

# GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE



*Jan 1957*

PORTLAND, OREGON

## GEOLOGICAL NEWS-LETTER

Official Publication of the

Geological Society of the Oregon Country

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# GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

## Officers of the Executive Board, 1956 - 1957

			Zone	Phone
President:	Dr. Francis G. Gilchrist	0644 S.W. Palatine Hill Road	1	NE 6-4792
Vice Pres:	Dr. Ruth E. Hopson	4138 S.W. 4th Avenue	1	
Secretary:	Mrs. Leo F. Simon	7006 S.E. 21st Avenue	2	BE 6-0549
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Directors: Mr. Fay W. Libbey (1957) Mr. Albert J. Keen (1957)  
 Mr. Leroy A. Palmer (1958) Mr. William F. Clark (1958) Dr. James Stauffer (1959)

### Staff of Geological News Letter

Editor:	Mr. Leroy A. Palmer	1209 S.W. 6th Avenue	4	CA 7-9347
Assoc. Ed:	Mrs. Lillian F. Owen	5933 S.E. Lafayette Street	6	PR 4-9729
Library Ed:	Dr. James Stauffer	717 - 8th Street, Oswego, Oregon		BL 1-3825
Business Mgr:	Mr. Edward A. Kelham	14018 S.E. Linden Lane	22	OL 4-2196

### Committee Chairmen

Program:	Dr. Ruth E. Hopson	Display:	Mr. Murray R. Miller
Field Trip:	Mr. Rudolph Erickson	Research:	Mr. Rudolph Erickson
Luncheon:	Mr. Leo Simon	Service:	Miss Margaret L. Steere
Library:	Dr. James Stauffer	Museum:	Mr. Alonzo W. Hancock
Membership:	Mrs. Ruth Harrison	Public Relations:	Mr. Clarence D. Phillips
Publicity:	Mr. H. Bruce Schminky	Historian:	Miss Ada Henley

### Society Objectives

To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country; the establishment and maintenance of a library and museum of geological works, maps, and specimens; the encouragement of geological study among amateurs; the support and promotion of geologic investigation in the Oregon Country; the designation, preservation, and interpretation of important geological features of the Oregon Country; the development of the mental capacities of its members in the study of geology; and the promotion of better acquaintance and closer association among those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mrs. Ruth Harrison, 1879 S.W. 10th Avenue, Phone CA 3-0255. Regular annual dues (single or family memberships) are \$5 for residents of Multnomah and adjacent counties; \$2.50 for others; and \$2 for Junior Members. Make remittances payable to the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.

### (Society Activities)

(See "Calendar of the Month")

Evening Meetings: Formal lectures or informal round-table discussions on geological subjects, on the second and fourth Fridays of each month at Public Library Hall, S.W. 10th Ave. and Yamhill.

Field Trips: Usually one field trip is scheduled for each month.

Library Night: Once a month. Lewis and Clark College.

Luncheons: Informal luncheons, with geological motif, each Thursday noon in Room B, Chamber of Commerce Building, S.W. 5th Ave. and Taylor St. \$1.00 per plate.

Publication: The Geological News Letter, issued once each month, is the official publication.

CALENDAR

Buffet Luncheon every Thursday noon at the Portland Chamber of Commerce, 824 S.W. Fifth Avenue, second floor. One dollar.

With our January programs we return to the Public Library, which has been remodeled and very much improved.

Friday  
Jan.11 Room B, Public Library, 7:30 P.M.  
Mr. Herbert Schlicker, Geologist, State of Oregon Department of Geology and Mineral Industries, will talk on "Reconnaissance Geology of the Western Cascades."

Tuesday  
Jan.15 LIBRARY NIGHT - Tuesday, January 15, in Biology Building, Lewis and Clark College. General topic for consideration will be the geology of the Coast Range Physiographic Province. A series of meetings is planned to study the various provinces of Oregon. Instructors will be everyone present who knows something about the subject. Bring along any colored slides, maps, minerals, rocks, or fossils relating to Coast Range geology that you may have. There will also be the usual periods for library browsing and refreshments.

Friday  
Jan.25 Room B, Public Library, 7:30 P.M.  
This meeting, cosponsored by the Public Library and the Geological Society, will consist of an outstanding film of Yosemite Valley, showing geological features and animations illustrating the development of the valley. Rudolph Erickson will give a talk on the controversy over the origin of the valley between Josiah D. Whitney, State Geologist of California, and John Muir, the leading naturalist of his day. Mr. Muir was sometimes dubbed by his professional rivals as "the shepherd," but in this argument the shepherd won out.

Friday  
Feb.8 To be announced.

Sunday  
Feb.17 FIELD TRIP - Sunday, February 17, 1:30 P.M.  
Basement trip to view two outstanding archeological collections of Columbia River area artifacts, consisting of fine arrow and spear points, knives, etc. - mortars and pestles, stone work, and Hudson Bay trading material.

Cars will leave in front of Vernon School, N.E. Killingsworth and 21st Avenue, at 1:30 P.M. Duration about 3 hours. Come - See- Ask questions.

\* \* \* \* \*

NEW MEMBERS - GSOC - December 1956

Howell, Mr. and Mrs. Paul W. Box 1884, Troutdale, Oregon

Phone  
MO 5-3033

\* \* \* \* \*

NOMINATING COMMITTEE

President Gilchrist has appointed the following nominating committee:

- Leo Simon, Chairman
- Ray Baldwin
- Orrin E. Stanley
- Edward Kelham
- Bruce Schminky

January 3rd the committee made its selections and submits the following slate for approval of the members for their officers for 1957:

- President, Leroy A. Palmer
- Vice President, Dr. James Stauffer
- Secretary, Miss Rose Hamilton
- Treasurer, Mrs. Emily Moltzner
- Director, Dr. Ruth Hopson

No nomination was made for editor and the Nominating Committee would be glad to have a volunteer for that post.

\* \* \* \* \*

FROM THE EDITOR

Once a ship off the coast of South America ran out of fresh water. The situation was getting critical when another ship was sighted and the one in trouble signaled its plight. The signal came back "Cast down your bucket where you are." Thinking he had been misunderstood the captain of the first ship repeated its message and got the same reply.

The ship then followed its instructions and brought up fresh water. It was off the mouth of the Amazon River whose volume and velocity carried its water far out to sea before it was contaminated by the salt of the ocean.

Dr. Stauffer's "Geology of a Recent Road Cut" in this issue is a good example of casting down the bucket where we are. We don't have to go far afield to find interesting geology. It is all around us, perhaps right in our back yards. (See "Back Yard Geologist" by Ed Kelham in the January 1955 News Letter.)

How about some of our members picking up the ball after Dr. Stauffer's touchdown and carrying on with some papers on what we have right under our eyes - and feet.

\* \* \* \* \*

CHANGE OF ADDRESS

Walsted, Mr. and Mrs. John P.           Route 1, Box 376, Corvallis, Oregon

Jqenke, Mr. and Mrs. Henry H.       Route 2, Box 712, Gresham, Oregon

Spaulding, Jacquette E.               721 N. Stafford                       Phone, BU 5-5328

\* \* \* \* \*

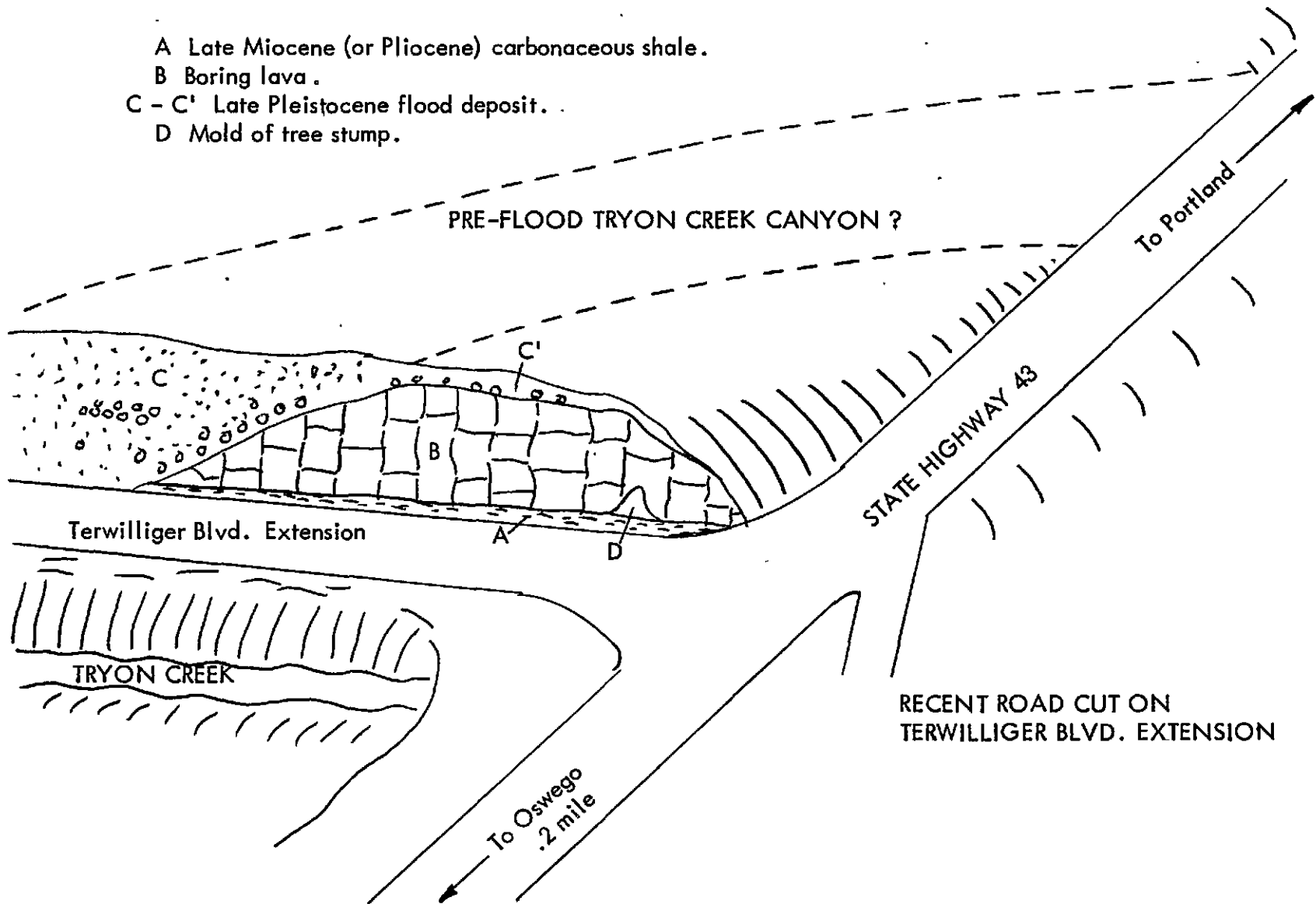
THE GEOLOGY OF A RECENT ROAD CUT

By  
Dr. James Stauffer

Every new road cut offers fresh opportunities to the geologist to observe a section of the earth's crust, but it is not often that a cut reveals a glimpse of geologic history as interesting as the one made for the new Terwilliger Boulevard extension just north of Oswego along Tryon Creek canyon. For, besides affording a view of late Tertiary and Pleistocene history, it reveals a number of significant geologic structures and processes. A diagram of the road cut shows: A, late Miocene or Pliocene carbonaceous shale; B, Boring lava; and C, late Pleistocene flood deposit (see page 4). A has been exposed to a depth of 5 to 6 feet but is probably a few feet thicker and presumably lies on top of Columbia River basalt which is exposed a short distance north along the main highway toward Portland. It is possible this shale correlates with the bed of limonite at the Oswego Iron Mine about 2 miles to the west, since there is a rather close coincidence in the angles of dip of the two beds. The shale is remarkable in containing numerous small cavities several feet from its top surface; so that, at first glance, it is easily mistaken for vesicular lava. What caused these cavities? Could they have been formed when the hot Boring lava, flowing out upon the black mud that was the precursor of the shale, caused water in the mud to flash into steam, thus honeycombing it with cavities? Absence of these cavities in the upper part of the shale may indicate that the top was comparatively dry at the time of the flow. Some limonite lenses in the upper layers probably represent concentration of material resulting from the chemical weathering of the overlying Boring basalt. This shale points to the existence of a large swamp lying just west of the Willamette River. In the course of time the eastern part of the swamp was filled with mud, possibly river alluvium, and the western end with limonite resulting from the decomposition of the Columbia River basalt. Overlying the shale is 20 to 30 feet of jointed columns of Boring lava. Fortunately the cut was made at a place where a large tree was once growing in the dried-up swamp area. Lava surrounded the tree, probably burned off its top and completely buried the stump which in time decomposed to leave a good-sized mold (D in diagram). The carbonized roots of the tree may be seen extending out into the top of the shale and a few smaller roots may be found nearby. Preceding or subsequent to the flows of Boring lava, warping occurred so that the shale now dips about 5° toward the east; consequently the structure here may be considered an extension of the west Portland hills anticline. C' at first glance appears to be a residual soil but it is composed mostly of sand containing a few waterworn pebbles. It is therefore part of the late Pleistocene flood deposit and one must assume that the old soil was completely stripped away by the flood and replaced by the sand. C is a continuation of this deposit and is composed of coarser materials below and sand above. Torrential bedding in the latter clearly reveals that the flood waters came from the northeast. Since the Boring lava gives way and is replaced by the flood deposit along the new cut, a puzzling situation is presented. It appears that C may represent an old canyon fill and that Tryon Creek canyon once occupied the area indicated by the dotted lines. A gap in the Boring lava along the main highway tends to confirm this. Therefore it appears that, after having had its old canyon completely filled with Missoula Flood deposits, Tryon Creek cut its present narrow canyon through a lower outlet.

\* \* \* \* \*

- A Late Miocene (or Pliocene) carbonaceous shale.
- B Boring lava .
- C - C' Late Pleistocene flood deposit. .
- D Mold of tree stump.



IN OUR LIBRARY

The Geological Story Briefly Told, for the general reader and for the beginner in the science. James D. Dana. 1875 edition.

This early edition of one of the classics in geology has been donated to our library by Mr. H. G. Richardson, 816 Manzanita Drive, Laguna Beach, California.

E. T. HODGE LIBRARY GIFT TO PORTLAND STATE COLLEGE

The gift to Portland State College of the substantial geology library of Dr. Edwin T. Hodge, emeritus professor of geology at Oregon State College, has been announced by Dr. J. F. Cramer, Portland State College president.

More than 100 volumes and texts, rare out-of-print monographs and maps are in the collection. Several books were originally in the library of Dr. Thomas Condon, pioneer Oregon geologist, and have his name on the flyleaf.

Other notable items in the donation are classic publications by the early workers of the U.S. Geological Survey, such as Powell of Colorado and Clarence King, first director of the survey. These early surveys of the 40th parallel and reports of the 1850's are now unobtainable.

In addition the collection contains a copy of the rare volume of Dr. Condon's Oregon Geology, the only work existing on Oregon as a whole.

The gift, made to Portland State through Dr. John Eliot Allen, professor of geology and a former student of Dr. Hodge, will be used to establish the basic geology library at the school.

TRACY WADE LIBRARY ACQUIRED

Arrangements were concluded in November with Mrs. Tracy Wade for the acquisition by the GSOC library of approximately 100 titles from the library of the late Tracy Wade, who passed away on July 15, 1955.

The books and bulletins consist mainly of publications of the Carnegie Institution of Washington; Geological Society of America; International Geologic Congress Guidebooks; U.S. Geological Survey Annual Reports, Professional Papers, Circulars, Bulletins, and Water-Supply Papers; University of California Press; State of Oregon Department of Geology and Mineral Industries; and publications of Oregon State College and the University of Oregon. There are a number of autographed titles and many out-of-print publications. One report by Diller dates back to 1893. Some titles are duplicates of those already owned by the Library and these may be disposed of by the Library by sale or exchange.

The catalog of the acquisition may be examined at the Library. A copy is also in the hands of the Secretary.

Tracy Wade was a charter member of the group and active in the work until the onset of his long illness in 1940. He was an enthusiastic member and contributed largely to the success of the group during the period of his active membership. Those who knew him loved him. The purchase of his library from Mrs. Wade was made possible in large part by interested charter members and others who cooperated with the Library in completing the transaction.

F.L.D.

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## LUNCHEON TALKS

CONCRETIONS - December 20, 1956 - Hollis M. Dole.

The five-minute talk for the December 20 luncheon meeting was concerned with a brief description of concretions, a subject brought up during the previous luncheon meeting. Reference was made to "Principles of Sedimentation" by W. H. Twenhofel and to "Sedimentary Rocks" by F. J. Pettijohn, where excellent discussions are to be found.

Concretions, it was mentioned, have a wide range of composition, the most common of which are calcite, silica, hematite, limonite, siderite, and pyrite. They are also composed of gypsum, barite, aragonite, witherite, manganese oxide, calcium phosphate, fluorite, phosphate, and bauxite. Size varies from a fraction of an inch up to many feet in diameter. Shape is generally round but may take almost any form. Concretions are limited to sedimentary rocks and are most frequently in sandstones and shales. The formation of concretions has been widely argued but because of lack of agreement on just what a concretion is, no single explanation will answer in all cases. Each occurrence should be considered separately, and evidence at the outcrops should be weighed to decide just how that particular concretion formed. Criteria to look for are whether bedding continues through the concretion or terminates at its edges, if depressions occur at the base of the concretion or at the top or both, if there is any sign of slickensiding (smooth surfaces caused from differential movement), or differential coloring.

It was brought out that pyrite commonly forms concretions and frequently the structure is radiating. Probably these have formed in place and are due to sulphide-reducing bacteria. Another concretion frequently seen in mineral collections is the barite "rose" or barite "dollar." Such minerals as pyrite and barite and the chert nodules found in chalk deposits frequently represent minor constituents of the enclosing beds and are a function of the permeability of the enclosing material.

Members of the Society were encouraged to refer to the publications noted above as the information obtained from a few minutes' reading would make their interpretations of concretions much more interesting when on field trips.

\*\*\*\*\*

THAT HISTORIC GRAPE JELLY. It was in April 1940 that Earl Marshall led a field trip by way of Skyline Boulevard over the Old Trappers' Trail.

One of the stops was at the site of an old, old house of which scarcely a trace remained but the remnants of some rotted boards and some old fashioned cut nails, such as were used in building, many years ago. Nearby, in a clearing in the pines, was an old apple orchard in which was an old grape vine. The vine was not native and, from the age of the place and the surroundings, it was apparent that it could have arrived in Oregon in only one of two ways, over the plains by wagon or around the Horn by boat.

From this vine Ray Baldwin took a slip and planted it in his spacious yard. For ten years or so the slip had a hard time of it, didn't seem to be able to make up its mind whether to grow or not, but finally decided to follow the example of the hardy pioneer from which it sprung.

To make the rest of the story brief it was delicious grape jelly that Ray passed around the luncheon table on December 27th.

L.A.P.

\* \* \* \* \*

Those who have been perplexed by the classification system in Dana's Mineralogy will appreciate the following. When Dana was professor at Yale and Shaler at Harvard the two were very keen professional rivals, in fact there were times when their interchanges were more or less barbed. So, Shaler used to tell his students, "Every mineral God Almighty ever made is in Dana's Mineralogy, but only God and Dana know how to find it." ☺

L.A.P.



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CALENDAR

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Friday Room B, Public Library, 7:30 p.m.  
Feb. 8 Dr. Francis Gilchrist, Professor of Biology, Lewis and Clark College, will talk on "Earth's Early Atmosphere and The Origin of Life."

Sunday FIELD TRIP. Basement trip to view two outstanding collections of Columbia  
Feb. 17 River area artifacts, consisting of fine arrow and spear points, knives, mortars and pestles, stonework, and Hudson Bay trading material. Cars will leave from in front of Vernon School, N.E. Killingsworth and 21st Avenue at 1:30 p.m. Duration about 3 hours. Come - See - Ask questions.

Tuesday LIBRARY NIGHT. At Lewis and Clark College, Biology Building, 7:30 to  
Feb. 19 10:00 p.m. The topic for consideration will be the geology of the Coast Range physiographic province. This meeting (postponed from January because of snow) will be the first of a series on the various provinces of Oregon. Instructors will be everyone present who knows something about the subject. Come and bring along any colored slides, maps, minerals, rocks, or fossils relating to the Coast Range geology which you may have. There will also be the usual periods for library browsing and refreshments.

Friday Room B, Public Library, 7:30 p.m.  
Feb. 22 Dr. Irwin Lange, Professor of General Science, Portland State College, will talk on "Dr. John Evans, U.S. Geologist in the Washington and Oregon Territories." This talk on one of our pioneer geologists should be very interesting. There will be a short annual business meeting to report on the election of officers.

CONDON LECTURES

This year the Condon Lectures will be delivered by Dr. Paul Sears, Chairman of the Conservation Committee of Yale University. Subject: Human Ecology. Place: Auditorium, Portland State College. Date: February 4 and 5. Time: 8:00 p.m.

The February-5th lecture will be on "Man, a Newcomer. The Living Landscape gets a New Tenant," and that of February 6th, "Man, the Tenant, becomes Landlord."

These lectures are the same that Dr. Sears delivered at Eugene and Corvallis.

OTHER FEBRUARY EVENTS ARE

February 12 at 8:00 p.m., Cleveland High School Auditorium. An Audubon Screen Tour, the first of the season. Howard Cleaves of New York will show a film on "Animals at Night in Color."

February 23 from 9:00 a.m. to 4:00 p.m. Annual meeting of the Oregon Academy of Sciences at Monmouth State College of Education.

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NEWS LETTER BINDING

Raymond L. Baldwin requests that all members wishing their News Letters bound will get them to him at an early meeting or Thursday luncheon so that he can take them all to the bindery at one time. He predicts prompt service for the first load, but is not willing to state how long it will take to get the later bundles processed.

Note: The editor has some extra copies of the issues from April through December and will be glad to fill out incomplete files as long as they last.

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MIRROR PAGEANT TO SHOW GEMS

Under sponsorship of the Deschutes Geology Club, a gem and mineral show will be held in Bend on the Mirror Pond Pageant dates, July, 4, 5, and 6.

This will be the first show of its kind ever held in Bend.

Merle Jones, general chairman in charge of arrangements, said the show will be presented as one of the major events of the three-day pageant program. Mineral hobbyists from all parts of the Northwest are expected.

Some of the outstanding mineral collections in the region are owned by central Oregon residents. (From The Oregonian, January 21, 1957.)

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TALES FROM THE LUNCHEON TABLE  
That Secret Process Again

In the earlier days of the development of Southern California a company decided to build a railroad from Pasadena to the observatory on Mt. Lowe but, when they came to acquire the right of way, they found they would have to cross a group of mining claims alleged to be valuable for gold. The company had the ground examined by a mining engineer who found no evidence of value, so a suit in condemnation was brought against the mining claimants.

At the hearing the claimants admitted readily that the ground would not show values by customary methods of assay, but by a secret process which they controlled, they could demonstrate that all of it contained gold, which could be extracted at a profit, but only by their process. Their "metallurgist" testified, produced so-called assay certificates, and stood up so well under cross examination that the company's attorney found an excuse for a two-weeks' continuance. What he really wished was a chance to think it over.

When the hearing was resumed the "metallurgist" was recalled and identified an assay certificate, showing a substantial gold content, as one that he had prepared as a report on a sample submitted to him, and assured counsel that he had used every precaution to obtain an accurate assay.

Then the company lawyer called a witness that had not appeared in the case previously and he identified the certificate as one that he had received as a report on a sample which he had delivered to the so-called metallurgist.

Q. Of what did that sample consist?

A. Of a portion of a broken flower pot that I crushed up before delivering it for assay.

P.S. - The railroad operated for several years but the "mine" was soon taken over by the "tommyknockers."

\* \* \* \* \*

L.A.P.

## THE ART OF GEOLOGY \*

By

John Eliot Allen

Professor of Geology, Portland State College

**Abstract:** Geology, unlike most other sciences, is still dominated by the descriptive phase, and much time must be spent accumulating facts about the earth. Interpretation of these facts presents complex problems involving a large number of variables, which can never be represented adequately by mathematical formulae or physical models. In other words, geology is as much an art as it is a science, and solution of its problems requires imagination as well as vast accumulations of facts.

### Introduction

Recently a colleague in another field remarked that "geology is not a science." This paper is not intended to be a rebuttal of that categorical statement, since I believe that in many ways geology, like medicine, is as much an art as it is a science. The remark and the succeeding discussion did, however, indicate a lack of knowledge of the fields and techniques of geology that, as a geologist, I naturally deplore. Perhaps this situation exists because geology does differ from most other sciences. It is important for geology teachers to be fully aware of the ways in which it differs and to be able to present these to their non-geological colleagues as well as to their students; for it is these very differences that make geology effective in economic fields where engineers, mathematicians, and physicists can fail.

### Thought Processes In Science

It is not easy to dissect the thought processes used in the pursuit of science - or art. This is certainly evidenced by the diversity and dissension among the various schools of psychological thought. But one can at least make the attempt, with salutary results at least in regard to the development of humility.

Reasoning can be conscious or unconscious. We sometimes think that conscious inference is the dominant form, but many if not most of the truly great discoveries have been made unconsciously, by insight, strokes of genius, or spontaneous illumination. These subconscious shortcuts have undoubtedly played a larger part in the development of science than the "reasonable" scientist likes to admit.

Conscious reasoning can also be divided into inductive (from special cases to general laws) and deductive (from general laws to special cases). There are other similar techniques of conscious inference, such as analogy (from similar cases), generalization (grouping into a larger class), specialization (dividing into smaller classes), and recently the application of the theory of probability as used to test statistical hypotheses. All these have recently been called the "logic of discovery," whereas deductive reasoning has been called the "logic of proof."

### Development of Scientific Laws

The life history of a scientific law might, somewhat facetiously, be divided, like the seven stages of man, into outrageous suggestion, tentative conjecture, credible proposition, plausible hypothesis, reasonable theory, accepted theory, and accepted law. Each reader, according to his own semantic background, will want to emend or change this list of terms. Most of the great geologic ideas have gone through some such history in their development.

\* Published in Journal of Geological Education, vol. 4, no. 1, Spring 1956.

Consider, for example, the development of the concepts of marine submergence, fossils as ancient organisms, the superposition of strata, the origin of igneous rocks, stratigraphic correlation, uniformitarianism, granitization, isostasy, evolution, base level, the duration of geologic time. Each of these ideas has changed our concepts of the nature of the earth and its parts, of its processes, and of geologic time.

\* \* \* \* \*

### Geology Compared With Other Sciences

An important difference between geology and many other sciences is the relatively large amount of time that must be spent by the geologist in collecting data. In many disciplines of geology - e.g., mineralogy, crystallography, petrography, stratigraphy, sedimentation, volcanism, physiography, glacial geology - the descriptive phase still predominates. Other are semidescriptive - e.g., structural geology, petrology, metamorphic geology, geomorphology, submarine geology, paleontology, economic geology. Most of the geologist's time is taken up with the compilation of an adequate description of that part of the earth's crust with which he is concerned.

There is no necessity for mathematical formulation in most of the disciplines of geology (although it is being used more and more, with highly variable results). . . .

Whereas the physicist formulates one explaining hypothesis, the geologist formulates all possible explanations. In geology we call this, after T. C. Chamberlain who first formulated it, the "method of multiple working hypotheses." Speaking now as a field geologist, I can say that it is necessary and practical and that it works. A geologist moves among a swarm of alternate possibilities. Each bit of additional information collected either adds to his belief in one or more hypotheses, suggests new ones, or eliminates old ones from the realm of possibility. Very few, if any, of the problems facing a geologist are so simple that he can solve them by a single method of approach. Furthermore, his final solution, based upon the necessarily incomplete data which he has available, usually consists of several alternates, each of which is still valid, none of which can be eliminated from the picture. This, perhaps, explains why geologists have the reputation of being great qualifiers, and why a geologist who is too positive in his opinions is looked at askance by his brethren.

### Geologic Thought Likened to a Banyan Tree

Thinking in terms of four dimensions (that is, three in space and one in time), as most geologists must of necessity do, I am in the habit of constructing physical models for geological ideas, and I spent some time trying to construct a model to illustrate this process of geologic thought. Finally I decided upon the familiar idea of the pattern or image of a tree. Each leaf on the tree represents an isolated fact. As one starts at the top of the tree and moves a horizontal plane of investigation downwards, the facts begin to coordinate and become organized into patterns of twigs (systematized ideas) and branches (hypotheses). Separate hypotheses then combine and integrate to show a larger and larger picture as new facts (leaves) and ideas (twigs) come to light. Various hypotheses then begin to govern the direction, one way or another, of the investigation and tend to develop new facts. So far, so good. But my tree did not show what happened to the abandoned and disproven hypotheses, until one of my co-workers suggested the banyan tree of India, which puts down numerous aerial roots from its branches, a few of which reach the ground to form new root systems. This completed the image, even to the extent of suggesting the various residual alternate hypotheses that remain after one has reached the ground and exhausted all the available data.

### Complexities of Geologic Problems

To illustrate, now, the complexity of even the most simple problems in geology, let us take a single hand specimen of sandstone. This piece of rock is made up of several minerals, each of which is characterized by a different chemical composition, specific gravity, hardness, toughness, and has a more or less definite cleavage or lack of cleavage. Each grain has a definite size, frequently different from any other, and there are varying proportions of the different grain sizes and varying relationships between grain size and mineral species. Each grain may have a unique shape, expressed in terms of roundness, sphericity, and angularity. Each grain may have a varying surface texture and degree of polish and may be altered in a different way or to a different degree.

This swarm of data must be interpreted in terms of the past history of the rock, for the chief purpose of geology is to reconstruct the past. The listed characteristics of the rock particles are a result of some of the following factors, which affected them during their history:

1. Conditions at source: kind of source rock; rate at which it was eroded; climate, vegetation, and soil at source.
2. Conditions of transportation: agent - air, water, ice, etc.; distance carried; climatic, physical, and chemical environment during transportation.
3. Conditions of deposition: if on land, the climate and vegetation of the area and the agent of deposition; if in water, its depth, chemical composition, and degree of movement.
4. Later alteration: diagenesis, silicification, dolomitization, etc.

Similarly complex problems of interpretation can be met with in any field of geology. An additional example is the interpretation of underground conditions from surface outcrops and geophysical surveys. The method of attacking the problem is dependent on the geologist's previous training and experience. As a result, no two geologists will submit identical interpretations, and in many cases widely divergent interpretations are submitted based on the same field data. Specific examples of such differing interpretations have been presented by Theodore Link<sup>1</sup> in a paper that may be useful to those readers who want to demonstrate this aspect of geology to nongeologists.

### Conclusion

I challenge any mathematician or mathematical physicist to set up a formula that will coordinate into an integrated picture of the past all the variables involved in the formation of a sandstone! Nor can a geological model ever reveal all the true facts of structure and outcrops. The multiple variables always presented by the four-dimensional facts of earth can never be adequately duplicated to form a perfect analogous model. The restricted regimens of mathematics, physics, and chemistry, valuable as they are, can never completely summarize and analyze any complicated geological phenomenon. Only the unlimited scope of man's imagination, governed, regulated, and channeled by generations of accumulated facts, can hope to solve earth's problems.

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<sup>1</sup>Link, Theodore A., 1949, Interpretations of foothills structures, Alberta, Canada: Am. Assoc. Petroleum Geologists Bull., vol. 33, p. 1475-1501.

(Reprinted from Journal of Geological Education, vol. 4, no. 1, Spring 1956.)

## 'OBSIDIAN' SOLD TO UNWARY FOUND TO BE MERE SLAG

By

Phil F. Brogan

Tall tales about cliffs of "green obsidian" still persist.

These cliffs, described as remnants of flows of molten glass from belching volcanoes, have been variously located in Wyoming, Montana, and even in the Jordan craters country of Oregon.

In proof of such volcanic eruptions of ancient days, there is being displayed in numerous wayside museums in western states specimens of green "rock" impregnated with crystal bubbles.

Sellers boost product

Throughout the West this material is offered for sale as "green obsidian" and described as the rarest of all volcanic glasses.

What is the source of this transparent material with its strange inclusions that resemble birds eggs in green jello?

Dr. H. C. Dake, Portland, editor of the Mineralogist, declares it is not a product of a volcano, and never was part of a flow of green lava welling from a vent or a breach in a prehistoric crater.

Dr. Dake declares it is the residue of a glass factory at Lovell, Wyoming, that was destroyed by fire many years ago.

For many years this slag from the old factory remained as a miniature "cliff" near Lowell - but that cliff was not as impressive as Oregon's obsidian cliff west of the Three Sisters, or the cliff in Yellowstone National Park made famous by one of Jim Bridger's tall tales of pioneer days.

Cutter takes own life

Bridger told of how mountain sheep saw their reflections in the Yellowstone mirrorlike obsidian and butted themselves to death.

Bit by bit and once in carload lots, the slag from the Wyoming factory was transported to all parts of the country. Once the slag was offered to the public as "American zircon." Generally it was sold as "green obsidian."

Much of this material found its way into the Pacific Northwest. On one occasion, Dr. Dake reports, a western gem cutter purchased a full carload of the stuff, thinking it was a rare obsidian. When he found that the "American zircon" was merely slag from a glass factory he committed suicide.

Under the name of "Wyoming obsidian," the slag was widely sought by collectors of minerals in earlier years because of its beauty, its crystal clearness, its conchoidal fracture, and its white, silken inclusions.

The curious mothball-like growths in this glass, Dr. Dake determined, are principally artificial wollastonite. Many of the collectors easily determined that the material was not a product of nature.

Last of the slag disappeared from the old factory site years ago.

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From The Oregonian, December 29, 1956.

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ANNUAL BANQUET - March 8, 1957. Call Leo Simon for reservations, CA 3-0300, or BE 6-0549.  
Mt. Tabor Presbyterian Church - S.E. 55th and Belmont - 6:30 p.m. Tickets: \$2.25.



## GLACIER EXPERT OBSERVES ICY GROWTH IN NORTHWEST

By

Leverett G. Richards

Glaciers in the Pacific Northwest are advancing, Dr. Harry Wexler, chief scientist for the U.S. IGY program in the Antarctic, revealed in a press conference here this week. Richard Hubley, of the University of Washington, has made the only studies that show the glaciers advancing instead of retreating in Washington, Oregon, and probably in British Columbia, Dr. Wexler said. Hubley is glaciologist for the northern hemisphere in the International Geophysical Year about to start throughout the world.

Whether Hubley's findings indicate a reversal in the trend throughout the world is a big question mark, which may be answered by observations taken during the IGY, Dr. Wexler explained. Hubley's are the first significant studies of sound statistical origin which show glaciers advancing - and at a rather rapid rate - Dr. Wexler said. Some of the mountain glaciers measured by Hubley have shown advances of tens of thousands of feet in volume in the past ten years. Some have advanced 10 to 15 feet laterally at their snouts, reversing the retreating tendency evidenced for the past hundred years or more.

This evidence is contrary to what has been accepted as a worldwide trend toward warmer weather and retreating glaciers, Dr. Wexler pointed out.

### Melting big question

Biggest question mark is the 5,000,000 and more square miles of ice, 90 percent by volume of the world's ice, which covers the Antarctic. Is it melting?

One of the major projects of the IGY in the Antarctic is to establish "benchmarks" for future measurements to determine the rate of growth or shrinkage of the ice sheet, as well as estimating its present bulk more accurately.

"Melting of the ice cap could raise the level of all the seas of the world by 150 feet or more, but not for periods of time in the order of 100 years," Dr. Wexler said. "But we have a responsibility for future generations. The benchmarks we establish now will enable future generations to forecast accurately the changes that may be wrought by the melting ice caps."

If the earth's weather is warming up, as supposed, it may be due to the increasing quantity of carbon dioxide in the air, Dr. Wexler said. "Carbon dioxide acts like a glass pane in a greenhouse, retaining and concentrating the heat of the sun and thus tending to produce warmer weather," Dr. Wexler explained.

### Long trend seen

Carbon dioxide from the burning of fossil fuels has been estimated to be building up in the atmosphere until it shows an increase today of 10 percent over 50 years ago. Some scientists claim these figures are distorted by local pollution from heavy industry in populated areas.

"The Antarctic provides an ideal laboratory for determining the true composition of the natural atmosphere," Dr. Wexler explained. "There is no local pollution here. If the carbon dioxide content has increased throughout the world it will be measured in the Antarctic atmosphere. Measurement during Rear Admiral Richard E. Byrd's 1939-41 expedition indicated just such an increase, but the Atka in 1954 found lower measurements. We have elaborate new instruments this year which should give a more accurate record," Wexler said.

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From The Oregonian, January 21, 1957.

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## LUNCHEON NOTES

ARTIFICIAL GEMS. Leroy A. Palmer, January 10, 1957.

Some time ago Albert Keen discussed the manufacture of emeralds as recently perfected by a chemist in San Francisco. The emerald is the fourth stone to be produced artificially on a commercial basis. The other three are ruby, sapphire, and pearl. The emerald is a beryl, the ruby and sapphire are alumina, and the pearl is in a class by itself. The process by which the emerald is made has not been revealed but the others have been common knowledge for many years.

Rubies and sapphires are made by fusing powdered alumina, mixed with a coloring matter, under intense heat and dropping the molten mixture very slowly on the tip of a thin steel rod or "spindle." The coloring matter for ruby is chromium. This process builds up a "bole" which consists of a series of concentric layers of the fused material and which assumes a pear shape. When the desired size is attained the bole is cooled and carefully split to free it from the spindle. The halves are then ready for cutting and polishing.

The artificial gems have the same chemical composition and the same physical and optical properties as the natural stones. They are not imitation any more than the ice you make in your refrigerator is imitation ice. They can be distinguished from the natural because, under a strong glass, the different layers of alumina that built up the bole will show up, but it requires an expert to detect them.

Artificial, or "cultured," pearls are made by duplicating Nature's process. A grain of sand is introduced into an oyster and the oyster secretes a fluid which builds around the irritant and then hardens into a pearl.

Although diamonds have been manufactured quite recently it is only for industrial use and not as gems, so they were not discussed other than to say that their manufacture involves subjecting "carbonaceous matter" to a pressure up to 2,700,000 pounds psi and a temperature of 5000° F.

PYRITE. Leo Simon, January 24, 1957.

Pyrite, one of the most useful minerals, has a composition  $\text{FeS}_2$ , H 6.0 - 6.5, G. 5. It crystallizes in the isometric system. The most common form is the cube. It is often found as nodules or concretions.

Commercially, pyrite is valuable as an ore of sulphur and frequently is associated with gold and copper.

Several unusual specimens were passed around. There were some with perfect cubes and very marked striations, a characteristic of the mineral. One specimen was of dark purple with an adamantine luster that made it look like a gem stone, one concretion showing definite bedding and one with pronounced radiated structure.

Following Leo's talk the discussion turned to the bird census, which is taken each December, and he gave us some information on that. His team covered the area from 82nd Avenue to the river and from Steele Street to the vicinity of Oswego. Due perhaps to the cold weather, only 48 species were observed in this area, somewhat fewer than in previous years. As an instance he stated that at one place only 100 ducks were noted where normally they would be reported in the thousands. No starlings at all were observed in this area. In the report of all of the teams later, 83 species were observed in the Portland area.

L.A.P.

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Mt. Tabor Presbyterian Church - S.E. 55th and Belmont - 6:30 p.m. Tickets: \$2.25.

# GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE



*March 1957*

PORTLAND, OREGON

## GEOLOGICAL NEWS-LETTER

Official Publication of the

Geological Society of the Oregon Country

703 Times Building, Portland 4, Oregon

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# GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

## Officers of the Executive Board, 1956 - 1957

			<u>Zone</u>	<u>Phone</u>
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Vice Pres:	Dr. Ruth E. Hopson	4138 S.W. 4th Avenue	1	CA 2-1430
Secretary:	Mrs. Leo F. Simon	7006 S.E. 21st Avenue	2	BE 6-0549
Treasurer:	Mr. Robert F. Wilbur	2020 S.E. Salmon Street	15	BE 5-7284

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 Mr. Leroy A. Palmer (1958) Mr. William F. Clark (1958) Dr. James Stauffer (1959)

### Staff of Geological News Letter

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Library Ed:	Dr. James Stauffer	717 - 8th Street, Oswego, Oregon		BI 1-3825
Business Mgr:	Mr. Edward A. Kelham	14018 S.E. Linden Lane	22	OL 4-2196

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Field Trip:	Mr. Rudolph Erickson	Research:	Mr. Rudolph Erickson
Luncheon:	Mr. Leo Simon	Service:	Miss Margaret L. Steere
Library:	Dr. James Stauffer	Museum:	Mr. Alonzo W. Hancock
Membership:	Mrs. Ruth Harrison	Public Relations:	Mr. Clarence D. Phillips
Publicity:	Mr. H. Bruce Schminky	Historian:	Miss Ada Henley

### Society Objectives

To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country; the establishment and maintenance of a library and museum of geological works, maps, and specimens; the encouragement of geological study among amateurs; the support and promotion of geologic investigation in the Oregon Country; the designation, preservation, and interpretation of important geological features of the Oregon Country; the development of the mental capacities of its members in the study of geology; and the promotion of better acquaintance and closer association among those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mrs. Ruth Harrison, 1879 S.W. 10th Avenue, Phone CA 3-0255. Regular annual dues (single or family memberships) are \$5 for residents of Multnomah and adjacent counties; \$2.50 for others; and \$2 for Junior Members. Make remittances payable to the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.

### Society Activities

(See "Calendar of the Month")

Evening Meetings: Formal lectures or informal round-table discussions on geological subjects, on the second and fourth Fridays of each month at Public Library Hall, S.W. 10th Ave. and Yamhill.

Field Trips: Usually one field trip is scheduled for each month.

Library Night: Once a month. Lewis and Clark College.

Luncheons: Informal luncheons, with geological motif, each Thursday noon in Room B, Chamber of Commerce Building, S.W. 5th Avenue and Taylor Street. \$1.00 per plate.

Publication: The Geological News Letter, issued once each month, is the official publication.

CALENDAR

Buffet luncheon every Thursday noon at the Portland Chamber of Commerce, 824 S.W. Fifth Avenue, second floor. One dollar.

Friday  
Mar. 8 ANNUAL BANQUET.

Tuesday  
Mar. 19 LIBRARY NIGHT. 7:30 p.m. in the Biology Building, Lewis and Clark College. Continuation of the study of the Oregon Coast Ranges. Mr. Paul Howell of the U.S. Army Engineers will discuss the physiography of western Oregon. The talk will be preceded by library browsing and followed by refreshments and discussion.

Friday  
Mar. 22 Room B, Public Library, 7:30 p.m.  
Dr. Irwin Lange, Professor of General Science, Portland State College, will talk on "Dr. John Evans, U.S. Geologist in the Washington and Oregon Territories." This talk on one of our pioneer geologists should be very interesting. This is the program scheduled for February 22 which was canceled on account of the storm.

A Board of Directors Meeting will be held after the lecture.

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DUES ARE DUE

Dues are payable March 1, 1957. Please send remittance to our new secretary, Miss Rose Hamilton, 5412 S.E. Powell Blvd., Portland 6.

