the year of 1878 was chosen as the starting point. In that year Portland and Seattle had low rainfall while San Francisco had an extremely high annual rainfall.

The period from 1880 to 1890 shows for San Francisco, two points of extreme maximum and two of extreme minimum, Seattle on the other hand experienced a gradual yearly decline. Portland had two maxima and two minima closely resembling San Francisco but with a marked difference in magnitude.

From 1890 to 1900 San Francisco was still on the down trend while Portland and Seattle recorded slight increases over the previous ten-year period.

Between 1900 and 1933, San Francisco had a fairly constant rainfall with a slight rise about 1909 to 1910 and again in 1915 and 1916.

Portland recorded an increase in the period from 1900 to 1905 followed by a gradual decrease to 1930.

Seattle records a continuous decrease from 1900 to 1929, followed by a sharp rise in 1930 to 1933.

San Francisco experienced its wettest year in 1884 with a 38 inch record and its driest years in 1898 and 1917 with only 9 inches each and 1929 with 10 inches of rainfall.

Portland had its wettest year in 1882 when 67 inches was recorded. Its driest year was in 1929 with 26 inches of rain.

Seattle experienced its wettest year in 1879 when 56 inches was recorded and its driest in 1929 with only 20 inches of rain.

The year of 1929 seems to have been minimum year for all three points when compared with the period from 1879 to 1884.

The difference between the highest maximum and lowest minimum for the three stations is as follows:-

	<u>Maximum</u>		<u>Minimum</u>		<u>Difference</u>
	Year	Inches	Year	Inches	Inches
San Francisco	1884	38.82	1917	9.0	31.82
Portland	1882	67.24	1929	26.11	41.13
Seattle	1879	56.44	1929	20.03	36.41

During the 56 year period involved in this study the total rainfall for the three stations and the percentage distribution together with the average annual rainfall is as follows:-

	<u>Total Inches</u>	<u>Average Inches</u>	<u>Percent</u>
	<u>For 56 yr. Period</u>	<u>For 56 yr. Period</u>	<u>of Total</u>
San Francisco	1214	21.7	22.6
Portland	2350	42.0	43.8
Seattle	1918	34.3	33.6

It should be noted here that Portland receives approximately on the average 10 inches more rainfall per year than Seattle, and 20 inches more than San Francisco.

A study of the San Francisco records shows that its greatest frequency is during the late night and early morning hours i.e., 9 P.M. to 9 A.M. The cause of this phenomenon is attributed to nocturnal cooling. Phenomena of this type are not common to either Portland or Seattle in the same degree as regards San Francisco.

Blair (5) has shown that for Oregon and Washington, warm and wet winters occur together and cold and dry winters occur together, while for California warm winters are dry and cold winters are wet. These conditions are attributed to northern low pressure areas followed by warm and wet weather in Oregon and warm and dry weather in California. Southern low pressure areas are followed by cool and dry weather in Oregon and cool and wet weather in California. This difference may in part explain the difference noted in the study of rainfall data for the three cities.

To sum up the salient points which have been discussed it may be stated with a fair degree of assurance that (a) the rainfall for the three cities is far from stable for any period we may consider, (b) there is an absence of cycles, and perhaps to the short period considered, (c) there is no regularity between the three cities which may be spread over a period greater than two years, and (d) there has been a marked decrease since approximately 1880 for all points and an increase for two of the stations with a decrease in the third station.

If in historic times, rainfall is as variable as we find it on the Pacific Coast, it seems safe to assume that in geologic times it varied in perhaps an equal or greater degree as is evidenced by the many canyons and river beds, too large for their present streams, such as we find in the Oregon Country.

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LECTURE ANNOUNCEMENT

January 9, - "Willanette Sound" by Professor Ira S. Allison Ph.D.

The greatest contribution of Professor Condon was the theory of the Willanette Sound. This theory has been discussed by many geologists and is probably known than any other geological feature than perhaps the Columbia Gorge. Professor Allison has spent many years in detailed study of the Willanette Valley and promises to offer very interesting conclusions regarding this theory. Mr. Hockwell's geodes, one of the finest possible collections, will also be shown.

