NEWS LETTER

VOLUME 20, 1954

GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE

Vol. 20 No. 1 PORTLAND, OREGON Jan. 1954

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

Officers of the Executive Board, 1953 - 1954

			Zone	Phone
President:	Mr. Raymond L. Baldwin	4804 S.W. Laurelwood Drive	1	CY 2-1452
Vice-Pres:	Mr. Orrin E. Stanley	2601 S.E. 49th Avenue	6	VE 1250
Secretary:	Mrs. Leo Simon	7006 S.E. 21st Avenue	2	EM 0549
Treasurer:	Mr. Robert F. Wilbur	2020 S.E. Salmon Street	15	VE 7284

Directors: Mr. E. Cleveland Johnson (1954); Mr. F. W. Libbey (1954); Mr. Rudolph Erickson (1955); Mr. Norris B. Stone (1955); Dr. Francis G. Gilchrist (1956)

Staff of the Geological News Letter

			Zone	Phone
Editor Emeritus:	Mr. Orrin E. Stanley	2601 S.E. 49th Avenue	6	VE 1250
Editor:	Mrs. Albert Keen	2715 N.E. 41st Avenue	13	GA 0229
Asst. Editor:	Mr. Ford E Wilson	308 South Cliff Street, Gallup, New Mexico		
Assoc. Editors:	Mr. Phil Brogan	1426 Harmon Blvd., Bend, Oregon		266-J
	Mr. F. W. Libbey	2259 N.W. Everett Street	10	BR 2145
	Dr. Ruth E. Hopson	4709 N. Willamette Blvd.		TW 3441
	Miss Margaret L. Steere	2064 S.E. 72 Avenue	16	VE 0917
	Mrs. William Clark	5237 N.E. Wisteria	13	GA 3242
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Committee Chairmen

Programs:	Mr. F. W. Libbey	Service:	Miss Margaret Steere
Field Trips:	Mr. Leo F. Simon	Museum:	Dr. J. C. Stevens
Membership:	Mr. William F. Clark	Public Relations:	Mr. C. D. Phillips
Publicity:	Mr. H. Bruce Schminky	Librarian:	Mrs. Edward Bushby
Social:	Mrs. William F. Clark	Historian:	Miss Ada Henley
Research:	Mr. Rudolph Erickson	Display:	Mr. Albert Keen

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CALENDAR FOR JANUARY 1954

Thursday Jan. 7	Luncheon Meeting - Room 305 YMCA
Friday Jan. 8	Friday Night Meeting - Library Hall - 8:00 p.m. Dr. Arthur Jones will show slides and speak on his recent vacation trip to the Hawaiian Islands. Dr. Jones will display interesting material collected on the same trip.
Tuesday Jan. 12	Library Browse Night - 1202 S.W. Cardinell Drive.
Thursday Jan. 14	Luncheon Meeting - Room 305 YMCA
Thursday Jan. 21	Luncheon Meeting - Room 305 YMCA
Friday Jan. 22	Friday Night Meeting - Library Hall - 8:00 p.m. Title of lecture and speaker will be announced in newspapers.
Tuesday Jan. 26	Library Browse Night - 1202 S.W. Cardinell Drive.
Thursday Jan. 28	Luncheon Meeting - Room 305 YMCA

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NIGHT EARTH-SCIENCE COURSES OFFERED

Several night college courses of possible interest to GSOCers are being offered by the General Extension Division of the State Board of Higher Education at Portland State College this winter. Regular college credit is given; winter term starts January 4.

Dr. Ruth Hopson is teaching Natural Resources of United States on Monday nights and Natural History of Oregon on Tuesday nights.

The second term of General Geology is offered Monday evenings, and the first of a two-term sequence of Engineering Geology is scheduled for Tuesday night. Both of these courses are instructed by Ralph Mason.

A course in Hydrology is being offered on Wednesday night. L. A. Clayton of Oregon State College is instructor.

Information on the courses may be obtained by calling CA 4251.

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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Report of Nominating Committee

Mr. President and
members of the Geological Society
of the Oregon Country:

Pursuant to the request and nomination and appointment of the President of the Society, the undersigned have met as a nominating committee and respectfully submit and nominate the following for the respective offices of the Society for the year next ensuing after the next annual meeting:

President	Albert Keen
Vice President	Earl Minar
Secretary	Johanna Simon
Treasurer	Robert F. Wilbur
Board Member	Fay W. Libbey
Editor of the News Letter	Francis Gilchrist

We have ascertained if each of the above is agreeable to having his or her name placed in nomination, and each have consented thereto. We place the names in nomination.