\*\*\*\*\*

NEW MEMBERS - GSOC  
Since January 1, 1957

		<u>Zone</u>	<u>Phone</u>
Hughes, Miss Margaret E.	1070 S.W. Gaines Street	1	CA 8-2928
Johnston, Mr. and Mrs. James H.	2418 N.E. 8th Avenue	12	AT 1-9504
Marsh, Mr. and Mrs. Howard C.	7029 S.E. 85th Avenue	66	PR 4-0107
McLean, Miss Jill	3106 S.W. 10th Avenue, Apt. 23	1	CA 8-3639
Merryman, Mr. Frank J.	1624 N.W. Everett Street	9	
Orem, Mr. and Mrs. Hollis M.	434 N.E. Mirimar Place	15	BE 4-2650
Perley, Miss Anne	1068 S.W. Gaines Street	1	CA 3-6833
Prentiss, Mrs. Ruth Eliot	1923 N.E. Schuyler Street	12	AT 1-0341
Scharpf, Mrs. Dorothy E.	7655 S.E. 17th Avenue	2	BE 6-3623
Wagner, Miss Marie K.	1088 S.W. Gaines Street	1	CA 2-3493

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DUES ARE DUE

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## JOHN P. WALSTED

We were greatly grieved to learn of the death on January 26 of Dr. John P. Walsted, one of our valued members. Grieved, but not surprised, as most of us knew of the valiant fight he had been making through the recent years.

He was not yet 60 and in the prime of his mental powers and accomplishments. After graduation from the Portland schools he went on to Oregon State College, where he received his bachelor's degree in 1921, then an MS at the University of Illinois, and a DSc at Massachusetts Institute of Technology in 1929, at which institution he taught for 6 years. From 1927 to 1941 he served as metallurgist for the U.S. Army at Whitinville, Mass., and as chief metallurgist at the Watertown arsenal. He was a veteran of both World Wars, attaining the rank of major. He served, all told, 39 years in the army until his retirement from the reserves in 1954. Interment was at Arlington National Cemetery.

We knew him best for his research at the U.S. Bureau of Mines Experiment Station at Albany. Here he did outstanding work on zirconium, chromium, and copper and nickel ores but his most important work, and of greatest interest to him, was on the Oregon iron ores, such as those at Scappoose. His very thorough work on these demonstrated that these difficult ores can be processed so as to be made into useful products.

We admired John Walsted, the scientist, but we loved John Walsted, the man, for his character, his courage, his good humor. He was interested in the society and was ever ready to do his part, in furthering its interests. We shall miss him.

\* \* \* \* \*

## MRS. FLORENCE TEETERS

It is with regret that we note the passing, on January 27, of Mrs. Florence Teeters, mother of our charter member, Miss Glenna Teeters. The sympathy of the society is extended to Miss Teeters in the loss of one dear to her.

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FROM THE EDITOR  
A WORTHY SENTIMENT:

We quote from the letter of transmittal that accompanied a recent contribution to the News Letter:

"My reason for submitting this is to be willing to give to the society something in return for what I constantly receive from it. This is my way of demonstrating my appreciation."

As this is the last News Letter that your present editor will get out he would like to pass this sentiment on to all of our members for the benefit of his successor. All of us get a great deal from our society. Are we supporting it in actions as well as in thought or are we reaping where we have not sowed?

A good article for our magazine is not too much trouble and, no matter how accustomed one may become to it, he always gets a thrill out of seeing something that he has created in print.

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## SAND COLLECTING FOR FUN

By  
Edward A. Kelham

This is a story of sand collecting by a strictly amateur geologist with no knowledge of mineralogy other than that gained by reading a few textbooks of general geology and by associating with other geologists, amateur and otherwise.

I started my collection of sand a few years ago because I did not have the room to house properly and display a general geological collection. My collecting started with only four samples of sand gathered from creek beds and sand dunes on a trip down the coast and has now grown to several dozen specimens, a number of which were sent to me from Europe and from islands in the Pacific by some of my globe-trotting friends who knew of my interest in the subject.

At first I kept my sand on most any handy shelf around the house but when we moved to a three-room apartment a few months ago I found it necessary to make a different arrangement so I built a cabinet 18 by 34 inches by 3 inches deep, in which to house and display my sand and I find it very satisfactory.

Let us take a look now inside the cabinet. We see shelves, each containing a row of glass bottles with straight sides and metal caps. They originally came from the grocery and contained an ounce or two of olives or cherries. Each bears a typed label with a number and a brief description of the sand it contains.

Let us pick a specimen at random and examine it. The label says, "#29; Dune sand; Columbia River near Celilo." I gathered this specimen a mile or so east of Celilo where the wind had picked up the sand from the river bed during a spell of low water and piled it in a dune at the side of the highway.

Peering at it through a hand lens we see that it seems to be mostly quartz with numerous flakes of mica visible. We see that the grains are quite uniform in size, very sharp and irregular in shape, not rounded. The latter is characteristic of river sand and the uniform size is due to sorting by the wind.

The next one we pick up is #22, the label says, "From Lake Tahoe." It is nearly black in color and very heavy. Testing with a magnet shows it to be fully 95 percent magnetic. This, together with the dark color and the unusual weight, identifies it as magnetite, a form of iron. A geological friend of mine gathered a supply on the shores of that famous lake and shared it with me. The next specimen is white, looking like so much salt or sugar. The grains are pure gypsum crystals and it came from White Sands National Monument in New Mexico. Here is another specimen of coarse, light-colored material that came from a beach on the island of Guam. It is composed almost entirely of the shells and skeletons of sea creatures pulverized by wave action; an organic sand.

Most of my specimens I gathered myself from rivers, creeks, and beaches in the three western states. I always carry several small tin cans in the trunk of my car; tobacco cans are the best but a band-aid can serves nicely though apt to leak. When you take a sample of sand, always put a penciled note in it telling where you got it; if you have more than one sample you may forget by the time you get home.

In preparing a specimen for examination and display it should first be carefully washed to remove dirt, weed seeds, and other foreign matter. If caked or lumpy upon drying, it may be put through a fine mesh sieve (a tea strainer is about right). You will need a hand lens, 10 power at least, a small magnet, and a small bottle of hydrochloric acid.

After assigning a serial or catalog number to your specimen it is interesting to note pertinent facts such as size, shape, uniformity, etc. Use your magnet to test for magnetite. Put a little sand on a saucer and apply a drop or two of hydrochloric acid to test for lime. Few western sands carry any but I have a specimen from Death Valley that fizzes beautifully.

After studying your specimens you will discover some interesting facts: Ocean sand, having been rolled and pounded by the waves for aeons of time, is usually found to be quite smooth and well rounded, some of the grains being so perfectly spherical and so highly polished that they look like tiny glass marbles. Also it will usually be mostly quartz because it is one of the hardest and least soluble of minerals, and it has outlasted the other minerals that were associated with it in the original rock.

Windblown sand will be well sorted as to size, may be well rounded, and individual grains may have a frosted appearance. River and creek sand is generally very irregular in size and shape; that from small streams in the mountains, extremely so.

But why should I tell you any more? Start your own collection and search out your own facts. It's more fun!

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#### WORK ON MUSEUM STARTED

February 18 was noteworthy, as on that day 400 friends of the Oregon Museum of Science and Industry attended a Chamber of Commerce luncheon at the Multnomah Hotel to celebrate groundbreaking for construction of the new museum building. There were many distinguished guests, including Governor Holmes, Mayor Schrunk, the President of the Senate, Speaker of the House, members of the Legislature, and the City Council.

The principal speaker was Dr. Lee Farr, medical director of Brookhaven National Laboratory, an international authority in atomic research, especially with respect to medicine. Dr. Farr emphasized the cultural effect that such a museum would have on the community and "to have the asset of a cultural center may be the most valuable asset of all." The atomic age offers a challenge and such a center will afford to all, youths and adults alike, where such challenges can be discussed and worked out.

The audience viewed by television the actual digging by a power shovel in the start of the excavation and a messenger brought in a box of the first dirt dug up, but no one knew what to do with it.

Our society was represented at the luncheon and has contributed financially, both as a society and by the members personally. It is hoped that we may play an active part in bringing this important project to completion.

L.A.P.

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#### BACKBONE

"It causes one to stop and ponder on the mysterious ways of Nature that in oceans filled with voracious and often gigantic crustaceans, a tiny soft-bodied, almost helpless little fish, lacking fins, eyes, brains, and even blood, should have been destined to be the progenitor of the countless forms of vertebrates that rule the land and sea today. And all because the little chap had a backbone. We utter a real truism when in our expressive slang we refer to someone as 'having plenty of backbone'."

(From The Strange Story of Our Earth, by A. Hyatt Verrill.)

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#### DUES ARE DUE



GEOLOGY UNDER OUR EYES - AND FEET

By

T. Herbert Laurence

Ordinarily landslides are considered as too prosaic to be interesting. Nevertheless, they are a recent part of the geology in the Portland area. During the winter of 1955-56, when there was an exceptionally heavy rainfall, numerous slides occurred along Rocking Chair Creek and Leif Erickson Drive. These areas are located in the northwestern part of Multnomah County and the City of Portland. The region is usually referred to as Forest Park or Forest Hills. Leif Erickson Drive is the road that bisects this park lengthwise at an elevation of about 500 feet above the Willamette River. Until recently, when the Multnomah County Road Department restored it to limited vehicular use, it was unused for several years and was slowly disappearing into oblivion.

Masses of earth and rock slid onto this road from a steep adjoining ridge. A topographic map indicates that the highest elevation of this ridge is 1091 feet above sea level, but averages about 950 feet. The map also shows that it is a continuation of the Portland west hills, which were studied in a field trip by the Society on March 25, 1956. We were given to understand, at that time, that these hills are a northwest-southeast trending anticline with a core of Columbia River basalt and a mantle of silt, sand, and gravel that contains some clay. However, in many places the softer sediments have been entirely eroded away. This combination of a hard underlying rock covered by soft materials is an ideal one for landslides. The abundant rainwater, mentioned above, seeped through the soft silt and sand till it reached the clay resting on the basalt. When it became saturated, it became very slippery, and the slides were the consequence. The reason for the clay being next to the basalt is explained by Ira A. Williams as the result of the weathering of the top portion of the basalt. The deposition of the gravels, sand, and silt at a later time protected it from erosion.

Although the masses of slide debris have been removed from the road, their scars on the bare rock are still present on the eastern limb of the anticline. The scars, along with the ravelings, furnish a good study of this phase of erosion clearly indicating how the removal of cover strata exposes the underlying rock. Although the basalt is a hard igneous rock, it contains fractures and crevices caused by cooling and later folding. When rainwater freezes in these cracks, as it did only a few days ago, it causes them to become larger and larger eventually breaking the rock into smaller pieces, which fall by gravity to lower elevations. Thus it is seen how erosion sculptures odd and unique land forms. These features are in abundance in this region as well as many other interesting geological features, such as spheroidal weathering, laterization, and the occurrence of red and yellow ochers.

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LUNCHEON TALKS

LIMESTONE - Fay W. Libbey, February 14, 1957.

Production of limestone in Oregon has shown a great increase in the past 20 years. In 1935 the output was 20,000 tons at an average price of \$2.45 per ton. By 1955 the output had increased to 1,200,000 tons at an average price of \$1.85, 60 times in tonnage and 45 times in value. The price relations over the 20 years seem to present a paradox. With the greatly increased demand, why did the cost go down 25 percent, especially as during the same time Portland cement, the principal product, increased in price more than 300 percent, from \$1.35 to \$6.10 per hundredweight? This question was the matter of some discussion with no one offering a conclusive explanation.

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LIBRARY NIGHT  
February 19, 1957

After the usual library browse and the bull sessions that go along with it, the group assembled in the lecture room of the biology building of Lewis and Clark College for a discussion of the geology of the Coast Range physiographic province.

Dr. Stauffer had prepared us by posting on the wall seven maps which illustrated the topography and areal geology of the region under consideration, which extends the entire length of the Oregon Coast. He also distributed a table correlating the Cenozoic formations as they appeared on the different maps.

Dr. Stauffer's talk itself was purposely brief but gave us a concise history of the development of the province; from the submarine eruptions of the Eocene, the warping of which created a long peninsula extending southward along the coast of what is now Washington and Oregon, but leaving a sea many miles wide between it and the then mainland, then through the great outpouring, in the Miocene, of the Columbia River basalts and on into the surficial deposits of recent epochs.

Following the talk we saw a film illustrating graphically many of the features that had been described to us and then Rudolph Erickson illustrated by film some of his geological ramblings in the Coast Range, which brought out many interesting features of the geology and topography. The showing of the films was followed by a discussion which demonstrated the interest of the group in the subject. As announced in the calendar our next library night, on March 19, will continue our study of the Coast Ranges. Mr. Paul Howell, geologist with the Army Engineer Corps, will talk on the physiography of Western Oregon.

L.A.P.

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MEMBERS AND FRIENDS OF GSOC

Ralph Mason, mining engineer in the Oregon Department of Geology and Mineral Industries, and a good friend of our society, has been elected president of the Oregon Technical Council, an organization of delegates chosen from various engineering and architectural societies of the state to promote the well being and the ethics of the professions. Mr. Mason gave a talk on the council at our luncheon meeting on May 24. He was also in the public eye on January 29 when he appeared on television, KGW-TV, Channel 8, with a very interesting talk on the geology of the Oregon coast.

February Geo-Times, monthly publication of the American Geological Institute, carries a review of Bulletin No. 36 of the New Mexico Bureau of Mines, "Mineral Resources of Fort Defiance and Tohatchi Quadrangles, Arizona and New Mexico," by Dr. John Eliot Allen and the late Robert Balk. Aside from other favorable comments the review mentions four features which tend to make the bulletin more interesting and understandable to nontechnical readers and suggests that such practice be followed in all such reports.

Dr. Allen has also been honored by election as national treasurer of the American Association of Geology Teachers.

L.A.P.

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DUES ARE DUE

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## YOSEMITE

Public Library, January 25, 1957

Our meeting on January 25 was cosponsored by the Public Library and our society, the first of a series under like auspices that we expect to present. It was most interesting as it presented by film one of the most spectacular and scenic areas to be found in the world, Yosemite.

First we saw the valley as it appears today. En route were the Big Trees; Wawona Tree, traversed by a 26-foot tunnel through which a car can be driven and a section from another which commenced its growth in 925 A.D. (on this section was indicated the growth that the tree had attained at the time of certain great historical events: Battle of Hastings, Magna Charta, Discovery of America, Revolutionary War, American Civil War); and in the valley proper were El Capitan, Half Dome, Lookout Point, and the many scenic wonders familiar to most of us, by picture at least.

The second part of the film showed graphically the geologic development of the valley and all of us wondered at the marvelous technique by which those events of millions of years ago are presented so realistically to us today.

Aeons ago, in pre-Carboniferous time, the area now occupied by the Sierra Nevada was an arm of the Pacific Ocean in which sediments accumulated to a depth of thousands of feet. Then, in the Permian, there was an uplift that formed a mountain range which was followed by erosion and further deposition and in late Jurassic was a second uplift accompanied by the intrusion of the great granodiorite batholith of the Sierra Nevada.

Throughout the Cretaceous these mountains underwent extensive degradation so that at the beginning of the Tertiary the region was one of moderate relief with the sediments largely removed and the granites predominating. For a long period during the Tertiary there was a gradual uplifting which raised the summit to approximately 7000 feet and gave the range a pronounced westerly slope. As this tilting progressed, the drainage, which had been northerly, shifted to westerly and the Merced River was born. This stream did most of the early cutting of the valley and there is evidence of three such stages, corresponding to the different uplifts of the range.

First was a stage in which the river meandered slowly through a broad and shallow valley with the tributary streams entering it at grade. At this time El Capitan was a rounded hill about 900 feet above the river. With the first tilting the velocity of the river was accelerated and it cut a deeper and narrower canyon, a typical mountain valley, to a depth of 1600 feet below El Capitan. As the tributary streams flowed at right angles to the slope of the range their grade was less than that of the river. They did not erode their bottoms as rapidly and their confluence with the river was effected by a series of cascades tumbling down the walls of the canyon. This brings us to the end of the Pliocene.

The early Pleistocene, the beginning of the Ice Age, brought the third era of river cutting. Further uplift had brought the summit of the range to its present height, approximately 14,000 feet, and the river became a torrent. The canyon was narrowed and deepened until El Capitan stood 2400 feet above the river and the suspended valleys came into being, the tributary streams dropping to the river in high waterfalls.

During the Ice Age the snows fell on the summit of the range faster than they melted so that great fields of compacted snow accumulated and glaciers were formed. These glaciers descended the main valley until they reached an elevation of about 2000 feet above sea level, where the temperature moderated sufficiently to check their advance. The valley was occupied by a huge trunk glacier, formed at its head by the junction of the two principal tributaries.

The evidence is that glaciers invaded the valley at least three times and, at their height, filled it and extended below present El Portal, the lower entrance. The last glacier, which occurred toward the end of the Ice Age, was smaller than the first two but, at that, filled the valley to about one-third of its depth. Most of the evidence of glaciation today is from this last glacier. A number of moraines in the lower end of the valley mark the recession stages of this last invasion and one of them accounts for the level valley floor. This moraine, appearing now as a high ridge, acted as a dam to impound the water of the melting ice and created pre-historic "Lake Yosemite." We do not know how long this lake was but seismographic tests show the bedrock to be in excess of 1000 feet below the surface at the deepest point. Eventually the lake filled with sediment and the river breached its morainic dam, draining the lake and leaving the valley floor as we see it today.

Following the film Rudolph Erickson gave a talk on the controversy over the origin of the valley between Josiah D. Whitney, State Geologist of California, and John Muir, then a young man not long out of college but later to become one of America's great naturalists.

The valley was discovered in 1855 and Whitney commenced his study of it in 1860. In 1865 he published his conclusion that it was a graben, a block of the earth's crust that had been downfaulted. Muir came to California three years later, at the age of 30, and went, shortly after his arrival, to Yosemite where he got a job as assistant to a sheepherder, which gave him an opportunity to earn his subsistence and study the country in which he was so greatly interested. From this study he reached the conclusion that the valley was of glacial origin.

Whitney was a man of distinct scientific achievements and he was incensed that a "sheepherder," as he contemptuously dubbed Muir, should challenge his conclusions. The controversy became quite heated at times and meantime several other theories were advanced, one being that the valley was caused by a tremendous earthquake which literally split the rocks asunder.

The matter became of sufficient public interest that finally the U.S. Geological Survey assigned two geologists, Francois E. Matthies and Frank E. Calkins, to a study of the subject and these two covered practically every foot of the region. The result is embodied in U.S. Geological Survey Professional Paper 160, on which the film we saw was based. The professional paper essentially confirms the glacial theory but one reading it might draw the conclusion that Muir did not give sufficient weight to the downcutting of the stream before the glaciers took over. At any rate, it puts the quietus on the graben and earthquake theories.

L.A.P.

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#### NEW MATERIAL DIAMOND-HARD

An entirely new material harder than any other substance ever made by man has been created and is expected to have far-reaching impact in industrial polishing and cutting operations, General Electric announced.

The material is a crystal hard enough to scratch a diamond, but where a diamond "burns up" at 1600 degrees the new creation, borazon, will stand 3500 degrees, it was said.

Dr. Robert H. Wentorf, a 30-year-old physical chemist from West Bend, Wisconsin, started with boron nitride, commonly called white graphite, and using pressures above 1,000,000 pounds per square inch and temperatures over 3000 degrees Fahrenheit, changed the crystals' structure from hexagonal to cubic, officials said.

"We believe borazon's resistance to oxidation will make possible superior methods of mounting stones in industrial tools and also may allow bits and wheels to be operated at higher speeds. . . ." (From the Oregonian, February 13, 1957.)

# GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE



*April 1957*

PORTLAND, OREGON

## GEOLOGICAL NEWS-LETTER

Official Publication of the

Geological Society of the Oregon Country

703 Times Building, Portland 4, Oregon

POSTMASTER: Return Postage Guaranteed

# GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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Luncheon:	Mr. Leo Simon	Service:	Miss Margaret L. Steere
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Membership:	Mrs. Ruth Harrison	Public Relations:	Mr. Clarence D. Phillips
Publicity:	Mr. H. Bruce Schminky	Historian:	Miss Ada Henley

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## Society Objectives

To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country; the establishment and maintenance of a library and museum of geological works, maps, and specimens; the encouragement of geological study among amateurs; the support and promotion of geologic investigation in the Oregon Country; the designation, preservation, and interpretation of important geological features of the Oregon Country; the development of the mental capacities of its members in the study of geology; and the promotion of better acquaintance and closer association among those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mrs. Ruth Harrison, 1879 S.W. 10th Avenue, Phone CA 3-0255. Regular annual dues (single or family memberships) are \$5 for residents of Multnomah and adjacent counties; \$2.50 for others; and \$2 for Junior Members. Make remittances payable to the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.

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## Society Activities (See "Calendar of the Month")

Evening Meetings: Formal lectures or informal round-table discussions on geological subjects, on the second and fourth Fridays of each month at Public Library Hall, S.W. 10th Ave. and Yamhill.

Field Trips: Usually one field trip is scheduled for each month.

Library Night: Once a month. Lewis and Clark College.

Luncheons: Informal luncheons, with geological motif, each Thursday noon in Room B, Chamber of Commerce Building, S.W. 5th Avenue and Taylor Street. \$1.00 per plate.

Publication: The Geological News Letter, issued once each month, is the official publication.

CALENDAR

Buffet luncheon every Thursday noon at the Portland Chamber of Commerce, 824 S.W. Fifth Avenue, second floor. One dollar.

Friday  
Apr.12 Room B, Public Library, 7:30 P.M.  
"An Amateur Geologist Flies the Lewis and Clark Trail." Dr. Arthur C. Jones.

Tuesday  
Apr. 16 Biology Building, Lewis and Clark College, 7:30 P.M.  
Round-table discussion of the geology of the northern end of the Willamette River, led by Dr. James Stauffer. The talk will be preceded by library browsing and followed by visiting and refreshments.

Friday  
Apr.26 Room B, Public Library, 7:30 P.M.  
"Geophysical History of the Coast Range." Dr. James Stauffer, Professor of Geology, Lewis and Clark College.

Sunday  
Apr.28 Field trip to Highland Buttes and vicinity, southwest of Oregon City. Meet at 9:00 A.M. at viewpoint on Highway 99E above Willamette Falls.  
Trip Leader: Dr. Gilchrist.

Friday  
May 10 Room B, Public Library, 7:30 P.M.  
"Minerals in Oregon's Future." Ralph S. Mason, Mining Engineer, State of Oregon Department of Geology and Mineral Industries.

Friday  
May 24 Room B, Public Library, 7:30 P.M.  
"Physiography of Western Oregon." Paul Howells, Geologist, U.S. Army Engineer Corps.

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DUES ARE DUE

DUES were due March 1, 1957, and become delinquent May 1, 1957. This will be the last News Letter if DUES are not received by the mailing date of the May News Letter. If any question please call Rose Hamilton, 5412 S.E. Powell Blvd., Portland 6, BE 6-8215.

\* \* \* \*

	NEW MEMBERS	Zone	Phone
Dahl, Mr. and Mrs. Arthur C.,	5853 S.W. Terwiliger Blvd.	1	CA 7-2878
Dole, Mr. and Mrs. Hollis M.,	2612 N.E. 23rd Avenue	12	AT 4-5994
Mason, Mr. and Mrs. Ralph S.,	8159 S.W. 41st Avenue	19	Ch 4-2106
Matthews, Mr. and Mrs. Thomas C.,	4014 N.E. Flanders Street	15	BE 6-6759
McKay, Mrs. T. H.,	3471 S.W. Patton Road	1	CA 3-6720
Stapleton, Mr. and Mrs. Chris.,	6426 S.E. Thiessen Road	22	OL 4-6323

Change of Address

Wilson, Mr. and Mrs. Ford E 1310 Bluff Road, Apt. 442 - 21, Anchorage, Alaska.

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MORE ABOUT DR. WALSTED

Since the March News Letter appeared we have received some further information regarding the interesting career of our late member, Dr. John P. Walsted. One feature, at least, will be of interest to our members, as it involves one of his greater, but little known, achievements.

In connection with his work for the degree of Doctor of Science from Massachusetts Institute of Technology he submitted a thesis, based on extensive research, on the case hardening of special steels by ammonium nitride.

During World War II, the Government made use of the Walsted formulas in the construction of tanks and it was found that these withstood the rigors of combat far better than those of the enemy, which they greatly outlasted. This was especially the case when they were called on to operate under the tough conditions of desert heat and sand which they encountered in such great struggles as that which raged across North Africa.

Those of us who had the pleasure of meeting with this modest good-humored man had no realization that it was his work that contributed much to the ultimate Allied victory.

L.A. P.

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NEW OFFICERS

As there were two vacant places on the Board of Directors these were filled at a board meeting March 22 by the election of Dr. John Eliot Allen and Franklin M. Brown to the vacancies. The appointment of Raymond L. Baldwin as editor of the News Letter was approved by the board.

The following will serve as committee chairmen during the ensuing year:

Mr. Albert J. Keen	Program
Mr. Leo F. Simon	Field Trip
Mr. Rudolph Erickson	Library
Mrs. Ruth Harrison	Membership
Mr. H. Bruce Schminky	Publicity
Mr. Murray R. Miller	Display
Mr. Rudolph Erickson	Research
Miss Margaret L. Steere	Service
Mr. Alonzo W. Hancock	Museum
Mr. Clarence D. Phillips	Public Relations
Mrs. William F. Clark	Historian

We feel that with the selection of the above officers and committee-men we have an outstanding group who will contribute materially to the success of the society during 1957.

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DR. FRANCIS G. GILCHRIST

Dr. Francis Gilchrist, Lewis and Clark college biology professor has been named by Mayor Schunk to a new ten-member committee to advise the parks bureau in development and maintenance of the Hoyt arboretum. (From "The Grapevine": First Church Spire, Feb. 14, 1957.)

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## OUR LIVING ALPINE GLACIERS

By

Howard J. Handewith, Jr.

Member Mazama Research Committee

Late in September 1956, a light single-engined plane took off from Hillsboro Airport and droned onward on its mission to the uppermost reaches of the Oregon-Washington Cascade Range. This plane was to circumnavigate the great summits of these mountains. The primary purpose of this flight was to bring up to date a photographic record of the glaciers as they existed in 1936 and 1938.\* As the plane darted in and out among the gigantic crevasses and ridges, at times close enough to see the footprints of climbers in the snow, it took picture after picture to make the coverage as complete as possible (Mason, 1956). This flight was only a small part of the vast undertakings of those concerned with International Geophysical Year (Anon., 1956).

One of the purposes of International Geophysical Year is to provide further information on the feasibility of the two following theories:

First, the recent theory in glaciology is that the ice ages of the past have always existed in approximately the same proportions (Pauly, 1952). In other words, the ice age has always existed and shall continue to exist in its maximum magnitude. To explain this theory it has been suggested that the earth, while rotating on its axis, has changed its polar locations: that is to say that the earth, being a sphere, would shift about and the poles would remain constant in relationship to the sun. If such is the case the great ice cap that existed over North America during the ice age is existing today in the same magnitude as always, and is presently located in the Arctic Ocean and in Greenland.

The second theory is in relation to the present understanding of the 11-year sun-spot cycle, and consequently the corresponding 11-year weather cycle (son, Ahlman, 1953). The present feeling is that the glaciers act just out of phase with this cycle and advance and recede in 11-year periods. However, the glaciers of Mount Hood have been retreating constantly for the last 75 years (Phillips, 1939). Assuming that the first theory is correct, it seems logical that any movement of this ice cap can be detected in advance by a sudden recession or rejuvenation of the Alpine glaciers forerunning the movement. The people concerned with International Geophysical Year are obtaining data from all over the world to test the feasibility of these theories.

A glacier is more than a pretty white snowfield trapped high upon a mountain. It is a living animal nourished on the raging blizzards of winter. It can devour an entire mountain. A glacier is an accumulation of ice in an area where the rate of precipitation (in snow) is surpassed by the amount of ablation or runoff. The snow is turned to ice under pressure, and a living glacial mass takes shape. Ice, being composed of water, will tend to act in the same manner as water and seek its own level. In a small mountain stream, the water will form cascades over rocks, it will break up in spray, and re-form in water for the next cascade. Glacial ice duplicates this process in slow motion, and thus crevasses, seracs, and other features of glaciers are formed. Pushing its gigantic snout, or terminus, down slope, it will tend to engulf, grind up, and completely digest all that may lie in its path. On the other hand, a retreating glacier may heave up great deposits of undigested debris to cover its withdrawal.

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\* Research Committee of the Mazamas, An Aerial Photographic Survey of the Glaciers of Mt. Hood, Mt. Jefferson, and the Three Sisters, Oregon, (Portland, Oregon, 1938).

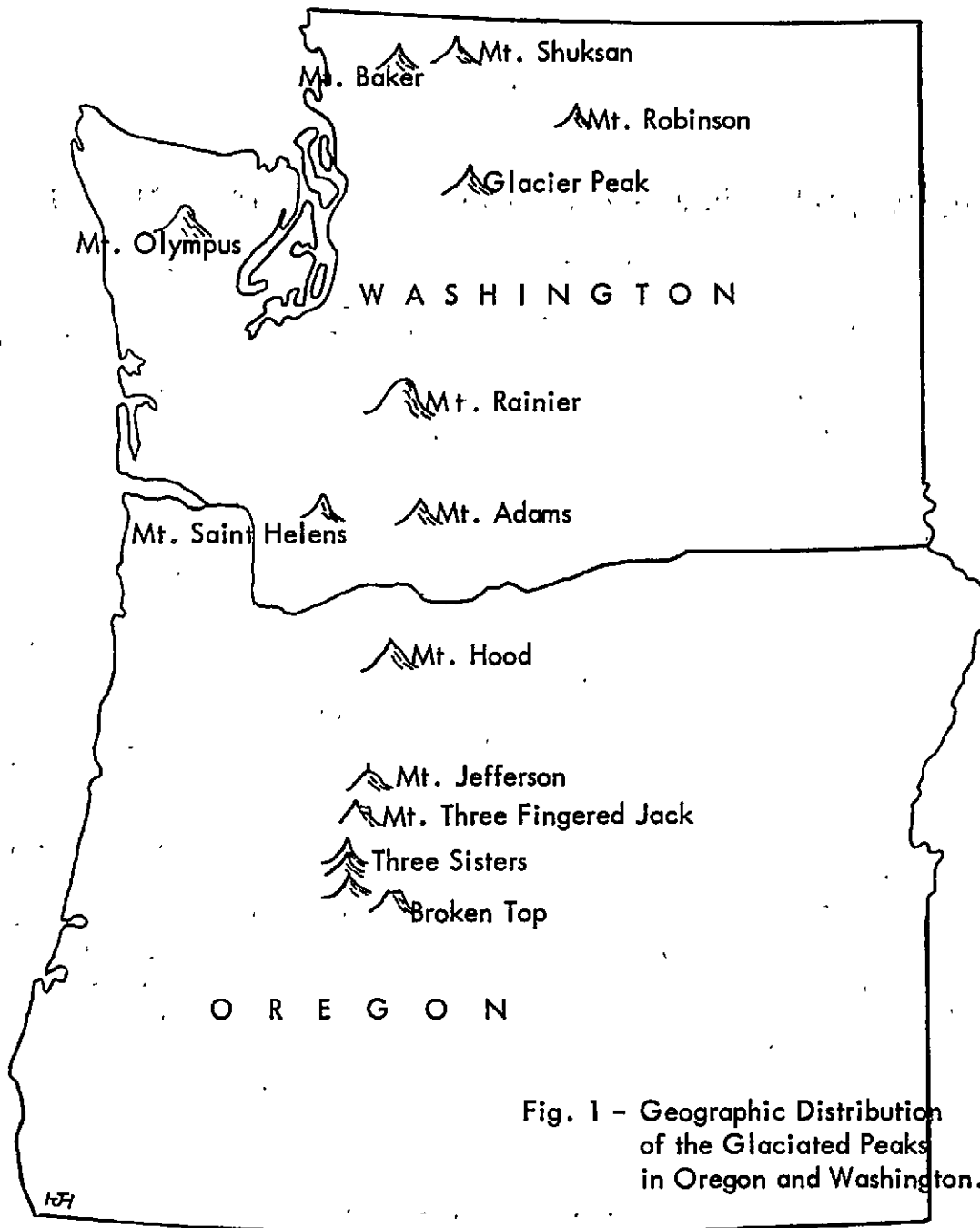


Fig. 1 - Geographic Distribution of the Glaciated Peaks in Oregon and Washington.

There are basically three types of glaciers (see Fig. 3 on p. 28): the Continental, the Piedmont or Valley, and the Alpine. The Continental glacier is, just as the name implies, a glacial ice cap covering an area of the earth's surface equivalent to the area of a continent. The Valley or Piedmont type glacier is a glacial mass formed in a V-shaped river valley which, as it progresses, devours all that lies before it, sculpturing a U-shaped profile. An Alpine glacier is formed high upon a mountain, in small valleys, on shallow sloping abutments, and in small cirques. This type of glacier is usually of limited extent (less than three miles across). Being a comparatively small body of ice and usually close at hand, it is a type usually more desirable to study.

The purpose of this paper is to explain the current studies on International Geophysical Year as they are being carried on in Oregon and Washington by the Research Committee of

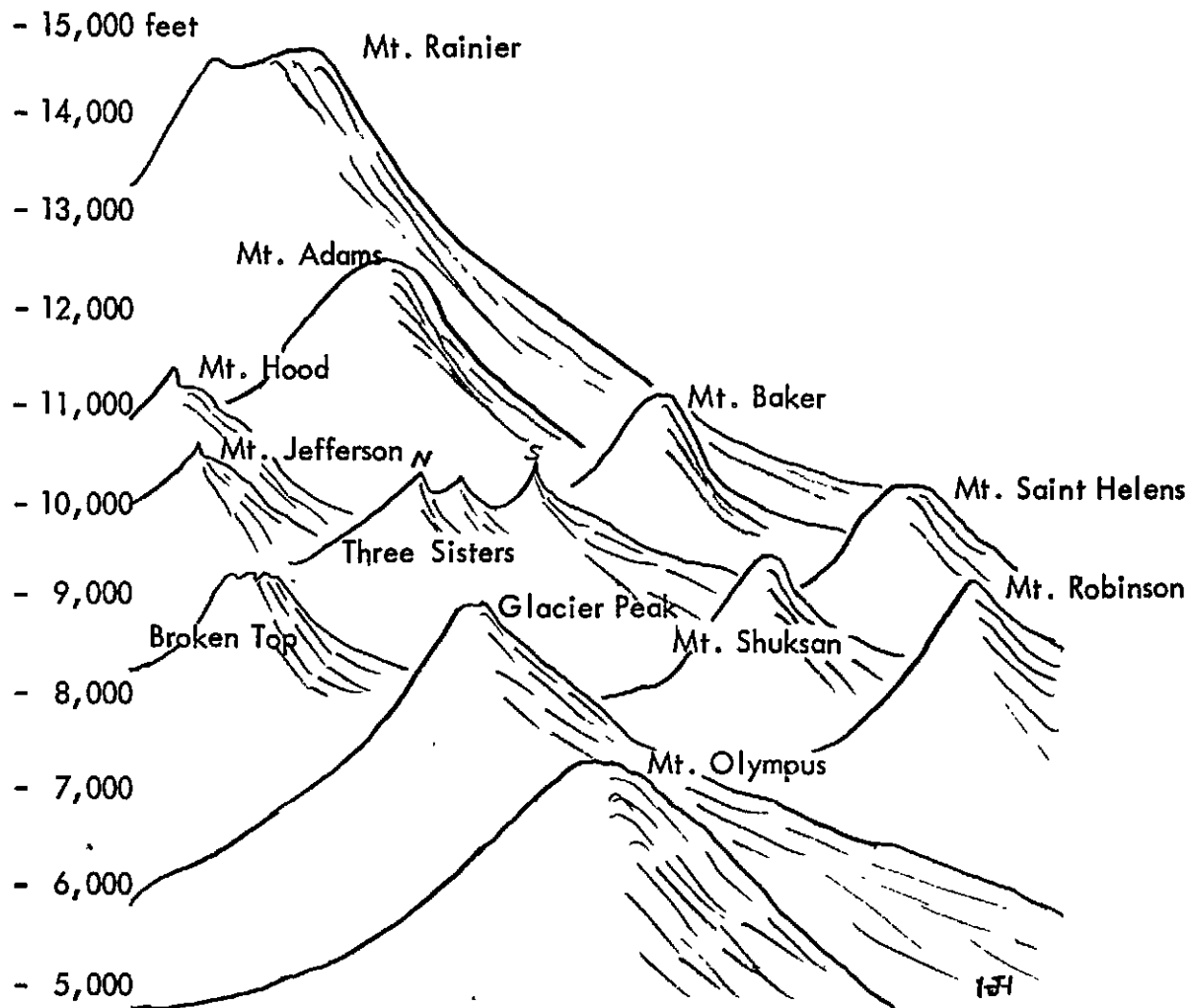


Fig. 2 - Comparative Elevations of the Glaciated Peaks in Oregon and Washington

the Mazama Alpine Club of Portland, Oregon. The previously mentioned airplane flight was one of the forerunning activities of the Mazamas, pertinent to International Geophysical Year. The same type of flight was made in the years 1936 and 1938 by the Mazamas.\* By comparing the aerial photographs of the earlier flights with those of the 1956 flights a quantitative conclusion can be drawn as to the status of our living Alpine Glaciers.

The study of glaciology in comparison with other sciences is a comparatively recent one. The first known and authoritative study of glaciers was undertaken by the Swiss professor Hugi in 1827 (Longwell, 1932). In this year he built an observation hut on the Aar glacier in the Swiss Alps. By 1841 the hut had moved 4,700 feet down glacier from the originating point, and professor Hugi had the first recorded indications of superficial glacial motion. In the year 1858, extensive studies were conducted on the Glacier des Bossons on Mount Blanc by another Swiss professor named Forbes (Vial, 1952). In 1820 a climbing party led by Doctor Hamel fell into the upper seracs on the Glacier des Bossons. Professor Forbes made the sensational prediction that the bodies of the party would appear on the snout about 1860. In 1861 the three bodies appeared, perfectly preserved, on the surface at the snout.

\* Research Committee, op. cit.

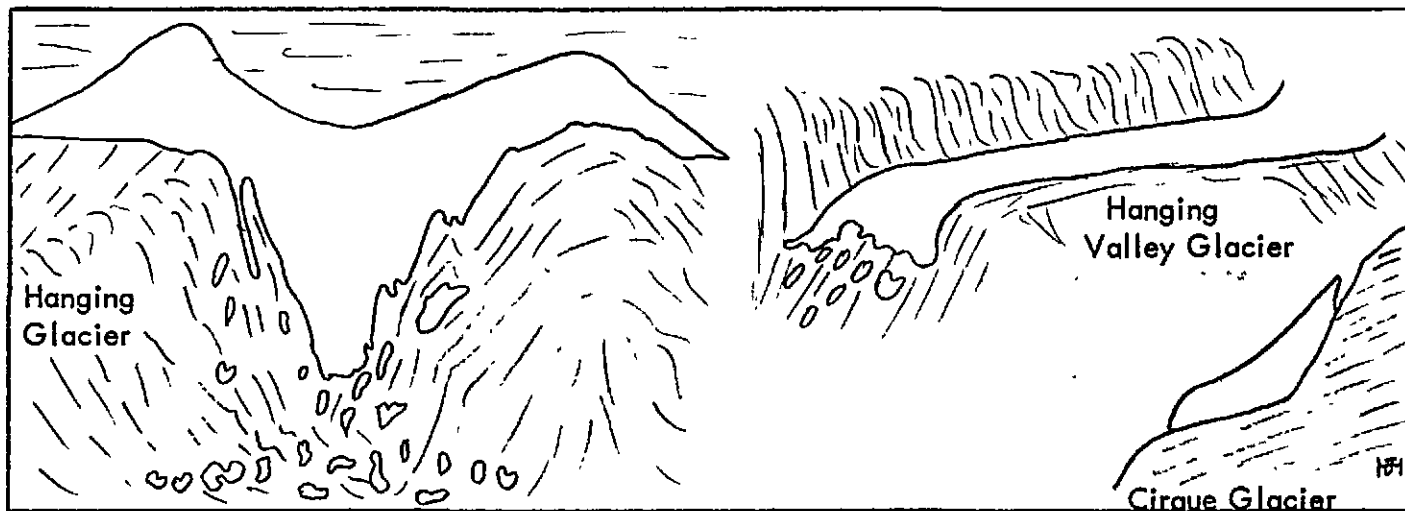


Fig. 3 - Types of Alpine Glaciers

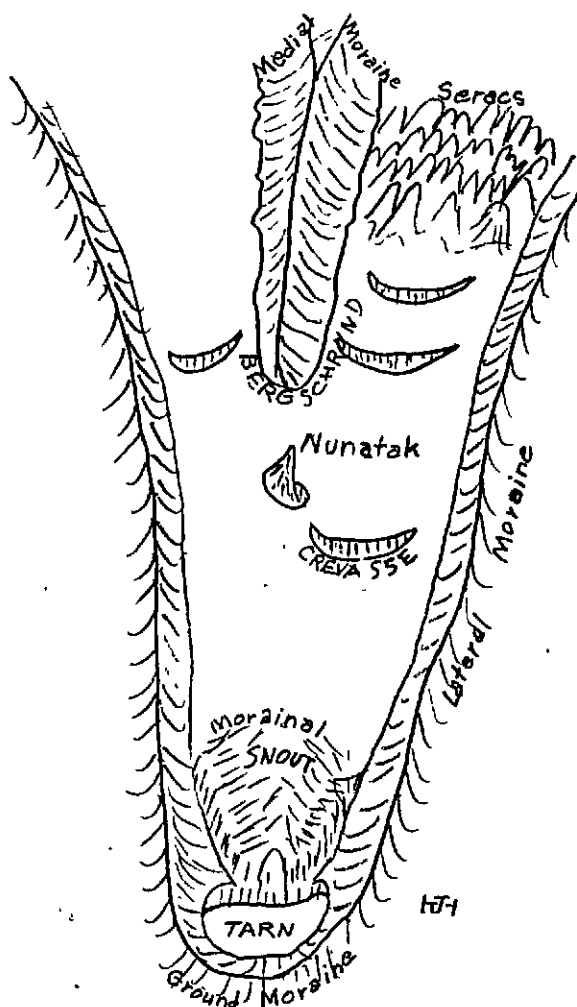


Fig. 4 - Terminology of an Alpine Glacier

In order to understand glacial functions one must have a slight knowledge of the anatomy and mechanics of a glacier (see Fig. 4 on this page). Glacial ice consists of many minute and complex crystals. It is developed by many years of accumulated snowfall. As the snow is compacted by succeeding years' snows, enormous pressure is exerted on the lowermost portions of the glacier. A glacier 1,000 feet thick would exert a pressure of approximately 486,000 pounds per square yard on its lower portions. With this tremendous pressure forcing down, the angle of repose can be overcome at which point glacial motion takes place. A glacier may be likened to an escalator wherein motion is more or less constantly exerted in a downward direction. It may recede at the snout at the same rate at which it moves downward. As a result of this process, gigantic amounts of wastage can be transported down the mountain and deposited in heaps at the snout. As Phillips (1939) so aptly stated:

"The net change in the position of the terminus of a glacier may be visualized as the algebraic sum of two factors:

- (1) The forward motion of the ice, which tends to advance the terminus, and
- (2) The loss by melting and evaporation which tends to cause it to recede."

Glacial ice is a crystalline solid. It can retain a firm grip on any rock and be shattered by almost any blow. It can also crack and crevass. In all, glacial ice is a weak solid. Unlike many other solids it retains a great deal of plasticity. It can be bent, provided it is not subject to a sudden blow. Once the glacier is formed, it possesses the characteristics of a mountain stream in slow motion. Its flow is fastest in the top center portion of the glacier. Friction dominates on either side and on the bottom, and motion is less apparent.