NEXT FIELD TRIP

January 19, 1936. Portland and Vicinity.

STUDY COURSES

The Society has arranged through the Portland Extension Service for two Geological Courses during the Winter Term starting January 6, 1936, as follows:

PHYSIOGRAPHY by Dr. Ira S. Allison.

Emphasis laid upon the physiographic cycle with a view to elaborating the general principles.

HISTORICAL GEOLOGY by Dr. Edwin T. Hodge.

The history of the earth, ^{not, no!} (it's) plants, animals and ancient man, as well as the economic results available from a study of ancient rocks. All material in the course is new and will therefore interest many who took Dr. Hodge's course last year.

DO YOU KNOW THAT THERE IS NO SEISMOGRAPH IN THE STATE OF
OREGON ?

TO THE MEMBERS OF THE GEOLOGICAL SOCIETY OF THE OREGON COUNTRY:

The great responsibility of the future welfare of the Geological Society of the Oregon Country has been placed upon the members of the Nominating Committee.

The Committee realizes that the Society, now in its infancy, must have men and women in its offices who will do all that is in their power to perpetuate its successful existence.

After weeks of consideration, the Committee now offers to the Society, the following names as nominees:

President	Clarence D. Phillips
Vice-President	J. C. Stevens
Treasurer	Mrs. Ben Smith
Secretary	Lillian W. Neif
Director	Jack Pratt

Respectfully submitted,

L. E. Kurtichnof

F. L. Davis

H. L. Jannison

Dr. Arthur Jones

J. Russell Collins - Chairman

DR. EDWIN T. HODGE DISCUSSES

THE MINES AND ORE DEPOSITS OF OREGON.

On October 24th, 1935, Dr. Edwin T. Hodge, Professor of Ore Deposits at Oregon State College, and President of the Geological

Society, gave an illustrated lecture on the "Mines and Ore Deposits of Oregon." The places in the state where ores may be found, descriptions of the various types of deposits, how to search for them and the main features that characterize each were discussed in detail.

Within the last few years there has been much interest evinced in the possibility of developing the latent mineral resources of Oregon but there has not been available to the public generally any series of educational lectures. The Geological Society plans to give from time to time such a series of talks presented by competent geologists and reputable mining engineers. These lectures will be strictly educational and not for the purpose of promoting some private mining enterprise.

The following resumé constitutes a brief summary of the salient points brought out in Dr. Hodge's lecture on the "Mines and Ore Deposits of Oregon."

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"Man has gradually learned one important thing in connection with the ores that he seeks - that they have come from the depths of the earth."

The metallic ore deposits of the world are all formed by great bodies of liquid rock that come up close to the surface of the earth from the interior. These bodies, called magmas, give off, upon cooling, gases and liquids which carry metals. Magma does not melt its way to the surface, but dissolves its way upward and magmas of different character form different ores at the surface. The metals are deposited on the outer portions of the magma and in the rocks that lie above and about it.

Dr. Hodge showed how his researches have indicated that Oregon is underlain by a very large magma that has been active for a long period. Extensions or cupolas from the magma have arisen toward the surface as shown by exposed parts that extend from southwestern Oregon to northeastern Oregon. They may be compared to the fingers of a hand; the palm being the magma and the fingers the cupolas or extensions. This hand has reached to the surface in a northeast-southwest direction following the major direction of rock folding in the state.

The rocks that have come up as fingers have formed within themselves deposits that geologists call magmatic segregations. Platinum and related minerals occur as such in Curry and Josephine counties. Chromite also occurs as segregations in the same counties as well as in Grant and Baker counties. Magnetite deposits of the same character are found in Curry county.