Respectfully submitted,

/s/ _____
Mrs. Rudolph Erickson

/s/ _____
Miss Myrtice Fowler

/s/ _____
Lloyd Ruff

/s/ _____
H. F. Travis

/s/ _____
Clarence D. Phillips,
Chairman

****

CONDON LECTURE SERIES ANNOUNCED

The Condon series of lectures will be held in the auditorium of Portland State College February 23 and 24, 1954. Dr. Ralph Buchsbaum, Department of Biological Science, University of Pittsburgh, will lecture on "The Sea and the Life Within It."

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LON HANCOCK HONORED

Oregon Academy of Science
December 7, 1953

Office of the Secretary Corvallis, Oregon

Mr. Alonzo W. Hancock
2720 S.E. 84th Avenue
Portland 66, Oregon

Dear Mr. Hancock

At the Council Meeting of the Oregon Academy of Science on December 5th, you were selected to receive one of the three annual citations made by the academy in recognition of outstanding contributions to science in the state of Oregon. The formal presentation will be made on February 27, 1954, at Linfield College.

Meanwhile, I should like to know exactly how you wish your name or initials entered on the citation. It is hoped that you can be present in person to receive the citation at the annual meeting, but if it should develop that you cannot be there, I would appreciate your designating someone who might accept it for you.

May I congratulate you upon this recognition by your fellow scientists.

Very truly yours,

/s/ F. A. Gilfillan, Secretary

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FRIDAY NIGHT MEETING - December 11, 1953

Lecture on Wallowa Area

Dr. Stauffer of Lewis and Clark College told of a most interesting camping experience. Twenty-three biology and geology students from Lewis and Clark College had a field trip in the Wallowa Mountains last summer. From the standpoint of geology the mountains are the most interesting in Oregon. The terrain exposed by long periods of erosion has proved to be some of the oldest in the state. A batholith of granodiorite covers the area. The topography shows much modification. The excellent slides used with the lecture showed caps of Columbia River basalt cut and carved by ancient glaciers, and U-shaped canyons and valleys. Feeder dikes of intrusive lava, fault lines, and alluvial fans along the scarp depicted a busy landscape of olden times. Now, the alpine flora covering the hills and valleys is delicate and beautiful.

Specimens of the region made up the display. They were of granite diorite, quartz diorite, Martin Bridge black marble, limestone, and Clover Creek greenstone.

Thank you, Dr. Stauffer, for a fine meeting.

S.K.

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ANCIENT LIMESTONE HILLS

A region of barren, rocky limestone hills half a billion years old and containing fossils of the first-known life on earth has been found in western Mexico. Situated near the town of Caborca in northwestern Sonora, these hills may constitute one of the most significant survivals yet known of the Cambrian geological period, when the first forms of life appeared of which any certain record still exists.

First found by Mexican oil geologists in 1941, these Cambrian rocks have now been intensively studied by specialists, according to a report by Dr. G. Arthur Cooper, of the U.S. National Museum, and Dr. A. R. V. Arellano, of the Institute Geologico de Mexico. This report has recently been published by the Smithsonian Institution.

Although fairly extensive areas of Cambrian rocks crop out all over the world, this is the first area of this kind found in Mexico. It seems of exceptional importance because of the variety of animal life it represents, covering essentially the whole range of the first living things on earth.

First, the trilobites. They were crablike creatures perhaps related - though very remotely - to the crabs, lobsters, and insects of today. The trilobites were greatly reduced as a race at the end of the Cambrian period, which may have lasted at least a hundred million years.

Second, the brachiopods. These creatures, perhaps quite remotely ancestral to the present mollusks, still survive in the modern seas, where they are an unimportant part of the world's present fauna. They may be considered the earth's longest-surviving animals. They appeared in a great profusion of forms on the supposed threshhold of life.

Third, the Pleospongia. Related to them are the sponges of the present, and perhaps also the coelenterates, the "jelly fishes" and corals, which can be considered the next step above the sponges in the ladder of animal life. In the Mexican deposits are excellent examples of the Archaeocyathidae, the "ancient cup bearers," which built limestone reefs in shallow waters. Some looked like lead pencils, others like flower vases, still others like dinner plates. But the predominant form was cup-shaped. The animals extracted lime from the water for their skeletons and attached themselves to the sea bottom in much the same manner as tree roots attach to land. (From the Smithsonian Institution).