The study of glaciers involves many methods of obtaining both quantitative and qualitative data. Quantitative data, being most abundant, will be discussed first. Surprising results may be obtained through armchair research. There are many older books with photographs of glaciers as they existed at the time of publication. These pictures compared with those of today should be carefully examined to calculate the approximate altitude at which the firm limit existed then and now. When comparing these pictures, one finds it possible to locate the position of the snout both then and now and to determine whether or not these glaciers have advanced. Finally, rough indications can be estimated as to whether or not the glacier increased or decreased in volume. Qualitative data may only be obtained through precise instrumental measurements. If a glacier is to be studied instrumentally, certain factors must be found. The measurement of ablation and accumulation can be determined with the Mount Rose snow sampler. The Mount Rose sampler is an instrument designed to measure the specific gravity and depth of snow and ice encountered. About the first of April of each year, the total amount of accumulation of the glacier should be measured. In late September or early October all other measurements should be conducted. A subtraction in the total amount of accumulation from the amount of snow then present will determine the amount of ablation. When a theodolite is employed, large amounts of data may be obtained from year to year. With the use of the horizontal transit line, any increase or decrease in volume may be obtained. When the longitudinal or vertical transit line is set up through the center of the glacier from top to bottom, any forward or retreating motion may be quickly determined. The ideal but prohibitively expensive method of measuring a glacier is to make an accurate topographic map and revise it periodically. With this map the exact amount of volume and movement may be obtained.

A glacier is a reservoir of frozen water high on a mountain protected by the alpine air from the hottest days of summer. The water from this reservoir, while the glacier is melting, is of important economic value to the drainage area concerned. If this reservoir has a more or less constant supply of accumulation, it will soon reach its maximum capacity. The angle of repose can be overcome, a slippage plane is formed, and downward glacial action takes place. This motion, however, is not necessarily indicative of an advancing glacier. As the reservoir was depleted by the forward motion the terminus of the glacier advanced. When the reservoir is empty the terminus will recede for lack of downward pressure. During the time of recession, the reservoir continues to be replenished (son, Ahlman, 1953).

Recently, there has been much discussion as to whether or not the glaciers in Oregon and Washington are beginning a trend of rejuvenation. Qualitative surveys of the Coleman and Roosevelt glaciers on Mount Baker in northern Washington have shown recent advances of as much as 1,000 feet at the snout (Bengston, 1955). On Mount Rainier there has been a tremendous wave of ice, moving like a gigantic tidal wave, advancing headlong down the length of the Nisqually glacier (Harrison, 1956). These instances have been the first signs of advancing glaciers in Oregon and Washington. Conversely, the theory has been for the last 60 years that the Cascade Mountains were becoming rapidly bankrupt, glacially (Phillips, 1939). Extensive quantitative information exists on the Mount Hood area dating as far back as 1901. The Mazama Alpine Club has conducted an annual instrumental survey of the glaciers in that area for the past 35 years. In the last 5 years these surveys have shown no indications

of anything but a series of retreating glaciers (Mason, 1954). It is an established fact that two small glaciers have completely disappeared in Oregon during the last two-score years (Phillips, 1939). During the 13-year period, from 1930 to 1943, the Carbon Glacier on Mount Rainier receded 1,050 feet.\* The possibility of advancing and retreating glaciers of the same proximity is apparent. This is not, however, a widespread phenomena nor as yet is it understood (Nicholas and Miller, 1952).

It has been the intent of this paper to express to the layman an introduction to the studies, mechanics, and general functions of a glacier. The further intent of this paper is to present for discussion several existing and new theories in glaciology. There is an apparent controversy as to whether or not a trend has started toward advancing glaciers in the Northwest. The advances of the Coleman, Roosevelt, and Nisqually glaciers could be explained by the constant accumulation theory wherein the precipitation remains constant, or very nearly so, over a great number of years. Where a reservoir of ice is formed in the uppermost reaches of a glacier, pressure is exerted downward. This pressure builds up until the angle of repose is overcome, at which time an ice wave may start down the glacier, and the snout of the glacier will advance quite rapidly. The reservoir at the top, having been depleted, exerts no more downward pressure. Therefore, while the accumulation is still remaining more or less constant and with the pressure removed, the snout will decay and withdraw back up the mountain. As to whether or not these glaciers will start receding, as the cyclical theory indicates, remains to be found by the intensive studies of the many independent organizations partaking in the glaciological studies for International Geophysical Year.

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\* *Am. Geophysical Union Transactions*, p. 681, 1944.

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 son, Ahlman, H. W.; 1953, Glacier variations and climatic functions, Bowman Memorial Lecture Series III: Am. Geog. Soc., New York.  
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### FOSSILS LINK CONTINENTS

Fossils of an oddly shaped animal which lived 150,000,000 to 200,000,000 years ago cast doubt on the theory that a land bridge between Africa and South America existed at that time, say two University of California paleontologists.

The evidence indicates it was more likely that these animals moved from the old to the new world over a land connection between northern Eurasia and North America, they add.

This conclusion is the result of studies of a mammal-like creature called the dicynodont. They were made by Professor Charles L. Camp and Samuel P. Welles. They were published recently by the University of California Press.

Differences among species of the animal and the way these species were distributed in South America and Africa fail to support the land bridge idea, the investigators said.

Northern Link Indicated: But similarities among the species from Asia and North America as well as resemblances among various kinds of other northern animals give strength to the theory of a northern intercontinental link, the researchers reported.

The dicynodont varied in size from a chipmunk to a rhinoceros. He had two tusks for rooting vegetation from the earth and he chewed by moving his jaws forward and backward.

One species which lived in Arizona had long hind legs and short forelegs. His head pointed toward the ground as he walked. He looked something like a bulldozer, the scientists said. (From The Oregonian, January 28, 1957.)

While the theory of a land bridge between Asia and North America is generally accepted, see also what Ralph Mason says in "Only a Stone's Throw" (News Letter, May 1956, p. 48):

"Continental Drift. In 1910 Wegener proposed the startling theory that the land surface of the earth was originally in two supercontinents that broke up and drifted apart, eventually forming the land mass of the earth as we now know it. The classic example cited is the correspondence of the west coast of Africa with the east coast of South America and, in later study, weight has been added by the fact that there is such a close matching of the fossils and geological formations of the two continents as could hardly be accounted for otherwise."

L.A.P.

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### OATFIELD HILL

At our luncheon meeting on May 10th, 1956, Ed Kelham gave a talk on a prominent ridge on the east side of the Willamette River, about opposite the town of Oswego. After discussing the geology he stated that, as far as he could learn, no name had been given to this topographic feature and suggested that the society make an effort to have it officially designated "Oatfield Ridge," in honor of Michael Oatfield, pioneer settler of the locality.

As this was agreeable to those present, steps toward that end were taken and it turned out that our own Phil Brogan, as chairman of the Oregon Geographic Board, was the man to carry the ball on such a project.

March 6th we received a letter from Phil enclosing one from the U.S. Board of Geographic Names and a topographic map of the locality. The letter referred to the map and called attention to the fact that the high point of the ridge appears on the map as "Oatfield Hill."

As the desire was to honor the pioneer, Michael Oatfield, this has been accomplished and Mr. Kelham has taken it on himself to notify some of the residents of the locality who were interested in the naming.

L.A.P.

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### MEMBERS AND FRIENDS OF GSOC

The following appeared in the "B-Mike" column of The Oregonian of March 21:

"B. Mike: Saw headline: '460,000 Camp Fire Girls to Note 47th Birthday.' Happy birthday, old girls! From an 84-year-old. - O.E.S., Portland."

We wonder if this is the same O.E.S. whose initials were familiar to readers of the Geological News Letter, especially during the time that he was editor.

\* \* \* \*

The Division of Mines of the State of California has issued as Bulletin 173, "Minerals of California," which lists alphabetically, describes, and gives the localities where found, all the minerals of the state. The names of several GSOC members, and others who are well known to our membership, appear in the bibliography of source material used in this book. President Leroy A. Palmer leads with six articles quoted; John Eliot Allen has three; Gladys C. Randolph, T. P. Thayer, and Howel Williams each have two; Dr. H. C. Dake, R. F. Henley (brother of Ada Henley), James L. Kraft (of cheese and jade fame), and Lloyd W. Staples one each.

H.B. Schminky

\* \* \* \*

Dr. John Eliot Allen has been notified that he has been elected to membership in the American Association of Economic Geologists. As AAEG represents the elite of the geological profession we congratulate Dr. Allen and confess to a feeling of pride that one of our members has been so chosen. If all of the honors that the worthy doctor has accumulated were translated into medals and he were to hang them on his chest we fear that he would develop a "strong list to port."

\* \* \* \*

### BOY SCOUTS

How many of our members have sons who are Boy Scouts or who are of Boy Scout age?

The National Council of the Boy Scouts of America has designated October 1957 as "Geology Month." A program is being prepared and will be announced later. It will include both indoor study and field trips. Word has gone out that it is desired to enlist the aid of geologists in carrying out this program. We do not need to put in a plug for the Boy Scouts. Next to the churches it is undoubtedly the greatest character building organization in the country. Keep this in mind and think up some way in which you can help to make this program a success. You will hear more about it later.

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# GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE



*May 1957*

PORTLAND, OREGON

## GEOLOGICAL NEWS-LETTER

Official Publication of the

Geological Society of the Oregon Country

1209 S.W. 6th Avenue, Portland 4, Oregon

POSTMASTER: Return Postage Guaranteed

# G E O L O G I C A L S O C I E T Y O F T H E O R E G O N C O U N T R Y

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	1957 - 1958			
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Vice Pres:	Dr. James Stauffer	717 - 8th Street, Oswego		BL 1-3825
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	Mr. Franklin M. Brown (1958)	Dr. Francis G. Gilchrist (1959)		
	Dr. Ruth E. Hopson (1960)			

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## Staff of Geological News Letter

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Business Mgr:	Mr. Edward A. Kelham	1210 S.W. Park Ave. Apt 302	1	CA 3-5875

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## Committee Chairmen

Program:	Mr. Albert J. Keen	Display:	Mr. Murray R. Miller
Field Trip:	Mr. Leo F. Simon	Research:	Mr. Rudolph Erickson
Library:	Mr. Rudolph Erickson	Service:	Miss Margaret L. Steere
Membership:	Mrs. Ruth Harrison	Museum:	Mr. Alonzo W. Hancock
Publicity:	Mr. H. Bruce Schminky	Public Relations:	Mr. Clarence D. Phillips
		Historian:	Mrs. William F. Clark

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## Society Objectives

To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country; the establishment and maintenance of a library and museum of geological works, maps, and specimens; the encouragement of geological study among amateurs; the support and promotion of geologic investigation in the Oregon Country; the designation, preservation, and interpretation of important geological features of the Oregon Country; the development of the mental capacities of its members in the study of geology; and the promotion of better acquaintance and closer association among those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mrs. Ruth Harrison, 1879 S.W. 10th Avenue, Phone CA 3-0255. Regular annual dues (single or family memberships) are \$5 for residents of Multnomah and adjacent counties; \$2.50 for others; and \$2 for Junior Members. Make remittances payable to the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.

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## Society Activities

(See "Calendar of the Month")

Evening Meetings: Formal lectures or informal round-table discussions on geological subjects, on the second and fourth Fridays of each month at Public Library Hall, S.W. 10th Avenue and Yamhill.

Field Trips: Usually one field trip is scheduled for each month.

Library Night: Once a month. Lewis and Clark College.

Luncheons: Informal luncheons, with geological motif, each Thursday noon in Room B, Chamber of Commerce Building, S.W. 5th Ave. and Taylor St. \$1.00 per plate.

Publication: The Geological News Letter, issued once each month, is the official publication.

## CALENDAR

Buffet luncheon every Thursday noon at the Portland Chamber of Commerce, 824 S.W. Fifth Avenue, second floor. One dollar.

Friday  
May 10 Room B, Public Library, 7:30 P.M.  
"Minerals in Oregon's Future?" Ralph S. Mason, Mining Engineer, State of Oregon Department of Geology and Mineral Industries.

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Tuesday  
May 21 Lewis & Clark College, 6:00 P.M.  
A Basket Picnic. Bring your own lunch to picnic area, near the swimming pool. Coffee and cream will be provided, and there will be a fire for those wishing to cook. If weather is unfavorable we may eat in the near by Geology Laboratory.

Library, 7:30 to 10:00, same place, same evening.  
Browsing. Discussion, demonstrations and special features.

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Sunday  
May 26 Field Trip. Leave Fred Meyer Burlingame Store Parking area at 9:00 A.M. We will cross Chehalem Mountain fault block to Newberg. Lunch in Bald Peak State Park. Bring drinking water as none is available. Afternoon visit to Gaston and Scroggins Creek marine fossil area. Return by Forest Grove. Time permitting at Verboort, visit Big Tree Lane, 17 California Big Trees.  
Approximately 100 miles.  
Dr. James Stauffer, leader.

June trip will be to Saddle Mountain area. Leader Leo Simon. Details in June News Letter.

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Friday  
June 14 Archaeological Travelogue. Mexico & Haiti. 3-D Color.  
Dr. & Mrs. J.C. Stevens. This should be an interesting program.

Friday  
June 28 Minerals you should know. Illustrated with excellent Mineral and Crystal specimens. Speaker - Mr. Leo F. Simon.

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## Change of Address

Davenport, Miss Mary 309 West 15th Street, Vancouver, Washington

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## WHY BE A GEOLOGIST?

The value of geology to everyday people is to make the earth more interesting. A drive or a walk is more fun if you know why the hills are here and what made that valley there; how the waves on a beach are sorting and distributing sand; how sand someday will be solid rock and carry oil or gas and water; how part of the land is always on its way to the sea; where minerals come from that are used to make the steel in the car and the gasoline in the tank.

## GRAVE ISLAND MEMORIAL

At final rest in this common grave overlooking the place they lived and died are the remains of members of a great American people. Hunters and fishermen, they were the first to challenge the mighty Columbia on its wild race through the Cascade barrier to the Pacific. Each season they called on the Columbia to pay its tribute in salmon, and when these members of the Indian tribes who fished here died, they went back to the river, on a rocky island of the dead, now buried beneath the water. They joined their ancestors. It was from now hidden Grave Island that the bodies were removed to this memorial point. From here the spirits of the first to challenge the Columbia look down upon the work of those who harnessed the river of the west.

(The above was composed by Mr. Phil F. Brogan and carved on the great marble stone that marks the last resting place on Grave Island.)

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## THE ISLAND OF THE DEAD

Hovering over the Columbia River these winter days is a helicopter on a strange mission.

It is being used to airlift the remains of some 3,000 Indians from upper Mema-loose island to a final resting place in a new cemetery a mile north of The Dalles bridge, on the Washington shore.

White men consider the airlift mission strange. But there are old people of the Columbia tribes who possibly have other opinions.

They may recall the story of Coyote and Eagle. It is a myth dealing with the origin of death.

In this Wishram myth, Eagle and Coyote go into the world of spirits to bring back their wives, very much in the manner Orpheus of Greek mythology went to Hades to bring back his Eurydice.

Eagle and Coyote, in the Wishram myth, went to the island of the dead, found their old friends and relatives having a gay time and decided to bring them back to the land of the living.

While Coyote covered the moon, Eagle caught the spirit people and placed them in a basket. Then they started to the land of the living — possibly with Eagle doing a bit of prehistoric air lifting.

But there was a rest en route. And the basket got heavier as the people came back to life. So Coyote opened the basket. Immediately the people resumed their spirit forms and went back to the island of the dead.

There they have rested until a whirlybird came out of the sky to lift them to a new and final home.

Editorial in Bend Bulletin  
By Phil F. Brogan

## THE GEOMORPHOLOGY OF WESTERN OREGON

By

Paul W. Howell

Geologist, Corps of Engineers

Western Oregon is made up of five principal constructional and three principal destructional land forms. These eight land forms, together with the stream conditions and patterns of the region, present the geomorphology and indicate the late geologic development of western Oregon as well as of the whole Pacific coastal region. The destructional land forms of western Oregon in order, from east to west are: (1) the mature erosion surface, extending from the summit of the Western Cascades to the coast line, developed on the folded lavas, pyroclastics and sediments of the area, (2) the high erosion scarp fronting the Pacific Ocean, and (3) the terraces cut in the scarp. The constructional land forms from east to west are: (1) High Cascade lava plateau, (2) the uplifted block of the Western Cascades, (3) the down warped Puget-Willamette-Great Valley trough, (4) the trough fill, and (5) the uplifted block of the Coast Range. All of these have been subjected to local modification, but each stands out as a principal geomorphic unit.

Numerous large streams of the Coast Range show by their entrenched meanders that they had reached a mature to old age stage of development prior to their incision. This in turn implies that the Coast Range area had reached at least a mature stage of land form development previous to stream incision. Six of the largest streams of the Pacific Coastal region cross the Coast Range physiographic barrier and three of them cross the higher Cascade Range barrier. The three smaller streams, which cross only the Coast Range barrier, had the most advanced meander development previous to incision. The six streams in order from north to south are Frazer River, Chehalis River, Columbia River, Umqua River, Rogue River, and Klamath River; the three smaller streams are the Chehalis River, Umqua River, and Rogue River. By far the larger number of streams originating in the Cascade and Sierra Nevada ranges gather together and form major streams flowing north or south along the trough before breaching the Coast Range barrier or joining a main stream that does breach it.

In most parts of the trough drainage reorganization was accompanied by aggradation, which in some cases was of considerable depth and extent. The (most well) best known of these deposits are the Troutdale formation of northern Oregon and the Tuscan-Tehama formation of northern California. Less well known are deposits in the Klamath River Valley, the Rogue River-Applegate Basin, the middle Umqua River Valley, the upper Willamette Valley, and the Cowlitz-Chehalis rivers area. The age of the Troutdale and the Tuscan-Tehama formations has been pretty well established as Pliocene, but the age of the other deposits has not been established and has been variously assigned to Pliocene time, to Plio-Pleistocene time, and to the several stages of glacial activity. All of these geologic ages may be represented, for many bits of evidence point to not just one period of trough subsidence, but to a continuing fluctuation of subsidence and uplift.

The time of post-folding mature land surface development, as indicated by the age and the relationship of the Troutdale formation to the partially bevelled folds of Columbia River basalt in the Columbia River Gorge, is late Miocene to early Pliocene. The broadscale uplift and warping began after the bevelling of the older Tertiary rocks was well developed but evidently before the end of Troutdale time upwarping of the Cascade Range area brought about the eruption of the High Cascade plateau basalts which buried parts of the Troutdale formation. Later fill deposits in the trough, coupled with terrace cutting on the coastal scarp, attest to probable later periods of broadscale warping or epeirogenic movement in the same region.

On the basis of this geomorphic and historical data it seems logical to believe that many more of the streams heading in the Cascade-Sierra Nevada ranges at one time flowed directly to the sea. Little direct evidence of this in the form of wind gaps and perched gravels has been found, possibly through the lack of diligent search, but breached divides along the trough resulting from the realignment of drainage are not uncommon. Modification of the old Coast Range courses to the point of obliteration is not unexpected in view of the climate and vegetation of the area and the elapsed time since stream defeat.

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#### DR. BRADLEY M. DAVIS

Dr. Davis died March 13, 1957. Dr. Davis was professor emeritus of botany at the University of Michigan. He died of a heart attack at his home, 2814 S.W. Labbe Avenue. He had lived in Portland for the past eight years and has been a member of the Geological Society of the Oregon Country since 1952. Our sympathy goes to the family.

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#### ROBERT T. STANLEY

All of our members were shocked and grieved by the news of the sudden and untimely death at Salem on April 19th of Robert T. Stanley, son of our honorary life member, Orrin E. Stanley.

Robert was 55 years old, a bridge engineer for the Oregon State Highway Commission, member of the State Board of Engineering Examiners and of the Salem Planning Commission. His wholly unexpected death occurred while he was returning home from a banquet of the Professional Engineers of Oregon.

He had accomplished much during his life and he will be missed. The sympathy of all of our members is with Orrin and his family in their loss.

L.A.P.

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#### THE PREHISTORIC STONE

The following, accompanied by an excellent illustration of the stone and Captain Raja, appeared in the Oregonian of March 22nd under the byline of Paul Hauser, Staff Writer. The bronze plaque which was placed on the stone in 1940 by The Geological Society of the Oregon Country shows up very well in the illustration.

"Long, long ago a missionary gone forth from India to spread the religion of Buddha came to the Columbia River and carved an image of Buddha on a rock.

That is the latest theory on the origin of the strangely carved petroglyph found in the Columbia gorge in 1910 and which has reposed on the city hall grounds since 1940.

Captain Yasin Raja of the Pakistani army, now at the University of Oregon as an assistant track coach under the state department visitor's program, offered the theory Thursday. He had studied the carved stone Wednesday night.

Captain Offers Proof

In the stone's design of circles and waving and radial lines, Captain Raja pointed out what seemed to him the image of a seated Buddha. Over the Buddha's heart he showed a place where a man's palm and fingers fit the indentations in the stone.

The ancient Buddhist missionaries, he said, carved stones in such a manner for use in a baptismal rite in which those accepting Buddhism placed a hand over the heart of the image of Buddha.

"I came and saw this and felt it to be true," said the young captain, who will train Pakistan's 1960 Olympic team. "There are quite a few in my country and I have seen 23 myself. They are found in the mountains and along rivers, in places where people go for picnics."

Captain Raja said, "I myself have no faith in Buddhism." He is a Mohammedan. But in his studies Captain Raja has learned of the prehistoric Buddhist disciples, who went from India to spread the Buddhist belief.

"We believe they never turned back," he said. "Where ever they went they made the stones. Not in language, but in pictures, for language was not then very well off."

Route Still Unknown

How the supposed Buddhist made his lonely way from India to the Columbia gorge Captain Raja does not guess.

"If my theory is not 100 per cent correct," he laughed, "I feel it is at least 80 per cent correct."

## MEMBERS AND FRIENDS OF G.S.O.C.

## EAGLES HONOR PHIL E. BROGAN.

Science writer Phil E. Brogan on April 5th received the 1957 service award of the Bend Fraternal Order of Eagles. It was only the fourth time in the past 30 years that the lodge in Bend has presented this award. It was given to Brogan by Lawrence Leahy of Wenatchee, Wash., the International President of the Eagles. Brogan is the associate Editor of the Bend Bulletin and chairman of the Oregon Geographic board. The lodge said it selected Brogan for his "Interpretation of earth sciences and local and state activities." Oregonian 4/7/57. Congratulations, Phil.

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Mr. and Mrs. Kenneth N. Phillips left Portland March 9th via Northwest Airlines for Ankara, Turkey where Ken will work with the Turkish Government on water resources development. Enroute the couple plans to visit their son-in-law and daughter, Mr. & Mrs. Merritt Coots, in Algiers.

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Several years ago Dr. Weinzirl took the country by storm suggesting starting a meal by eating dessert first. In keeping with this plan our Emily Moltzner has found in Tillamook, a good place to get Apple Pie at a reasonable price. Your editor and family recently stopped at Buellton, California for some of that fine Split Pea Soup served at Andersens Restaurant. Now if someone will come up with a place for the Entree, we can recommend meals on Highway 101 ala Weinzirl, or regular way.

Friday night, April 5th, in the Oregonian Hostess House, Dr. Ruth E. Hopson showed color slides of wild flowers of the McKenzie River area. This showing is part of a month long program calling attention to Oregon's wild flower resources. A selection of Dr. Hopson's large collection of pressed wild flowers which she has given to Portland State College for class reference use was also on exhibit.

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Mr. & Mrs. Edward Kelham are in Portland General Hospital. Both are doing well and we hope they will be home before we go to press.

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A letter from Dr. Ewart Baldwin states that with the opening of third term and all its activities, things are rushing at University of Oregon. During spring vacation he, with 5 others, had a wonderful trip down the Owyhee River. They took three rubber rafts and floated from Rome to the dam. Took about a week, and the weather was good most of the time. Saw a lot of geology and got lots of Kodachromes. He also mentioned he was going to G.S.A. in Los Angeles on April 17th.

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The Society wants to thank the Hendersons for turning in their back numbers of News Letters. Also Miss Ada Henley for presenting to the Society eleven bound volumes of News Letters.

Those wishing to have News Letters bound, please see that they are turned in to your Editor. We have some bound volumes of former years on hand which can be purchased at \$2.25 per volume.

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Mr. & Mrs. William Clark just returned from a trip to Death Valley and way points. Bill reported it was hot down there. He submitted one car badly in need of a paint job and ruined wind shield as evidence of what a sand storm can do to a car.

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Mr. Hollis Dole attended Pacific Southwest Mineral Industry conference held in Reno, Nevada, April 5-6.

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Pacific Northwest Regional Conference of American Institute of Mining and Metallurgical and Petroleum Engineers was held at Multnomah Hotel, Portland on April 11-12-13. The names of following members of our Society appear as chairmen Technical Sections, - Messrs. Hollis Dole, Fay Libbey and Ralph Mason.

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The Geology Classes of Portland State College, under leadership of Dr. John Allen and Ralph Mason, have planned a two day bus trip to Eastern Oregon. They are leaving Ochoco Inn at Prineville, 8:00 A.M. May 25th. Will visit fossil locations in John Day and Clarno regions, stopping Saturday night at Fossil. Return to Portland Sunday P.M. Trip approximately 500 miles. Members of G.S.O.C. wishing to join caravan will be welcome. For further information phone Mr. Mason, CA 6-2162 Ext 488 or Dr. Allen, CA 2-4251.



## DR. JOHN EVANS, PIONEER GEOLOGIST

By

Dr. Irwin Lange\*

Public Library, March 22, 1957

Dr. John Evans was one of the least known and least recognized of the pioneer scientists who explored the "Oregon Country", which, aside from his work, received very little attention from the scientific angle until after his death in 1861.

Dr. Evans was born in 1812 and educated at Andover. After spending some years in the Post Office Department in Washington, D.C., he moved to St. Louis, studied and, at the age of 27 received the degree of Doctor of Medicine.

In 1847 he and another doctor were chosen as assistants to a Dr. Owens who had been delegated to make a survey of certain areas in the mid-west. His work in this connection attracted favorable attention and in 1849 he was sent up the Missouri River for a study of the territory along that stream. This brought him to the Dakota Badlands and he was the first explorer to visit this vast "cemetery of extinct animals." The reports of his explorations in this area aroused so much interest that expeditions came from as far as Europe to follow the trail that he had blazed.

In 1851 he was appointed by the Secretary of the Interior to make a study in connection with certain areas in which land surveys were being made and, in this work, covered much of the land between the 45th and 49th parallels. In doing this work he followed a new route from Nebraska to Oregon, visiting the Badlands again. He found it almost impossible to get anyone to accompany him on his march over the mountains. Two guides deserted him en route but finally, with one man, he got over the Continental Divide to a Flathead Indian village and thence on to the coast. Here he spent some time in studying the geology all of the way from Coos Bay to Vancouver Island.

In 1853 Isaac Stevens, governor of the newly created Washington Territory, appointed Dr. Evans to make a survey of a strip 200 miles wide from St. Paul to Puget Sound to gather geologic data and to determine the feasibility of a railroad. He reported a railroad to be feasible and it is interesting to note that the railroads that have since been constructed are running through the mountain passes that he recommended.

After the railroad survey he stayed in the Northwest, making several trips which took him to various localities from the Canadian Rockies to the Pacific Coast.

Late in 1856 he returned to Washington, D.C. with the intention of preparing his report on the territory that he had explored but, unfortunately found a very unsympathetic congress, which was inclined not to pay Dr. Evans for any of his work, much less appropriate any money for a report. In time it did relent to the extent of paying for the field work but never did authorize publication, so that all of the interesting and valuable data that he collected has been lost to the public.

In 1860 Dr. Evans went to Panama as geologist for a commission that was investigating a route for a canal and, in 1861, he died while still in his prime.

L.A.P.

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\*Professor of General Science, Portland State College.

## AN AMATEUR GEOLOGIST FLIES THE LEWIS AND CLARK TRAIL

By

Dr. Arthur C. Jones

Public Library

April 12, 1957

The above meeting brought us another interesting "geologue" to add to many others that we have seen and heard at our Friday lectures. With the excellent colored slides, which Dr. Jones accompanied with his running description, we got a far more complete idea of the geology than Lewis and Clark did in their more leisurely trek and also covered considerably more territory, albeit that we followed the Lewis and Clark trail only in a most general way.

Starting from Portland we went to Yakima and then across the scab-lands to Couer d'Alene with its beautiful lake, then over the Rockies and across the plains country until we reached Detroit. This gave us a broad regional view of the areas that we traversed and let us see as a whole the many interesting features which the surface traveller can view only piecemeal. The Idaho mountains, with their hard quartzites, showed up as sharp serrated peaks but when we got over the Bitterroots we observed the rounded domelike summits characteristic of granite. Over treeless Butte we looked down on "the richest hill on earth" with its many copper mines and then after following the Yellowstone River we crossed the Badlands with their wierd topography sculptured from the soft but coherent rocks and the sharp pointed "tee-pee buttes" of the Bighorn. Crossing Wisconsin and Michigan we had spread before us the effects of the great continental ice sheets that covered this country during the Pleistocene and at Detroit what was once a lakebottom.

We returned by way of Colorado and saw the remnants of the many seas that once occupied the Great Plains, then northerly over embattled Hell's Canyon, the Wallowas and down the Columbia to home.

After this most interesting trip our speaker took us on another on which we covered Crater Lake in winter, Klamath Lake, lying in its fault trough, Donner and Tahoe Lakes and several views of the High Sierras where the glacial phenomena were spread out before us in a most graphic manner.

All in all it was a most interesting evening and those of us who enjoyed it had the feeling that "You Were There."

L.A.P.

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LET'S BE SOCIABLE

At a recent meeting of the executive committee of our society one of the members made the statement that some of our newer members are not getting as much out of the field trips as they should, perhaps because of a feeling of diffidence over mingling with the older members. Perhaps they feel that we are a highbrow bunch and that they might show their ignorance by asking questions.

This isn't at all in accord with Gesoc policy - we are a friendly and informal group. Let every older member consider himself or herself a host or hostess to make the newer members feel at home with us and let the newer members not hesitate to break the ice and get acquainted and ask questions.

We'll guarantee that you won't be bitten, or even growled at.

L.A.P.

## THE MILKY WAY — A SPIRAL GALAXY

By

Phil F. Brogan

N.W. Director, American Meteor Society

In their third and completely revised edition of "The Milky Way", Bart and Priscilla F. Bok invite their readers to join them in a tour along the "road to the heavens" — a broad band of distant suns.

This journey proves to be a thriller. And certainly this starry road is far better marked with guideposts than when Dr. Bok, formerly with Harvard University and now Director of the Commonwealth Observatory in Canberra, Australia, wrote his first volume.

In the past decade, research on the Milky Way has made notable progress, primarily as the result of radio astronomy techniques.

From recent research has emerged the theory that the Milky way is in reality a spiral galaxy. Out on an extended arm of the galaxy is apparently the sun and its family of planets, including the earth, once believed to be the center of the starry universe.

The sun, in its insignificant location within the whirling pin-wheel known as our "home galaxy", is not even a big star.

"Our galaxy is probably a spiral of the intermediate type, not unlike the giant spiral in Andromeda," the Boks note in their spectacularly illustrated volume, published by the Harvard University Press.

The sun is very close to the central plane of the galaxy, in the whirling midst of the spiraling structure. For this reason it is most difficult precisely to trace the spiral structure of this "home galaxy". "The task would be simpler if we could only remove ourselves to a point 25,000 or 50,000 light years above or below the central plane of the galaxy, for then we should presumably see an entire spiral pattern," the Boks note in the 1957 edition of "The Milky Way." And what a sight that would be! In the Milky Way are more than 100 million suns. Light traveling 186,000 miles a second requires 100,000 years to cross the spinning pinwheel. The distance from our sun to the galactic center is estimated at 27,000 light years.

The Boks, listed among the world's most brilliant astronomers, do not confine their entire volume to the rather insignificant galaxy known as the Milky Way. They have prodded into other parts of space and make mention of startling discoveries beyond our "home range" in recent years.

As many as 50,000 individual galaxies, some of them vastly larger than the Milky Way have been found in a section of the sky that is about as large as the Big Dipper.

"The Milky Way," is a fascinating, stimulating volume. But it is not a book through which the reader can browse with an ear cocked to the radio or an eye slanted toward a television set. It is a fine volume that calls for deep concentration.

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## PTOLEMAIC RELICS FOUND IN CAVES

CAIRO, Egypt (Reuters)— Recent earth movements in the sea bed near Alexandria have revealed relics of an ancient Egyptian civilization which have been submerged for thousands of years.

Professor Anwar Abdel Alim of Alexandria university said caves, graves and the remains of buildings had been found during the past 48 hours following a sudden drop in the water level off the five-mile beach between El Agamy and Aboukir.

The relics date back to the Ptolemaic dynasty, which ruled Egypt from 367 B.C. until around the time of Julius Caesar.

During that period Egypt's foreign trade was greatly expanded and for a time the country was one of the strongest naval powers in the Mediterranean. With the expansion of the Roman empire, the Ptolemaics were gradually eclipsed.

The Oregonian  
April 16, 1957

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G.S.O.C. Luncheon Meeting April 4, 1957

A select group of ten members of the G.S.O.C., including Rudolph Erickson, apparently fully recovered from his recent stay at the hospital, and accompanied by his wife, were entertained by R.L. Baldwin's account of the recent trip of his family to Disneyland where his granddaughter, Joan, "cut loose" for a day "on her own" and had a grand time. The family visited Mrs. A.D. Vance and Mr. and Mrs. E. N. Bates on their way home.

Specimens shown were Nevada wonderstone by Ralph Mason and a "petrified potato" (or so it appeared) from the Portland gravels, brought by Bruce Schminky. The "potato" so closely resembled the genuine article, even to the eyes, that one was surprised by its weight and hardness when picking it up.

O.E.S.

2 CENTS 2

# GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE



*June 1957*

PORTLAND, OREGON

## GEOLOGICAL NEWS-LETTER

Official Publication of the

Geological Society of the Oregon Country

1209 S.W. 6th Avenue, Portland 4, Oregon

POSTMASTER: Return Postage Guaranteed

State of Oregon  
 Dept. of Geology & Mineral Industries  
 1069 State Office Bldg.  
 Portland 1, Oregon

UNITED

# G E O L O G I C A L S O C I E T Y O F T H E O R E G O N C O U N T R Y

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## Officers of the Executive Board

		1957 - 1958	Zone	Phone
President:	Mr. Leroy A. Palmer	1209 S.W. 6th Avenue	4	CA 7-9347
Vice Pres:	Dr. James Stauffer	717 - 8th Street, Oswego		BL 1-3825
Secretary:	Miss Rosa Hamilton	5412 S.E. Powell Blvd.	6	BE 6-8215
Treasurer:	Mrs. Emily Moltzner	7032 S.E. Stark Street	16	CA 2-2420
Directors:	Dr. John Eliot Allen (1958)	Mr. William F. Clark (1958)		
	Mr. Franklin M. Brown (1958)	Dr. Francis G. Gilchrist (1959)		
	Dr. Ruth E. Hopson (1960)			

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## Staff of Geological News Letter

Editor:	Mr. Raymond L. Baldwin	4300 S.W. Laurelwood Drive	1	CY 2-1452
Library Ed:	Dr. James Stauffer	717 - 8th Street, Oswego		BL 1-3825
Business Mgr:	Mr. Edward A. Kelham	1210 S.W. Park Ave. Apt 302	1	CA 3-5875

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## Committee Chairmen

Program:	Mr. Albert J. Keen	Display:	Mr. Murray R. Miller
Field Trip:	Mr. Leo F. Simon	Research:	Mr. Rudolph Erickson
Library:	Mr. Rudolph Erickson	Service:	Miss Margaret L. Steere
Membership:	Mrs. Ruth Harrison	Museum:	Mr. Alonzo W. Hancock
Publicity:	Mr. H. Bruce Schminky	Public Relations:	Mr. Clarence D. Phillips
		Historian:	Mrs. William F. Clark

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## Society Objectives

To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country; the establishment and maintenance of a library and museum of geological works, maps, and specimens; the encouragement of geological study among amateurs; the support and promotion of geologic investigation in the Oregon Country; the designation, preservation, and interpretation of important geological features of the Oregon Country; the development of the mental capacities of its members in the study of geology; and the promotion of better acquaintance and closer association among those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mrs. Ruth Harrison, 1879 S.W. 10th Avenue, Phone CA 3-0255. Regular annual dues (single or family memberships) are \$5 for residents of Multnomah and adjacent counties; \$2.50 for others; and \$2 for Junior Members. Make remittances payable to the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.

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## Society Activities

(See "Calendar of the Month")

**Evening Meetings:** Formal lectures or informal round-table discussions on geological subjects, on the second and fourth Fridays of each month at Public Library Hall, S.W. 10th Avenue and Yamhill.

**Field Trips:** Usually one field trip is scheduled for each month.

**Library Night:** Once a month. Lewis and Clark College.

**Luncheons:** Informal luncheons, with geological motif, each Thursday noon in Room B, Chamber of Commerce Building, S.W. 5th Ave. and Taylor St. \$1.00 per plate.

**Publication:** The Geological News Letter, issued once each month, is the official publication.

CALENDAR

Buffet luncheon every Thursday noon at the Portland Chamber of Commerce, 824 S. W. Fifth Avenue, second floor. One dollar.

Friday  
June 14 Room B, Public Library, 7:30 p.m.  
Archaeological Travelogue. Mexico & Haiti. 3-D Color.  
Dr. & Mrs. J. C. Stevens. This should be an interesting program.

Library Night - discontinued until September 17th.

Sat. & Sun.  
June 22-23 Field Trip. To Coast and Saddle Mountain. By way Sunset Highway and 101. Meet at Lewis & Clark Camp ground at Fort Clatsop. See Marker near Clatsop Airport. Leave at 10:30 a.m. for Fort Stevens Battery, Russell Park where we lunch. Visit the Peter Iredale Park. This ship hit the beach under full sail and was wrecked here. Return to Highway 101, thru Seaside, Cannon Beach Junction, turn right to Cannon Beach and Ecola State Park. Geologic and Scenic views. Return to Highway 101, then to Saddle Mountain State Park where we camp for the night. Campfire!

Sunday 9:00 a.m. leave camp for climb to summit. About a 4 mile hike. On the way we will see many wild flowers, geologic features such as spectacular lava dikes that look like piles of cord wood. Round trip about 200 miles. Leaders - Rudolph Erickson and Leo Simon.

Friday  
June 28 Room B, Public Library, 7:30 p.m.  
Minerals you should know. Illustrated with excellent mineral and crystal specimens. Speaker, Mr. Leo F. Simon.

Friday  
July 12 Room B, Public Library, 7:30 p.m.  
Two films - "Portrait of the Earth" -- Hycon Aerial Surveys  
"The Eighth Sea" -- St. Lawrence Waterway -- Caterpillar Tractor Co.  
(Other films will be shown if these do not arrive on time.)

Friday  
July 26 Room B, Public Library, 7:30 p.m.  
"Fifteen thousand miles in an hour" - Colored slides - Orrin E. Stanley

NEW MEMBERS

Brodie, Dr. and Mrs. Walter  
Route 1 Box 237 Sunnyside 470 Clackamas, Oregon

Rawls, Mr. and Mrs. Guy R.  
9265 S. W. Highway 217, Portland 19 CH 4-4117

Williams, Mr. and Mrs. Philip M.  
4858 S. E. Grant Street, Portland 15, BE 5-0612

Junior

Elmore, Jan Marie  
434 N. E. Mimir Place (15) BE 4-2650

Change of Address:

Wilson, Mr. and Mrs. Ford E.  
1045 Elm Street, Apt 665-32, Anchorage, Alaska

## CLEARING UP MYSTERY ON SPECKLED SHEEP

In order to refresh the memories of those who have belonged to the Society for over 15 years, and remembering the arguments which were aroused in this august assembly when Mr. Orrin E. Stanley, editor of the News-Letter at that time, wrote an article which he headed, "War, Sheep and Librarians" - we quote from Geological News Letter Vol. 8-No. 13, 1942.

"We were riding back to Gold Beach after having enjoyed the thrill of a boat ride to Agness and back down the Rogue River to the starting place when the better half turned to me and inquired:

"What kind of sheep do you think those speckled ones are that we saw on the north side of the river?" Just like that.

"I don't know, but we can probably find out when we get back to the library," I replied.

"Don't you think they were wild ones?" she asked.

"Oh, no," said I, wisely. "I don't think there are any wild sheep in these low altitudes." And there the matter dropped, for in spite of having been intimately associated with me for something like two score years, (look that up in the old arithmetic) she still thinks I know a few things.

Days passed. At length I found myself in the library and hunted up a book about sheep. I learned many things about the intimate family life of the source of mutton and blankets, but not a word about speckled sheep. I replaced the book on the shelf and hesitated a moment before wandering into the Mark Twain room to see if they had received a photographic book that I had not read as yet, and as you know, "He who hesitates is lost." I found that I was looking square into the eyes of Miss Jones.

"Can I help you?" she asked.

Caught unawares, I blatted out the truth, that I was looking for some information about sheep to settle a family argument; instead of lying glibly that I was looking for my wife.

Miss Jones appears to be a peace loving young lady so she immediately set to work to prevent intra-family strife by getting out something like a cord (another reference to the old arithmetic) of books, all having more or less to say about sheep--but no speckled ones.

Time did not permit reading all the references provided at that time so I returned when I had more leisure and boldly tackled the books again. I had deserted the flock of works on photography and devoted myself to a diligent search for the lost (speckled) sheep. Miss Jones again came to my aid with many interesting suggestions which at length led me to the reference room and to other helpful young persons whose entire mission in life seemed to be to help me find a book that would give me the information I sought.

There I got hold of a directory of the sheep owners of Oregon, and found the names of several located in the Gold Beach area.

Did you ever pick out a name from a list with the idea that a person by that name must certainly know all the answers? It is an interesting experiment.



The first man to whom I wrote had not seen any speckled sheep, but he knew sheep pretty well and suggested several cross breeds that might produce the phenomenon about which I had inquired. However, to be dead sure, he suggested that I write to the county agent. That seemed like a very sensible idea and I promptly did so.

My very great respect for the staff of the Portland Library Association is undimmed, but the reply I received from the county agent of Curry County caused me to have doubts about my vision.

The letter follows:

Dear Mr. Stanley:

This is answer to your letter of June 13. I have never seen any speckled black and white sheep in Curry County, nor do I know of any such breed. Occasionally we find a sheep that has more or less black wool, but never speckled.

We do have quite a few hogs running in the acorns and sometimes due to crossing or breeding with Poland Chinas, we do get speckled black and white hogs.

Incidentally I thought you would be interested in the statement I obtained from one of the up-river boat operators when I made inquiry in order to answer your question. His answer was, "Find out what kind of whiskey the gentleman drinks."

Yours very truly,  
R. M. Knox  
County Agent

\*\*\*\*\*

We just recently learned that Orrin had commissioned Ken Phillips on his inspection tour throughout Turkey to be on the lookout for Speckled Sheep. This explains the following certificate of credibility, and as far as we are concerned closes the argument. We now know without doubt there really are some sheep which are speckled.

CERTIFICATE OF CREDIBILITY

MEHRABA!

Ankara, Turkey  
28 Nisan, 1957

WHEREAS, on a recent trip to Samsun, Tokat, Amasya and way points, I saw many spotted sheep; and

WHEREAS, some of these sheep were black with white spots, some were white with black spots, and some were 50/50; and

WHEREAS, for a small fee photographic evidence of this phenomenon can be furnished; and

WHEREAS, the veracity, credibility, and/or visual acuity of one Orrin E. Stanley was at one time questioned because of his having reported seeing spotted sheep, which questioning did cause the said Orrin E. Stanley to suffer great mental pain, anguish and distress; and

WHEREAS, said suspicions of his credibility were entirely without warrant;

NOW, THEREFORE be it

RESOLVED, that corroborative testimony as to the evidence of spotted sheep can be furnished to the said Orrin E. Stanley, for such use as may be helpful to him in clearing his reputation and removing a fancied stigma on his veracity; and be it further

RESOLVED that any person still questioning the existence of spotted sheep is hereby cordially invited to visit Turkey with all expenses paid (by himself), that he may thus remove the beam from his own eye and recover his confidence in the integrity, perceptivity, and credibility of the said Orrin E. Stanley.