The gases and liquids that escaped the fingers penetrated cracks in the neighboring rocks. The farther the gases and liquids travelled in their escape, the more of their metallic

load was lost in the journey. Because the hand or magma is still buried deep beneath Oregon with only the tips of the fingers reaching the surface, many types of ore deposits lie at great depths. Hence, veins that are formed at great depths at high temperatures and under high pressure are rare in Oregon. Only a few gold quartz veins of this high temperature and high pressure type occur in the Blue Mountains region.

Veins formed under more moderate temperatures and pressures, along the edges of the fingers, are more frequent but yet not common. They are represented by gold quartz veins associated with pyrite, arsenopyrite, sphalerite, chalcopyrite, galena, tetrahedrite and some tellurides in a gangue of micas, calcite and dolomite. A belt 100 miles long and 40 miles wide extends from the Snake River to Canyon City in the Blue Mountains, the fingers with which they are associated being quartz diorites and granodiorites. The Cornucopia mine is a good example.

The upward thrust of this magmatic hand has not been so vigorous nor has erosion removed the cover to as great a depth in Oregon as in some other mineralized areas. Consequently, the veins that are formed close to the surface and at the tips of the cupolas are the common type.

Such veins belong to four main groups. The first type includes gold and silver veins associated with copper, lead and zinc. The gold in these deposits is generally so low grade that it forms minable deposits only when it has been enriched by surface concentration. The deposits occur in the Cascade Mountains from California to Washington, in the Bohemia, Blue River, Quartzville and Washougal districts.

The second type is represented by deposits of mercury. These occur on the west slope of the Cascade Mountains in Jackson, Douglas and Lane counties. Most of the deposits are low grade. They occur in the Ochoco Mountains area in Crook and Wheeler counties. One of the most steady producers is the Opalite district of Malheur county.

The third type are the gold veins associated with antimony. Examples occur in the Applegate River area near Watkins in Jackson county, near Eckley in Curry and near Baker and Palmer in Baker county.

The fourth type is shown by veins associated with manganese minerals which are found in southwestern Oregon.

The veins and lodes as described above in many cases have been enriched by the removal from them of valueless minerals and the residual concentration of the gold. The principal agent in the process has been the weather. Consequently, when such deposits have been mined down to the depth to which weathering has been effective, they become too low grade to work.

In the process of weathering much of the gold and platinum has been carried away and concentrated in the stream courses. Such has been the origin of such famous placer deposits as Sailor Diggings opened in 1852, and the other numerous placers from which seventeen millions of dollars in gold have been taken.

Dr. Hodge illustrated his lecture with many descriptive sketches and diagrams, the map on the following page being a copy of one drawn to show the various ore deposits of the state.

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GEOLOGICAL HISTORY OF OREGON

Subject of Address by R. H. BALDOCK, State Highway Engineer

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On the evening of October 25th, 1935, Mr. R. H. Baldock, State Highway Engineer, addressed the members of the Oregon Historical Society and their guests in the Story Hour Room of the Central Public Library. The invitation to attend the meeting extended by the Historical Society to the Geological Society of the Oregon Country was accepted by many of our members and a large audience was in attendance.

Mr. Baldock prepared the setting for the geological history of the state which is represented by our various topographic features today, by going back to the probable beginnings of the earth and the origin of our solar system. Briefly he stated the various theories propounded concerning the birth of the earth and the planets and their place in the universe. The gradual growth of our earth through eons of time, the periods of mountain making, volcanic action and tremendous earth movements were shown to play their parts toward bringing Oregon's mountains, plains and valleys into being.

After tracing the dramatic story of earth forces and presenting a summary of the general geologic principles involved, the striking geologic features of Oregon itself were discussed. The extensive lava flows of the Columbia plateau, the piling up of the Cascade Mountains and the history of the Columbia River were stressed. Mr. Baldock speculated upon the origin of this mighty river in its beautiful gorge and touched upon many of the scenic as well as geological wonders of the state.

Acknowledgment was expressed for the scientific researches and findings presented by various geologists of note including Dr. Thomas Condon, Oregon's pioneer geologist, and Dr. Edwin T. Hodge.