Allaha is marlidik!

Kemeth L. Phillips

## OUR ANNUAL BANQUET

The 1957 banquet on March 8th at the Mt. Tabor Presbyterian Church was the usual enjoyable affair with about 150 members and guests present. Following tradition the menu was "sheets of muscovite with pumice" or "slabs of cinnabar." The members identified these as roast turkey or salmon loaf.

Our master of ceremonies, Dr. John Eliot Allen, took over after the dessert was stowed away and made a real snappy job of it, kept things moving. There were the usual brief talks by the outgoing and incoming presidents and the presentation to the latter, for a year's custody, of a first edition copy of "The Two Islands" and the gavel that was made from a timber of the "beeswax ship" that was wrecked on the Oregon coast so long ago that nobody knows just when.

With the serious business out of the way the funmakers took over for a spell with the old reliable Jones Boys Quartet sounding off and including in a parody from "Pinafore" a dig at our emcee on the splitting of infinitives.

Then we had the feature of the evening, Dr. Ira S. Allison's "Geological Glimpses around the World." Dr. Allison returned last fall from a two year absence from his post at Oregon State College, most of which time was spent in Thailand in setting up an educational program for the colleges in that country. In returning he completed the circuit of the globe and in his travels accumulated the very interesting collection of pictures from which he drew for our entertainment and instruction.

These pictures showed many interesting and beautiful scenes from the places that the speaker visited and the geology was not slighted but was skilfully woven in with the description with which the narrator accompanied the slides.

The closing feature was the usual skit (author, Jane Erickson, of course) featuring Leo Simon in impersonations and so cleverly done were Leo's takeoffs that the spectators would have sworn that they were seeing Lon Hancock, Norris Stone, Francis Gilchrist, Franklin Brown and our junior senator in the flesh rather than as the clever impersonations of an accomplished thespian.

When the final curtain was rung down we had our closing song, "Good Bye Rock-hunters, Good Bye" and our twenty second annual banquet was history to linger in the minds of those who participated as coming up to the best traditions of these annual affairs that add so much to the enjoyment and good fellowship of our society.

L.A.P.

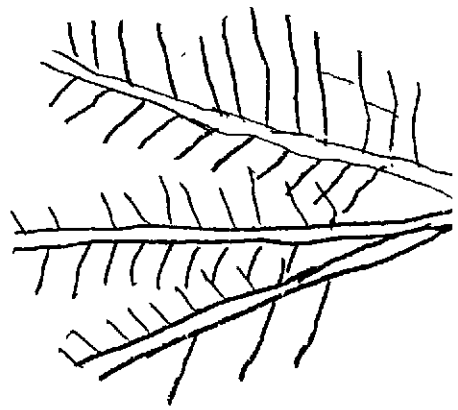
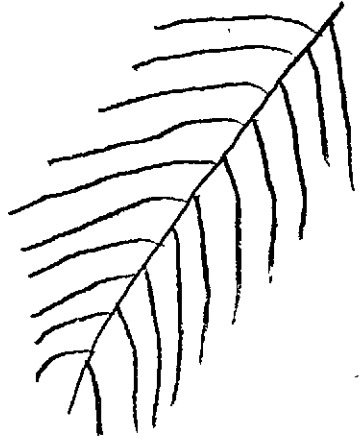
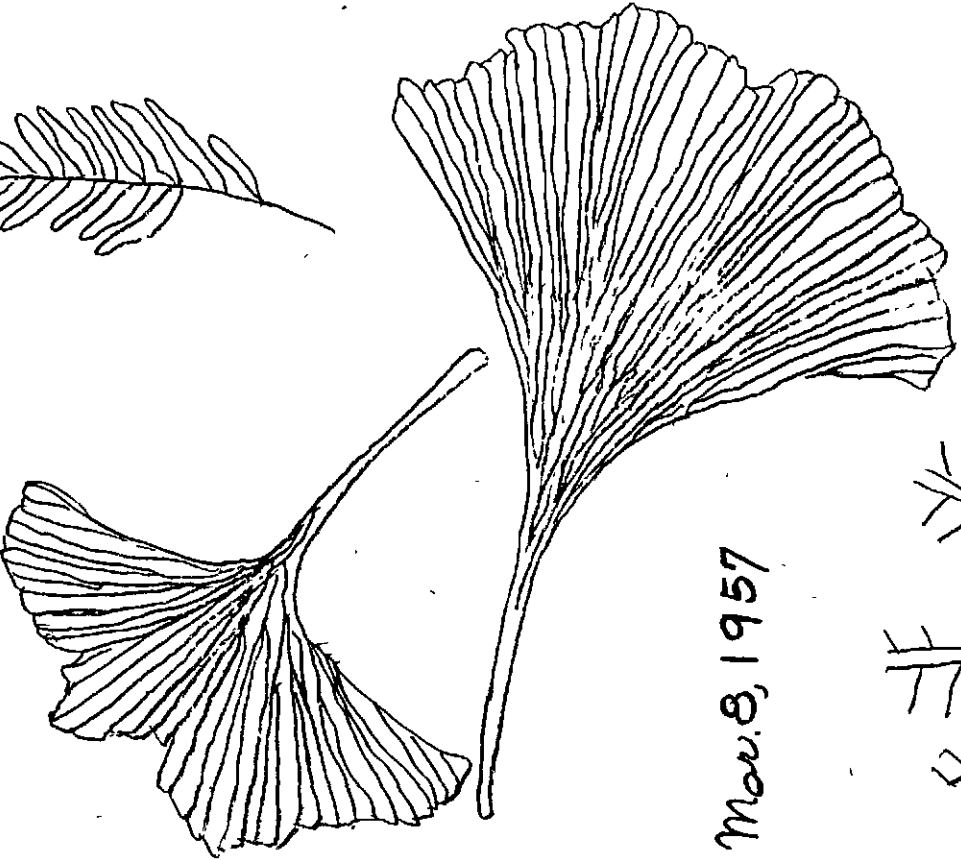
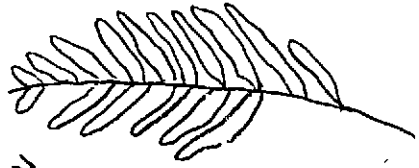
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The following have requested transportation on our field trips throughout the season. There seems to have been some confusion regarding the circular, as it was not meant for just one trip. Those desirous of transportation for any single trip should get in touch with Trip Chairman, Leo Simon.

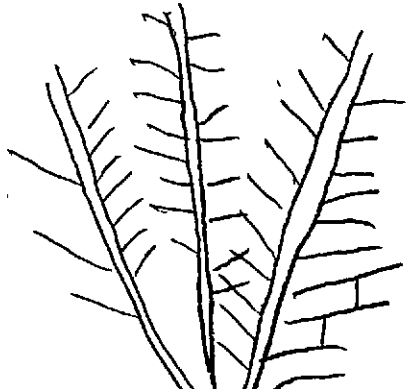
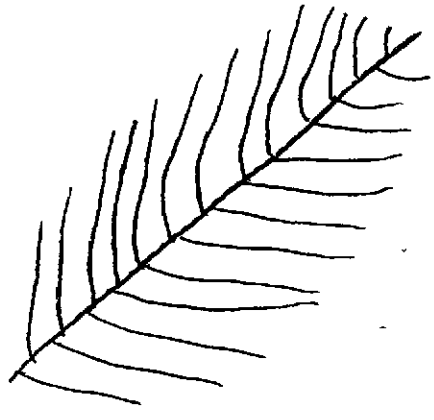
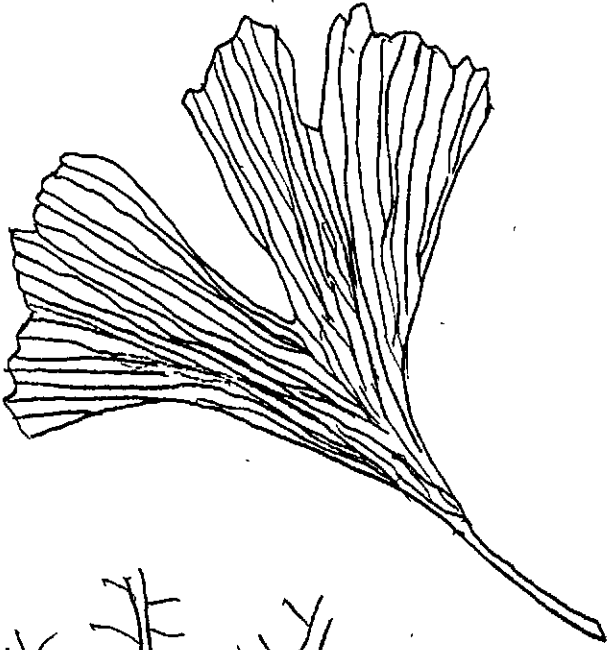
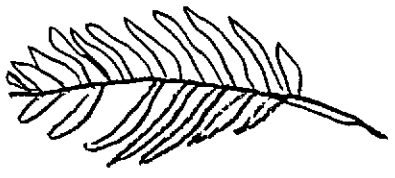
## TRANSPORTATION REQUESTED FOR FIELD TRIPS

Mrs. Emily Moltzner, CA 2-2420 (Office) AL 4-2362 (home) 7032 S. E. Stark, City 16.  
Mr. James Galt, CA 3-4601 St. Helens Court Apts, 1131 S. W. Montgomery St., Portland.

Geological Society  
of the  
Oregon Country



Nov. 8, 1957



Twenty-second Annual Banquet  
Geological Society of the Oregon Country

Retiring Officers, 1956

President, Dr. Francis Gilchrist  
Vice President, Dr. Ruth E. Hopson  
Secretary, Mrs. Leo F. Simon  
Treasurer, Mr. Robert F. Wilbur  
Editor of New Letter, Mr. Leroy Palmer

Board of Directors 1956

Mr. Albert Keen            Mr. Fay Libbey  
Mr. Leroy Palmer        Mr. Wm. F. Clarke  
Dr. James Stauffer

1957 Officers

President, Leroy A. Palmer  
Vice President, Dr. James Stauffer  
Secretary, Miss Rose Hamilton  
Treasurer, Mrs. Emily Moltzner  
Editor of News Letter, R. L. Baldwin

Board of Directors 1957

Dr. Ruth Hopson        Mr. Wm. F. Clarke  
Dr. Francis Gilchrist  
Dr. John Eliot Allen    Mr. Franklin Brown

Banquet Committee

Tickets - Mr. Leo Simon  
Dinner - Mrs. Leo Simon  
Song Leader - Dr. Arthur Jones  
Pianist - Mrs. A. W. Hancock  
Entertainment - Dr. Gilchrist  
Hospitality (at door)

Mr. and Mrs. Oberson and daughter  
Gifts - Mr. and Mrs. Bruce Schminky  
wishes to express her thanks for the wonderful  
entire group.

Hostesses (table seating)  
Mrs. Davis            Mrs. Anza Barr  
Mrs. Lilly            Mrs. Ejner Olsen  
Mrs. Simon            Mrs. Clark  
Camellia Corsages - Mrs. Ben Smith  
Corsages, Programs, Place Cards,  
Table Decorations - Mrs. Ruth Harrison  
General Chairman - Ruth Harrison, who  
teamwork and assistance given by the

Menu

A la Mineralogy  
Sheets of Muscovite, with Pumice  
Liquid Magma  
or  
Slabs of Cinnabar  
Nodules  
Garnets in Mica Schist  
Diatomite Veins of Chrysocolla  
Rubies in Gneiss  
Mud flow or Old Faithful

Menu

just plain English  
Turkey and Dressing  
Giblet Gravy  
or  
Salmon Loaf  
Rolls  
Cranberry Salad  
Mashed Potatoes    String Beans  
Cherry Pie  
Coffee or Tea

Program

Master of Ceremonies - Dr. John Allen  
Prof. Geology, Portland State College  
Song, led by Dr. Arthur Jones - everyone

Dinner

Installation of Officers  
Retiring President, Dr. Gilchrist  
Incoming President, Leroy A. Palmer  
Introduction of New Officers

Intermission

Quartette

Conglomerate Unconformity by Major Fault  
and three minor Faults

Address

"Geological Glimpses around the World"  
by Dr. Ira S. Allison  
Prof. of Geology, Oregon State College

Skit

"Playback" by Professor Horrendous  
Copycat (Jane Erickson)  
Song, "Goodbye Rock Hunters" - Everyone

Address of Dr. Francis G. Gilchrist  
Retiring President

In his farewell remarks retiring president Gilchrist took opportunity to thank the many who had worked to make the past year a good one for the Society. When he became president, he said, he felt humble and concerned. Now as he hands over the gavel he feels even more humble but no longer concerned. The Society runs on the momentum of a rich and effective past, and would continue even without a president. However, there is need for more of our young people entering into leadership.

There were problems during the year. While Library Hall was being remodeled we were accommodated in the auditoriums of the Oregon Journal and of Multnomah College, to both of which institutions we are deeply grateful. There was the problem of the NEWS LETTER. For the past fifteen years we have had a most happy relationship with the State Department of Geology and Mineral Industries. We owe to their staff and especially to Mrs. Lillian Owen a great appreciation for their aid in publishing the NEWS LETTER. This arrangement is drawing to a close.

The Geological Society of the Oregon Country continues to have a great opportunity to be of service. The attendance at our meetings and on our field trips has been good. We find ourselves to be not narrowly interested in Geology alone, but in all that can be enjoyed and understood in this great world about us--trees, flowers, animals, and the artifacts of man. We shall have an even greater opportunity to serve through the Oregon Museum of Science and Industry which is now in the process of building a new "Science Center." The Museum has no more loyal supporters than members of our Society.

\*\*\*\*\*

OUR SOCIETY

by

Leroy A. Palmer, Incoming President

For the purpose of keeping in touch with others engaged in the same line of work I have, at one time or another, held membership in several professional or semi-professional societies. One of these, the Technik Club of Denver, has stood out in my memory, not only because of the high standing of its members but also the informality and good fellowship that pervaded its meetings. I really didn't think I would find another group just like the Technik Club.

Then the years passed and I found myself in Portland and, not long after I got settled here, through the efficient publicity of Bruce Schminky, I attended a lecture at the Public Library by the Geological Society of the Oregon Country. I remember it very well. It was the evening that Fay Libbey spoke on the land subsidence at Long Beach, California. After hearing the talk and the discussion and meeting some of the members I realized that I wanted in and made my application as soon as I could.

After becoming a member and having time to get acquainted and become familiar with the work the society was carrying on I realized that in it we had the same high quality of personnel, the camaraderie and good fellowship as in that group in which I had found so much enjoyment forty years before.

I don't need to go into details with you as to the caliber of our members. Some are of national and international reputation, we have officers of national societies of high standing, others have made their marks in their particular lines of work. But when we meet around the luncheon table or on a field trip all are Geosockers first and those other things are of secondary importance.

So, you can realize the pleasure that I felt, the thrill I may say, when Leo Simon phoned me one evening and, as chairman of the nominating committee, told me I had been chosen to lead our society for the ensuing year. Viewing its accomplishments in the past I must confess to some feeling of diffidence in following in the footsteps of my predecessors, but I assure you that I shall make every effort that my year as president may be a credit to our society.

I believe that we have a year of opportunity ahead. Ground has been broken for the new museum and I should like very much to see active cooperation with the Oregon Museum of Science and Industry in this great project. The National Council of the Boy Scouts of America has set aside October as "Geology Month." We can find very rewarding work in cooperating in this program and giving our youth some understanding of the science that means so much to us. If you read the News Letter you know that one of my hobbies is that geology is important to everyone. I would like to see some efforts in informing the general public along that line. There will be other opportunities.

Again my sincere thanks for your graciousness in calling me to be your president and my assurance that I shall do my best to maintain the high standing of our society during the year that I preside.

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#### REPORT OF THE SECRETARY FOR 1956

The Geological Society of the Oregon Country has as of today the following memberships:

Regular Annual memberships	175
Junior memberships	9
	<u>184</u>

As 102 regular memberships include Mr. and Mrs.

Total individuals are	102
	<u>286</u>

We have three Honorary Life Members as follow:

Dr. Edwin T. Hodge  
Mr. Alonzo W. Hancock  
Mr. Orrin E. Stanley

We have 24 Charter Members.

There were 27 new memberships since March 1st, 1956.

There were 2 "News Letter" subscriptions.

The Executive Committee held 3 regular meetings and two special meetings during the year.

Respectfully submitted,

MRS. JOHANNA M. SIMON, Secretary

\*\*\*\*\*

Your society received a total of 92 inches of newspaper space during the past year for its meeting and trip notices.

This was divided as follows -

The Oregon Journal.....48 inches  
The Oregonian.....44 inches

Respectfully submitted,

H. B. SCHMINKY, Publicity Chairman

SUMMARY OF OPERATION, G. S. O. C.  
FOR FISCAL YEAR OF MARCH 1, 1956 -7.

The following items were budgeted by the Board of Directors on the basis of the year's membership-receipts June 1; the total on that date being \$614.00.

	Percent of \$614.00		
	Cost	Budgeted	Approx. Cost
News Letter	\$258.68	42%	42%
Postage, printing, stationery	38.70	10	6
Meetings, trips, programs, lectures	54.43	10	9
Library (other than purchases from Book Fund)	.50	5	-1
Replacement fund for Multilith	100.00	15	15
Miscellaneous (Camp Hancock \$15, Museum Sci. and Ind. \$32.35, Funeral sprays \$15.60, Annual picnic \$10.80, and Treas. Bond \$5.00)	78.75	15	13
Totals for budgeted items	\$531.06	100%	86%

Our Book Fund for the purchase of maps and books for the Society's library is supported by donations made at the time of payment of dues or at the weekly luncheons. Balance on hand is \$24.01.

There were no mineral-identification or "bumper-cards" purchased this year. A supply of the latter is still on hand.

Valuable acquisitions to our library were made through the purchase of the geological library of our deceased member, Tracy Wade, for \$75.00. Donations were received for this purpose supplemented by \$8.75 from the Book fund.

The replacement fund for the Multilith machine on which our News Letters are printed is in a savings account at 3% interest showing a balance of \$206.07.

Our checking account, with a balance of \$910.56 carried over from last year, fluctuated from a low of \$753.36 in March to the present high of \$1186.83.

Respectfully submitted, 2/28/57  
R. F. WILBUR, Treasurer

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MEMBERS AND FRIENDS OF G.S.O.C.

Our Business Manager, Mr. Ed Kelham, is again in Portland General Hospital, and getting along satisfactorily.

The week end of April 26, Mr. Orrin E. Stanley was in Walla Walla attending a regional convention of the American Society of Civil Engineers.

At a Mazama meeting May 1st, Mr. Stanley showed colored slides of his recent trip through National Parks. Mr. Stanley was granted a leave of absence from reporting the Thursday luncheons to attend the photographic meeting at Victoria B.C. He has his application in for a like-leave to attend a similar meeting in California in July. These requests have been reluctantly granted.

Mr. Chester K. Sterrett, industrial department manager, Chamber of Commerce, in his recent report on how important low-cost electric power is in attracting new industries to this area, says so long as rates are reasonable and power service reliable, prospective industries are more interested in taxes, labor supply, raw materials, transportation, and markets than in power-costs.

## G.S.O.C. Programs 1956-57

- Friday, March 23 Geology of Idaho. Speaker, Mr. Lloyd L. Ruff  
 Friday, April 13 Pictures Canadian Rockies. Mr. Orrin E. Stanley  
 Friday, April 27 Land Slides. Speaker, Mr. Herbert G. Schlicker  
 Friday, May 11 Eocene Mammal Fossils in Clarno. Mr. Alonzo Hancock  
 Friday, May 25 Meteorites and the Great Meteor Crater of Arizona  
 Speaker, Mrs. Bella E. Johnson  
 Friday, June 8 The 1950 Eruption of Mauna Loa. Mr. Frank Hjort  
 Friday, June 22 High lights of Cave Park and Saddle Mountain field trips  
 Friday, July 13 Moving Pictures mining operations for nickel and uranium  
 Friday, July 27 The Glenn Canyon of the Colorado River  
 Misses Hazel and Ruby Zimmer  
 August Annual  
 Friday, Sept 14 Trip through Colorado Plateau Parks. Mr. and Mrs. Ed Bushby  
 Friday, Sept 28 River forecasting methods in the Columbia River  
 Messrs. Donald Kyehl and Mr. Vail Schermerhorn  
 Friday, Oct 12 Scenic Geology of the Navajo Country. Dr. John Eliot Allen  
 Friday, Oct. 26 Best color slides showing summer activities of members.  
 Friday, Nov. 9 Relation of Forests to Soil - Water and Erosion. Mr. Melvin Burke  
 Friday, Nov. 23 No meeting.  
 Friday, Dec. 14 Geology of the Northern Portion of the Olympics. Mr. Robert Brown  
 Friday, Jan. 11, 1957 Reconnaissance Geology of the Western Cascades. Speaker, Mr. Herbert Schlicker, Geologist State of Oregon Dept. of Geology and Mineral Industries  
 Friday, Jan. 25 Co-sponsored by Public Library and G.S.O.C. Film on Yosemite Valley. Mr. Rudolph Erickson talk on controversy of Valley between Josiah D. Whitney, State Geologist of California and John Muir.  
 Friday, Feb. 8 Earth's early atmosphere and the origin of life.  
 Speaker, Dr. Francis Gilchrist.  
 Friday, Feb. 22 Dr. Irvin Lange. Subject Dr. John Evans, U.S. Geologist in Washington and Oregon Territories.

Respectfully submitted,  
 RUTH HOPSON

## G.S.O.C. Field Trips 1956-57

- Feb. 29 State Dept. of Geology and Mineral Industries tour of Department in State Building. Hollis M. Dole, leader.  
 March 25 Trip to area where next year we hope to have new building for Oregon Museum of Science and Industry  
 April 15 Studying features of flood area southwest of Portland. Dr. James Stauffer, leader.  
 May 12-13 Two-day trip. Cove State Park, Terrebonne and Smith Rocks. Phil Brogan, leader on 13th.  
 June 20-July 1 Saddle Mountain to study Geology and Flora of region.  
 July 15 Joint trip with Salem geological Society. Salem and Eola Hills.  
 August 19 Cooper's Spur and Cloud Gap Inn. Leader, Franklin Brown.  
 Sept. 1-3 Labor Day. Coos Bay and Cape Arago Area. Dr. James Stauffer, leader.  
 Oct. 14 The Dalles, Wakemap Project. Leo F. Simon and Lloyd Ruff.  
 Feb. 17, 1957 Basement Trips to view two fine archaeological collections of artifacts from Columbia River area.

Respectfully submitted,  
 RUDOLPH ERICKSON, Trip Chairman



A R E M I N I S C E N C E

Notes made of a lecture given some years ago by the late Dr. Warren D. Smith at a meeting in support of Atlantic Union, came to light recently. Dr. Smith, it will be recalled, was Dean of Geology at the University of Oregon and lectured at times before the G.S.O.C., always most acceptably. He died a few years ago, but is well remembered by many members of the Society, as well as others, all of whom still hold him in high regard.

It seems appropriate, therefore, to pass on to the NEWS LETTER these notes, just as they were scribbled down during the lecture, without embellishment or elaboration. They reveal the stature of the speaker and present an infrequently considered phase of the science of geology -- its service to mankind.

C.P.R.

\* \* \* \* \*

Lecturer: - Dr. WARREN D. SMITH, at a meeting in support of ATLANTIC UNION

Subject : - IMPORTANCE OF GEOLOGY IN INTERNATIONAL RELATIONS; MINERAL RESOURCES, OIL

He described how former students of his, now in Arabia and Iran, wrote telling him of conditions there. Then he said he would make a statement which would be strongly disputed if made before certain audiences; - He regarded the Oil Companies as one of the great Christian missionary influences of today!

Just what is an Oil Co.? An organization to make money, to make dividends, the bigger the better, for its stockholders and, to do that, they find that it is most effective to adopt Christian principles. They provide good conditions for their workers, equally so for natives as for those from the home land.

Housing, sanitation, water, schools, churches, good entertainment; also roads, parks, recreation fields and other amenities of a clean civilization. These constitute one of the finest tributes to Christianity which could possibly be cited - it works where other creeds fail.

Compare the very negation of Christian principles which characterized the ivory and rubber industries in Africa half a century and more ago.

Then Dr. Smith added that this was not an inappropriate theme for a Geological Society, for, whether it is realized or not, the creed is a basic one in all organizations of that character.

\* \* \* \* \*

MEMBERS AND FRIENDS OF G.S.O.C.

Dr. John E. Allen, professor of geology at Portland State College, announces the following gifts to their museum. Twelve rare specimens of Baltic Sea Amber given by Mr. Richard Walker, and several hundred sea shells from the Marshall Islands area given by Dr. Leroy Pierson.

## LUNCHEON NOTES

April 11, 1957

A very select group of eleven members gathered on this occasion. Discussions were few and peaceable. Mr. Schminky brought a copy of "The Beaver," a Hudson's Bay Company publication, containing an illustrated article about the Steep Rock iron deposits in southwestern Ontario. Another article, in "Steelways," told of the operation of the taconite mines in northern Minnesota. Miss Henley had a photograph of a sixteen foot tall sunflower plant. Paul Howells asked for help in finding all the operating gravel pits in Oregon.

April 18, 1957

Among the members who are seldom seen at the weekly luncheons were Mrs. Owen, Dr. J. C. Stevens, recently returned from Mexico, and Mr. and Mrs. Rose. A guest was Mr. Kelham from Texas, son of our fellow member, E.A. Kelham, who was at that time in the Portland General Hospital, expecting to be out again about the end of April. Bruce Schminky had copies of "Mineral Information" published by the California Bureau of Mines; and a list of new publications by the U.S. Dept. of Interior. Mr. Keen showed a very nice specimen of calcite, and Mr. Libbey had a small sample of calverite ( $\text{An As Te}_2$ ) and was so anxious that all present could see its beautiful qualities that he trusted his high power hand lens to accompany it around the table. Mr. Howells had a one dollar slide rule giving the characteristics of 96 atomic elements. He can get these for others who desire to have one.

April 25, 1957

Fourteen members present and no visitors. Sympathy card was sent to Mr. and Mrs. Kelham, who were in Portland General Hospital. Bob Wilbur passed around specimen of chrome ore from Mozambique area of South Africa. Dr. John E. Allen spoke of having attended a very interesting G.S.A. meeting in Los Angeles and said next year Eugene would be host. He urged all who could to attend some of the sessions. Bruce Schminky passed around latest catalogue from Bureau of Mines, and Washington State publication showing location of mining operations in that State. Al Keen passed around piece of fossilized wood showing very distinct markings of weathering before fossilization took place. Leo Simon passed around card from Wm. Grubers who are in Spain and have been on extended tour of Europe. Rudy Erickson passed around Bulletin U.S. Naval Institute Proceeding, in which Ira Henry Freeman had an article entitled, "Crack in world is found in Sea." 45,000 mile crack around world 20 miles wide and two miles deep. Mrs. Moltzner passed around copy of Pacific Wonderland for September.

Rudy Erickson reviewed the Seven Caves by Carlton S. Coon. In this book Coon accounts that in these caves of southern Asia, Asia Minor, he had found evidence of human habitation dating back some 43,000 years. He had collected 150,000 artifacts, 15 skeletons, and bushels of bones.



# GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE



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*July 1957*

PORTLAND, OREGON

## GEOLOGICAL NEWS-LETTER

Official Publication of the

Geological Society of the Oregon Country

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G E O L O G I C A L   S O C I E T Y   O F   T H E   O R E G O N   C O U N T R Y

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		1957 - 1958	Zone	Phone
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                  Mr. Franklin M. Brown (1958)        Dr. Francis G. Gilchrist (1959)  
                  Dr. Ruth E. Hopson (1960)

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Committee Chairmen

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Field Trip:	Mr. Leo F. Simon	Research:	Mr. Rudolph Erickson
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Publicity:	Mr. H. Bruce Schminky	Public Relations:	Mr. Clarence D. Phillips
		Historian:	Mrs. William F. Clark

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Society Objectives

To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country; the establishment and maintenance of a library and museum of geological works, maps, and specimens; the encouragement of geological study among amateurs; the support and promotion of geologic investigation in the Oregon Country; the designation, preservation, and interpretation of important geological features of the Oregon Country; the development of the mental capacities of its members in the study of geology; and the promotion of better acquaintance and closer association among those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mrs. Ruth Harrison, 1879 S.W. 10th Avenue, Phone CA 3-0255. Regular annual dues (single or family memberships) are \$5 for residents of Multnomah and adjacent counties; \$2.50 for others; and \$2 for Junior Members. Make remittances payable to the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.

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Society Activities

(See "Calendar of the Month")

**Evening Meetings:** Formal lectures or informal round-table discussions on geological subjects, on the second and fourth Fridays of each month at Public Library Hall, S.W. 10th Avenue and Yamhill.

**Field Trips:** Usually one field trip is scheduled for each month.

**Library Night:** Once a month. Lewis and Clark College.

**Luncheons:** Informal luncheons, with geological motif, each Thursday noon in Room B, Chamber of Commerce Building, S.W. 5th Ave. and Taylor St. \$1.00 per plate.

**Publication:** The Geological News Letter, issued once each month, is the official publication.

Editor:	Dr. James Stauffer	717 - 8th Street, Oswego		BL 1-3825
Business Mgr:	Mr. Edward A. Kelham	1210 S.W. Park Ave. Apt 302	1	CA 3-5875

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CALENDAR

Buffet luncheon every Thursday noon at the Portland Chamber of Commerce, 824 S.W. Fifth Avenue, second floor. One dollar. You are welcome!

Friday  
July 12 Room B, Public Library, 7:30 PM  
Two films - "Portrait of the Earth" -- Hycon Aerial Surveys  
"The Eighth Sea" -- St. Lawrence Waterway - Caterpillar  
Tractor  
(Other films will be shown if these do not arrive on time.)

Friday  
July 26 Room B, Public Library, 7:30 PM  
"Fifteen Thousand Miles An Hour" - colored slides - Orrin E. Stanley

JULY TRIP

Sunday  
July 28 Swift Creek Dam on the Lewis River. Dinner at noon at the cookhouse at the dam for which a nominal fee will be charged. There will be a 3-hour conducted tour around the dam. Caravan leaves South side of Interstate Bridge at 8:30 A.M. SHARP. Leader of the trip is Mr. Franklin Brown.

Friday  
August 9 ANNUAL PICNIC! Little Volcano, Mount Tabor Park, 6:30 PM  
It is not too early to mark this on your calendar, that you may be with us for another happy evening of food and frolic. As in the past, the event will be a pot-luck affair, but bring your own plate, cup and silver.

Friday  
August 23 No meeting

NEW MEMBERS

Mr. and Mrs. Arna R. Taggart  
2647 Willamette Falls Drive, West Linn, Oregon

S - Mr. Mac Olissewski  
6453 S.W. Evelyn, Portland 19, Oregon

Junior  
Miss Karla Steinhauser  
0615 S.W. Palatine Hill Road, Portland 1, Oregon NE 6-3683

NEW BUSINESS MANAGER APPOINTED

ROBERT F. WILBUR has accepted the position of Business Manager of the News Letter, the post made vacant by the death of Edward A. Kelham. Bob served very efficiently as Treasurer over a long period of time and we appreciate his willingness to give of his time to further the interests of the Society.

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ARE YOU GOING TO MOVE?

PLEASE! If you change your address, please notify the Secretary promptly. Each month we have copies of the News Letter returned because the addressee has moved and we have no forwarding information!

EDWARD A. KELHAM

The Grim Reaper has again entered our ranks and called away our Business Manager, Mr. Edward A. Kelham.

Mr. Kelham was born January 31, 1898 in West Plains Missouri. His folks later moved to Idaho in the vicinity of Troy. For the past 27 years he had resided in Portland where for years he was employed by the Post Office Department. Mr. Kelham loved the out of doors and was a member of the Audubon Society, and joined our Society in 1950. He became our Business Manager in 1953. He worked out a budget for the Society and we are now living within our budget.

It was Mr. Kelham who first suggested that the prominent ridge on the east side of the Willamette River opposite Oswego be named after the Oatfields, a pioneer family in that region. It is now officially known as Oatfield Hill.

Our sympathy goes out to the bereaved family.

Mrs. Kelham has given to our Library six bound volumes of the Newsletters and several Geological Bulletins from Mr. Kelham's library.

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HERMAN A. CALEF

We regret to report the death on May 29th of a pioneer furniture man of Portland, Mr. Herman A. Calef. Mr. Calef was a brother of our fellow member, Mr. M.H. Calef.

\*\*\*\*\*

NEWS OF MEMBERS

Dr. JOHN E. ALLEN spoke Wednesday evening, June 5th over KVAN on our Northwest Neighbors Program. Subject of his talk. "Our Mount Tabor".

MR. RALPH MASON spoke to the Mariners Group of the Valley Community Church on May 11th. Mr. Mason gave an entertaining and informative talk on the geology of the familiar beauty spots in Oregon.

MISS MARGARET STEER, geologist with the State of Oregon Dept. of Geology and Mineral Industry had a fine article in May 1957 issue of Ore-Bin. The article was entitled "Fossil Localities of the Sunset Highway Area of Oregon". Her introductory paragraph was as follows:

"The Sunset Highway area in western Columbia and Washington counties, Oregon is famous for its abundant marine fossils of the Oligocene age. This fossiliferous area lies about 35 miles northwest of Portland and extends from Mist at the north end to Gaston at the south. Outcrops yielding fossils are numerous, and almost every exposure of sedimentary rock that is hard enough to have resisted weathering reveals at least a few fossils. The twelve localities described on the following pages and shown with corresponding numbers on the accompanying map are easily reached by road. Sunset Highway (US 26) bisects the area and surfaced roads lead north and south from it".

PRESIDENT'S BIRTHDAY HONORED

Friday, June 14th, some forty members and friends accepted the invitation of Mrs. Eddie Bushby to meet at the clinic of Dr. Arthur C. Jones, where he and his wife were gracious hosts at a get-together following the program at Library Hall. There a capacity audience had viewed the 3-D color slides shown by Dr. and Mrs. J.C. Stevens of Haiti and Mexico where they had traveled extensively. Of particular interest were the Mayan ruins. These informal after-program gatherings provide a happy way to get better acquainted. Members of the Society and friends are welcome to attend.

-Emily Moltzner-

THE MINES OF MOUNT LAURION

by  
Fay W. Libbey

Introduction

In the Attic Peninsula, about 25 miles south of Athens, there is a ghost locality called Laurion (or Laurium) which, in ancient times, was one of the most productive silver-lead districts of all times even measured by present-day standards.\* Besides the great extent of its metallization and long productive life, it had such history-making characteristics as intimate relationship to the economy of the State of Athens, enrichment of prominent Athenian families, and a major part in saving Athens from invasion by the Persians in the time of Themistocles. Revenues from the mines were the mainstay of Athenian finances for several centuries, and deterioration of the mines definitely marked the deterioration of the State.

The influence of the Laurion mines on the destinies of Athens has been recorded by many of the ancient historians, as Xenophon, Plutarch, Aristotle, Pliny, and Herodotus. Many modern and medieval authors have written about the Laurion mines using the background furnished by Greek historians. Agricola (1556)<sup>1</sup> describes the Mount Laurion operations, and T. A. Rickard<sup>2</sup> devotes a chapter to the subject. Boeckh<sup>3</sup> writes of the locality ".....the silver mines stretched from coast to coast in a line about sixty stadia\*\* from Anaphlystus in the southwest to Thoricus on the northeast sea. To what distance they reached downwards to Sunium and upwards to Hymettus is unknown". He also mentions Mount Laurion was a ".....high and abrupt hill covered with pine trees and abounding in marble."

The mines were owned by the State and leased to important individuals who conducted the mining operations with slaves. Xenophon<sup>4</sup> advocated state operation of the mines and outlines a plan for the purchase of State slaves. The profits from the labors of these slaves would be used to purchase more slaves which would further increase the profits to buy even more slaves and so on. There is no record that this plan was ever tried. Xenophon wrote that the more workmen the greater the monetary gains. He says, ".....no man was ever so overstocked with silver as not to desire a further increase; if there are any who have more than their occasions require, they hoard up the rest with as much pleasure as if they actually made use of it."

-----  
\*The Ore-Bin, November 1947, quotes E. DeGolyer as saying, in a commencement address at Trinity College, Hartford, Connecticut, "The silver content is estimated to have been from 40 to 120 and rarely less than 60 ounces per ton of ore. From the dumps of the old workings it is estimated that silver to the value of some \$800,000,000 was produced during the three centuries of prosperity of this district."

<sup>1</sup>Agricola, Georgius, De Re Metallica; translated by H. C. Hoover and L. H. Hoover (1912), pp. 27, 28, 29; 1950 edition.

<sup>2</sup>Rickard, T. A., The Romance of Mining; The MacMillan Company of Canada, Ltd., 1945.

<sup>3</sup>Boeckh, Augustus, The Public Economy of Athens in four books, to which is added "A Dissertation on the Silver Mines of Laurion," translated from German to English, John Murray, London, 1828.

\*\*A unit of measurement, and was the distance (606.75 feet) between terminal pillars of the stadium at Olympia. Sixty stadia would be approximately 7 miles. The Roman unit of the same name had a different value (F.W.L.).

<sup>4</sup>Xenophon (B.C. 430-354); Memorabilia and Oeconomics (English translation by E. C. Marchant Heineman, 1923).



Rickard<sup>5</sup> states that, in 431 B.C., there were 90,000 slaves in Attica in a total population of 275,000. Of this number, only 50,000 were entitled to citizenship.

### History

No authentic record exists of the discovery and first mining at Laurion. There is evidence that the district was visited by the Phoenicians who were always seeking metals in their travels. It is likely that they gouged out surface high-grade only.

Xenophon<sup>6</sup> comments that "No one ever pretended from tradition or the earliest accounts of time to determine when these mines first began to be wrought, which is proof of their antiquity; and, yet as ancient as they are, the heaps of rubbish which have been dug out of them, and lie above ground, bear no proportion with the vast quantities which still remain below, nor does there appear any sensible decay, or diminution in our mines; but as we dig on, we still discover fresh veins of silver-ore in all parts, and when we had most laborers at work in the mines, we found that we had still business for more hands than we employed."

Rickard<sup>7</sup> places the beginning of important silver production at Laurion somewhat later than the beginning of Solon's tenure in 594 B.C., and he mentions the coinage of silver at mints established at Mount Pangaeus and Laurion during the middle of the sixth century B.C. Rickard also refers to the reduction in the tithe from 10 to 5 percent at that time which, he said, both Herodotus and Aristotle ascribed to successful operations at Laurion, and indicated the prosperous conditions of the State.

Footnotes in Agricola give some historical background as follows:

"The silver mines of Mt. Laurion formed the economic mainstay of Athens for the three centuries during which the State had the ascendancy in Greece, and there can be no doubt that the dominance of Athens and its position as a sea-power were directly due to the revenues from the mines. The first workings of the mines is shrouded in mystery. The scarcity of silver in the time of Solon (638-598 B.C.) would not indicate any very considerable output at that time.....The first definite discussion of the mines in Greek record begins about 500 B.C., for about that time the royalties began to figure in the Athenian budget (Aristotle, Constitution of Athens, 47). There can be no doubt that the mines reached great prosperity prior to the Persian invasion. In the year 484 B.C., the mines returned 100 Talents (about 83,700 oz. Troy) to the Treasury, and this, on the advice of Themistocles, was devoted to the construction of the fleet which conquered the Persians at Salamis (480 B.C.).....The domination of the Macedonians under Philip and Alexander at the end of the 4th and beginning of the 3rd centuries, B.C., however, so flooded Greece with money from the mines of Thrace, that this probably interfered with Laurion; at this time, in any event, began the decadence of these mines.....Finally, Strabo writing about 30 B.C. gives the epitaph of every mining district - reworking the dumps. He says (IX,1,23): 'The silver mines in Attica, when the mines yielded a bad return to their labor, committed to the furnace the old refuse and scoria, and hence obtained very pure silver, for the former workmen had carried on the process in the furnace unskillfully.....'

"Since 1860 the mines have been worked with some success by a French company, thus carrying the mining history of this district over a period of twenty-seven centuries."

<sup>5</sup>Op. cit., p. 87.

<sup>6</sup>Op. cit.

<sup>7</sup>Op. cit.

<sup>8</sup>Op. cit., pp. 27, 28, 29.

Rickard<sup>9</sup> writes that the old slag dumps and mine workings were reworked in 1914-1918 for lead and zinc to make munitions of war once again.

#### The Mines

The ore, silver-rich galena, was found in contact deposits between limestone and schist in a series of flat alternating beds. The deposits were probably replacement bodies in the limestone with veins extending into the schist. According to Mr. Hoover,<sup>10</sup>

"The deposits are silver-lead and they occur along the contact between approximately horizontal limestones and slates. There are two principal beds of each, thus forming three principal contacts. The most metalliferous of these contacts are those at the base of the slates, the lowest contact of the series being the richest. The ore-bodies were most irregular, varying greatly in size from a thin seam between schist planes, to very large bodies containing as much as 200,000 cubic meters. The ores are argentiferous galena, accompanied by considerable amounts of blende and pyrites, all oxidized near the surface. The ores worked by the Ancients appear to have been fairly rich in lead, for the discards worked in recent years by the French company, and the pillars left behind, ran 8% to 10% lead. The upper contacts were exposed by erosion and could be entered by tunnels, but the lowest and most prolific contact line was only to be reached by shafts. The shafts were ordinarily from four to six feet square, and were undoubtedly cut by hammer and chisel; they are as much as 380 feet deep. In some cases long inclines for travelling roads join the vertical shafts in depth. The drives, whether tunnels or from shafts, were not level, but followed every caprice of the sinuous contact...If the ore were mainly overhead, it was hand-stoped, and stopes filled as work progressed, inclined winzes being occasionally driven from the stopes to the original entry drives. If the ore was mainly below, it was under-hand-stoped, pillars being left if necessary - such pillars in some cases being thirty feet high. They also employed timber and artificial pillars. The mines were practically dry. There is little evidence of breaking by fire. The ore was hand-sorted underground and was carried out by the slaves, and in some cases apparently the windlass was used. It was treated by grinding in mills and concentrating upon a sort of buddle. These concentrates, mostly galena, were smelted in low furnaces and the lead was subsequently cupelled.....Even the overseers were at times apparently slaves, for we find (Xenophon, Memorabilia, 11.,5) that Nicias paid a whole talent for a good overseer. A talent would be about 837 Troy ounces of silver. As wages of skilled labor were about two and one half pennyweights of silver per diem, and a family income of 100 ounces of silver per annum was affluence, the ratio of purchasing power of Attic coinage to modern would be about 100 to 1."

Boeckh<sup>11</sup> writes enthusiastically:

"In the age of Xenophon, the extent of the mines was continually increased as new spots abounding in ore were discovered; but to none of the bordering countries, either towards the sea, or towards the mainland, did any veins of silver extend; Attica alone, says Xenophon, received this gift of heaven."

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<sup>9</sup>Op. cit.

<sup>10</sup>Agricola, op. cit., p. 28.

<sup>11</sup>Op. cit.

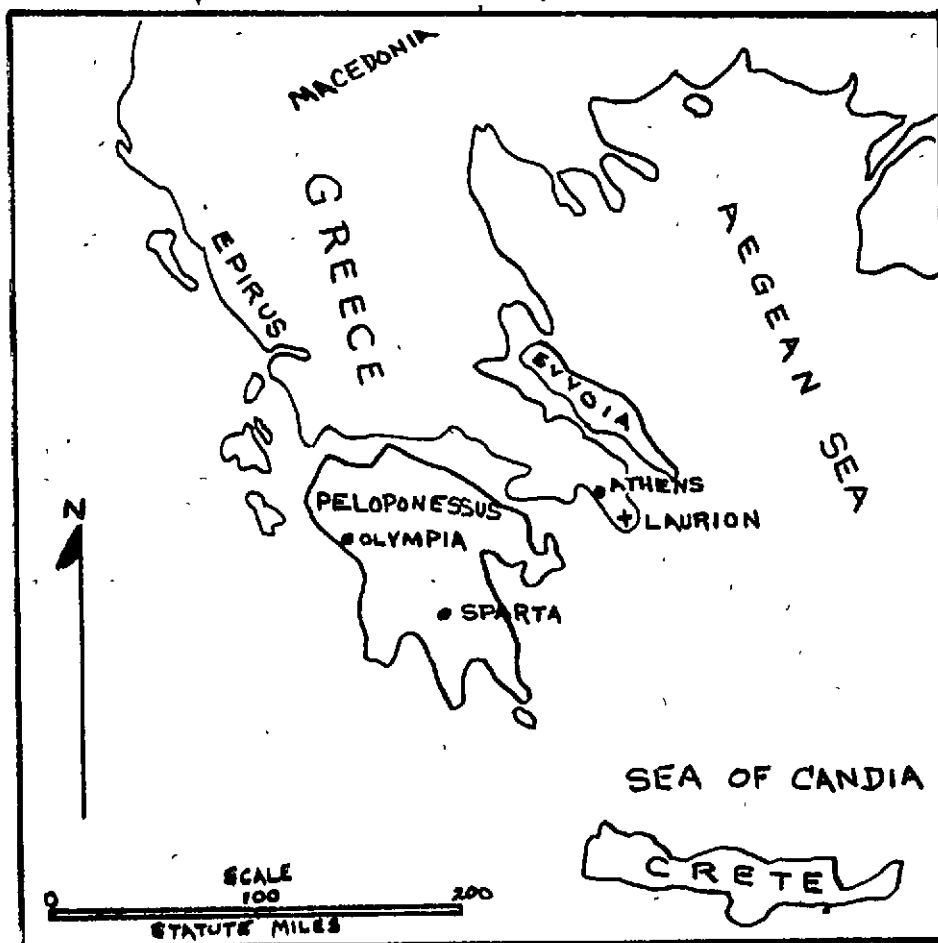
Footnote: (Dana's System of Mineralogy by Palache, Berman and Frondel, 7th Edition, vol. 11, 1951, pp. 62-63.)

Laurionite:  $[Pb(OH)Cl]$  Lead hydroxide chloride.

Crystals, orthorhombic, elongated, thick to thin granular; sometimes striated, cleavage distinct. Not brittle,  $H = 3 - 3\frac{1}{2}$ ,  $G = 6.24 - 6.14$ . Luster adamantine on pearly. Colorless to white.

Occurrence: Found in lead slags that have been exposed to the action of the sea at Laurium, Greece, associated with paralaurionite, penefieldite, fiedlerite, phosgenite, cerrussite, anglesite, and other secondary lead minerals. The Laurium mines were worked extensively by the Athenians at the time of Pericles (circa 430 B.C.) for their content of lead and especially silver. The ore which contained principally galena were smelted on the shore of the sea where slags were dumped. The mineral has been found in oxidized ore in the mine Wheal Rose near Sithney, Cornwall.

## ANCIENT GREECE



MR. & MRS. CLARENCE D. PHILLIPS TO MEET QUEEN OF ENGLAND

Seventeen Oregon lawyers, and their wives, are going to meet the Queen of England in July. They are lawyers who will attend a meeting of the American Bar Association in London from July 24 to 31. Queen Elizabeth invited them to attend a reception at Buckingham Palace July 29. Clarence D. Phillips appears in the list of those attending the Bar Association meeting.

From the Journal, June 14, 1957

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GOLD PICK EMBLEMS AVAILABLE

Members, old or new, may purchase the gold pick emblem of the society in either lapel or pin style from Karl J. Klein, Room 700, Jackson Towers, Portland.

\*\*\*\*\*

MT. RAINIER GLACIER MOVES RECORDED

Two major glaciers have pushed several hundred feet down Mt. Rainier's sides in the past three years. Nisqually Glacier moved 678 feet and Emmons made an advance of 508 feet during that period. Emmons is considered to be the largest glacier in the United States.

From the Journal, June 18, 1957

\*\*\*\*\*

PORTLAND HILLS HAVE A NEW NAME

The Tualatin Mountains is a new name on the map of Oregon. The thirty-five odd miles of mountain that borders the north and easterly sides of the Tualatin valley from the Coast Range at the divide between Gales Creek and Beaver Creek in an unbroken sweep to Lake Oswego is now named officially for the first time.

The name Tualatin Mountains has appeared on one previous map entitled "Sketch Map of Oregon Territory, Exhibiting the Locations of the Various Indian Tribes, The Districts of Country Ceded to Them, with the dates of purchases and treaties, and the Reserves of the Umpqua and Rogue River Indians." It was dated April 18, 1855.

The range is more than thirty-five miles in length and lays in Washington, Columbia and Multnomah and Clackamas counties. In area, it covers more than 200 square miles. Its height decreases from 2225 feet southwesterly of Bacona to about 500 feet at Oswego. Heights of some of the named points are: Pisgah Mountain, 2033 feet; Dixie Mountain, 1609 feet; Barnes Heights, 1260 feet; Council Crest, 1073 feet; and Mount Sylvania, 1020 feet.

Drainage enters the Nehalem River through its East Fork and Beaver Creek. The Tualatin receives the waters of Gales, Dairy, Rock and Fanno Creeks. North and South Scappoose, McCarthy, Miller, Balch, Johnson, Tanner and Tryon Creeks spill their waters into the Willamette. They were all good fishing streams in the old days.

For a Sunday drive, Skyline Boulevard and Dixie Road, along the summit of the Tualatin Mountains, offer many scenic miles to the northwest.

- H. B. Schminky -

\*\*\*\*\*

INVENTION OF DR. J. C. STEVENS USED WORLDWIDE

An ingenious device manufactured here in Portland has been keeping mechanical tab on the rise and fall of streams with unfailing accuracy according to an Oregonian news article. This instrument is an invention of our own Dr. J. C. Stevens and is manufactured by Leupold & Stevens Instruments, Inc.

KENNETH AND FLORENCE PHILLIPS WRITE FROM TURKEY

(Orrin Stanley has kindly given the News Letter permission to print a letter he has received from the Phillips who have moved to Turkey.)

U.S.G.S. - I.C.A.

A.P.O. 254, New York, N.Y.

Dear Orrin:

I have thought of you often since coming to Turkey, and of many other friends in the GSOC. I am sure they would all find Turkey a most interesting place historically and culturally as well as scenically and geologically.

The central plateau of Analia (Turkey in Asia) has topography and climate somewhat like southern Nevada. This is supposed to be the wet season, with 40 days of afternoon showers, and today is wet all right! A rain will be a big boon to the dry-land wheat farmers and to the mountain pasturage for the millions of sheep, goats, cattle and "water buffalo", on which the livelihood of most of the Turkish people depends.

So far I have had only one trip out of the city to Samsun on the Black Sea, Tokat on the old East-West caravan road, and Amasya, the ancient capital of Pontus from which the Pontic Alps derive their name. Much of that region is made up of sediments; limestones and shales especially, folded and probably faulted. I'm sure Lon Hancock would have filled a suitcase with museum specimens. I got only one little fragment from a shell imprint. But at Ankara there are some old volcanics and I am told that farther south much younger volcanic cones and tuffs may be seen.

The earthquake last week in southern Turkey was not noticed here and I think in the towns I visited a week ago which have had some very destructive quakes in the past. Amasya and Erbaa being hard hit in the '30's. By the way, it was near Amasya that Julius Caesar defeated the king of Pontus and sent back his famous message "Veni, vidi, vici".

East of Ankara thousands of clay tablets and other artifacts have been found belonging to the Hittite period, about 2,000 to 1,000 B.C. There is a museum of antiquities here in Ankara, mostly of the Hittite period. The day we were there the workmen were cleaning a couple of headless marble figures of Roman age that had just been unearthed by a bulldozer doing some excavating for future business rather than for a study of the past. Not far from our apartment is the old temple of Augustus who was Caesar at the time when Christ was born, still carrying legible inscriptions (if Latin and Greek can be legible) reciting the events of the life of Augustus. Storks were nesting on top of the walls which are no longer bridged by a roof.

Also it was at or near Ankara that the Galatians lived who were rebuked by the apostle Paul for their lack of constancy. A short distance west of here Alexander is said to have cut the Gordian knot -- could be! Looks like a good place to cut it!

April 1-30 this year is the Moslem month of Ramazan which is to be followed by a 5-day holiday May 1 to 5. We plan to go on a sight seeing trip to Bursa, famous for silk and fruits, and to Mt. Olympus in Asia, thence to Izmir, ancient Smyrna, Ephesus, and other places in famous biblical and profane history. We will miss hundreds of places we would like to see, of course; but can hardly believe that it is really us who are here in this very different, historic land.

Read Galatians, Chapter 5, verse 11.

With best wishes from us both to you and all our GSOC friends.

Kenneth and Florence Phillips

MINERALS IN OREGON'S FUTURE

In a talk on May 10th, Mr. Ralph Mason started by exploding the generally believed idea that miners and metallurgists are in the "get rich" class. There is a lot of exploration and hard work in the mining business, and the highly publicized lucky strikes are very few.

He illustrated his talk with a map of Oregon showing the locations of various mines and prospects, and said that there is now more tonnage of coal known than has been mined; and mentioned the coal deposits in the Coos Bay area being explored by the Pacific Power and Light Company for use in a steam-electric plant where water power is to be used to help in times of high demands, and the water stored by high dams when the steam plant can furnish the needed power.

Some big oil companies are drilling in Oregon to determine whether there is oil and if so, how much.

Bauxite is found in several places in the state; three cement plants are in operation; and near Baker where there is practically limitless supply of high grade limestone, there is a lime plant.

The only uranium mine in the state is near Lakeview, but some uranium has been found near Salem. Chromite has been shipped from the Grants Pass area to stockpiles for national emergency at a cost of as much as \$14.00 a ton for transportation from the mines.

Mr. Mason illustrated his remarks by a sketch of a pyramid. Near the apex a small part was marked off as the amount of gold already mined as compared with the enormously greater volume at the base of the pyramid representing the quantity yet to be found. As for oil, coal, etc., he said that there is more tonnage known than has ever been known before.

- O. E. S. -

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GLACIERS AND SUNSPOTS

That glaciers may have higher growth rates when sunspots are least numerous was discussed by Dr. Donald B. Lawrence, professor of Botany at the University of Minnesota, in his Sigma Xi lecture, "Glaciers and Vegetation in Southeastern Alaska" given recently at 30 places in northeastern United States and Canada.

The Eliot Glacier on Mount Hood appears to have reached its greatest advance about the year 1740, according to growth layers of a tree pushed over partway by the ice pressure. The Mendenhall Glacier, 12 miles north of Juneau, Alaska has receded two miles since about 1765. Nine other glaciers also had their positions in the early or middle 18th century. Radiocarbon dating shows that trees overridden by the latest advance of North American glaciers were alive less than 500 year ago. In southwestern Norway, the Nigardsbre Glacier grew larger in the late 17th century, but its recession began in 1748.

Dr. Lawrence associates these changes with the dearth of sunspots from 1645 to 1715. It was for this time also that tree-ring patterns failed to reflect the 11-year sunspot cycle. A study of a score of ridges formed during the recession of the Herbert glacier north of Juneau reveals a tendency for moraine formation (reflecting favorable glacier nutrition) to occur at the time of minimum sunspot activity in each cycle.

(The above is quoted verbatim from "News Notes" on page 332 of the May 1957 issue of SKY AND TELESCOPE, Harvard College Observatory, Mass.)

LIBRARY NIGHT PICNIC AT LEWIS AND CLARK COLLEGE

A picnic supper in the rain  
Would be a soggy sight - -  
So we met in Geology Hall  
Where all was warm and bright.

So said some fifty members and friends while they had a happy time visiting and eating - especially the latter, judging from the food consumed. Mrs. Stauffer, Mrs. Clark and Mrs. Gilchrist served generous quantities of good hot coffee. Finally Jim Stauffer, who was in charge of the program, had to suggest that the eating business be concluded so he could begin the program.

Two outstanding films from Washington State College film library were obtained for the double purpose of showing them to the Lewis and Clark Geology class and to the GSOC members and friends.

The first, "The Petrified River", is a scientific story of uranium, showing how this precious mineral was formed during the earliest ages of our ageless earth. We were taken visually to the Colorado plateau where we watched a lone, grizzled prospector clambering up and down on precipices with his Geiger counter, a small airplane flying over canyons searching for likely looking uranium-containing spots, and government men surveying and claim-staking. Scenery was beautifully spectacular.

The stages of drilling, mining and milling were shown in detail.

Scenes in the Oakridge plant gave us an on-the-spot view of operations there. We were made aware of the deadly potentialities of this radioactive substance by noting the elaborate precautionary methods used to shield the workers and the robot devices for handling it.

In a hospital, we were permitted to observe patients, one of whom had been given a drink of radioactive iodine solution preliminary to searching for a diseased condition of the thyroid gland. Another, the victim of cancer, was being treated with cobalt.

Thus we had an excellent lesson on uranium and the dangers in its improper usage. We also learned of its present and future importance in our economy as well as the partially explored field of its beneficent value in the treatment of disease.

The second movie "In the Beginning" is the geological outline of the formation of the Grand Canyon. Its showing was prefaced by Dr. Stauffer's diagram and chalk-talk illustrating the different eras and the billions of years they combine to cover.

In the story, narrated by professionals and accompanied by dramatic music and sound effects, one was actually transported to the canyon itself. We had close-ups of the various strata as we were told how they were laid down, one on the other. We saw the processes of erosion caused by rain, snow and ice from their beginning in tiny trills growing into small streams, finally becoming mighty, turbulent rivers carrying their thousands of tons of silt as they wear away the land. The destructiveness of the wind as it blows off the soil was also shown.

Fossilized remains of creatures, some of them similar to those of today were presented, as well as footprints of the mighty dinosaur.

For an enthralled half hour we seemed to be personally exploring this incredible multi-colored canyon until "the mind seemed to grow giddy by looking so far into the abyss of time".

- Emily Moltzner -

GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE



*Aug 1957*

PORTLAND, OREGON

**GEOLOGICAL NEWS-LETTER**

Official Publication of the

Geological Society of the Oregon Country

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# G E O L O G I C A L S O C I E T Y O F T H E O R E G O N C O U N T R Y

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## Officers of the Executive Board

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President:	Mr. Leroy A. Palmer	1209 S.W. 6th Avenue	4	CA 7-9347
Vice Pres:	Dr. James Stauffer	717 - 8th Street, Oswego		BL 1-3825
Secretary:	Miss Rosa Hamilton	5412 S.E. Powell Blvd.	6	HE 6-8215
Treasurer:	Mrs. Emily Moltzner	7032 S.E. Stark Street	16	CA 2-2420
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	Mr. Franklin M. Brown (1958)	Dr. Francis G. Gilchrist (1959)		
	Dr. Ruth E. Hopson (1960)			

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Library:	Mr. Rudolph Erickson	Service:	Miss Margaret L. Steere	
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Publicity:	Mr. H. Bruce Schminky	Public Relations:	Mr. Clarence D. Phillips	
		Historian:	Mrs. William F. Clark	

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## Society Objectives

To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country; the establishment and maintenance of a library and museum of geological works, maps, and specimens; the encouragement of geological study among amateurs; the support and promotion of geologic investigation in the Oregon Country; the designation, preservation, and interpretation of important geological features of the Oregon Country; the development of the mental capacities of its members in the study of geology; and the promotion of better acquaintance and closer association among those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mrs. Ruth Harrison, 1879 S.W. 10th Avenue, Phone CA 3-0255. Regular annual dues (single or family memberships) are \$5 for residents of Multnomah and adjacent counties; \$2.50 for others; and \$2 for Junior Members. Make remittances payable to the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.

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## Society Activities

(See "Calendar of the Month")

**Evening Meetings:** Formal lectures or informal round-table discussions on geological subjects, on the second and fourth Fridays of each month at Public Library Hall, S.W. 10th Avenue and Yamhill.

**Field Trips:** Usually one field trip is scheduled for each month.

**Library Night:** Once a month. Lewis and Clark College.

**Luncheons:** Informal luncheons, with geological motif, each Thursday noon in Room B, Chamber of Commerce Building, S.W. 5th Ave. and Taylor St. \$1.00 per plate.

**Publication:** The Geological News Letter, issued once each month, is the official publication.

August 1957

## CALENDAR

Buffet luncheon every Thursday noon at the Portland Chamber of Commerce, 824 SW Fifth Avenue, second floor. One dollar. You are welcome.

- Friday  
Aug. 9 Annual Picnic. Little Volcano, Mt. Tabor Park, 6:30 p.m. SHARP.  
See further instructions below.
- Friday  
Aug. 23 No meeting.
- Sat.-Sun.  
Aug. 17-18 Field trip to the Bird Creek Meadow. Mt. Adams Regional Region.  
See newspapers for further details.
- Friday  
Sept. 13 Speaker, Mr. Leroy Palmer, president of Geological Society of the Oregon Country.  
Subject: "Salt of the Earth".
- Friday  
Sept. 27 Speaker, Mr. F. W. Libbey, retired director of the State of Oregon Dept. of Geology and Mineral Industries.  
Subject: "Arizona Gold Mining Experiences".

## NEWS FLASH - PICNIC

- Friday  
Aug. 9 Annual Picnic. Little Volcano, Mt. Tabor Park, 6:30 p.m. Mark this on your calendar that you may be with us for another happy evening of food and frolic. As in the past, the event will be a pot luck affair, but bring your own plates, cups and silver. Tea, coffee, sugar, cream and butter will be provided. Fish portions will be provided for those desiring. It has been suggested by the Committee that those who attended last year bring the same as last year, and increase the portions a little. Those attending for the first time, and in doubt as to what they should bring, should contact either Mrs. Barr (PR 4-2459) or Mrs. Clark (BE 4-7096). If threatening rain - perish the idea - call either Mrs. Barr or Mrs. Clark. Remember the serving line starts at 6:30 sharp.

The shadows are beginning to lengthen - let us wander over to the Volcano Theater, where Mrs. May Bushby is "whipping up" some entertainment as an extra dessert to be traditionally epicurean picnic potluck. May is "pleading" for a second short skit (or other entertainment) and would appreciate your calling her if you have the nucleus of a plot or even if you would be willing to act a role. There will be song sheets so that all may participate in the community singing with Dr. Arthur Jones as our capable song leader. The Society could use some new songs - - - . Have you tried to write words of a geological nature to a familiar tune? You would find it fun. If your attempt is successful, please submit it to May as soon as possible, BE 4-3361, extension 361, or CA 8-3021. We would appreciate being able to locate slides of GSOC songs.

Your presence will help make the picnic a success. Be seeing you August 9.

Mrs. Ruth Schminky, Chairman  
and  
Picnic Committee

DR. ALFRED ERNEST MATTERN

Dr. Alfred Ernest Mattern, optometrist, with offices in the Morgan Building, a member of our Society, died June 22nd. Funeral services were held June 26th at Ross Hollywood Chapel. The sympathy of our Society is extended to Mrs. Mattern.

## NEW MEMBERS

Mrs. Wyvonne Pagni  
6008 SE 50th Avenue, Portland 6, Oregon

Mr. Carl Fisher  
365 Edgewater Road, Gladstone, Oregon

## CHANGE OF ADDRESS

Mr. Bill Wallace  
6823 NE Broadway, Portland 13, Oregon

Mr. Frank J. Merryman  
1856 Tyler Street, Corvallis, Oregon

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Our efficient secretary, Mrs. Rose Hamilton, is working hard on our new Directory, which will be coming out in the September Issue. She is much distressed that she has several names on the list who have not paid their dues. Will you please check and make sure your name is not on this unpaid list, as we do want your name in the Directory. Thank you.

## NEW EDITION OF ROCK BOOK PUBLISHED

A new edition of Classification of Rocks, by Dr. Russel B. Travis, assistant professor of geology at the Colorado School of Mines, is now available. This popular book originally published in 1955, has gone through two printings and is now in a new edition. It contains instructions for naming any kind of rockigneous, sedimentary, or metamorphic. Three charts and 66 photographs are included. The book sells for \$1.00 postpaid by the Department of Publications, Colorado School of Mines, Golden, Colorado.

## SEE OREGON FIRST

Now that summer is drawing near it is time to think of interesting vacation spots. One of the most interesting in our state is the Oregon Caves in Josephine County a few miles south of Grants Pass via U.S. Highway 199 to Cave Junction and thence on State Highway 46. Here one will find ample parking space, a hospitable lodge, a souvenir shop, and competent guides. Coveralls may be rented in order to protect clothing from moisture which is constantly dripping from ceilings and walls in the Caves. The good roads and accommodations are a far cry from the days of 1888 when W. G. Steel and party followed a pack trail over the mountains to their destination. The following is copied verbatim from a book published in 1890 entitled The Mountains of Oregon (see footnote).

L.F.O.

JOSEPHINE COUNTY CAVES\*

by

W. G. Steel

On Friday evening, August 24, 1888, S. S. Nicolini of Ragusa, Austria, E. D. Dewert of Portland, and the writer boarded the south-bound train for Grant's Pass, intent on a few days' outing. This town of Grant's Pass was so named for a pass in the mountains several miles south, where in early days, the silent hero camped for the night.

Early Saturday morning my head was banged up against one end of our sleeping car, an instant after hearing the shrill whistle sounding down brakes. As soon as possible I got on the outside and found the engines standing within a few feet of a yawning chasm where a bridge had been. Now, however, seven bents had been burned away and a terrible railroad accident was averted by the quick eye of Engineer Elliott, who saw the fire as we turned the curve and stopped the train almost instantly. At Grant's Pass, H.D., M.M., and F.M. Harkness joined us, and we started for the Josephine County Caves, about thirty miles due south, in the Siskiyou mountains. For twenty miles the trip was made over a very good road by wagon. At this point it became necessary to pack our things on two horses and walk over a trail into the mountains. On a hot day, this portion of the trip is very laborious, owing to the fact that it is up the steep mountain side about two-thirds of the way, and down an equally steep incline the remainder. We arrived at our destination a little before noon on the 27th, and found two openings, one above the other, and about one hundred yards apart, on the south side of a deep canyon. When out hunting a few years since, Elijah Davidson, of Williams Creek, found a bear and chased it into the lower entrance thus discovering the caves.

Each entrance is high enough to admit a person without stooping, and is probably about eight feet wide. At noon we entered the upper cave. For a few feet the floor inclined inward; we then descended a ladder for about six feet, and found ourselves in a passage way eight feet wide by an equal height, which changed, however, at every step. Now it would be wider, and now narrower, now higher and now lower. Walls, ceiling and floor were composed of solid rock. To describe them, appropriately would simply be to use a gift made divine by inspiration. No man can behold them, then impart to others an accurate idea of their appearance. Soon after entering we were compelled to progress on hands and knees, then stood upright in chambers ten feet high, the walls of which were white. Stalactites were first seen here, and involuntarily we cast sly glances around us to discover the bodies of kings preserved beneath such droppings in "King Solomon's Mines." We wandered from place to place, from chamber to chamber, dragging ourselves through passage ways barely large enough to admit a human body, while with toes and fingers we worked along, or stood in the midst of rooms that reached far above us. Now we see a beautiful pool of clearest water, surrounded by a delicate crystal formation in the shape of a bowl. In color it is as white as the driven snow, while each crystal is oblong, projecting at right angles with the main portion for about an eighth of an inch. One peculiarity of these crystals that disappointed us was the fact that they change from white to a dull, yellowish color, immediately after being removed from the caves.

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\*From The Mountains of Oregon, by W.G. Steel, p.34-39, Portland, Oregon, 1890.

We were extremely anxious to try a new process for taking photographs in the dark, so Dewert took his camera and acted as a photographer for the party. Owing to the limited space at times and cramped manner of locomotion it required the services of four men to carry the camera and accompanying necessities. Having reached a suitable place for a picture, the camera was first put in position, a board was laid on the top of it on which a tin reflector was placed, and a little powder called the lightning flash was then poured on the board in front of the reflector. At this point the order was given, "Douse the glim," and all lights were extinguished. The plate was exposed in perfect darkness, the powder was ignited, and instantly there was a flash of the most intense light. This light was so brilliant that, for several minutes, it caused in the eyes a glimmering sensation of light. Several photographs were taken in this way, which will doubtless prove excellent examples of what ingenuity can do in the dark.

It would require days of constant work to explore all the passages we found, whereas our time was limited to that portion of one day after 12 o'clock noon. For this reason we remained in the caves from noon to midnight, first examining the upper, then the lower one. This difference exists between them; The one above is possessed of fine stalactite formations, while below none appear. Instead, however, immense rocks are piled indiscriminately one upon the other, with great cracks between. Long ladders were used to climb to the top of the rocks, over the sides of which yawning pits could be seen that seemed to possess no bottom. Lack of time alone prevented us from making a thorough investigation, but I could not resist the temptation to climb over the side of one friendly rock for a few feet to see how it looked. Down for twenty feet the space remained unchanged, so that I could easily reach from rock to rock. It then widened out and I could proceed no farther without ropes, so I returned to the party. A fine stream of clear cold water flows from this cave and a strong breeze of cool air rushed forth also. At times in both upper and lower cave, the wind blew toward the entrance so that it was impossible to keep the lights burning. No traces of foul air have been found in either cave.

Before our visit, visions of square chambers filled my mind, only to be dashed aside when real ones presented themselves, the irregular shape of which could not well be surpassed. There are no parallel walls, few straight ones, but corners everywhere. The floor will pitch in all directions, likewise ceiling and walls. Beautiful views of stalactites and stalagmites stand out in bold relief against snow white walls. At the farthest extremity of the upper cave in one direction an immense chamber presents itself, and should be known as the devil's banquet hall. It is probably 75 x 150 feet and sixty in height. Great blocks of rock hang as by a thread from the ceiling, while on every side rocks of equal size lie in all conceivable shapes. Standing at the point of entry one looks at the opposite side and sees the great cracks, yawning cavities with open mouths of blackness, dismal shadows, to which flickering lights give a ghoul-ish, dance-like appearance. Yes, the devil seems to be holding high carnival, while his imps would dance the night away. They bob up and down and swing their arms in fiendish glee, while the dance goes on forever. None can look therein without seeing these imps and their antics. The floor recedes rapidly from the entrance, and is composed of great rocks scattered in confusion. We placed a number of lighted candles in different places, then climbed to the opposite side to view them. The shadows had partially disappeared, crevices and holes in the walls not before seen became suddenly black and excited our curiosity, so we climbed over high rocks into unknown passages. In a small chamber on one side we found a beautiful stream of water, falling several feet into a crystal basin. The walls of the chamber are white, and the effect by candlelight is very fine.

Midnight found us still employed, but we reluctantly ceased our labors and withdrew. Without unnecessary ceremony we wrapped our blankets about us, laid down beneath the stars, and slept the sleep of the just until 3 o'clock, when the dulcet notes of a coyote called us to the business of the day. Preparations were quickly made for the journey, and at daylight we were on our way to Grant's Pass, where we arrived at 9 o'clock P.M.

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#### AMENDMENT OF MEMBERSHIP QUALIFICATIONS

At a special meeting of the Executive Committee, July 12th, Article II, Section 3, Paragraph (1) of the Bylaws was amended to read as follows:

A Junior shall be a person over eighteen and under twenty-one years of age, or a regularly enrolled student of a college or university while carrying on studies toward a degree, such status not to exceed four years.

The amendment consists of adding the underlined words, the purpose being to make membership available to students at a time when the difference in dues of a Member and a Junior Member may be of some moment to them. It has been brought to our attention that there are a number of students who would like to join our society but are deterred because, as we all know, many of them are obliged to watch expenses very closely.

Article XII, Section 4 of the Bylaws provides that they may be amended by the Executive Committee and the amendment will take effect immediately but the action must be submitted for the approval of the Society at its next annual meeting.

This amendment will be so submitted and it is hoped that the Society will approve it.

L.A.P.

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#### LUNCHEON NOTES SINK HOLES IN IRRIGATED FIELDS Robert F. Wilbur

The appearance of crater-like openings, sometimes fifteen feet across and twelve feet deep which suddenly appear in irrigated fields in some California districts was discussed by Mr. Wilbur at the luncheon on May 2, 1957.

These craters appear suddenly in alluvial fans from streams on the east slope of the Coast Range, and sometimes require from five to thirty cubic yards of soil to re-fill them. As much as 500 cubic yards to a forty acre field may be needed. The water loss may amount to as much as three cubic feet per second if the leak in a ditch occurs at night.

These sink holes are supposed to be caused by underground channels which had been filled with brush or rubbish before being covered in subsequent floods with a layer of soil. Then when irrigation water is turned into a ditch, it may find a crack or animal burrow leading from the ditch bottom to the brush filled cavity which the flow enlarges until a large quantity of soil as well as water has been wasted.

There appears to be no way of knowing that more craters may be formed even after many have been filled and there has been no new occurrence for several years. It has been suggested that the surest way of preventing their occurrence is to irrigate by means of pipes and sprinklers.

## LUNCHEON NOTES

May 16, 1957

Dr. John E. Allen states he was holding open house in the new Geology Rooms of Portland State College, May 22, 1 to 5 p.m.

Mr. Fay W. Libbey presented to our Library a copy of his recently published bulletin "Lime Resources of the Pacific Northwest, Report No. 9".

Dr. Allen reported on trip taken recently to study scab lands and effect of Spokane flood in vicinity of Oswego and southward. In the group were Messrs. Erickson, Walker, Gilchrist, Howell and Stauffer. They may have more to tell at a later date regarding an interesting find they made out Wilsonville way.

Mr. Leroy Palmer presented to our Library Flint's "Glacial Geology and the Pleistocene Epoch". This book has been reviewed for us by Dr. Allen.

## BOOK REVIEW

"Glacial and Pleistocene Geology" by Richard Foster Flint, John Wiley & Sons, 1957.  
Price \$10.00

Dr. Flint's previous book, "Glacial Geology and the Pleistocene Epoch", published in 1947, was an outstanding contribution to the study of earth events of the last million years. But the tremendous accumulation of new facts in the intervening decade, sparked by the use of radiocarbon dating (up to 30,000 years); rhythmite chronology (up to 28,000 years); and deep sea sediment study (to 300,000 or 600,000 years) has made necessary a complete revision and publication of what is essentially a new book.

Starting with basic concepts and the study of the principles of present day ice activity, the book proceeds through a study of glacially sculptured landscapes, glacial deposits of all types, glacial soils, frozen-ground phenomena, and the evidence of lakes in non-glaciated regions. It then discusses world-wide events such as isostatic changes in level due to crustal unloading of ice and eustatic changes in sea level due to accumulation of ice on land or melting of ice caps. After two chapters on chronology and stratigraphy (with the inclusion of a number of new and hitherto unpublished correlation charts) he goes into the geographic distribution of glacial evidences and the stratigraphic record in North America, Europe, and elsewhere; and the record of the Pleistocene fossils. Finally, he examines the numerous and conflicting hypothesis that have been postulated to account for the cause or causes of ice ages.

This is an excellent and valuable survey, but to a northwesterner a little disappointing, since Dr. Flint has, in the interests of world coverage, I suppose, almost completely neglected this part of the world. No mention of the Spokane flood and its extensive (and intensive) results. One short sentence on the Willamette sound and its erratics (p.331). Out of 14 pages on loess deposits, no mention of the Palouse loessal soils. Three lines on the Mima mounds. He spends 32 pages discussing the stratigraphy of Europe, and 1 page (330-331) on the northwest.

The map of pluvial lakes on p. 227 does show the southeastern Oregon lakes, but the map of basins on p. 84 (although it is small scale) should show as well Wallowa Lake and the Scabland basins, which are of much greater significance than most of those in Canada, shown in great numbers. The map showing the glaciated areas in the western states is good - since it was taken from the G.S.A. map of North America, and indicates properly the glaciated areas in Oregon, Washington and Idaho. Some areas in southwestern Oregon have not been marked, but this is through no fault of Flint - they have not yet been described in the literature.

John Eliot Allen

10 June 1957

LUNCHEON NOTES

MY MOST UNFORGETTABLE CHARACTER

Leroy A. Palmer - May 23, 1957

Mr. Edwin F. Walter was met by chance one day in 1916 in a hotel in Yuma, Arizona that advertised "Free meals every day the sun doesn't shine". He had had a most interesting life and one of wide experience, a Civil War veteran on the staff of General Shaler, who was later professor of geology at Harvard, a civil engineer who had worked in the Southwest in the days that were really wild and wooly and an explorer who had accompanied the first expedition to the Mayan country.

Many interesting stories developed in the course of a number of visits. There was the irrigation project for which he laid out a canal and discovered that his line, established with modern surveying instruments, was following that of a canal built hundreds of years before by that mysterious race that has left traces of its civilization in the Southwest, but of which we know next to nothing.

And there was the Papago Indian who killed a white man by crushing his head with a rock. It was the boast of the Papago tribe that they had never shed a drop of white man's blood so when the sheriff went to the Indian village to arrest the offender the head man motioned to follow him. He took him to the culprit's tepee and there the sheriff found the guilty man, lying on the ground with his head crushed in exactly the same manner in which he had killed the white man.

Most interesting of all of the stories was of the expedition to Yucatan, led by the French explorer Plonjon, the first man to make a study of the ancient Mayan civilization. Here they found the ancient cities and the pyramids, the calendars and the cuneiform writings, so like those of the early Egyptians as to raise the question as to whether there might not have been communication between the two regions.

Highlight of the expedition was watching the "ceremony of the sun" which is observed in the main temple at each winter solstice. A few days before the solstice all fires in the village are extinguished and, in this case, the visitors were required to surrender their matches and smoking tobacco. Some of them were admitted with the priests to a room in the temple in which the only outside opening was a narrow slot in the wall, so placed as to admit a ray from the sun. On the first day of the ceremony it can be observed, from the ray, that the sun is receding, that is apparently moving southerly. The priests send out word to the village "The Great Sun Father is retreating. Pray that he will not leave us" and fervent prayers are offered by the villagers. At the solstice there is a period when, judging by the ray in the temple, no change in the sun's position can be detected for several days. The word goes out "The Great Sun Father is in doubt. Pray harder" and the prayers are redoubled.

Finally the word is sent forth "The Great Sun Father is returning. Rejoice." The priests light the sacred fires in the temple for another year, the villagers come to the temple and get some of the sacred fire, with which they start the fires in their homes, these fires to be maintained throughout the year. It is to be noted that the first day on which it can be noted definitely that the south declination of the sun is decreasing is the 25th of December. Hence our Christmas.

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## LUNCHEON NOTES - June 6, 1957

In addition to the seventeen members present at the weekly luncheon on June 6th was Emily Moltzner's guest, Miss Anna McQueen. . . . Rudolph Erickson, who seems to always travel with his eyes open, reported having seen an unusual rock formation on the Butte Creek road near Molalla. It had the appearance of an onion, split vertically, and was about one hundred feet across. It is at an elevation of about 3000 feet above sea level. . . . Tom Matthews brought some specimens of light-weight concrete. . . . A letter from Arthur M. Greenhall, formerly director of the Oregon Museum of Science and Industry, but now Curator of the Museum of Natural History, Royal Victoria Institute, Port of Spain, Trinidad, who is in the United States studying bats, regretting that since the Portland area is not infested with bats, he will not be able to include this area in his present studies. . . . Ralph Mason discussed the coastal sand dunes as a source of fresh water supply.

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## LUNCHEON NOTES - June 13, 1957

Dr. George Beck of the Eastern Washington College of Education met with the GSOC luncheon group on June 13, and as always, he had something interesting to tell us. This time he discussed the discovery of the Rhino Cave in the bluff overlooking Blue Lake in the coulee district of Eastern Washington. This cave is in pillow lava of the Columbia basalt and is just above a narrow shelf about twenty feet above the water level in the lake. A cast of the inside of the cave has been made verifying the assumption of the first explorers that the plastic lava surrounded the carcass of a rhinoceros. Fragments of bone picked up in the cave furnish further evidence that a "rhino" had the rock formed to fit his carcass, and he might still have been occupying this made-to-order tomb had not Mother Nature seen fit to cause the erosion of the face of the bluff to admit air to cause the disintegration of all but bones.

Your reporter, being a credulous individual was willing to believe the rhino theory after trying the cave on for size and poking his arms into the branches of the main cave said to have been caused by the animal's legs.

Cogitating on why a rhino should have been in Washington at the time of this lava flow, and what caused his death (for the position of his body when caught by the lava flow indicates that the animal may have been washed up on the shore of an ancient lake before being encased by the lava) is another case for speculation. Your guess may be as near right as anyone's.

We hope to see more of Dr. Beck, as he said he is moving either to Portland or Vancouver.

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Quoted from a letter to your reporter--

"Has it occurred to you that if you live longer than Methuselah there will still be places you have not seen, rocks that you have not touched, and paths that you have not trod?"

Certainly, but it's still fun to try for the rest.

LUNCHEON NOTES - June 20, 1957

Among the dozen around the luncheon table June 20th was Dallis Peck, guest of Hollis Dole. . . . Mr. Dole had some specimens that Dr. Underwood had left with him. One was a gold-bearing piece of magnetic hematite from Sonora, Mexico. Another exhibit was several small garnets with a pyrite coating. . . . And, right here, may we be permitted to suggest that you will get a much better idea of what happens in these luncheons by attending in person, instead of depending upon our unprofessional comments in these notes. . . . Tom Matthews had a specimen of "Yellow Cake", the final result or the treatment for uranium, being from 87% to 88%  $U_2O_8$ , and worth about \$8.00 a pound at present market. He also told about magnets which are more than fifty times as powerful as the steel magnets commonly used. . . . Leo Simon had specimens of bamboo in blossom. He told of its rapid growth -- sometimes as much as three feet in 24 hours. It is a member of the grass family. . . . Bruce Schminky brought several maps from the collection of Henry G. Richardson, formerly of the Portland city engineer's office, and told of the Tualatin Mountains which lie northwest from Portland, and of a controversy as to their being rugged enough to be actually called mountains. . . . The arguments arising at these meetings are always interesting, but with several in progress at the same time, the best way to learn about them is to come to the luncheons. To print them, one over another, as they sound, might be hard reading.

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LUNCHEON NOTES - June 27, 1957

There was an interesting ad in the Oregonian of Sunday, June 23, which told of \$1.00 "Buffet Lunch at Albert's, second floor Chamber of Commerce Building, SW 5th and Taylor. Clip this ad - it entitles you to bring a guest free. Offer applies June 24-28."

Evidently members of our group do not read ads in the Oregonian, as we had 13 members present on the 27th and not one had seen this ad!

Mr. Hollis Dole passed around two pieces of lava of the Jordan Valley section.

Mr. Rudolph Erickson had a series of Road Maps of Lane County put out by the Highway Department. Also Izee & Logdell quadrangle map and Geological map of Lower Suislaw River area, the latter by Dr. Ewart Baldwin. Also a book for our Library, J.V. Howells "Glossary of Geology and Related Sciences."

Rudy gave us a 5 minute talk on Miocene in Scott Mills area.

Tom Matthews passed around a specimen of Gadolinite from Norway. Bruce Schminky passed around bulletin from Information Service dealing with Aluminum.

Friends of the Three Sisters area had an interesting trip over the Fourth. Al Keen, back from trip to Denver and Southwest, had a fine set of Limonite pseudo morphics after Iron Pyrites.

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## LUNCHEON NOTES - July 11, 1957

There were 12 present. Rudy Erickson had as his guest Miss Hilda Freed whom he introduced as a good prospect for membership in our Society. Mr. Douglas Huegli, Director of the Oregon Museum of Science and Industry, was a welcome guest.

Jack Wolf is back with us for a short time, having finished his course at Harvard. This fall he plans to go to Berkeley to University of California, to do further research work.

Bruce passed around a small shell which Leo said was that of a rock oyster. Al Keen had a specimen of Gilsonite.

Rudy gave account of their trip to Clarno, then Mt. Rainier and way points.

Mr. Huegli passed around copy of Museum News sheet on which was printed an article taken from the Bend Bulletin of June 24, 1957. This article was as follows:

## A SERMON IN SILENCE

A sermon on a mount was preached in silence Sunday on the rocky dome of a hill overlooking the eon-sculptured John Day valley.

That sermon was followed by the story of creation.

In charge of the impressive service, under a blazing mid-morning sun was Oregon venerable paleontologist, Lon Hancock of Portland, a retired postal worker who has probed into the ancient earth and made spectacular and startling discoveries.

His audience included 40 young Oregon scientists, the oldest 16, who are attending the annual summer camp of Science and Industry near Clarno.

They climbed to the peak of a high, colored hill over a winding trail. From the heights they looked down on Camp Hancock with its village of tents in the valley below.

Rimming the vast earth bowl 20 miles to the north, 15 miles to the east and out over the rugged Fossil Range country were those massive layered rocks geologists call the Columbia basalts.

And in the deep John Day river valley below were the colored beds of the John Day Clarno formations.

A whistle sounded on the mount and there was silence, except for the chirping of birds in some junipers, and the cry of another bird attacking a circling hawk high overhead.

It was announced that church services were to be held on the mount. But there was no music, no preaching.

The sermon of silence lasted for 20 minutes. It was a period of meditation, with each youngster asked to worship in silence, "in their own faith".

A leader's whistle, that of Bob Van Atta, sounded gently, and Lon Hancock, the retired postman whose finds in the ancient Clarno clays have amazed American paleontologists, traced the story of creation.

It was a story applied to the Clarno hills, and to the role the John Day river and its winding tributaries have played in shaping the spectacular bowl that holds entombed creatures that ranged over interior Oregon millions of years ago.

Lon Hancock told of the semi-tropical forests that succeeded the final sweep of ocean over the area, traced the story of the first life of the region, described the vast sweep of John Day times, then pictured the flooding of the region with lava.

With geologist's pick at his belt and a few notes in his hand, Lon Hancock pointed to the formations he mentioned and pictured ancient lakes that cut across barriers in ancient days.

The sermon of silence and the story of creation, presented on that rangeland hill overlooking the Clarno country lasted one hour. Again the director's whistle sounded.

The service, unique in Oregon, was over.

Yet that impressive service on the mount was not the first in the region. Long ago, Thomas Congdon, Oregon's pioneer pastor-geologist, meditated in silence in those same hills.

# GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE



*Sept. 1957*

PORTLAND, OREGON

## GEOLOGICAL NEWS-LETTER

Official Publication of the

Geological Society of the Oregon Country

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G E O L O G I C A L S O C I E T Y O F T H E O R E G O N C O U N T R Y

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Field Trip:	Mr. Leo F. Simon	Research:	Mr. Rudolph Erickson
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Publicity:	Mr. H. Bruce Schminky	Public Relations:	Mr. Clarence D. Phillips
		Historian:	Mrs. William F. Clark

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Society Objectives

To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country; the establishment and maintenance of a library and museum of geological works, maps, and specimens; the encouragement of geological study among amateurs; the support and promotion of geologic investigation in the Oregon Country; the designation, preservation, and interpretation of important geological features of the Oregon Country; the development of the mental capacities of its members in the study of geology; and the promotion of better acquaintance and closer association among those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mrs. Ruth Harrison, 1879 S.W. 10th Avenue, Phone CA 3-0255. Regular annual dues (single or family memberships) are \$5 for residents of Multnomah and adjacent counties; \$2.50 for others; and \$2 for Junior Members. Make remittances payable to the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.