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SILVER CREEK FALLS TRIP

On Sunday morning, October 20th, 1935, a large group of members of the Geological Society of the Oregon Country, met at Silverton, Oregon, where they were joined by several Silverton members, Mr. T. M. Potter, Mr. Drake and others, and also Dr. Hodge, Mr. Wayne Felts and the geology class from Oregon State College. :

The party gathered at Mr. Drake's shop, a comfortable meeting place on a chilly, rainy morning, and spent considerable time examining the many interesting fossils on exhibition. The ribs of some large, prehistoric creature, and a piece of a huge tusk which had been found in the vicinity of Silverton, offered concrete proof of the existence of the great mammoths which inhabited the Willamette valley millions of years ago. Concretions containing shells and marine forms, and peculiar "mud tracks" or imprints resembling the hoof of some animal were subjects of much speculation and discussion. After a brief talk by Dr. Hodge on these various specimens, the large caravan left Silverton for the Silver Creek Falls area.

The following story on the geology of the region traversed and studied is taken from an essay by DOROTHY ROSE KEEP, Oregon State College student. Miss Keep's report was considered by Dr. Hodge as the best turned in by members of his class.

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"The first stop made by the caravan after leaving Silverton was made near Silver Creek. The creek is in a rock-bound valley and flows directly over a rocky bed. If this stream were to acquire a load of sediment that would be too much for it to carry, it would have to deposit the silt on this rocky foundation and the valley would become alluvial. One of the members of the party was fortunate enough to dig up from the rocky floor of the creek a concretion with a shell embodied in it. This shell was once lying on a sandy soil, the sand becoming rock due to the lime leaving the shell and hardening the surrounding material."

"A mile or so up the road from Silver Creek was a large deposit of tuff. A Seattle company started to mine the rock several years ago. One experimenter has been successful in putting a variegated glaze on the material by subjecting it to a temperature of 2000 degrees Centigrade. The rock is very light, actually being spun glass. It was blown out of some volcano as a frothy liquid full of gas and cooled in the air before reaching the ground as a rock full of many air spaces. It is a rock filled with water which contains many mineral salts, and when this water evaporates, the mineral salts cement. Therefore, it makes a concrete which is very light. Before the rock hardens it can be sawed or chopped and a nail easily placed in it will be cemented there as the water evaporates. Tuff rock is common in Oregon and will probably be used more and more in

the future for buildings, and being light in color is especially attractive for such purposes. In ship hulls it may be used as an aggregate. For making a cement without the generation of much heat, the material is ground and mixed with lime and fused into clinkers. Tuff rock is valuable as a material in all structures in which little weight is desired. Knowledge of the substance is not new for the Romans used a similar material in making cement."

"The remainder of the day was spent in the beautiful state park area beyond Silverton. This park includes a large tract of land in which there are nine different water falls. If one were to take out all the trees and streams in the area, the same topography as that of the Mesa Verde Park in Colorado would prevail."

"The hard rock or basalt in the country around the park is underlain by friable sandstone, clay and sandy shales. All of these shales and sandstones have a marine origin. The mud was carried into the sea by streams, and the creatures who have left their remains in the earth were then living in this sea. Probably during the Miocene Age lava poured forth over this area, the sea retreating and then advancing again. Three such lava flows left their respective layers upon the earth and water falls at three different levels. The lava poured over the forests at 600 to 700 degrees Centigrade burning the trees, the heat of the lava drawing out of them the volatile oils and leaving charcoal behind. If the trees were not charcoaled by the hot lava and decay did not set in, they could still be found buried in the lava."

"The lava is all basaltic lava, high in iron and magnesium, having flowed from eastern Oregon over to western Oregon before the present intervening mountains were formed. Behind the Silver Creek Falls is a deep depression permitting people to walk in back of them. As the water falls over the edge of the cliff, it curves inward, sucking the air behind it and leaving a vacuum. This vacuum pulls sprays of water onto the sandstone facing of the cliff-wall soaking it and softening the rock until it breaks off and falls in the water below. The ice in the winter also helps in eroding this cave by boring out the rock. Ice is sometimes thirty five feet thick here. When a jointing plane in the lava is weakened by water, the rock between it loosens and falls into the pool. Thus the falls are gradually being undermined, the measure of time it takes them to recede passing into thousands of years. In the basaltic walls of the cave are huge holes left by the trees when the flow of lava covered them. This proves that it was a land surface over which the lava poured."

"The second falls visited by the party had an underhang similar to the Silver Creek Falls, but not so deep and was probably the result of a thicker lava flow. When the lava was hot it contained more gas than it did solid matter, although most of it escaped. As a crust formed on top of the magma,

the remaining gas collected at the bottom of the flow. When this lava hardened, tubes or tunnels would result, many of which may be seen near the falls. These tunnels may also be caused by water being sucked into the hot lava. Scoria is found on the top of the lava flow. There appears to have been two lava flows resulting in one large water fall and one scant one. The velocity and swirling of the water falling upon the ground below the falls has dug a large pot hole at least eighty feet deep. Pot holes such as this have caused much trouble in the building of dams. The valley drops into a V-shape in front of these falls, which is a sign that it is a young valley. It was probable that the streams in this vicinity were much larger than they are now, the falls being small for the large topographic features surrounding them."

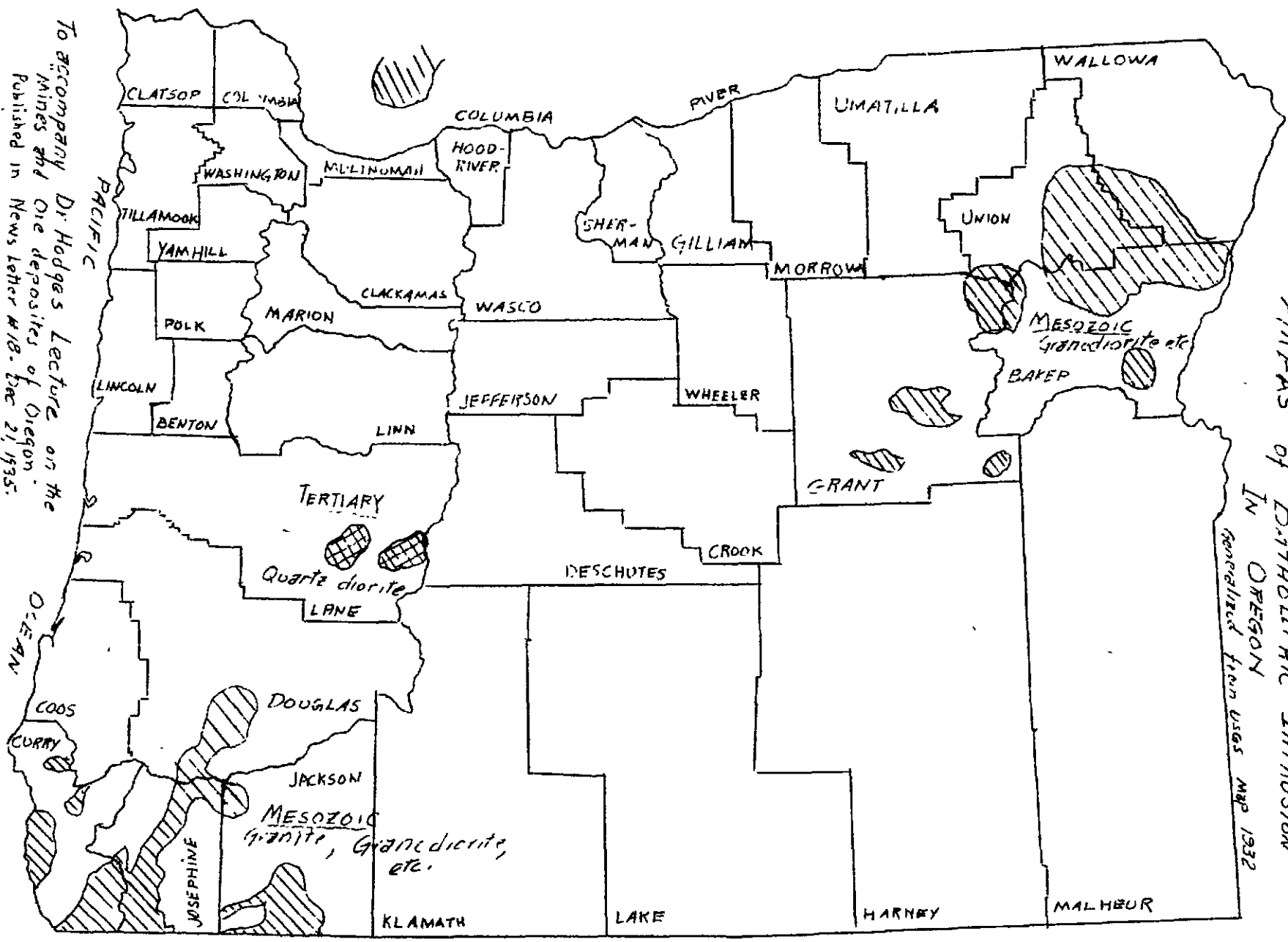
"At the bottom of the North Falls is a small dirty settling basin. This is characteristic of all lakes and pools until enough silt is deposited to become level with the land and the stream can bridge the depression."