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Society Activities

(See "Calendar of the Month")

Evening Meetings: Formal lectures or informal round-table discussions on geological subjects, on the second and fourth Fridays of each month at Public Library Hall, S.W. 10th Avenue and Yamhill.

Field Trips: Usually one field trip is scheduled for each month.

Library Night: Once a month. Lewis and Clark College.

Luncheons: Informal luncheons, with geological motif, each Thursday noon in Room B, Chamber of Commerce Building, S.W. 5th Ave. and Taylor St. \$1.00 per plate.

Publication: The Geological News Letter, issued once each month, is the official publication.

CALENDAR

Buffet luncheon every Thursday noon at the Portland Chamber of Commerce, 824 S.W. Fifth Avenue, second floor. One dollar. You are welcome.

Friday  
Sept. 13 Speaker, Mr. Leroy Palmer, president of Geological Society of the Oregon Country.  
Subject: "Salt of the Earth".

Sunday  
Sept. 15 Sandy River Trip. See further instructions below.

Friday  
Sept. 27 Speaker, Mr. F. W. Libbey, retired director of the State of Oregon Dept. of Geology and Mineral Industries.  
Subject: "Arizona Gold Mining Experiences".

SPECIAL LECTURE SERIES

A series of three lectures has been arranged entitled "Our Silicate World". These will cover the atomic structure and other properties of this important group of minerals. To give a better understanding to the layman (and this includes most of us) these lectures will be illustrated with movies, models, drawings, etc. A fundamental knowledge of this group of minerals, comprising a high percentage of the earth's crust, will open a whole new world of understanding of all minerals. It is strongly urged that you attend all of these lectures. They will be held on successive Friday meeting nights and will be conducted by Paul Howell, geologist with the U.S. Army Corps of Engineers. Question and answer periods will follow each lecture.

Friday  
Oct. 11 Part 1 - "Our Silicate World". Introduction. Two movies from the North American Phillips Company. "The Ultimate Structure" and "Terre Incognito". Mr. Paul Howell.

Friday  
Oct. 25 Part 2 - "Our Silicate World". General Geochemistry. Paul Howell.

Friday  
Nov. 8 Part 3 - "Our Silicate World". Geochemistry of the Silicates.

SANDY RIVER TRIP

Sunday  
Sept. 15 The trip is designed to present a picture of the alluvial stages of the Sandy and Columbia rivers and their relation to the geomorphology of the area. Two alluvial stages and four formations are involved. The two alluvial stages are the High Cascade fill stage and the Spokane flood fill stage. The latter involves the buried forest of the Sandy River. The formations from oldest to youngest are: the Troutdale formation, the Sandy upland fill, the Spokane flood gravels, and the buried forest fill.

Eight stops are planned. Approximately half of them are designed to show typical deposits of each fill stage. The remainder are designed to show the geomorphology of the area.

Those making the trip will assemble at the Troutdale Grade School on top of the hill at Troutdale at 8:00 a.m., Sept. 15. Lunch will be at Buck Creek (everyone bring their own lunch) and disbandment will be at stop 8 on Section Line Road (Division Street). Trip leader will be Paul Howell.

## NEW MEMBER

Miss Hilda W. Freed  
1969 S.W. Park, Apt. 306  
Portland 1, Oregon

## CHANGE OF ADDRESS

Pfc. Irving G. Ewen  
Enlisted Detachment  
4th U.S. Army  
Fort Sam Houston, Texas

## NEWS OF MEMBERS

The Clarence Phillipses, who traveled in Europe before and after the American Bar Association meeting in London, are home. They flew the polar route to Los Angeles from Copenhagen. In the Danish capital they visited their daughter, Shirley and son-in-law, Hugh Harcourt. They also saw their new grandson, born in Edinburgh in May. Son Jim joined them in Copenhagen from military police duty in Germany.

Oregonian, August 20, 1957

Mrs. Emily Moltzner was quoted in the peoples column in the Oregonian as a grower of hollyhocks. She boasted of one being over 12 feet tall, but one W.J. Mills protested that he had one several inches taller. Our Emily still says hers is unusually tall, and is still growing.

## LUNCHEON NOTES - July 18

There were 15 present. Mrs. Loris Killian was a guest of Miss Margaret Steere and we were glad to have Mesdames Fowler, Smith and Kerr with us.

Fay Libbey had a specimen of Rhyolite on cinnabar from Horse Heaven Mine, and Miss Steere had Eocene birdbone from sedimentary inter beds in Siletz River.

Al Keen had fossilized algae from Green River formation of Utah.

Howard Rose was our 5 minute speaker, and made our mouths water or hand itch as he told of a recent fishing trip they had taken in region around Williams Lake, B.C.

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In this issue we are printing the revised membership list. Perhaps some of our members do not realize the amount of work necessary to keep this list up to date. We know that in the near future there are going to be some new telephone exchanges and some changes in zones. Will you please examine this list and check your own phone and zone numbers. If there is any correction to be made, please advise Rose Hamilton, Phone BE 6-8215.

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Some quotes from letter received from the Ford Wilsons who are now at Anchorage, Alaska.

"Ford and I are both working at the District Engineers' Office. In the States they refer to it as the Corps of Engineers. Although it is all the same thing, the District Engineer seems to get the honor here. I believe the Alaska District is supposed to have 19 commissioned officers and 1000 civilians. There is quite a turnover especially of women employees whose husbands are stationed here."

"The two large military installations are Fort Richardson and Elmendorf Air Force Base. Our office is on the Base. We have not seen too much of Alaska yet. We have been to Palmer and the Matanuska Valley. We expect to join a group of photographers on a trip to Seward next Sunday. We are members of the Alaska Prospectors' Club. They are planning weekend trips. The Engineers have their first trip planned for the 26th."

"We have never been cold here. The apartments are kept so warm that we have suffered from the heat rather than the cold. Yesterday we had a high of 71° that broke all records for May 8. The low last night of 49° was almost a record high."

"We now have 16 hours and 57 minutes of daylight. Sunrise 3:28 a.m. Sunset 8:25 p.m."

"Next week we are going on a trip of great geological interest. This will include Mt. Spurr (which covered Anchorage with ash four years ago), Augustine Volcano on the west side of Cook Inlet, Katmai National Monument (Katmai Volcano and Valley of 10,000 smokes) and a long stop on Kodiak Island before returning to Anchorage via Kenai Peninsula. That should about fill one of our 17 hour day days."

TWO GEESOCKERS IN ALASKA. I. MT. MCKINLEY AT MIDNIGHT

By Ford and Alice Wilson

FOREWARD. This is the first of what is planned to be a series of notes describing some of our adventures in the fabulous Alaska Country. By word pictures, we hope to bring to other members in GSOC the high lights of geologically interesting field trips. We thank Editor Ray Baldwin for his invitation to submit these notes to Geological Newsletter.

In the Anchorage area, we have found no true geological or rockhound clubs. For field trips, one usually must depend upon sponsored or charter trips arranged by the Alaskan Prospectors Society, various airline and travel companies, a local photo shop or other similar organizations. These tours provide a wide variety of trips to points all over Alaska. They range from short, inexpensive bus trips to nearby interest points up to elaborate all-expense air journeys to such far away places as the Pribilof Islands, Point Barrow or Nome and Kotzebue. Normally, the tours are designed for sight-seeing and photography. Geological features are the added bonus for such as us.

On June 21 occurred the shortest night of the year, some  $4\frac{1}{2}$  hours in Anchorage. The nights just before and after were nearly as short. Actually there is no darkness. Dusk changes imperceptibly to dawn as the sun dips slightly below the northern horizon.

On one of these nights, we set forth at 11 p.m. from International Airport in a chartered DC-3 of Alaska Airlines. As this was a photo trip, nearly every passenger was armed to the teeth with cameras and all the other gadgets dear to a photographers heart.

We circled briefly over the bright neon lights of downtown Anchorage, then headed northwestward over Knik Arm of Cook Inlet. Soon the plane was passing over the Susitna River flood plain, with its many meandering streams, oxbows, lakes and mottled green and brown terrain. Far below, the silt-choked Susitna River presented the beautiful pattern of a braided stream.

The Mt. McKinley mountain mass is 135 miles from Anchorage. Soon we were climbing above its rugged foothills, where ribbons of residual snow showed white on the steep brown slopes. Mt. Foraker (17,317 feet) loomed ahead to the left, while majestic Mt. McKinley (20,269 feet) towered high on the right. Within minutes we saw below a land of sheer cliffs, knife-edge ridges, a maze of snow fields, and, of course, long, sinuous glaciers. Our initial route, at 13,000 feet, was between Foraker and McKinley. We did not see the sun, but the peaks were illuminated by a pink glow from the northern sky. For some 45 minutes, the pilot circled and turned over the area, giving everyone an opportunity to shoot numerous pictures of breath-taking and everchanging views of snowland and colored sky.

Homeward bound, we descended gradually to the elevation of Anchorage, near sea level. As the plane approached the city in the dawn, the Chugach Mountains appeared high in the east, while far to the right over Cook Inlet, the Alaska and Peninsula Ranges showed white. We plan to describe these ranges in another report.

As mere earthlings, we will set foot, one of these days, in Mt. McKinley National Park and gaze upward at the grandeur of Mt. McKinley and its associated peaks. But we already know their format, their environment and the closeup details of their sculpturing.



## G S O C Picnic 1957

The annual picnic of the Geological Society of the Oregon Country and invited guests was held on Friday evening, August 9, 1957, at the usual rendezvous in the extinct crater in Mt. Tabor Park and was carried out in the accustomed manner with efficient preparation and service by the willing ladies, Mrs. Bruce Schminky, chairman, and Mesdames Anza Barr, William F. Clark, and others on the committee, with more than sufficient amount and variety of food for the guests' consumption.

The weather was made to order with the exception of a slight shower of but a few seconds duration while the crowd was eating, which sent some of the diners scurrying to their cars for overcoats and umbrellas. However, it takes more than a shower to dampen the spirits of the GeeSocksers and the meal proceeded and was finished without further interruption.

After the dinner, the crowd gathered in the open-air theater where a very delightful program of songs and skits was presented under the direction of Mrs. Bruce Schminky, chairman, with Mrs. Edward D. Bushby acting as master of ceremonies. The program opened with a welcome by President Leroy Palmer, followed by group singing from words and music flashed on a screen on the stage, led by Dr. Arthur C. Jones and accompanied on the chord organ by Mrs. Bushby. The organ was kindly loaned by Sherman Clay and was transported to and from the park by our faithful member, Ray Golden.

The skits were interspersed by lusty singing by the members. Mr. and Mrs. Edward Bushby had prepared some new songs set to familiar tunes, such as "Hit the Trail" to the tune of "The Caissons Are Rolling Along". In one of the numbers, Mrs. Averill Olson whistled an obligato to the accompaniment of clapping hands.

One musical number, "The Pageant of the Clarno", an adaptation of the Lon Hancock song, "The Hills of Oregon", and dedicated to the author was sung very effectively as a solo by Dr. Arthur Jones illustrated by colored slides of the Clarno taken by Edward Bushby and thrown on the screen by Bruce Schminky. For the first time in the history of the Society's get-to-gether, the old favorite, "The Oregon Country Ain't What She Used to Be", was not sung and we missed it. A number of novices and visitors were thus deprived of the rare privilege of learning to pronounce the jaw-breaking geological and paleontological names embodied in the song. The singing of two rounds with words by Mrs. Arthur Jones added greatly to the fun.

The skits were cleverly presented and showed no little originality in their preparation and histrionic ability on the part of the participants.

The first skit, "Fire Water", adapted as a scenario by Mrs. Jane Erickson from the book, "The Earth We Live On", by Moore, was in the nature of a pantomime with Paul Howell and Harry Munson as actors impersonating learned French and German scientists debating the time-worn subject of vulcanism versus Neptunism as a causation of the layers of rock forming the earth's crust. The narrator was Ray Baldwin who put all the punch imaginable into the dialogue. Averill Olson played the part of the serving maid. A number of the Geological kids were worked into the plot as a surprise feature and they did the disappearing act in snitching the Herr Professor's schnitzel. The gurgling sound of the Professor quaffing his stein of beer reverberated to the far reaches of the amphitheatre. Mrs. Erickson came forward to accept the plaudits of the audience.

The second skit was especially notable in having been written by one of our junior members, Alice Schminky. It was entitled "Leave It to the Women" and featured a contest on a fossil hunting expedition between a group of men and a group of women

amateur geologists. Emily Moltzner, naive cow-girl from Oklahoma with her "Geeger" counter, was the star performer, vying for honors with Bruce Schminky, the rootin' tootin' sheriff armed with a cap pistol. He was truly a fearsome sight and his menacing attitude as he fired off his pistol and barked out his blood-curdling commands struck terror to the hearts of the fossil hunters. Impersonating Lon Hancock on whose fossil preserve in the Clarno the women's group was inadvertently trespassing was Kenneth Hammill. At the close of the performance Alice Schminky was called to the stage for recognition. She in turn called Lon Hancock himself to the platform to receive the fossil skull of a "What's It" and the odd assortment of bones the women had dug up and which they offered him as penance for trespassing on his fossil claim. The crux of the plot was that the women's skill as diggers far exceeded that of the men.

The members participated in a drawing for prizes. Mary Louise Oberson, daughter of Mr. and Mrs. Louis Oberson, was asked to draw out the winning numbers from the box and, much to her surprise, she drew her own number, the prize being a choice petrified wood specimen. The second prize, also a rock trophy, went to young Johnnie Hammill, and the booby prize to Miss Myrtice Fowler.

In closing, President Palmer, Mrs. Schminky and Mrs. Bushby made grateful acknowledgement of the assistance of the committees and individuals who arranged for the picnic, the lighting, microphone and stage props, and of those who took part in the program, also of Ray Golden, Sherman Clay, and the superintendent of the park. In these speeches one note especially was sounded - that of the cheerful and willing cooperation of the participating members in making both the picnic and the program a success. It is the old spirit of the Geological Society - the perennial enthusiasm and ready response when called on that carries the organization on to successful achievement year after year. In his closing remarks President Palmer voiced the sentiment that the program had been put on in the best traditions of the Society.

Claude and Myra Adams

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Several members of the Geological Society of the Oregon Country have appeared on a television series presented weekly by the Oregon Museum of Science and Industry on KGW-TV, Channel 8. The programs, seen on Thursdays at 11:30 a.m., are part of the station's Community Workshop presentations. The theme of the series has been to point out the scientific facts behind the scenic wonders of the Northwest and thus make summer vacations and outings more enjoyable for the entire family. The following is a list of some of the programs which have been televised in the past few months and also those to be seen in the future.

- June 6 Wildflowers of Oregon. Dr. Ruth Hopson, Portland State College.
- Aug. 8 A.W. Hancock and campers from Clarno fossil beds in Central Oregon. These teen-age science camps are a regular summer activity of OMSI.
- Aug.15 Volcanoes of Oregon. Ralph Mason of the State Dept. of Geological and Mineral Industries.
- Aug.22 Petroglyphs of the Columbia Gorge. Jim Hansen, sculptor, and films taken by OMSI of the Indian rock carvings in Petroglyph Canyon at The Dalles.
- Aug.29 Identification and collecting of rocks. A.J. Keene, of the Agate and Mineral Society.
- Sept.5 Rock formations and waterfalls of the Columbia Gorge. Dr. John Allen, Portland State College.
- Sept.19 Seaweed and other forms of marine life, studied at the Coos Bay marine biology station. Dr. James Stauffer, Lewis & Clark College.
- Sept.26 Atomic fallout and problems of radiation. Dr. Clarke and Dr. O'Brien of Hanford, Washington, atomic plant, and Dr. Arthur F. Scott, physicist, Reed College.

At the June 11 Tuesday noon luncheon of the National Convention of Men's Garden Clubs, Mr. Leo Simon spoke on the "Geological Highlights of the Columbia River Gorge". The following day on their trip up Columbia River Highway Leo pointed out places of interest and passed out a sheet entitled "The Geological Interpretation of the Scenic Beauty of the Columbia River Gorge as seen from Chanticleer and Crown Point". It has often been suggested in our Society that there should be a revised hand book on Columbia River Highway. We feel Leo has made a good start. Why not make such a project one aim of our Society?

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THE GEOLOGICAL INTERPRETATION OF THE SCENIC BEAUTY OF  
THE COLUMBIA RIVER GORGE AS SEEN FROM CHANTICLEER POINT AND CROWN POINT

This awe-inspiring gorge was carved through the heart of the Cascade Mountains by the powerful Columbia River and it was cut so fast, geologically speaking, that the streams coming in at the sides were left in hanging valleys to form the beautiful waterfalls you will see. Millions of years ago red hot lava poured out on this surface and built up these mountains and volcanoes.

At Chanticleer Point we are 925 feet above the Columbia and as we look across into the State of Washington, we see a low dome, Mt. Pleasant, 1010 feet high, and further on Mt. Zion, 1656 feet high, both of which are young andesite lava volcanoes. Scoriaceous lavas are still visible at Mt. Zion's summit. Resting upon the lavas are thick beds of gravels which were laid there by the Columbia at a later date, providing evidence that it flowed at a higher elevation at one time.

The rocky cape jutting out into the water is a massive lava flow known as Cape Horn, tunnelled through by the S.P.&S.R.R. Directly behind is Fletcher Flat, 1600 feet high, a gentle sloping plateau. Table Mt. is in the background. Next in line are the conspicuous cliffs of Archer Mt., 2000 feet high. About 6 miles farther is the notched profile of Mt. Hamilton, 2400 feet elevation, a veritable wild flower garden in the spring. Table Mt., the one with the flat top, is 3420 feet high and is the north abutment of the legendary "Bridge of the Gods" whose collapse dammed the Columbia and created Cascade Rapids now drowned by the Bonneville Dam. The low pinnacle at the river's edge is Beacon Rock. It rises 800 feet above the water and is thought to be the core of an extinct volcano. If the weather is clear enough we should see Bonneville Dam.

Then on the Oregon side we see the continuation of the Cascade Mts. The middle highland is Angel's Rest, 1500 feet elevation, also known as Fort Rock. Above is Devil's Rest or Eagle's Eyrie, a volcanic vent 2500 feet high. To the right we see a peak with a long slope, Larch Mt., 4045 feet elevation, an old shield volcano.

This large amphitheatre in front of Chanticleer Point was made by a giant land slide and across it is Crown Point with its sheer drop of 600 feet. This is composed of massive basalt lavas, crowned now by the Vista House which was built to honor the pioneers who made their way down the Columbia River to the Willamette Valley. This was the route of Lewis and Clark in 1805. The rock pinnacle to the left at the river's edge is Rooster Rock.

From Crown Point we get a fine view down the river where there are visible some of the younger volcanic and erosional features. The first cliff is Chanticleer Point from which we viewed the Columbia Gorge. The point in the distance is Chamberlain Hill at Troutdale where the Sandy River, famous for smelt, enters the Columbia. In the distance is Vancouver, then upstream the towns of Camas and Washougal. Directly across the river is a high ridge whose highest peak is Silver Star Mt.

Continuing on the highway down to the river level we will see several beautiful falls. The first is Latourell Falls, 224 feet high, then Shepperd's Dell, Bridal Veil, Coopey, Mist and Wahkeena, 242 feet high. The most spectacular of them all, Multnomah, is 625 feet high. Horsetail Falls, 208 feet high, is at the highway's edge and just beyond Multnomah Falls.

MEMBERSHIP LIST - G.S.O.C.  
September 1957  
Compiled by Rose Hamilton, Secretary

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Hazelhurst, Mr. & Mrs. Glenn C.	818 N.E. Floral Place	13	BE 4-8063
Henderson, Mr. & Mrs. Dwight J.	838 S.E. Peacock Lane	15	BE 2-0814
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O#* Hodge, Dr. & Mrs. Edwin T.	2915 N.W. Luray Terrace	10	CA 3-8345
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Kerr, Miss Marguerite	5518 N. Williams Ave.	11	AT 4-8625
Klatt, Mr. Joseph F.	7315 S.E. 52nd Ave.	6	

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Laurence, Mr. & Mrs. T. Herbert	1808 S.E. 35th Place	15	BE	2-5294
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Lilly, Mr. & Mrs. Elwin R.	2125 N.E. Hancock	12	AT	2-7838
Lloyd, Mr. & Mrs. L. G.	01139 S.W. Palatine Hill Rd.	1	NE	6-4493
Lytle, Mr. & Mrs. Marvin J.	5344 S.E. 34th Ave.	2	BE	4-5152
McKay, Mrs. T.H.	3471 S.W. Patton Road	1	CA	3-6720
McLean, Miss Jill	3106 S.W. 10th Ave., Apt 23	1	CA	8-3739
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Marsh, Mr. & Mrs. Howard C.	7029 S.E. 85th Ave.	66	PR	4-0107
Marshall, Miss Emily L.	3471 S.W. Patton Rd.	1	CA	3-6720
Mason, Mr. & Mrs. Ralph S.	8159 S.W. 41st Ave.	19	CH	4-2106
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Mattern, Mrs. Alfred E.	2214 N.E. 39th Ave.	13	AT	1-0511
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Mix, Miss Adeline E.	1969 S.W. Park Ave., Apt 208	1	CA	3-9320
Moltzner, Mrs. Emily	7032 S.E. Stark	16	CA	2-2420
Mueller, Mr. Godfrey	7117 S.E. Harold St.	16	PR	4-4724
Munson, Mr. & Mrs. Harry C.	4072 N.E. 32nd Ave.	12	AT	7-6856
Nelson, Miss Clare A.	9529 N. Edison	3	AV	6-0869
Nestlen, Mr. & Mrs. Fred H.	11136 S.W. 64th Ave.	1	CH	4-3846
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Oberson, Mr. & Mrs. Louis E.	3569 N.E. Stanton St.	13	CA	7-3685
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Owen, Mrs. Lillian F.	5933 S.E. Lafayette St.	6	PR	4-9729
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# Poppleton, Miss Grace M.	12640 S.W. Riverside Dr., Oswego, Ore.		CH	4-7222
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Rawls, Mr. & Mrs. Guy R.	9285 S.W. Highway 217		CH	4-4117
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*Ruff, Mr. & Mrs. Lloyd L.	810 N.E. 52nd Ave.	13	AT	2-3664

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Spak, Mr. & Mrs. Edward	3814 S.E. Lambert	2	PR 1-8764
O Stanley, Mr. Orrin E.	2601 S.E. 49th Ave.	6	BE 5-1250
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Steere, Miss Margaret L.	2064 S.E. 72nd Ave.	16	PR 4-6382
Steller, Mr. Neil	1504 N.E. 30th Ave.	13	AT 1-0051
Sterrett, Mr. Chester K.	3320 S.W. 100th Ave.	1	CY 2-1357
Stevens, Miss Eliza	3934 S.E. Boise St.	2	PR 4-1439
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<sup>m</sup> Stone, Mr. & Mrs. Norris B.	16450 Glenmorrie Dr., Oswego, Ore.		NE 6-1154
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Taggart, Mr. & Mrs. Arna R.	2647 Willamette Falls Dr., West Linn, Ore.		8277
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Van Dermark, Miss Phyllis	9100 S.W. Garden Home Rd.	19	CH 4-3830
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Wagner, Miss Marie K.	1088 S.W. Gaines St.	1	CA 2-3493
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Williams, Mr. & Mrs. Philip M.	4858 S.E. Grant St.	15	BE 5-0612
<sup>m</sup> Wilson, Mr. & Mrs. Ford E.	1310 Bluff Rd., Apt 442-21, Anchorage, Alaska		
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Wallace, Mr. Bill	6823 N.E. Broadway	20	AL 3-3065

# GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE



*Oct. 1957*

PORTLAND, OREGON

## GEOLOGICAL NEWS-LETTER

Official Publication of the

Geological Society of the Oregon Country

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		Historian:	Mrs. William F. Clark

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## Society Objectives

To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country; the establishment and maintenance of a library and museum of geological works, maps, and specimens; the encouragement of geological study among amateurs; the support and promotion of geologic investigation in the Oregon Country; the designation, preservation, and interpretation of important geological features of the Oregon Country; the development of the mental capacities of its members in the study of geology; and the promotion of better acquaintance and closer association among those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mrs. Ruth Harrison, 1879 S.W. 10th Avenue, Phone CA 3-0255. Regular annual dues (single or family memberships) are \$5 for residents of Multnomah and adjacent counties; \$2.50 for others; and \$2 for Junior Members. Make remittances payable to the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.

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## Society Activities

(See "Calendar of the Month")

**Evening Meetings:** Formal lectures or informal round-table discussions on geological subjects, on the second and fourth Fridays of each month at Public Library Hall, S.W. 10th Avenue and Yamhill.

**Field Trips:** Usually one field trip is scheduled for each month.

**Library Night:** Once a month. Lewis and Clark College.

**Luncheons:** Informal luncheons, with geological motif, each Thursday noon in Room B, Chamber of Commerce Building, S.W. 5th Ave. and Taylor St. \$1.00 per plate.

**Publication:** The Geological News Letter, issued once each month, is the official publication.

CALENDAR

Buffet luncheon every Thursday noon at the Portland Chamber of Commerce, 824 S.W. Fifth Avenue, second floor. One dollar. You are welcome.

SPECIAL LECTURE SERIES

A series of three lectures has been arranged entitled "Our Silicate World". These will cover the atomic structure and other properties of this important group of minerals. To give a better understanding to the layman (and this includes most of us) these lectures will be illustrated with movies, models, drawings, etc. A fundamental knowledge of this group of minerals, comprising a high percentage of the earth's crust, will open a whole new world of understanding of all minerals. It is strongly urged that you attend all of these lectures. They will be held on successive Friday meeting nights and will be conducted by Paul Howell, geologist with the U.S. Army Corps of Engineers. Question and answer periods will follow each lecture.

Friday Oct. 11 Part 1 - "Our Silicate World". Introduction. Two movies from the North American Phillips Company. "The Ultimate Structure" and "Terre Incognito". Mr. Paul Howell.

Friday Oct. 25 Part 2 - "Our Silicate World". General Geochemistry. Paul Howell

Friday Nov. 8 Part 3 - "Our Silicate World". Geochemistry of the Silicates.

LIBRARY NIGHT

Tuesday Oct. 15 Biology Building, Lewis and Clark College, 7 p.m. to 10 p.m. Library browsing until about 8:30, followed by a showing of colored slides of geological interest taken by members during the past summer. Select your best 3 slides, write a brief explanatory note for each and bring them to the meeting. Slides will be shown anonymously, judges will select the best three and prizes will be given for these. If you are unable to be at the meeting send along your slides anyway. Also, if you have any library books out, please return them so that others may use them.

TRIPS

Two trips planned for October

Saturday Oct. 19 Meet at 9 a.m. at Mt. Tabor Crater - Geology of Portland area. Be sure to bring your lunch. This Saturday trip will be mainly for Boy Scouts. Leaders - Trip Committee and Bruce Schminky.

Sunday Oct. 20 Meet at 10 a.m. at Mt. Tabor Crater - Some features of Geology of Portland area. Leaders Bruce Schminky and Trip Committee. Caravan will disband about 4 p.m.

DONALD R. MCKAY

On September 16th Don McKay of 5455 S.W. Patton Road fell to his death while attempting to climb St. Peter's Dome in Columbia Gorge. A memorial service was held in the Unitarian Church at 1 p.m. Wednesday, September 18. Mr. McKay was the son-in-law of Dr. and Mrs. Arthur C. Jones. The Geological Society of the Oregon Country extends sympathy to the bereaved family.

## NEW MEMBERS

Mr. Milvoy Robosky	Star Route West, Box 49, Tillamook, Ore.,	Victor 2-4088
Dr. John Hammond	14815 S.E. Oatfield Rd., Portland 22	OL 4-5570
Mr. Richard T. West (Junior Member)	Route 1, Box 469, Lake Grove, Ore.	NE 6-5169

## CHANGES OF ADDRESS

Our plea to keep our roster up to date is getting results. Please recheck those zones and telephone numbers.

Mr. Melvin Burke	1129 S.W. Washington, Portland 14	CA 3-7133, Ext. 219
Mr. and Mrs. Edward Bushby	2626 S.W. Ravensview Dr., Portland 1	CA 8-3021
Mr. & Mrs. Stephen W. Blore	5520 S.W. Downs View Ct., Portland 1	CA 8-7977
Mr. Gregory Davis	Sherwood Terrace, 2427 Channing, Berkeley, Calif.	
Miss Grace M. Poppleton	12640 S.W. Riverside Dr., Portland 1	NE 6-4891
Mr. & Mrs. C. W. Rawls	9285 S.W. Highway 217, Portland 19	CH 4-4117
Mr. Neil Stellar	3819 S.E. Brooklyn, Portland 2	AT 1-0051
Mr. George V. Elder	6922 S.E. Brooklyn, Portland 6	PR 1-5846
N.Y. Public Library	5th Avenue and 42nd Street, New York, N.Y.	

## NEWS OF MEMBERS

Our roving Ambassador of Goodwill, Orrin E. Stanley, is off on another trip which started Sept. 12. He expects to be away about three months. He will stop at Mt. Vernon, Iowa, to make a brief visit at Cornell College, his Alma Mater, then on to New England States. At Oxford, N.H. he will attend a photographic school on fall foliage. This school is being conducted by Miss Helen Manzer of New York City. This past summer Orrin attended a session of one of her schools at Pacific Grove, Calif. The school will last for a week, after which Orrin will tour New England taking pictures, then start south through the Smokies and down to Key West before starting homeward.

At a recent convention of N.W. Federation of Mineral Clubs which was held at Tacoma, two of our members walked off with prizes. Mrs. Albert Keen took a second prize with her display of crystals and Al took a first with his display of petrified wood.

Dr. John Allen appeared Sept. 17 at 11:30 a.m. on a program sponsored by the Oregon Museum of Science and Industry on the Community Workshop, KGW-TV, channel 8. His subject was "Rock Formations and Water Falls of the Columbia Gorge".

Wednesday evening, Sept. 25th, at a Fellowship Dinner at the First Presbyterian Church, Clarence Phillips was the speaker, his subject being "A Lawyer Looks at Europe".

Messrs. Fay Libbey and Hollis Dole attended the Annual American Mining Conference, Western Division, at Salt Lake City, Sept. 9-14.

The following notice appeared in the Oregonian, Monday, Sept. 16, 1957.

## COFFEE BREAK TO HELP OMSI

"A silver 'coffee break' for the benefit of the Oregon Museum of Science and Industry will be given Tuesday by Mrs. Rudolph Erickson, 249 S.W. Glenmorrie Drive, south of Oswego. The party will be a week ahead of the coffee parties being planned for September 25 by the 'roof-raising' committee of the Museum because Mrs. Erickson and her husband will be away on a trip on the later date.

"Coffee guests will see slides taken by the Ericksons on Unit Masonry Day in mid-August when members of the Unit Masonry Association put up the science center's walls in a gigantic 'barn raising'.

"Mrs. Francis Gilchrist will assist the hostess Tuesday."

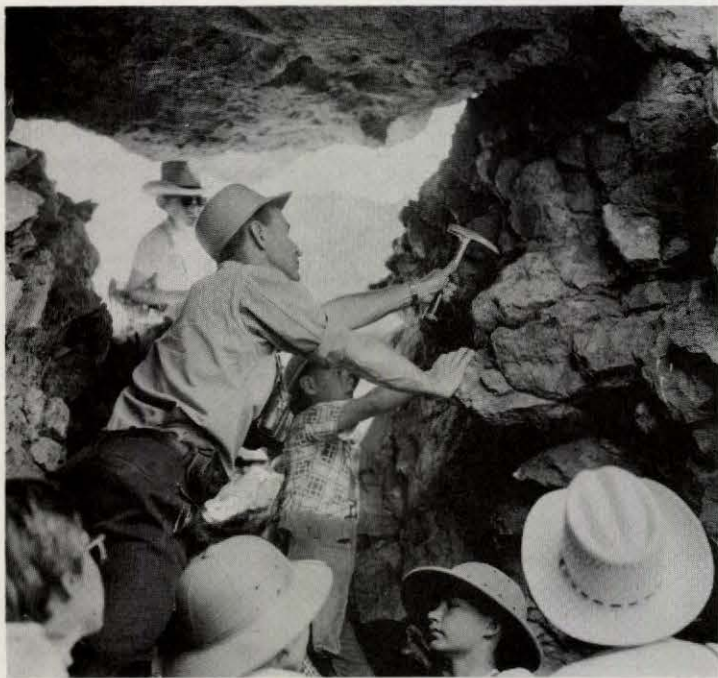
(We accused Rudolph of getting ready to go deer hunting. He said no such thing, as this was to be a real vacation including Grand Canyon and then to Berkeley, Calif. before returning to Portland.)



All hands gather for 6:25 A.M. Flag raising. Breakfast is on the table. (Second session, June 30 - July 14.)



Study of the Heavens on clear nights drew many campers to the OMSI 4-inch refracting telescope.



A formation in Clarno Age Rocks is explained to a group of campers by Ralph Mason, Camp Hancock Geologist, June 30 - July 7.



A family of black widow spiders (hundreds of 'em) get some close study by two of the girl campers.

REPORT FROM CAMP HANCOCK  
by Bob Van Atta

The Geological Society of the Oregon Country should take pride in its part in the program for young people at Camp Hancock these last seven years. The members' interest and support of this natural history camp has done much to enhance its effectiveness. The active participation of the members, as instructors and workers, has done inestimable good, not only in the immediate service to the young campers, but also in the general build-up of the policies and program each year. The preface is just exactly what it seems to be - a resounding pat-on-the-back to the Geological Society, which, along with many other friends and organizations, has done so much to establish this unique summer program.

We could not go much further without writing some word pictures concerning the nature of the camp as it developed during the current camping season, June 16th to July 28th. To accompany this there are some real pictures which will help the reader to visualize some of the many phases of Camp Hancock's program. We tried to do as much exploration as possible this camping season. To this end some of the usually frequented areas of study and collection were passed over in favor of expanding our knowledge of other locations in the Clarno Basin. A large amount of exploratory work was done in the vicinity of Hick's Ranch, approximately six miles up the John Day River from Clarno. Fossiliferous outcroppings, suspected to be of Cretaceous Age, had been reported by people living in the area but no evidence was found during three or four excursions. Some very fine quartz geodes and banded agate were located, however, about two miles above Hick's Ranch in Amine Canyon. In highly faulted volcanics immediately south of the ranch a group of campers discovered a very thick outcropping of calcite, which proved upon study in camp, to fluoresce beautifully with a cream or yellow light. The whole area in general will bear much future exploration.

It might be interpolated here that the ideas behind a more exploratory approach were threefold. Mineral and fossil localities are like mines - they play out, especially with 120 to 150 active "miners" quarrying out material each summer. Then, too, the percentage of returning campers is high each of the three sessions; although each area of study provides ample material for study and serious collection year after year, there does come a time when the "Oh, we've been there so many times before" attitude dampens even the most ardent camper's enthusiasm. Also, as previously noted, we know only a part of the rich resources for learning in the immediate vicinity of camp.

Exploration in Robinson Canyon, about five miles from camp, toward Fossil, revealed some excellent amethystine quartz geodes, zeolite geodes and other mineralization. In the area known as the Cove, including Knox Ranch, the Pentacost Ranch area was found to contain excellent leaves of Knox Ranch age and a few Upper John Day fossil localities. Serious effort was made to locate and mark each of the discoveries upon the Mitchell quadrangle map. It is hoped that this will be retained and filled in each year as other areas are explored. In the end then, each camping season should begin with a wide variety of locations for study.

It would distort the picture if Camp Hancock's program was presented as including geological study only. A sincere effort was made, although not fully realized, to maintain a balanced program in geology, biology and astronomy. We had excellent help in botany from Mr. Murray Miller. Animal biology was staffed particularly by Doug Burns and Leo Simon. Geology had the greatest number of instructors; Lloyd Ruff, Ralph Mason, Jack Wolf, Al Kenney, Paul Howell, and, of course, the dean of the camp, Lon Hancock. Astronomy was introduced by Mrs. Stella Hodges, assistant camp director, with the aid of the Museum's 4 inch telescope. It was hoped that

something could be done with the study of insects, but no instructors were available (hear ye! a "bugologist" needed each session). Mr. Leo Simon led the study of birds and general natural history when he came with us the first week of third session. An attempt was made, after a few days of general orientation to the area and its resources for collection and study in all the sciences, to place campers within special interest groups of their own choosing. In this manner a fairly well-rounded science program was maintained for each camper.

Lots could be written concerning the "extra-curricular" activities, many of which go a long way in making real natural history students of all, but space here won't permit. One innovation was the introduction of some rock-climbing instruction during the hours after supper. This has helped at least one camper in making the descent into a crevasse on Mt. Hood when glacier measurement was made by Mazamas during the latter part of the summer.

Work was done in some of the many Indian caves in the area. Technique of excavation and location of artifacts was taught to a few in the belief that this would help preserve Oregon's rich anthropological material in other areas from improper handling because of ignorance.

Perhaps by now some readers have decided that Camp Hancock is pretty highbrow and academic. It is the sincere hope of the staff that this will never happen because all the sciences are fun and Camp Hancock is a unique area for just such good times. However, it is truly believed that for just this reason the camp has a unique mission. In contrast to other types of camps, it can teach in every phase of its program. The campers generally come with the expectation of learning. Can we afford to fail them by not providing the means of fulfilling this desire?

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#### GEOLOGY DEPARTMENT TO COORDINATE SCOUT MONTH

The State Department of Geology and Mineral Industries has taken upon itself the task of coordinating the programs for the Boy Scouts in the area for October which has been designated by the national headquarters as "Geology Month". There are approximately 1500 Scout and Explorer troops in Oregon and adjacent areas all of which have been notified by the Department. It is obviously impossible for the geology department to handle all of these requests for speakers, trip leaders, motion pictures and demonstrations single-handed and mineral and rock clubs, industries and other organizations interested in geology are being asked to supply programs for scout troops requesting them.

This month-long program offers all of us interested in mining and geology an excellent opportunity to acquaint the scouts with one of the most fascinating of sciences. A boy interested in geology gets a lot more out of life, and although he may never become a professional geologist or mining engineer he may become a GSOCer--who knows?

If you wish to participate in this program, either as a speaker, demonstrator or leader, tell the State Department of Geology about it. They need your help, the scouts need help----and you will have the satisfaction of doing your bit in a worthwhile cause.

Ralph Mason



The "Dean" explains a fossil find. Scenes such as this occurred daily - keeping Lon Hancock "going" most evenings.



Lapidary equipment was in constant use during "in-camp" hours.



Leaf impressions in Clarno Conglomerate, found near Clarno, are studied by Mr. and Mrs. Klucking (Univ. of Calif. Paleo botanist) Ray Harris and Dr. Victor Gregory and son.



Campers assisted daily in the Mammai Beds, (Clarno age), learning the techniques of extraction and preservation for shipping.

## FIELD TRIP TO SWIFT DAM PROJECT ON THE LEWIS RIVER

About eighty members and friends of the G.S.O.C. assembled at the south approach to the Interstate Bridge on Sunday morning, July 28, and in about thirty or more cars drove east on the Evergreen highway about fifteen miles, then north across Clark county to the North Fork of the Lewis River where, at the confluence of Swift Creek, about 38 miles east of Woodland, Washington, the Pacific Power & Light Company is installing an earth-fill dam as the third phase in that company's development program to harness the power potential of the hard-working Lewis River. Merwin and Yale hydroelectric projects are already in operation.

The trip leader was Franklin Brown and as the caravan stopped at various places on the way to the dam Bruce Schminky kindly consented to explain the origin of the many topographical features and we found much evidence of both glacial or Ice age and volcanic deposits. The rolling mounds of the Plains and also such scenes as Tumtum Mountain were of particular interest.

The caravan arrived at Project headquarters just before noon where the hungry visitors were pleasantly surprised to learn that they were to be the guests of Colonel Beadle formerly of the Army Engineers and now in charge of the Swift project. After a most delicious and bountiful meal of baked ham with ALL the trimmings Col. Beadle took us to one end of the large mess hall where he explained the construction and technical features of the dam with the aid of charts and diagrams.

The party was then divided into two groups before taking off into the field to view first hand this tremendous undertaking which was impossible to comprehend in terms of mere diagrams or figures. As we stood on the edge of the road overlooking this vast excavation we could see the many ant-like creatures below which upon close inspection proved to be enormous trucks each capable of carrying a load as large as an average house. However, it seemed to us that tackling a job such as this even with the help of the big earth movers was like trying to pile up Mt. Tabor with a toy shovel and sand bucket. We did recall one thing mentioned on a chart at the mess hall; we were looking at the foundation and anchors of the highest earth-fill dam in the world. Just then one of the great trucks started up an incline loaded with a single rock almost as large as the truck.

The following technical features of Swift and related projects were furnished the writers by officials of the Pacific Power and Light Company.

An earth-fill type structure, the dam will rise 510 feet from its foundation and be the highest dam of its type in the world. The massive embankment will contain more than 15,300,000 cubic yards of rolled earth and rock fill. At its crest, it will reach 2,100 feet across the valley; its base will be 1,950 feet thick.

The dam will impound 740,000 acre-feet of water in a  $13\frac{1}{2}$  mile long reservoir.

Power installations will add an important block of new capacity to the Northwest Power System.

President Paul B. McKee of PP&L has announced that initial hydroelectric generation from the \$51,000,000 Swift development is scheduled for December, 1958.

Swift No. 1 power house, which will be built at the toe of the dam on the left bank, will have three turbine-generators rated at a total of 204,000 kilowatts. The maximum output of the Yale dam units is 133,000 kilowatts and the Merwin powerhouse will



generate 150,000 kilowatts after a third unit is installed. This brings the Lewis river system operated by PP&L up to 533,000 kilowatts by late 1958.

Another 70,000 kilowatts of rated capacity is scheduled for the No. 2 Swift powerhouse, which is being built by the Cowlitz County, Washington, Public Utility District at a site three miles below the main Swift project. Swift No. 1 will discharge into a canal feeding Swift No. 2 which will, in turn, discharge into Yale Reservoir.

The principal contractors for the current phase of the work, the main embankment, power and penstock tunnels and the spillway-forebay, are J.A. Jones Construction Co., Charlotte, N.C., and C.H. Tomkins Co., Washington, D.C., in a joint venture as Jones-Tomkins. Some 1,200 men are presently at work on the project. Initial excavation for the foundation and site clearing was contracted by Guy F. Atkinson Co. of Portland, Oregon. The Atkinson firm will also construct the downstream phase of the project for Cowlitz County.

Relocation of 17 miles of highway is involved in the project. Clearing for this was completed in mid-June by Kukenberg Construction Co. and J.N. Conley Co., both of Portland.

Construction on Swift started in May of 1956 and diversion of the Lewis river was done late in 1956. In June, 1957 the foundations for the dam were begun after completion of the cut-off designed to prevent seepage beneath the structure. The steel piling and concrete cut-off reaches from the foundation line 90 feet down to bedrock.

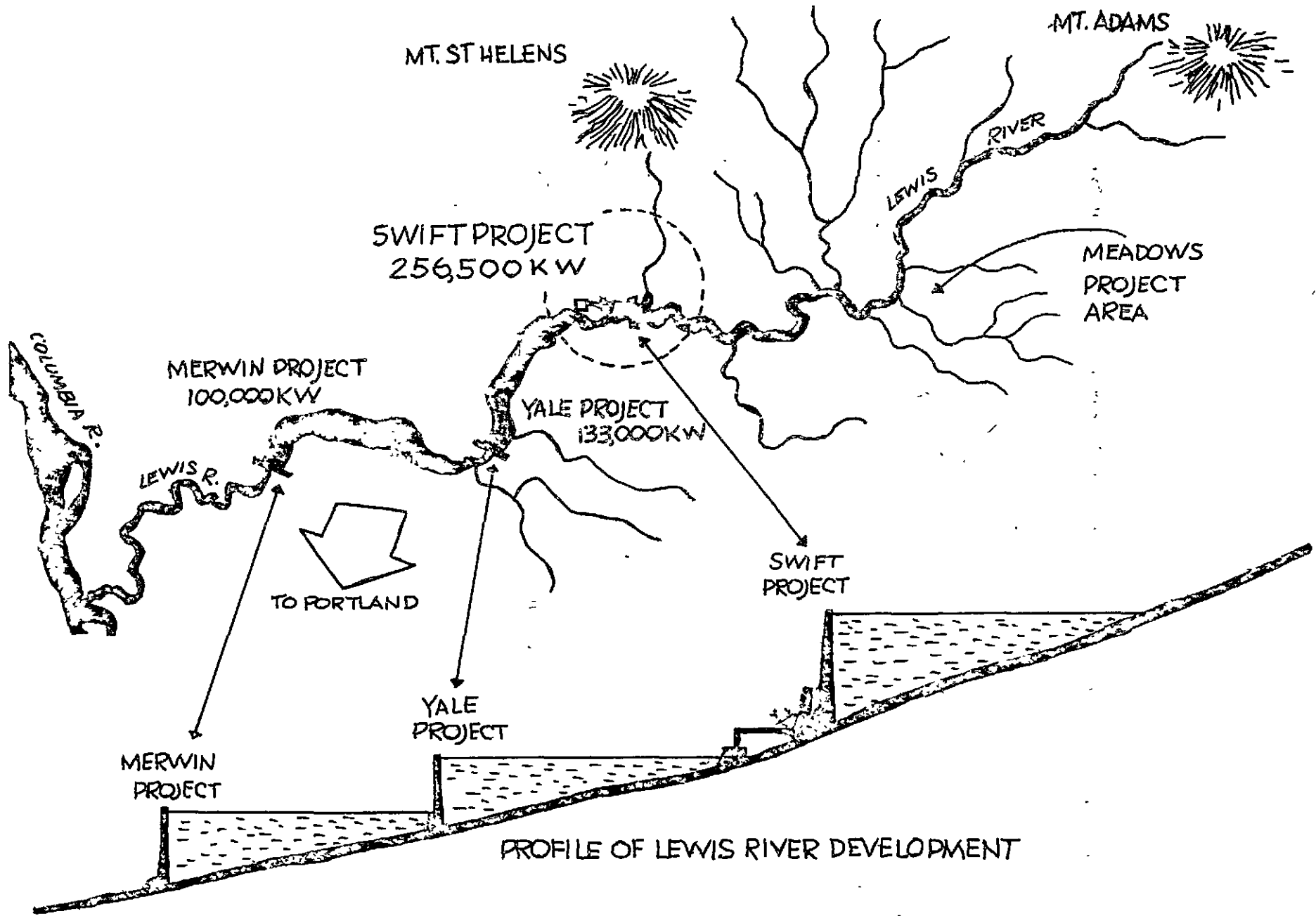
Placement of material in the dam had reached the 10 percent mark by June 15 and by the end of July it was expected that an average of 40,000 yards a day would be moved into place. The power tunnel and surge chamber have been driven through, also the two penstock tunnels branching from the main power tunnel, and the steel liners for them are being fabricated at the site by the American Pipe & Construction Co., Portland, Oregon. These huge liners are 25 feet in diameter for the main power tunnel and reduce to 13 feet in diameter for the penstock liners. At the time of our field trip excavation for the spillway and forebay was well under way.

After several hours of pleasant exploration around the project we were extended an invitation by Colonel Beadle to visit Yale and Merwin projects on the way downstream and home. Several in our group expressed a desire to see the Yale dam and our host most graciously gave us a personally conducted tour of the site and answered many questions about the project. We found that Yale is also fast becoming a popular recreational area. Boats and water sports were much in evidence, and a water skier with Mt. St. Helens as a background was indeed a beautiful sight.

We are very thankful to those people of the PP&L staff who gave up their day of rest that we might be well fed and well informed as to what was happening to the geology of the Lewis river.

After taking leave of Colonel Beadle and starting for home we couldn't help but wonder how many more millions of loads the trucks and shovels had ahead of them in order to build the mountain across the Lewis river channel.

Orrin Stanley and Franklin Brown



MT. ST HELENS

MT. ADAMS

SWIFT PROJECT  
256,500 KW

MEADOWS  
PROJECT  
AREA

MERWIN PROJECT  
100,000 KW

YALE PROJECT  
133,000 KW

COLUMBIA R.

LEWIS R.

LEWIS  
RIVER

TO PORTLAND

SWIFT  
PROJECT

YALE  
PROJECT

MERWIN  
PROJECT

PROFILE OF LEWIS RIVER DEVELOPMENT

## LUNCHEON NOTES - Sept. 5

There were twenty present at the luncheon. Al Keen reviewed his talk at Community Workshop program, August 29, over KGW-TV.

President Palmer gave talk of the day telling of the failure of dam in Santa Clara River, California, with loss of many lives and ruination of hundreds of acres of valuable farm land.

## LUNCHEON NOTES - Sept. 12

There were thirteen present at the luncheon. Rudolph Erickson passed around something that looked like a piece of petrified beefsteak, but he said it was iron, which came from the site of the old blast furnace at Oswego. Leo Simon had a specimen of Pyroxene. Mrs. Gregory had what looked like foliage of sequoia in matrix, and she said it came from Stinking Water area. Bruce Schminky had a mineral information bulletin telling about mining around Bishop, California.

We were glad to welcome back Clarence Phillips who had just returned from a tour of Europe after attending the first joint meeting of lawyers of America and Great Britain. He told of visit to Buckingham Palace and ground, and their trip over Europe looking for Ken Phillips. At several hotels they would get the message, "Kilroy was here", but they finally caught up with them in Holland.

## LUNCHEON NOTES - Sept. 19

There were twenty present at the luncheon. Miss Freed had as her guest Mrs. Douglas E. Cameron. Miss Freed also had some rock specimens from the Wallowas which she wanted identified. She certainly picked the right Thursday, as one member said it has been a long time since we have had as many professional geologists and mining men at a luncheon.

Dr. Allen called attention to Geological Society of America annual meeting next Spring with Eugene as the host. He urged all our members who possibly could to attend the meeting.

Rudolph Erickson told of fine trip last Sunday starting at Troutdale on Sandy River, led by Paul Howell. There were 12 cars in the caravan and about 30 people in the group. He said it was one of the most interesting trips he had ever attended.

Bruce had a bulletin describing copper deposits of Skamania County.

Leo Simon was our five-minute speaker. He and Mrs. Simon had attended a convention of N.W. Federation of Mineral Society meeting at Tacoma. They continued on a trip around the Olympia Peninsula. The trip up to Deer Park and Blue Mountain was quite a thrill, 17 miles of narrow, steep winding road, but the view from the top was very fine. He mentioned fact that Hurricane Ridge was well named. They visited Olympic Hot Springs then the Rain Forest on Pacific Slope.

Dr. Ewart Baldwin was at this luncheon, and some of us were fortunate enough to get copies of his interesting bulletin on "Drainage Changes of the Willamette River at Oregon City and Oswego".

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We are always glad to welcome our friends at Wake Robin, 4300 S.W. Laurelwood Drive. For the benefit of some of our Geological Society friends, will say we live on East side of street --- the power line is on the west side of same.

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## NEW EDITION OF ROCK BOOK PUBLISHED

A new edition of Classification of Rocks by Dr. Russel B. Travis, assistant professor of geology at the Colorado School of Mines, is now available. This popular book, originally published in 1955, has gone through two printings and is now in a new edition. It contains instructions for naming any kind of rockigneous, sedimentary, or metamorphic. Three charts and 66 photographs are included. The book sells for \$1.00 postpaid by the Department of Publications, Colorado School of Mines, Golden, Colorado.

FROM RICHES TO RAGS TO RICHES

The Calico Mountains in the Mohave Desert are well named. Their variegated colors, sometimes brilliant, other times somber, as the rays of the sun may strike them, could well remind one of the many colors of a piece of calico cloth. And it might be noted that in the days when the camp of Calico was in its prime the local newspaper was named "The Calico Print".

The mountains are an isolated group about six miles long and three miles wide, an uplift in which lavas are mingled with lake beds, all of Tertiary age and of varying composition. They rest on a basement of pre-Tertiary crystalline rocks as evidenced by occasional granite boulders, some of considerable size, which have been ejected by the volcanoes.

The first discoveries were made in 1879 and in 1881 rich ores were found and the town of Calico came into being. It was essentially a silver camp, the ores occurring as chlorides and bromides, mostly in a barite gangue. Shipments assayed as high as \$2000 per ton and ore carrying less than \$30 was considered low grade.

Calico boomed but, unlike some of its contemporaries, it was comparatively peaceful. There was plenty of liquor and one could always find a game but crimes of violence were rare; there was no Boot Hill and "a man for breakfast" was unknown. With such rich ore at stake greed inevitably entered the picture but it was expressed in legal actions rather than in violence. There were some notable lawsuits over extralateral rights with batteries of highpowered lawyers and geologists in which, as usual, whoever won lost and both sides were impoverished.

But silver is a fickle mistress and very sensitive to economic conditions. From a price of \$1.13 an ounce in the early 'nineties it dropped to half of that. The rich deposits had been worked out and the mines could not be made to pay at the low price. Soon after 1896 the camp folded up, the residents moved away and the buildings fell into ruins. From time to time a few leasers, "chloriders" they were called, operated in a desultory way, searching for pockets of rich ore but Calico became just about the ghostiest ghost town one could imagine.

When this writer first saw the camp, about 1918, there were less than a half-dozen buildings standing and all but one in ruins. The one was occupied by an oldtimer and his wife, who had some holdings in the area and held on hoping that "something would turn up." An effort, backed by ample capital, was made during the 'twenties to prove extensions of the rich ore bodies but the net result was to prove that while the veins went to some depth the ore shoots were shallow, and so Calico was deader than ever.

South of the Calico Mountains is the valley of the Mohave River, one of those "upside down rivers" with sand on top and water at depth, so that one with the hardihood to drill a well and equip it can go into the farming business. Here, many years ago, but after the heyday of Calico, a family named Knott took up a homestead. After some years of battling the desert with indifferent success they moved to Buena Park in the Los Angeles area and acquired a smaller tract of intensively cultivated land and set up a roadside stand for the sale of products from their small farm. Hard work and good business judgment paid off. The roadside stand became a restaurant, a unique Western museum was added, the fame of "Knott's Berry Farm" spread throughout the land and the Knott family prospered.

The desert casts a spell over many of those who have lived in it and in their prosperity the Knotts often thought, with some nostalgia, of their years in the

Mohave Valley and finally decided to do something about it and produced an idea as unique as that which had made their famous Berry Farm the success that it was. They bought the old townsite of Calico and, after much research to insure a faithful reproduction, are now restoring it so that it represents, as closely as possible, just what the old camp was like in its palmy days.

The site is only three miles from a main East-West highway (U.S. 91) and now the sightseer can observe what a live mining camp was like in the days when men underwent hardships and took big chances to make Mother Nature give up her hidden treasures.

L.A.P.

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#### NEW GEOLOGIC MAPS AVAILABLE FOR OREGON

In the past months two new geologic maps of areas in Oregon have been published by the U.S. Geological Survey. These maps may be ordered from the U.S. Geological Survey, Denver Federal Center, Denver, Colorado, at the prices indicated.

1. Map MF 82 - Reconnaissance geologic map of the Izee and Logdell quadrangles, Oregon, by R.E. Wallace and J.A. Calkins. Price 50 cents.

This map shows the geology of the area lying between Suplee and Silvies in the southern part of Grant County and is part of the large region of Triassic and Jurassic formations of east central Oregon described in 1941 by Lupher. Many fossiliferous outcrops are located on the map. The map is in black and white with patterns and symbols to indicate the geologic formations. It has to be colored in order to be easily readable. A text accompanies it.

2. Map OM 186 - Geologic map of the lower Siuslaw River area, Oregon, by E.M. Baldwin. Price 50 cents.

This map is part of the Oil and Gas Investigations Series of western Oregon. It covers four quadrangles (Heceta Head, Mapleton, Florence, and Goodwin Peak) in the coastal region of Lane and Douglas counties. This large area is underlain almost entirely by the Tye formation of Eocene age composed of rhythmically bedded sandstone and siltstone containing much fragmental plant material. Igneous dikes many miles long penetrate the Tye formation and nearly all of them trend east-west. Eocene volcanic rocks form the rugged coast in the Heceta Head area, and Pleistocene sand and alluvium occur in the wide dune area along the coast and in the stream valleys. No text accompanies this map, but the legend gives the ages and lithology of the deposits.

#### LEBANON QUADRANGLE PUBLISHED

The State Department of Geology and Mineral Industries has recently published Reconnaissance Geologic Map of the Lebanon Quadrangle, Oregon, by Ira S. Allison and Wayne M. Felts. The map is in color and has a text on the back. It may be obtained from the Department's office at 1069 State Office Building, Portland. Price is 75 cents.

The Lebanon quadrangle lies due east of Albany along the eastern margin of the Willamette Valley. The ancient shore line of the Oligocene sea passes north-south through the center of this area. As shown on the map, Oligocene marine sediments (Eugene formation) occur on the western side of the quadrangle. They are particularly well-exposed at Peterson Butte where they contain marine shells at several outcrops. Oligocene terrestrial sediments and volcanics are exposed along the eastern side of the quadrangle and contain several fossil leaf localities, chief of which is the well-known Scio flora on Franklin Butte. The Oligocene formations are overlain in places by Stayton lavas (Columbia River basalt), and are intruded locally by basic volcanic dikes and pipes. Pleistocene gravels of several glacial stages are widespread on terraces in the valleys of the North and South Santiam rivers.

# GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE



*Nov. 1957*

PORTLAND, OREGON

## GEOLOGICAL NEWS-LETTER

Official Publication of the

Geological Society of the Oregon Country

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Dept. of Geology & Mineral Industries  
1069 State Office Bldg.  
Portland 1, Oregon

G E O L O G I C A L   S O C I E T Y   O F   T H E   O R E G O N   C O U N T R Y

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Vice Pres:	Dr. James Stauffer	717 - 8th Street, Oswego		BL 1-3825
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	Mr. Franklin M. Brown (1958)	Dr. Francis G. Gilchrist (1959)		
	Dr. Ruth E. Hopson (1960)			

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Committee Chairmen

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Field Trip:	Mr. Leo F. Simon	Research:	Mr. Rudolph Erickson
Library:	Mr. Rudolph Erickson	Service:	Miss Margaret L. Steere
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Publicity:	Mr. H. Bruce Schminky	Public Relations:	Mr. Clarence D. Phillips
		Historian:	Mrs. William F. Clark

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Society Objectives

To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country; the establishment and maintenance of a library and museum of geological works, maps, and specimens; the encouragement of geological study among amateurs; the support and promotion of geologic investigation in the Oregon Country; the designation, preservation, and interpretation of important geological features of the Oregon Country; the development of the mental capacities of its members in the study of geology; and the promotion of better acquaintance and closer association among those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mrs. Ruth Harrison, 1879 S.W. 10th Avenue, Phone CA 3-0255. Regular annual dues (single or family memberships) are \$5 for residents of Multnomah and adjacent counties; \$2.50 for others; and \$2 for Junior Members. Make remittances payable to the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.

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Society Activities

(See "Calendar of the Month")

**Evening Meetings:** Formal lectures or informal round-table discussions on geological subjects, on the second and fourth Fridays of each month at Public Library Hall, S.W. 10th Avenue and Yamhill.

**Field Trips:** Usually one field trip is scheduled for each month.

**Library Night:** Once a month. Lewis and Clark College.

**Luncheons:** Informal luncheons, with geological motif, each Thursday noon in Room B, Chamber of Commerce Building, S.W. 5th Ave. and Taylor St. \$1.00 per plate.

**Publication:** The Geological News Letter, issued once each month, is the official publication.

Nov. 1957

## CALENDAR

Buffet luncheon every Thursday noon at the Portland Chamber of Commerce, 824 S. W. Fifth Avenue, second floor. One dollar. You are welcome.

## LECTURE

Friday  
Nov. 8 "Our Silicate World". Geochemistry of the Silicates.  
Speaker Paul Horvath.

## FIELD TRIP

Sunday  
Nov. 10 Visit to Oregon Portland Cement Plant at Oswego. This part of trip lead by Lawrence Newland.

Rudy Erickson will take us to Old Blast Furnace where we can pick up some specimens. If weather permits visit other places of Geological interest.

Trip starts at 1:30 P. M. from Richfield Service Station, on Highway 99W, north end of Oswego.

## LIBRARY NIGHT

Tuesday  
Nov. 19 At Biology Building, Lewis & Clark College. 7-8 P. M. Library study.

8-9:30 - Laboratory study of some of the common minerals, including those found in igneous rocks. To be followed, if there is sufficient interest, by a study of other minerals at a later library night. Especially for new members and others who have had little experience with minerals.

9:30 - 10. Refreshments.

Friday  
Nov. 22 No meeting.

Friday  
Dec. 13 Lecture. Geophysical Features of Willamette Valley - Dr. Stauffer.

Friday  
Dec. 27 No meeting

## NEW MEMBERS

Mr. & Mrs. Gerald H. Clawson	6604 E. Burnside St., Portland 16.	Be 6-8736
Mr. Allen Gibbons	3244 N. E. 47th Ave., Portland 13	AT 2-6514

## Renewal

Miss Jaquette Spaulding 7730 S. W. Macadam Ave., Zone 1



We try to give credit to those who contribute articles and pictures to our Newsletter. To be fair to those who assemble and get out the Newsletter we must set a deadline of the 20th of month preceding issue. Last month we were forced to hurry with some articles at last minute, and we did not give Mr. Ed Bushby credit for those very fine photos of his used in Mr. Bob Van Att's article on Camp Hancock. Our apologies to Mr. Bushby.

GEOLOGIC MAP OF PORTLAND QUADRANGLE  
PUBLISHED BY U. S. GEOL. SURVEY

"Geology of the Portland quadrangle, Oregon-Washington," by Donald E. Trimble, has just been published by the U. S. Geological Survey as Map GQ 104. The map has a scale of 1 inch to the mile and depicts in color and pattern the various geologic formations present. A text describing these formations accompanies the map on a single folded sheet. The map may be obtained from the Denver Federal Center, Denver, Colorado. Price is \$1.00.

Mapping of the Portland quadrangle was done by Mr. Trimble during the years 1948 to 1953 as part of a larger field investigation in the Portland region, results of which will be published in bulletin form by the Survey at a later date.

The area occupied by the Portland quadrangle is a broad structural basin in which the bedrock is largely mantled by surficial deposits. The bedrock consists of two series of Tertiary basaltic lavas, Columbia River basalt and Boring lava, separated by more than 1000 feet of sedimentary rocks of the Troutdale formation. A careful study of the Troutdale formation in this and adjacent areas has revealed an upper and lower member in the unit. The surficial deposits in the quadrangle consist of Pleistocene clayey silt believed to be of windblown origin capping the Portland hills; widespread lacustrine gravel, sand, silt, and clay deposited by ponded Pleistocene flood waters; Pleistocene alluvium; and Recent sand, silt, and bog deposits.

Mineral resources in the area consist of construction materials and ground water. Sand and gravel, available in abundant supply in the Pleistocene lacustrine deposits, are used extensively for road metal and concrete aggregate. Columbia River basalt and Boring lava are used satisfactorily for road metal, riprap, and building stone. Two clay deposits in the area support brick and tile plants. Columbia River basalt and Troutdale gravels are the chief sources of ground water in the Portland quadrangle.

-September Ore-Bin.

CAT STRIKES PERMA-FROST 20 FEET Deep.

A buried ice field at least 300 feet wide was unearthed last week (summer 1957) three miles west of Northwestern lake in Buck Creek Canyon by Don Gibbons who was cutting a mountain side road to install the new W. S. water main.

Gibbons' D-8 cat struck the permafrost 20 feet under the surface where it has held the earth in an icy vice for perhaps thousands of years.

The ground was frozen much too hard for the powerful tractor to budge until several days of direct sunshine had melted and exposed permafrost which contained chunks of clear ice as big as a man's fist.

A similar vein of permafrost was found when Hood River excavated their reservoir, according to Tom McBride, inspector on the White Salmon water job.

-Recent article from White Salmon Wash.  
. Paper.

## A PRELIMINARY CONCEPT OF THE STRATIGRAPHY AND STRUCTURE ALONG PART OF THE COAST RANGE ESCARPMENT IN DOUGLAS COUNTY, OREGON

F. D. HANSEN

March 1957

### INTRODUCTION

The area investigated lies along the east front of the Coast Range off the north flank of the Klamath Mountains from Tenmile Creek to the Umpqua River at Coles Valley, about 15 miles northwest of Roseburg. In this area are two primary geomorphic features--the eastern escarpment of the Coast Range and the Umpqua drainage basin. The former is a bold and thickly forested ridge of gently northwest-dipping Tyee sandstone. The latter is the highly punctuated area between the Coast Range to the west and the Cascade Range to the east. The Umpqua River, an antecedent stream, flows across these features.

It is the purpose of this paper to record the writer's concept of the general stratigraphic and structural relationships along the Tyee escarpment. Geology upon which this concept is based was mapped during the winter and spring of 1951 on Metsker township maps using Brunton compass and pace methods.

Two previously described and named sedimentary formations crop out within the area, the Umpqua and overlying Tyee, both middle Eocene in age (Diller, 1898). Because of the scattered nature of the outcrops and the lithologic homogeneity of much of the Umpqua formation, stratigraphic and structural relationships are difficult to determine. Distinctive lithologic units are too thick to have disclosed much more than the larger structural movements.

The writer is indebted to Mr. G. S. Knox, geologist for the Phillips Petroleum Company, for his contribution to the understanding of the geologic problems and partial development of the written text. Acknowledgment is also due Mr. L. R. Child, of Grants Pass, Oregon, for his stimulation of field work in this area.

### STRATIGRAPHY

#### UMPQUA FORMATION,

The Umpqua, generally consisting of alternating beds of marine shale, siltstone, and thin argillaceous sandstone, can be divided into four poorly-defined lithologic units arbitrarily called the upper, middle, lower, and basal members. The lower contact was seen only on and near Tenmile Creek in which locality a thin series of basal sandstones and shales overlain, with possible unconformity, by massive conglomerate rests unconformably upon a complex of sedimentary, igneous, and metamorphic rocks named the Myrtle formation by Diller, but called the Cretaceous-Jurassic basement in this paper. The lower series of shales and sandstones, exact age for which has not been determined, is probably of lower Eocene age.

Basal Umpqua is best exposed in the vicinity of Tenmile where it stands out as steep hills of fine to coarse, poorly-sorted, moderately well indurated and cemented conglomerate with interbedded sandstone. Pebbles and cobbles of this conglomerate range up to eight inches in diameter and are composed of sub-angular to well-rounded metamorphic rocks, quartz, and quartzite of the basement complex. Estimated total thickness of this member in this area is 1450 feet.

Lower Umpque is roughly estimated to range from 2000 to 4000 feet in thickness and is composed predominantly of dark gray to brown regularly-bedded carbonaceous, calcareous, silty to sandy shale with thin interbeds of non-micaceous fine to medium-grained feldspathic sandstone or graywacke. The sandstones are, in places, tuffaceous and contain fragments of chert, shale, and metamorphic rocks. Thin argillaceous limestone beds and concretions are commonly found with the shales.

Middle Umpque is defined as a series of fairly massive medium-brown weathering fine to coarse-grained finely micaceous and occasionally pebbly arkosic or feldspathic sandstones having an estimated thickness ranging from 350 to 500 feet. This sandstone series can be observed on the steep slopes of Woodruff Mountain, Cleveland Hill, and along the Wardton-Reston road in T. 27 S., R. 7 W. It also may be seen holding up various ridges in T. 28 S., R. 7 W. East of the discussed area, where it overlies the Eocene basalts, this series is also characterized by fine to medium conglomerates containing pebbles derived from the volcanics.

Upper Umpque, which ranges from about 800 to 1200 feet in thickness, differs only slightly from lower Umpqua and is difficult to impossible to differentiate lithologically. Generally the lower Umpqua shales seem to be harder, the black color tends to be better preserved at the surface, and thin limestone beds are more numerous. Upper Umpqua shales frequently exhibit secondary fracture to such an extent that bedding is obscured or obliterated. The uppermost portion is gradational with the overlying Tyee sandstone and consists of alternating gray to brown fine to medium-grained micaceous arkosic or feldspathic sandstone and olive-green to black silty and calcareous shale. A few thin lignite seams are present and carbonized plant fragments are common.

Diller, along the Little and North Umpqua Rivers, measured 12,000 feet of Umpqua, while Turner (1938) measured 6300 feet along the middle fork of the Coquille River. Diller's is a faulted section and is not believed to be as thick as reported. Aggregate thickness of the Umpqua formation in the area under consideration is estimated to range from 4600 to 7200 feet.

#### TYEE SANDSTONE:

The Tyee is the predominant formation of the southern Oregon Coast Range and caps the eastern escarpment of the range. There has been some question as to its relationship with the Umpqua (Turner, 1938 and Baldwin, 1947). Exposures near Landers Lookout and on the Coos Bay wagon road near Reston indicate the

conformability of these formations. In Coles Valley, structural incompatibility suggests unconformity, but where the actual contact was examined a gradational zone is present and attitudes in upper Umpqua and Tyee are generally very similar when in or near vertical section.

Tyee sandstone, generally a medium-gray medium to coarse-grained micaceous arkosic or feldspathic sandstone with occasional thin dark gray shale partings, is lithologically similar to that of the Umpqua, differing chiefly in its more massive bedding, better sorting, and its content of large and abundant flakes of muscovite. About 1100 feet of Tyee is exposed in a steep slope on Tyee Mountain, its type section. In the section on Coquille River, Turner measured more than 3000 feet of beds, mostly sandstone, with a 270 foot shale break near the middle. Average thickness along the Tyee front is about 800 feet.

### STRUCTURE

The area in general is characterized by broad gentle folds in the competent Tyee, middle Umpqua, and basal Umpqua beds with incompetent contortion in the Umpqua shales and siltstones. Drag folding, occasionally resulting in wide areas of contortion, often gives the appearance of unconformity or faulting.

Diller obviously recognized the generally simple overlying structure of the Coast Range region and consequently did not publish the secondary structural complexities to the east of the Tyee front. He suggested the possibility of faults, but apparently did not realize their nature or extent. A series of faults between Roseburg and the coast is shown by Harrison and Eaton (1920) as well as by Smith (1938). Turner suggested the possibility of low angle thrusting toward the east. There have been no publications of detailed mapping in the area.

Profound northeast-trending ramp thrusts, having displacements of as much as 1000 to 3000 feet from the southeast, lie to the east of the escarpment. The escarpment itself apparently is primarily the result of erosion with some fault control. Exact age determination for fault displacement is difficult to impossible in view of the size of the area under discussion and the short time interval represented by the disturbed rocks. Other writers have described periods of diastrophism in the Coast Range from late middle Eocene (post-Tyee) into the Pleistocene. According to Weaver (1945), late Miocene and late Pliocene folding resulted in generally north-trending axes in most of the Oregon Coast Range. It seems probable that late middle and post-Eocene orogenic rejuvenation in the Klamath Mountain region is the cause of the northeast-trending folding and faulting in this area.

#### TENMILE CREEK THRUST:

Conclusive evidence for the major fault of the area is exposed on and near Tenmile Creek in section 23, T. 28 S., R. 8 W. and to the northeast, where the basal Umpqua series of conglomerates is seen to overlies a relatively thin series of sandstones and shales which, in turn, overlies the basement complex. To the northwest, shales of probable lower Umpqua age are overturned toward the northwest. The fault trace lies in a complicated zone of Eocene sediments,

volcanics, and basement rocks which are exposed in the deeply eroded crest of a large overturned anticline. The writer has roughly traced it from the southwest side of Tenmile Creek in section 23, T. 28 S., R. 8 W. northeastward across Porter Creek and through section 17, T. 28 S., R. 7 W., a distance of over four miles. Its trend suggests it may be involved with the surface location of the zone of volcanics at Roseburg. 2500 feet is a rough estimation of the stratigraphic separation on Tenmile Creek.

#### OTHER STRUCTURAL FEATURES:

In the northern part of Coles Valley, a northeast-plunging anticlinal fold lying within one-quarter to one mile of the Tyee scarp has been traced for over three miles. Its southwestern end lies against what appears to be a steeply-dipping thrust fault in Umpqua shales. The Oil Developers-Union Oil Company well in the southeast quarter of section 27, T. 25 S., R. 7 W. penetrated 7000 feet of black shales some of which dip steeply and are faulted, which suggests that lower Umpqua is exposed on the surface. If this is true, the Coles Valley fault must have a stratigraphic separation of at least 1400 feet near the well, probably upward from the southeast. This area is cut by at least one other northeast-trending fault on which the southeast side has apparently been thrust upward. Woodruff Mountain at the south side of the valley apparently is a complex eroded anticlinal fold which is supported by middle Umpqua sandstone and conglomerate. It is flanked to the south and southeast by highly contorted interbedded shales and sandstones which have not been classified as to stratigraphic position.

A north to northeast-trending anticlinal fold lies within one-half mile east of the Tyee front in sections 4, 9, and 16 of T. 27 S., R. 7 W. Upper Umpqua shale and siltstone comprise the rock types on the surface. Faulting of undetermined nature and extent has been observed, but it is believed to be of minor significance.

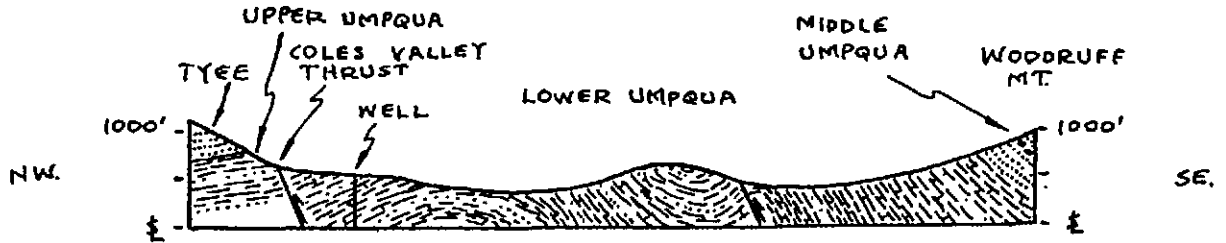
Within one-half mile of the Tyee scarp a steep-flanked faulted anticline can be traced for over two miles from Tenmile Creek to the northeast. Its axis is completely in incompetent shales.

Many other minor structural features are present as well as one or two major folds. The nature of the stratigraphic section makes faulting observable only if outcrops are present near or along the traces revealing fracture or anomalous dips. A few tear faults have been recognized, generally in association with major thrusts. There is some evidence for minor tensional faulting in the Tyee near the scarp. Relative motion has not been determined for certain, but it is probably downward to the east.

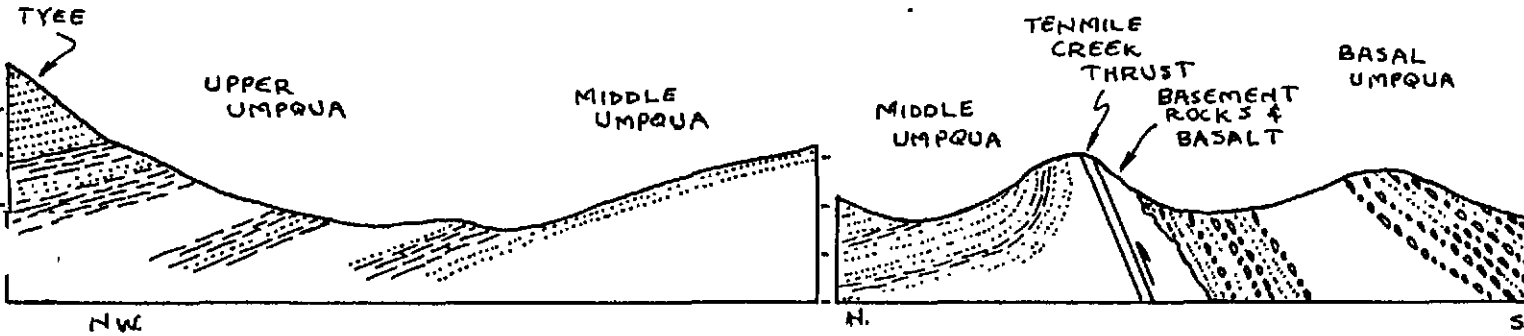
#### SUMMARY

Briefly, the area under consideration is a relatively simple series of folds in the competent Tyee and middle and basal Umpqua beds with a complex of incompetent folding in the Umpqua shales and siltstones. The two formations have been found to be conformable to gradational wherever the contact was approached along an unfaulted section. They are involved in major faulting which the writer

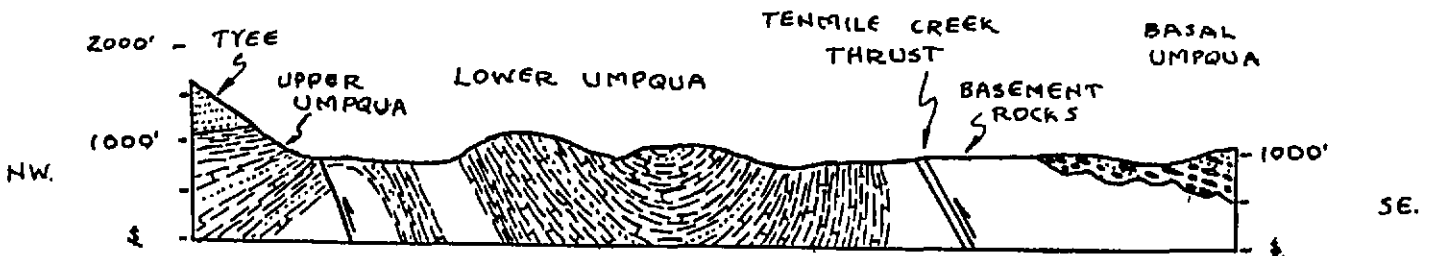
# STRUCTURE



COLES VALLEY SECTION



PORTER CREEK SECTION



TEHMILE CREEK SECTION

SCALE:

HORIZ: 1 IN. = 4000 FT.

VERT: 1 IN. = 2000 FT.



considers to be high-angle or ramp thrusting from the southeast. Since displacement is from the southeast along northeast-trending lines, the cause of disturbance is presumed to have been rejuvenation in the Klamath Mountain region possibly along or associated with pre-Eocene faults. In accordance with work in other parts of the Oregon Coast Range, it is presumed that major disturbance occurred during the late middle Eocene, superimposed folding and faulting during late Miocene and late Pliocene, with possible relaxation and minor tensional faulting during the intervening and subsequent time.

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## NEWS OF MEMBERS AND FRIENDS

Mr. Leroy Palmer, our president, is now in Holiday-Park Hospital, and Bob Wilbur's father is also hospitalized at this time. We hope both will be out and well enough to be back with us by the time this goes to press.

\*\*\*\*

The annual meeting of the Forest Park Committee of Fifty was called to order by Chairman Thornton T. Munger on the lawn of the Forestry Building Sept. 10, 1957 at 3:45 p. m. Chairman Munger made remarks on the following matters:

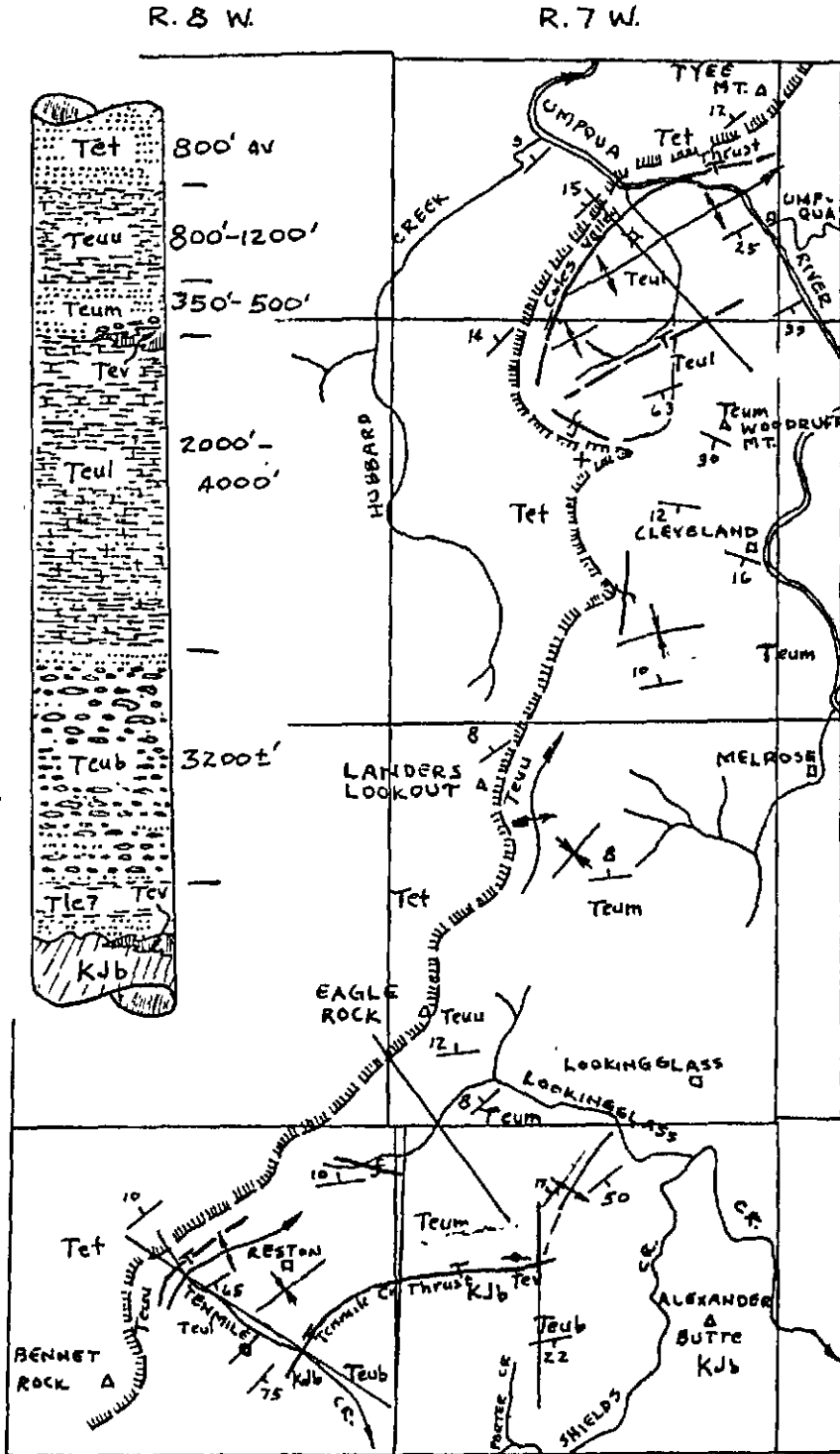
1. The position of forester was vacant a year ago. It was filled for six months by a very competent man, who left then for a better paying location. Once more the Forest-Park is without a forester.
2. The executive committee met at luncheon twice during the past year with the Park Superintendent.
3. Up to now, six public utility crossings have been granted across the Forest-Park. It is hoped no more will be needed.
4. The executive committee looked favorably on the proposal for a quarry near Saltzman Road, which Mr. Buckley will explain later when we visit the site.
5. Acquisitions to the Park are coming in slowly; there have been no tax foreclosures this year.
6. Leif Erickson Drive has been well fixed up by money from the Disaster Relief Fund, but the ditches have not yet all been dug out. The road has not been opened to the public this year, however, because of lack of supervision on week-ends to direct travel and guard against fire.
7. The committee was reminded there should be no smoking while traveling on the Field Trip.

Dr. Ruth Hopson was present, representing our Society, and Leo Simon for the Audubon Society. Harry Jennison represented the Mazamas.

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Bob Wilbur, Emily Moltzner and Milvoy Robosky (Emily's brother), a new GSOC member, made a four-day camping trip Sept. 27th to 30th. They visited the obsidian cliffs at Paulina, weathered a thunderstorm at East Lake, basked in the autumn sunshine at Fort Rock, returned home via Lakeview and Willamette Pass. About 1 mile north of Collier State Park Logging Museum they were much intrigued by a many-layered deposit in a road cut. There was only one thing disappointing -- time did not permit seeing numerous other points of interest.

# STRATIGRAPHIC COLUMN AND SURFACE GEOLOGY



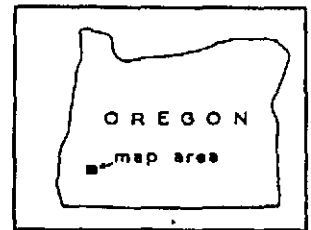
## LEGEND

- T. 25 S. Tet Tyee formation
- Teuu Upper Umpqua fm.
- Teum Middle Umpqua
- Teul Lower Umpqua
- Teub Basal Umpqua
- Tle? Lower Eocene(?) rocks
- Tev Eocene basalt
- KJb Cretaceous-Jurassic basement rocks

A Topographic high point  
 □ Community

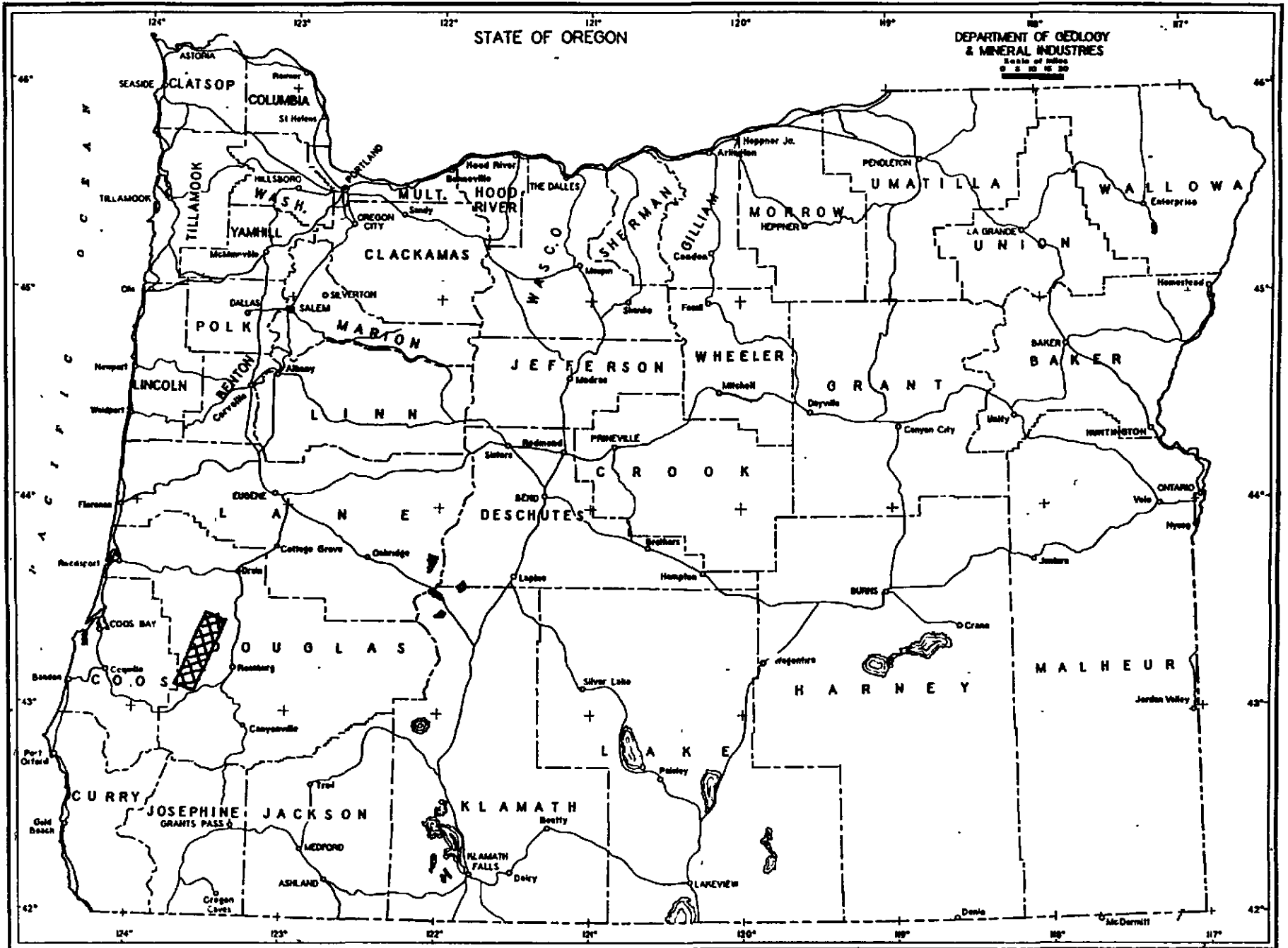
—T— Thrust fault  
 —S— Fault of undetermined nature.