"The Middle North Falls are characterized by a secondary falls directly beneath them. Water flows down a stream towards the lip of any falls at the velocity determined by the stream bed, and only after the water plunges over the cliff does it gain in velocity. Erosion is due to the velocity of the water as it goes over the cliff, cutting a niche in the rock. It finally curves a U-shape in the surrounding lava, lengthening the legs of the U as time goes on. A stream always erodes from its mouth toward its source. The rock under the stream below the Middle North Falls is hard, so that only slight erosion occurs and a series of steps or "dalles" are formed instead of falls."

"Descending to the Double Falls, the valley, floored with flat lying basalt, had become deeper and deeper. The Double Falls are at the same elevation as the Middle North Falls. One of these falls followed up one tributary and the other up another tributary. The upper part of the ledge behind the Double Falls has moved back farther than the lower ledge probably due to the eroding effect of the spray upon the rocks. Where there have been joints, the rocks have loosened and fallen to the bottom. To the right of the falls can be seen a trough where there had once been a tributary falls. However, the present falls had cut back in the rocks more quickly and have become the master falls. At the lower part of the falls are massive pieces of rock which become smaller as the upper part is reached. The reason for this is that the top part cooled and froze rapidly but while still hot contracted and formed so many cracks that a sort of brick-bat structure resulted. The lava in the lower part cooled more slowly giving a columnar formation while the lava at the very bottom cooled the slowest into massive rocks. Therefore, the types of flow shown are scoria, on the very top, brick-bat, columnar and massive."

"The South Falls are an excellent example of an ogee falls."

AREAS of Batholithic Intrusion
 IN OREGON
Generalized from USGS MAP 1932



To accompany Dr. Hodges Lecture on the
 "Mines and Ore Deposits of Oregon"
 Published in News Letter #18. Dec 21, 1935.

("Ogee" means the surface over which water will spill and produce a minimum amount of erosion.) At the bottom of the falls is a deep pool. Man has imitated this feature of nature in making his dams. He digs a deep pool lined with cement at the bottom of the dam so that the energy of the water as it hits the pool is used up in passing through the water before it can erode away any rock material."

"After seeing these geologic features one begins to have a slight conception of the length of time and the mighty changes that have occurred since the beginning of the earth."

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This index has been prepared by one of our members, Mr. Ray Treasurer. It will be noted that numbers 15, 16, have never been issued. The index for volume 2 is in preparation and will be released as soon as the volume is completed. Those who are preserving their Geological News Letter will wish to add this index to their file of volume 1.

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