T. 27 S.



T. 28 S. Scale: 1 in. = 3 miles

Base map from Mletsker's Douglas County map.



INDEX MAP

Keene, N.H. Tuesday, October 8, 1957

Dear friend Baldwin:

Although I was in Orford for a week, and passed through Fairlee several times, I neglected to see the interior of the inn, or even to look at the landscaping in the Fairlee station grounds. I did, however, try for some pictures of the "Old Round Church" which I found is at Richmond, Vermont instead of Burlington. I did go to Burlington, though, before finding that I had passed the church. Burlington is a nice town, and I am glad that I went astray. A kind woman offered to let me look at the inside of the church, but I was going to be late for supper anyhow, so I satisfied myself with the outside, except for peeking through the windows.

Today I am on my way home, and progressed eighty miles. I would not have gotten even this far if it hadn't started to rain about noon. The coloring of the hillside is beyond belief, so I shall not try to describe it -- only to do my best to record it for you. Every time that I get into the car, resolved to go on home, I am confronted with a burst of color that stops me again and then again.

I found my way up the steep and very crooked road to the Joseph Smith monument, and can't imagine how they go so massive a granite shaft up there. It would be almost out of the question to do it even with modern power and methods.

By conveniently getting lost I found myself face to face with the "Old Man of the Mountain" and I believe that I got a better picture than I did on my first attempt on the way to Orford.

Several members of the photography class are doing as I have done, staying after school, and I meet them along the roads, trying to capture some more of the color.

One sad thing has happened to me. The boarding place that Mrs. Manzer chose for me has increased my weight five pounds in six days. If I should have stayed there until Christmas, I would not have needed to borrow a pillow to pinch-hit for Santa Claus. And it was not for lack of exercise, either, for I was pretty well worn down every day.

Today I passed a place said to be "the oldest land in New Hampshire." I had no way of checking the statement. But yesterday I found an outcrop of granite in a pasture where the rocks were deeply striated, the grooves being very close to directly north and south. I was told by a farmer that he had sunk a well about twenty feet deep quite close to an outcrop of rock. It is a very interesting country, and just now is very beautiful.

From present indications, my friends will have to be content with looking at last year's Christmas cards. Maybe, however, I shall be able to make more mileage when I hit Texas and New Mexico, but I plan to visit friends in both states, and that will hold my average pretty low.

A woman member of the class had stopped for a picture of a lake this morning when I came along and stopped for the same purpose. A breeze ruffled the water surface to her disgust, but she reached down and picked a mushroom and started to eat it. I looked surprized, so she handed me a piece of it, and remarked: "It is delicious." I couldn't agree with her, but did not find it to be very bad. Leo would doubtless have known it by its first name.

Sincerely,

This is the introduction to an article by Tom Matthews in the September issue of Ore-Bin.

- - - -

### THORIUM, THE RARE EARTHS, AND THEIR USES.

One of the richest areas for exploration in the field of metals today is in that versatile group of elements known as the rare earths. The 15 elements commonly grouped together as rare earths are those with atomic numbers 57 through 71. Added together they are about as abundant as copper in the earth's crust. Found with these 15 elements are their closely related cousins, thorium and yttrium; and because of their similarity any discussion of processing or development of uses must include them. The rare-earth elements are conveniently divided into two major groups. The certain group of "light" rare-earth elements contains those from lanthanum to europium, inclusive. The yttrium group of "heavy" rare-earth elements contains those from gadolinium to lutetium plus yttrium, atomic number 39.

The rare-earths are remarkably alike in their chemical behavior because of their atomic structure. This characteristic has made chemical separation so difficult that only in recent years have metallurgists and engineers had relatively pure metals to use in testing and alloying. It has been found that the rare earths offer enormous potentials and already many of these metals are being used in a variety of industrial fields.

\*\*\*\*

### LUNCHEON NOTES

September 26 - 13 were present. Mrs. Florence Peterson, a new member of our Society was at luncheon. Howard Rose has as his guest his attorney, Mr. Pat Ledwidge. There were no specimens today. Your editor passed around a card received from Mr. Stanley written after his visit to Mr. Vernon, Iowa. Said he was looking for trilobites and all he could find was mosquito bites.

Howard Rose certainly was surprised when our President told him he was speaker of the day. Howard came through in his usual fine shape telling of a recent trip he and Mrs. Rose had had to Wallowa Mountains. His descriptions of horse back riding in a thunder storm was vivid indeed. Fine scenery, but unfortunately it rained most of the time they were there, but fishing was good. He also told us something of the film made for the Museum during the brick laying contest the middle of August.

October 3 - 10 were present. Leo Simon passed around a fine, very glassy specimen of Actinolite from the Bandon area. Bruce Schminky said that Saturday October 12 there was to be a railroad excursion to Seattle to see the cinerama showing "Seven Wonders of the World!" Price for the whole trip to be \$8. 25.

Mr. Laurence was our 5-minute speaker, telling of a trip to Valley of the Moon, Grand Tetons and Yellowstone Park.

October 10 - 14 were present. Our president, Mr. Leroy Palmer, was in Hospital so Leo presided. Bob Wilbur's father also was in the hospital.

Bruce passed around the August list of geological Survey bulletins available, and also a Mineral Information Service Bulletin for October, the leading article being about Boron.

Mrs. Ted Gordon showed a fine specimen of Apophyllite, and was very mysterious about the location from which it had been obtained.

Ford Wilson, now of Anchorage, had as he said, engineered a trip back to school at Rock Island, Illinois, and dropped in for a few days vacation in Portland while enroute back to Alaska. He was our 5-minute speaker, his subject being Alaska. Those of us who have enjoyed Ford's articles in recent Newsletters will soon be able to read more of such articles.

October 17 - only 9 were present. We have not heard of any members being sick with flu, Asiatic or other kind, and World Series is over, so we hope for a bigger turnout hereafter.

Bruce Schminky passed around a newspaper article entitled "Diatomite mine project started in Fort Rock Area".

Ford Wilson told of a trip hunting zeolites in King's Valley.

The Ericksons had just returned from a trip to Grand Canyon and California points, reporting plenty of water north of Sacramento.

Rudy passed around a copy of a book entitled "Problems of Clay and Laterite Genesis". This was a report on a symposium at the annual meeting of the American Institute of Mining and Metallurgical Engineers held at St. Louis February 19-22, 1957.

Mr. H. F. Travis was our 5-minute speaker, his subject being 3 Heavens and 2 Hells, the Three Heavens being Bryce, Zion and Grand Canyon. The two Hells being 1, the country from the Navajo Bridge to the south side of Grand Canyon, and 2, the section North of Lone Pine.

Excerpts from the Oregonian - May, 21, 1957

### Oldest Eggs Find Noted

The father of a Portland woman is being credited with the discovery of the oldest dinosaur eggs ever found.

He is C. D. Curtis, Abilene, Tex., father of Mrs. Robert Huft, 7110 S. E. Hazel street.

Curtis, a 56-year-old Baptist minister who also is an insurance man and building contractor, has been an amateur rock-hound for nearly 40 years. He discovered the two eggs of a triassic phytosaur in the Davis mountains area near Abilene.

### Eggs First Found in U. S.

Dr. Walter Huang, head of the geology department at Hardin-Simmons university, studied the eggs and pronounced them "a major scientific discovery."

Huang said the eggs are from creatures which were among the first dinosaurs

and lived some 190,000,000 years ago. They are the first dinosaur eggs found in this country and are older than dinosaur eggs found in the Gobi desert by Dr. Roy Chapman Andrews.

Curtis was hunting for gem stones when he found the pullet-sized dinosaur eggs.

Excerpts from the Oregonian, May 7, 1957

#### Ancient Bones Found in Iraq

The Smithsonian institution announced Monday that an adult human skeleton has been found buried in the Shanidar cave, in northern Iraq.

No exact age can be given for the skeleton, the announcement said, but the layer in which it was found "is known to be over 34,000 years old."

The discovery was reported by Dr. Ralph S. Solecki, archeologist leader of a Smithsonian-sponsored expedition to Iraq.

Solecki previously had found a child's skeleton 26 feet below the surface of the cave. A recent study of the child's teeth, the announcement said, indicates it belongs to a new form of mousterian or upper pleistocene man. It added:

"Since the newly discovered adult comes from a higher level in the cave, (14 1/2 feet below the surface in the top mousterian layer), it may represent a still different type of man."

# GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE



*Dec. 1957*

PORTLAND, OREGON

## GEOLOGICAL NEWS-LETTER

Official Publication of the

Geological Society of the Oregon Country

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	Mr. Franklin M. Brown (1958)	Dr. Francis G. Gilchrist (1959)		
	Dr. Ruth E. Hopson (1960)			

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Staff of Geological News Letter

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Committee Chairmen

Program:	Mr. Albert J. Keen	Display:	Mr. Murray R. Miller
Field Trip:	Mr. Leo F. Simon	Research:	Mr. Rudolph Erickson
Library:	Mr. Rudolph Erickson	Service:	Miss Margaret L. Steere
Membership:	Mrs. Ruth Harrison	Museum:	Mr. Alonzo W. Hancock
Publicity:	Mr. H. Bruce Schminky	Public Relations:	Mr. Clarence D. Phillips
		Historian:	Mrs. William F. Clark

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Society Objectives

To provide facilities for members of the Society to study geology, particularly the geology of the Oregon Country; the establishment and maintenance of a library and museum of geological works, maps, and specimens; the encouragement of geological study among amateurs; the support and promotion of geologic investigation in the Oregon Country; the designation, preservation, and interpretation of important geological features of the Oregon Country; the development of the mental capacities of its members in the study of geology; and the promotion of better acquaintance and closer association among those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mrs. Ruth Harrison, 1879 S.W. 10th Avenue, Phone CA 3-0255. Regular annual dues (single or family memberships) are \$5 for residents of Multnomah and adjacent counties; \$2.50 for others; and \$2 for Junior Members. Make remittances payable to the GEOLOGICAL SOCIETY OF THE OREGON COUNTRY.

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Society Activities

(See "Calendar of the Month")

Evening Meetings: Formal lectures or informal round-table discussions on geological subjects, on the second and fourth Fridays of each month at Public Library Hall, S.W. 10th Avenue and Yamhill.

Field Trips: Usually one field trip is scheduled for each month.

Library Night: Once a month. Lewis and Clark College.

Luncheons: Informal luncheons, with geological motif, each Thursday noon in Room B, Chamber of Commerce Building, S.W. 5th Ave. and Taylor St. \$1.00 per plate.

Publication: The Geological News Letter, issued once each month, is the official publication.

Dec. 1957

## CALENDAR

Buffet luncheon every Thursday noon at the Portland Chamber of Commerce, 824 S. W. Fifth Avenue, second floor. One dollar. You are welcome.

## LECTURES

Friday

Dec. 13

Lecture. Geophysical Features of Willamette Valley - Dr. Stauffer.

Friday

Dec. 27

No meeting.

Friday

January 10

Geological Scenery of Oregon - Dr. Ruth Hopson.

## LIBRARY NIGHT

Tuesday

Dec. 17

At Biology Building, Lewis &amp; Clark College. 7-8 P. M. Library study. 8-9:30 Laboratory work with minerals and rocks.

No Field Trip in December.

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## CHRISTMAS MESSAGE

"Our Christmas tree - yours and mine - is laden with riches. Its boughs are loaded with things for which the rest of the world is hoping and eternally striving. It is lighted by the Torch of Freedom. It bears an abundance of food, clothing, shelter and many luxuries that we regard as commonplace. It is hung with opportunities for those who have the will and energy to accept their challenge. At the base is a priceless gift from our forefathers, a Bill of Rights which bestows upon each of us the dignity of individual sovereignty and insures our personal rights to life, liberty and the pursuit of happiness. Above all, it banishes a fear which grips so much of the world today, for we may say what we believe to be true without dread of a sinister knock on our door in the dark hours of the night, or cruel reprisals against those whom we love. Truly we should be happy this Christmas and have faith in the New Year."

Casting about for a Christmas Message to our society I found the above, which is taken, word for word, from a letter received a year ago from a valued friend, who has achieved notable success from a material point of view but has never allowed thoughts of worldly matters to intrude upon a conscientious appraisal of spiritual values.

It is so much better than anything I could conceive that I am sharing it with our members in the hope that it will bring the same inspiration to them that it has to me.

From Your President,

Leroy A. Palmer

### NOMINATING COMMITTEE APPOINTED

President Leroy Palmer has announced appointment of the following members to serve on the Nominating committee for officers for next year. Chairman, Rudolph Erickson, Mrs. Alonzo Hancock, Mrs. Leo Simon, Albert Keen and Norris Stone.

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### NEWS OF MEMBERS AND FRIENDS

Though still not up to par, President Palmer is home from Hospital.

Bob Wilbur's father is still at Portland Sanitarium.

A recent letter from our Ambassador of Goodwill, Orrin Stanley, found him at Charleston, S. C. He sent a clipping from Charleston Evening Post stating, "A mole can move an object 32 times its own weight" - then added that this may or may not have a bearing on the Tenino Mounds, depending on whether you believe what you read in the papers and have already formed theories about glaciers and floating ice, and one thing or another. He said he did not enjoy his stay of four days in Williamsburg, as something like "flu" caught up with him and he never was so glad to get away from a place in his life.

The following is an explanation of the picture which appeared in Sept. 21 issue of Presbyterian Life. The picture shows Dr. Francis Gilchrist, Professor of Biology at Lewis and Clark College, Portland, Oregon. According to Dr. Morgan S. Odell, Lewis & Clark's president, "Dr. Gilchrist has been on the faculty since 1946. He is an elder in the First Presbyterian Church of Portland and comes from a family of Presbyterian ministers in California. He is one of a number of our faculty who hold high the two great aims of a Christian college, namely, the advancement of knowledge and the growth in spiritual understanding." Presbyterian Life, Nov. 2, 1957.

No. 12

Local Organist plays abroad.

Alden Gilchrist, son of Dr. and Mrs. Gilchrist of Portland, recently played a public concert on the cathedral organ at Chartres, France. Two of the performer's own compositions were on the program. Gilchrist is studying in Paris on a scholarship grant made possible by George Ladd of San Francisco in conjunction with the University of California. He is a graduate of Lewis & Clark College.

-Oregonian, Nov. 2, 1957

Early American Glass Group adds Library Books.

This club is amassing a considerable library books and papers pertaining to their projects as a member of the National organization of Early American Glass Clubs. The following books have been added to the club library through the bequest of Margaret Hughes: "Glass" by E. Barrington Haynes. "Price Guide to Pattern Glass" by Ruth Webb Lee. "The Charm of the Antique" by R. & E. Shackelton, "Nineteenth Century Art Glass" by Ruth Webb Lee. "Decoration" by Sarah M. Lockwood. "Glass" by W. B. Honey, "The Lipton Collection of Silver used in Service of Tea" booklet, "Thumbnail Sketches" by J. Stanley Brothers, "American Glass" by Mary Harrod Northend, "Early American Glass" by R. M. Knittle, "Practical Collecting" booklet, "Sandwich Glass" by Ruth Webb Lee, "The Practical Book of Chinaware" by Eberlein & Ramsdell, "Glass, the Miracle Maker" by C. J. Phillips, "The Period Dictionary" by Clifford.

On Monday November 11th, on the "Science is Fun" program sponsored by the Oregon Museum of Science and Industry, and the Jewish Community Center, Ralph Mason was one of the speakers.

Renewals

Mr. & Mrs. Chester A. Wheeler, 14119 S. E. Madison St., 33 Portland. AL 2-1959

Phone number change.

Mrs. Rose Hamilton - PR 5-9762

## SALT OF THE EARTH

Leroy A. Palmer

Abstract of Lecture at Public Library  
September 13, 1957

Sodium chloride, common salt, is one of those everyday things that are so abundant in our daily lives that we fail to appreciate them. Actually, salt is one of the prime necessities of life, one of the essential components of the human body. To quote "if all of the salt in our systems were suddenly removed we could not live forty-eight hours ----- salt is, so to speak, a policeman, whose duty lies in patrolling our blood and keeping our chemical fluids in proper balance".

Salt forms a definite part of the blood, the perspiration and the tears. Before the technique of blood transfusion was developed, physicians attempted to compensate for loss from excessive bleeding by injecting salt solution into the veins. In occupations where workers are exposed to excessive heat salt tablets are provided at the drinking fountains that the workers may replenish the salt eliminated from the body by perspiration.

Salt occurs in nature as the mineral halite or rock salt, formula NaCl. It forms beautiful crystals in the isometric system, characterized by their cubical structure. Normally it is colorless but may take on different colors, due to impurities.

As a commodity, salt is older than history. The Chinese have a written record of it ascribed to 2700 BC and we know that it was an item of commerce before then. The great prosperity of Venice in the Middle Ages has been ascribed, to a considerable extent, to its control of the salt trade. Wars have been fought for the control of salt deposits. During the American Civil War the shortage became extremely acute in the South and one transaction is on record involving the sale of 7193 lbs. at one dollar per pound. In ancient Rome soldiers received part of their pay in salt and this portion was referred to as salarium, hence our word salary.

## ORIGIN OF SALT DEPOSITS

Where does salt come from? All rocks are more or less stable compounds of various minerals. Under the influence of atmosphere and moisture, heat and cold, they disintegrate and are subjected to chemical changes in which some of their constituents form chemical compounds, mostly alkaline. Rain falls and some of the soluble compounds are taken into solution, part remaining in the soil and the rest carried to the nearest water course. Even our Bull Run water, one of the purest municipal supplies in the country, contains 15 different minerals, but only in quantity of 30.4 parts per million.

## ENCLOSED BASIN DEPOSITS

One of the great physiographic provinces of the country is the Great Basin, a vast area lying between the Rocky Mountains on the east and the Sierra Nevada on the west, including the greater part of Western Utah, almost all of Nevada and of California east of the Sierras, with a small portion extending into Oregon. This area of 200,000 square miles has no exterior drainage, the only escape for precipitation that falls within its boundaries is by evaporation. The climate is arid, precipitation low and evaporation high. Within the Great Basin, itself, are numerous smaller enclosed basins, each with its individual watershed. It is within the Great Basin that most of the deserts of the country are found.

Because of the shallow soil covering in the desert, the proportion of runoff to precipitation is high. This runoff accumulates first as a tiny rivulet, which unites with others to form a creek and these finally unite in the main drainage course of the region in what, in the desert regions, is dignified by the name of river. These desert rivers terminate in lakes or in "sinks", where the water seeps into the ground and is absorbed by the underlying alluvium.

In flowing over the rocks and soil of the watershed such streams dissolve the soluble minerals and these are carried in solution to the lake or sink into which the major stream empties. As this has no outlet the only escape for the water is by evaporation which, in the arid regions, is high. But evaporation removes only the water, not the solids contained in it, so that after a cycle of inflow and evaporation we have all of the solids that have been brought into the basin but a considerably reduced volume of water. Thus the proportion of solids is greater than in the original inflow and as this is built up, season after season, eventually the solution will become saturated, or even supersaturated and the solids will precipitate.

## THE DEAD SEA

The greatest concentration of salines in an enclosed basin is in the Dead Sea in Palestine. This body of water, 47 miles long with a maximum width of 10 miles, has an area of 460 square miles and is 1300 ft. below the level of the Mediterranean, making it the lowest body of water on the earth's surface. It is the outlet of the River Jordan which flows through a graben, whose fault boundaries can be traced definitely on both sides of the valley.

During Jurassic and Cretaceous periods the Mediterranean covered Palestine and Syria but in the Tertiary there was a general uplift which produced the hilly and mountainous country of West Palestine, thus cutting off the Dead Sea area from the Mediterranean. It was at this time that the rift valley was formed.

Following the uplift there was a long pluvial period, so intense and lasting that the waters in the basin rose to a height of 1400 ft. above their present level and the sea attained a length of 200 miles. The rocks immediately adjacent are more than normally saline, in fact on the southeast shore, at the base of Mt. Sodom, is a bed of salt 150 ft. thick. At its greatest extent the sea had an area approximately 18

times what it is now and, as the waters gradually receded, they absorbed salts from the watershed and concentrated them in the smaller basin. Considering the enormous shrinkage from the original volume, the increment, year after year, especially from the Jordan, itself draining an area of alkaline rocks, we can understand how, over the ages, the Dead Sea has built up a concentration of 25 per cent saline matter.

### SURFACE DEPOSITS

The salines that are dissolved in these solutions form very complex combinations. They have different degrees of solubility and as the solution becomes supersaturated with respect to one, that one will be deposited and form a layer at the bottom. The most refractory as to solubility will be the last to go into solution and the first to deposit, the others following in the inverse order of their solubility, deposition being as follows:

Iron oxide	$\text{Fe}_2\text{O}_3$
Lime	$\text{CaCO}_3$
Gypsum	$\text{CaSO}_4-2\text{H}_2\text{O}$ .
Salt	$\text{NaCl}$
Magnesium sulphate	$\text{MgSO}_4$
Magnesium chloride	$\text{MgCl}_2$
Sodium bromide	$\text{NaBr}$
Potassium chloride	$\text{KCl}$ .

However, on this subject, Clarke says, in his "Data of Geochemistry" "When a natural water is concentrated by evaporation it deposits its saline contents in the reverse order of their solubility, the least soluble first and the most soluble last of all. The process, however, is not so simple as it might appear to be, for the solubility of a salt in pure water is one thing and its solubility in the presence of other compounds is another. Each substance is affected by its associates and its deposition is partly a matter of concentration and partly a question of temperature. In general the character of a saline deposit can be predicated from the character of the water that yields it, a chloride water gives chlorides, sulphate water sulphides and waters of mixed types furnish compounds or even double salts. The more complex the water, the greater becomes the range of possibilities.

Such deposits as we have been considering are of recent geological origin. The surface may be water, as the Dead Sea or Great Salt Lake, or it may be a crust of the more soluble minerals, which are among the last to deposit, with sodium chloride predominating. In such a case, beneath the crust we find a strong brine containing different minerals in solution and beneath that a "crystal body" of the minerals that have been precipitated. It must not be assumed that there will be a clean line of demarcation between any two salts in the crystal body, there will always be some intermingling at the contact.

### ROCK SALT DEPOSITS

These surface deposits are attributed to the Pleistocene or Recent epochs but, of course, such phenomena had been going on since the world began and many a deposit so formed was buried under the rocks of succeeding geological ages. These buried deposits are found all of the way from the Cambrian through the Mesozoic and in them occur the great salt deposits of New York, Michigan and Kansas, the Kansas and Michigan gypsums, the potash of New Mexico and many other valuable deposits throughout the United States.

Throughout the world the greatest deposits of salines in solid form are found in the Permian, in which are the great deposits of Central Europe. Notably, in Austria is a deposit of sodium chloride that can be traced along the base of the Carpathian Mountains for 250 miles.

The complex deposits at Stassfurt, Germany are the best known. Here the deposit has a thickness of 3000 ft. and is estimated to indicate 10,000 years of continuous deposition. A remarkable thing about it is that it represents a complete sequence of deposition, with gypsum at the base and the top layer carnallite, a hydrous potassium-magnesium chloride. It was this deposit that gave Germany a monopoly of the world potash market until the United States developed the Searles Lake and New Mexico deposits during World War I. More than thirty saline minerals are found at Stassfurt.

### DEPOSITS IN THE UNITED STATES

The United States has its great salt deposits. The largest of these are the great salt domes that are found in Louisiana and Texas. On Avery Island, in Louisiana, is a deposit in which the drills, at 2200 ft. were still in salt and at Humble a deposit has been proven to a depth of 5410 ft., more than a mile!

The salt in these deposits does not occur in regular beds but in "domes" of enormous size which are surrounded by thick strata of Tertiary and Quaternary sediments, which have been arched by the domes and dip away from them on all sides. In some cases these sediments have been prolific sources of petroleum. Associated with them are gypsum deposits up to 600 ft. thick and the great sulphur deposits of the region.



There is still considerable uncertainty as to the origin of the salt domes. The first theory was that the salt was deposited by ascending solutions and the doming was the result of the expansion of crystallization. Another theory was that the beds were forced into their present structure by laccolithic intrusions. Later study leaves the question as to the force that caused the doming still in doubt. Nor is the age of the salt known definitely, being ascribed variously to Carboniferous, Permian or Cretaceous. As the overlying sediments are Tertiary and Quaternary it is evident that the doming must have been quite recent.

While the salt domes contain the greatest deposits, as far as thickness is concerned, they have not been exploited to as great an extent as those of the northeastern and southwestern parts of the country.

In the northeastern part of the United States is the Silurian Basin, embracing the lower peninsula of Michigan, a large area in southwestern New York and portions of Ohio, Pennsylvania and Ontario. During the Silurian an arid climate prevailed over a large part of the eastern United States and a sea covered this area. Because of excessive evaporation this sea became so saline that salt and gypsum were deposited in large quantities over an area of 100,000 sq. mi. in what has been designated, very aptly, as the Salina formation. These salt beds attain a thickness in excess of 600 ft. in Michigan and have been proven up to 325 ft. in New York. The thickness is explained by assuming that a channel connected this sea with the ocean and, as the level of the sea was lowered by evaporation, its waters were renewed by inflow from the ocean until these great thicknesses were accumulated.

In the southwest part of the country is the Permian Basin, which covers the greater part of Texas, New Mexico and Oklahoma, extending across Kansas into Iowa. In the Carboniferous a great sea covered the central and southwestern part of the United States with a channel extending into the ocean, but this channel was narrowed by sedimentation so that the inland sea was cut off intermittently from the ocean. The climate was arid and water in the sea evaporated but was renewed, from time to time, as the ocean level rose to sufficient height to overflow the barrier. Study of the deposits indicates many oscillations of the water level and generally complicated conditions. Sodium chloride deposits in this basin have been demonstrated over an area 650 miles long, with a width of 150 to 250 miles and an area of 100,000 sq. mi. Thickness and succession of the beds varies but one borehole showed 700 ft. of sodium chloride. Various large deposits of gypsum and anhydrite are found in the Permian Basin but their occurrence is irregular and no definite relationship between them and the salt deposits has been established.

### SURFACE DEPOSITS

We have given some general consideration to the formation of surface salines deposited by evaporation. The best known such deposit in this country is Great Salt Lake, which has a saline content of 15 per cent, 80 per cent of which is sodium chloride. There are numerous other salt "flats" or "marshes" where the surface is covered by a crust of saline matter, some of which are of economic importance. Greatest of these is Searles Lake, in Southern California, a complex deposit of various salines in which sodium chloride is present but of minor importance, so that no effort is made to recover it.

## RECOVERY

We have considered how the salines got into the ground but unless we get them out they will not do us any good so we will see how they are recovered so as to be of benefit to mankind.

Sodium chloride has the largest production of any mineral in this country except iron ore. The U. S. Bureau of Mines reports the 1955 output as 22,704,000 tons. Sixty per cent of this was marketed as brine, 24 per cent was produced from underground deposits and 16 per cent from the surface.

Salt is recovered from underground by two methods, mining and pumping brine from wells. Before any attempt at recovery is made diamond drill holes are bored to determine such features as depth, thickness and purity. With this information a method of attack on the deposit is planned.

If recovery is to be by pumping, a well is drilled through the overlying rocks to the bed of halite. The well is equipped with two casings, one inside the other and water is pumped under pressure down the space between the two, thus dissolving the salt and forcing the brine up the inner casing to the surface. Average brine so produced has a sodium chloride content of 26 1/2 per cent, about ten times that of sea water.

The mining of rock salt is on the same principle as coal mining by the "room and pillar" method. A shaft is sunk to the deposit and from it are driven wide parallel "galleries", connected at intervals by cross galleries. These are the rooms, from which the salt is extracted, leaving between them the pillars which support the great mass overhead. Of course this is not done haphazardly; size, spacing and height of galleries must be calculated carefully to allow the removal of the greatest amount of salt consistent with leaving pillars that will provide ample support for the great weight overhead.

A particularly interesting mine is that of the International Salt Co. at Detroit, Michigan, where, over the years, 400 acres have been mined out under an industrial and residential area within the limits of one of the largest cities in the country. The shaft is bottomed at 1130 ft. and from it workings extend two and one half miles. The men are hauled from the shaft to the working faces in rubber tired wagons pulled by jeeps and, on this level, is a machine shop and an office, the latter built of blocks of rock salt.

Mining is by machines adapted from the coal mining industry. An endless chain, carrying steel teeth, cuts, perhaps saws would be a better word, at the floor of the room a slot 7 in. wide, 10 ft. deep and 60 ft. long. Then a similar machine makes a 7 in. cut 22 ft. high vertically at each end of the 60 ft. cut, thus outlining a block 10 X 22 X 60 ft., 900 tons of salt, which is then drilled and blasted down. It is obvious that blasting must be done with great care to avoid excessive vibration in this populated area.

Electric shovels load the blasted salt to 20 ton battery electric trucks which deliver it to underground crushing and screening plants, from which it is hoisted to the surface and dumped to the storage bins.

## TREATMENT

Mined rock salt is almost pure and thus suitable for many commercial uses without treatment, other than grinding and sizing. For domestic use, salt from brine is preferred and this is submitted to some further refining.

A salt refinery is not a poor man's proposition, it is an extensive plant, calling for a large capital outlay. Considering the practice followed at the plant of the Morton Salt Co. at Port Huron, Mich., the brine from the wells goes to a 125,000 gallon storage tank where it stands while the insoluble contents settle out, then the clarified brine goes through a series of tanks in which a chemical treatment removes any last impurities.

The final recovery is effected by evaporation of the purified brine. This is accomplished by heating in large shallow open "pans" or in "vacuum evaporators". Either process yields salt of the same purity but they have different physical characteristics which adapt them to different uses, the vacuum evaporated being the kind that finds its way to our tables. From the evaporators the salt is given a final drying to remove the last trace of moisture and is packaged for sale.

## SOLAR SALT

Originally all salt was produced by solar evaporation but now this is practiced at only a few operations, at Great Salt Lake and on the sea coasts.

The process is simple in its elemental principles but, as so often happens, can involve plenty of complications in its application. The brine is pumped from its source to a large settling pond and kept there a sufficient time for suspended particles to settle, after which it is transferred to the first evaporating pond. The overall area of the Leslie Salt Co. operations on San Francisco Bay approximate 40 sq. mi. and individual ponds have areas up to 1 1/4 sq. mi. The sea water pumped each year is measured in the billions of gallons.

When the settled brine is transferred the delicate part of the operation comes in as it is necessary to recover the sodium chloride without contamination by the other salts associated with it in the brine. This involves long experience and a thorough understanding of theory. The salt technician does not work with specific or Baumé gravity but with "salometer", in which a clear water solution represents zero and a saturated sodium chloride solution 100 degrees.

We have noted the order in which the different constituents of a brine settle out as it is concentrated by evaporation. When the salometer reading shows that all the lime and gypsum in the pond should have precipitated the brine is pumped to another pond and evaporation continued until the salometer reading shows that it is about time for the magnesium sulphate, next in order, to start precipitation. Before this can happen the "mother liquor", as it is called is pumped out, leaving behind a crust of pure salt. This is allowed to dry, then "harvested", washed with a brine solution to remove the last of the impurities and, after a final drying, grinding and sizing is packaged for market.

The mother liquor contains valuable ingredients and is given final treatment for these. It is from this source that magnesium chloride, used in the manufacture of magnesium metal, is obtained. One of the most interesting deposits is at Searles Lake in Southern California. Here, by a complex process of "differential crystallization" a rather unusual brine is made to yield several products of sodium and potassium with byproducts of bromine, lithium carbonate and phosphoric acid but as sodium chloride is not one of them we are not giving consideration to the Searles Lake operation here.

To quote from a brochure of the Morton Salt Co., from which much of the above data was obtained:

"So you see salt is not 'just salt'. It is a scientific product, produced by elaborate and costly machinery according to rules of the most exactness. ---Salt today is as different from the course, impure product made by the ancients along the Dead Sea as daylight is from dark."

#### EVIDENCE FOR A MAJOR CLIMATIC CHANGE CLOSE TO 11,000 YEARS B. P.

WALLACE S. BROECKER

Columbia University, Lamont Geological Observatory, Palisades, N. Y.

Recent studies at the Lamont Geological Observatory have led to the idea that a major change in climate occurred rather abruptly close to 11,000 years ago. The evidence for this change has been found in a number of widely separated climate-sensitive systems. The events in the various systems are correlated on the basis of  $C^{14}$  measurements. Evidence from the Great Basin region suggests that the pluvial lakes found in this area underwent a rapid decrease in level at this time. Studies carried out on ocean cores taken from the Atlantic Ocean and adjacent seas indicate that the change in surface-water temperature found on the basis of faunal evidence by Ericson was nearly simultaneous throughout this system and occurred close to 11,000 years ago. The sedimentation rate of both carbonate and lutite in the equatorial Atlantic appears to have been significantly greater before than after this date, suggesting a change in the surface current systems. The turbidity currents which deposited a layer of clay more than 50 feet thick over the abyssal plain of the Gulf of Mexico (Ewing et al, 1957) ceased abruptly close to this time suggesting a change in the operation of the Mississippi River system. There is a suggestion of a rapid retreat of the mid-continent glaciers from their Valdres maximum. The combined evidence indicates that this event may well mark a change from glacial to interglacial conditions.

(Geol. Soc. America, Annual Meeting, 1957, p. 33)

## SOME SPACE TRAVEL PROBLEMS

by Carl P. Richards

The recent successful launching of artificial satellites of the earth apparently has caused the general public to become space conscious. Even Junior is discarding his cow-boy outfit and, with great glee, sporting forth in a space-helmet, while John Q. himself talks glibly about sending men to the moon and neighboring planets. It is a matter of record, too, that an enterprising real estate dealer in New York is doing a lively business in selling half-acre lots in the lunar crater Copernicus with, as he advertises, "all fishing and wintersports rights".

It is pretty generally accepted nowadays, that a missile can be accurately directed and sufficiently propelled to land on the moon. The ability to accomplish that is an admitted fact, the technique to do it has been mastered, but to put a man within that missile and land him safely on the moon is still puzzling even the super experts, let alone the problem of getting him back alive!

But let us assume that the feat can be performed successfully, and *genus homo* sets foot upon the moon, what is he going to find are the conditions of his new abode? They are indeed strange, and he will be well advised to come prepared - if that is even possible. The science of astro-physics has acquired knowledge of the physical conditions that he will meet, but medical science has not yet acquired the knowledge of how his body, a complicated biological mechanism, is to overcome those conditions. Right there is THE problem in space travel. Let us take a glance at some of the conditions that will confront a human being on arrival on the moon.

(1) Reduced gravity. On the moon gravity is only one sixth of terrestrial gravity and, during his journey through space to get there, a man will experience less - even complete weightlessness. But both these conditions have been overcome by pilots flying at great speed in a high altitude, so it is expected that a visitor to the moon would also be able to surmount them.

(2) Lack of oxygen. The moon is entirely without atmosphere and our *genus homo* would find himself in a perfect vacuum, so he would have to be provided with some sort of non-leakable pressure suit. But let us suppose that he is successful in that respect and is able to keep himself supplied with fresh air, what next is lacking?

(3) Lack of water. No water exists on the moon - not even ice - hence, when he requires to quench his thirst, he will have to rely on the supply he brought with him, but he must use it sparingly, for it evaporates quickly at zero pressure.

(4) Temperatures. The moon revolves around the earth once in about thirty days, but always keeps the same side facing the earth, so that no man has ever seen the other side of the moon. But, relative to the sun, the moon rotates on its axis once for every revolution it makes around the earth, which causes its "day" to be thirty times as long as one of our 24-hour days. Which means that on any particular point on the moon the sun shines continuously for fifteen days, followed by fifteen nights of darkness, during which the sun's warming rays are lacking.

This condition, combined with the absence of any atmosphere, involves tremendous changes of temperature and careful measurements by our great observatories show a mid-day heat of nearly 300 degrees Fahrenheit and a mid-night cold of some 200 degrees below zero - a total difference of about 500 degrees Fahrenheit. What form of protection would guard a man from such extremes of heat and cold has not yet been evolved.

To imagine a human being contending successfully with such a temperature variation is difficult enough, but when to this difficulty is added that of low gravity, no oxygen, no water, plus hardships regarding food supplies and sanitation, it is very evident that a vast amount of investigation and research must be accomplished before, let us say, he can enjoy the fishing and winter sports rights in the lunar crater Copernicus, which go with the half-acre lot he purchased before he left Planet Earth!

#### CHANGING APPROACHES TO THE PROBLEM OF VERTEBRATE ORIGIN

George M. Robertson  
Grinnell College, Grinnell, Iowa

Theories of vertebrate origin are largely morphological, with the same type of reasoning which has been used through several decades of speculation. Two sources of data need exploitation: a thorough search into pre-Silurian sediments for more adequate material of the earliest vertebrates, and research into the genetics of fundamental vertebrate features, such as bone formation, coupled with experimental embryological study of these same features.

(Geol. Soc. America, Annual  
Meeting, 1957, p. 116)

## LAND OF ATOMS, OIL EXPLORED

By Phil F. Brogan

This wandering Oregonian recently toured a weird land of "beeping" rocks, grotesquely sculptured canyons, red mesas and old volcanoes tipped with the first snow of the season.

The region was the Moab area of southeastern Utah, where a wild rush is still underway for two of the earth's hidden treasures, uranium and oil.

Moab, incidentally, now calls itself the "Uranium capital of the world". Only a few years ago it was a quiet Mormon rangeland village in the old land of eroded plateaus where the muddy Colorado slashes its way southwest to a junction with Green River.

Much of this country we viewed from rimlevel, aboard a plane piloted by Fred Frazier, reputedly one of Moab's new millionaires, but as common as a cowpuncher on a fall roundup. At the controls of his new Cessna, he took us out on a flight over the rugged uranium country to show us what makes the region "tick" in this atom age.

Fred Frazier is known in Moab as America's top "rim flier", the name given pilots who follow wilderness gorges in their study of formations that hold uranium minerals. He has also served as pilot for Hollywood movie companies that have made pictures in this gaudily colored land of barren mesas overlooking awesome gorges.

From the Moab airport, our air trip took us out over the "Utex" open pit uranium mine of Charlie Steen, the young Texas geologist who nearly starved in locating a claim valued at around one hundred million dollars. Fred Frazier dipped his plane as he cut over the "Utex" at tree top, to make it possible for us to get a fine picture of the operation.

From the "Utex" our plane circled low over a dozen world famous uranium mines in a richly mineralized belt near the high LaSal volcano - a loccolith believed to have played a major role in impregnating the wild Moab region with the stuff of which atomic bombs are made.

A snow storm had enveloped the LaSals, so our plane cut out over mesas toward the Colorado, across the "Robbers Roost" country of Zane Grey and out over the wild canyon country known as Dead Horse Point. We flew at rim level up the Colorado making possible the wing tip inspection of uranium digging in two well known formations of southeastern Utah, the Chinle and the Chinarump of the Mosozoic.

Pilot Frazier finally lifted us out of the Colorado gorge and out over the spectacularly eroded country of old sea beds, with a primordial desert sandwiched between. This trip took us over Arches National Monument, a region we had visited only two years before by car.

Joining us on this flight over the grand gorges of the Colorado was my wife, Louise, and Bill Jenkins of the Klamath Falls Herald & News. We made the trip into the Moab country to get first hand information about uranium mining. This included jeep drives, and hikes on foot up canyons that had just been washed by cloudbursts.

A highlight of our visit to the historic town of Moab, where the Mormons established their Elk Mountain mission in 1855, was a trip through the nine million dollar Uranium Reduction Company Mill, dedicated earlier this fall.

Charles Augustus Steen, who made the fabulous discovery of high paying uranium near Moab, is vice-president of this big mill. We were met at the mill by Mitchell Melich, president. As we toured the plant, trucks bearing rich uranium ores were rolling through the gates, from many properties.

First this ore is weighed, then dumped on the ore pad. Thence it is taken in lots, crushed, sampled and stored in bins according to uranium quality or uranium content.

When withdrawn from the bins, it is ground to 28 mesh in the ball mill section, pumped to the leach tanks, and treated with sulphuric acid. The leached slurry goes to the classifiers, where the coarse sands are separated from the slimes and discarded to the tailings pond. The slimes go to the RIP (The resin in pulp) section, where, by in exchange, the uranium in solution is precipitated on resin beads and the barren pulp sent to the waste.

Uranium on the beads is dissolved with chemicals and the resulting solution is pumped to the recovery section of the plant. There the uranium in solution is precipitated by chemical action, filtered, dried and packaged in steel drums for shipment to the Atomic Energy Commission.

This concentrate is called "yellow cake" about 80 per cent uranium. And strange as it may seem the stuff does not affect a Geiger counter. It is inert.

We spent a week in Uraniumland, and returned home full of admiration for the earth scientists and engineers who developed the "Know how" that made possible the extraction of uranium from the ancient rocks of the Colorado Plateau.

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## ZIRCONS IN THE METAMORPHIC AUREOLE OF THE BALD MOUNTAIN BATHOLITH, ELKHORN MOUNTAINS, NORTHEASTERN OREGON

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Zircons were extracted from 37 metamorphosed sediments in the aureole of the Bald Mountain batholith of northeastern Oregon by crushing 200-400 grams of each rock and concentrating the zircons with bromoform and a Frantz separator. After mounting, lengths and widths of 300 crystals were recorded whenever possible. For 18 rocks in which less than 300 zircons were recovered, every crystal was measured. Recovery of zircon from 11 rocks was inadequate (2-87 crystals) for statistical treatment.

At metamorphic intensities below pyroxene-hornfels facies, zircons show no changes. As the contact of the batholith is approached, zircons develop overgrowths in argillaceous rocks of pyroxene-hornfels facies which result in a gradual change from rounded grains into euhedral zircons.

In the Elkhorn Mountains, zircon studies offer one possible method for distinguishing granitic rocks of magmatic origin from similar rocks of metasomatic origin. In thoroughly granitized rocks, euhedral zircons are distinct from euhedral zircons in associated granitic rocks of magmatic origin. Zircons in granitized rocks are distinguished by simpler crystal habits, greater elongation ratios, and more variability among samples in crystal size, elongation ratio, and number of crystals present. Major differences between the two contrasting kinds of zircons can be shown by comparison of various types of curves constructed from statistical data. (Geol. Soc. America, Annual Meeting, 1957 - 1958)



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