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LUNCHEON NOTES - November 19, 1953

An even dozen were present at today's luncheon. We were happy to have Mrs. Kelham with us. . .how about more of the ladies attending some of the luncheons? Dr. Adams passed around an interesting serpentine specimen. Mr. Dole brought an unusual specimen of high-grade silver from the Henrietta mine, Delamar, Idaho. He explained that this particular piece contained both miargyrite and pyrostilpnite. President Baldwin had a letter from Orrin Stanley, who reports the weather is turning cold in Mexico City, so he may be heading for the City of Roses soon. Leo Simon passed around a copy of the American Scientist containing a very interesting article on Pacific Coast earthquakes. Leo gave us some interesting facts concerning silver, including its recovery in the photographic

business. In a five-minute talk, Leo gave us an account of a new industry springing up in the Hawaiian Islands, the growing of macadamia nut trees. These trees are well adapted to this area and are expected to provide another important product of the islands. Macadamia nuts are found at the present time in the nut bed at Clarno - but these are from trees which grew at this spot in Eocene time.

A.K.

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GRASSHOPPER GLACIERS

Among America's natural curiosities are "grasshopper glaciers." These are great masses of glacial ice containing layers of embedded frozen grasshoppers. They occur among high mountains in the Northwestern States, and often contain perfectly preserved bodies of grasshoppers, though in some cases the slow grinding movement and great pressures characteristic of most glaciers reduce specimens to fragments. Such layers may be the remnants of vast grasshopper flights, part of migrations recurring at irregular intervals over several centuries.

The most notable of the grasshopper glaciers is located in the Beartooth Mountains of Montana, close to the northeastern corner of Yellowstone National Park. It has been known for over half a century, but a detailed illustrated account of it, prepared by Dr. Ashley B. Gurney of the U.S. Department of Agriculture has been given for the first time in the Annual Report of the Smithsonian Institution just issued. This glacier is difficult of access and has been visited by few scientists, although the recurrent layers of dead insects may throw new light on the prehistoric habits of some of the country's worst grasshopper pests.

All the frozen insects identified are of the so-called Rocky Mountain grasshopper, the most destructive grasshopper in this country and one which spreads devastation in the wake of tremendous migratory flights in the 1870's and 1880's, mainly in the Great Plains and northern Rocky Mountain states. Studying insects from glaciers has given clues regarding the spread of insect pests by wind. It is believed that great hordes of this grasshopper either flew over the glacier or were carried there by winds and that while there sudden snowstorms or cold air rising from the ice field caused them to drop. While it is not known how many of such aggregations of grasshoppers decompose after dying on the ice and snow, it is evident that some are embedded and frozen so quickly that they remain perfectly preserved until melting occurs--decades or even centuries later.

In 1949 living specimens were found on the ice of this same glacier, apparently soon after they alighted and before embedding or decomposition occurred, and they proved to be a grasshopper then migrating through range land in Nevada and Oregon. The upward rising convection currents which carry dust for hundreds of miles sometimes are important in the widespread movement of pests.

Grasshoppers recently chopped from the ice of this glacier have been given age-determination tests by the radioactive-carbon method, but so far they reveal only that the oldest ones examined have been in the ice less than 600 years.

Several other grasshopper glaciers occur in Montana, and there have been similar reports from the high mountains of Africa. (Smithsonian Institution)

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DECEMBER LUNCHEON NOTES

December 3, 1953

Having thirteen at the table seemed to bother no one at today's luncheon. Mrs. Jones passed around several bronze replicas of animals found in the La Brea tar pits in Los Angeles; also a copy of Rancho La Brea, an excellent publication of the animals from this area. Lon Hancock reported he had received some twenty publications on paleontology, donated to the GSOC Library by Dr. Chester Arnold of the University of Michigan. Bruce Schminky had several publications, one of them being Calico Print. Ed Kelham brought a specimen picked up near Moses Lake. Rudolph Erickson passed around specimens of sycamore leaves and a seed, all on the same piece. Dr. Hopson asked for information on a specimen brought in by one of her students at Seaside. It was identified by Mr. Dole as quartzitic, with dendritic patterns on the surface - only in much more technical language. Leo Simon had two interesting specimens, one a volcanic bomb and the other apparently andesite surrounded by a thick coat of black lava. In a five-minute talk, Al Keen related experiences in importing a quantity of amethyst from Uruguay.

* * * * *

December 10, 1953

Sixteen members were present today. We were happy to have with us one of our new members, Mrs. Worth. We hope she will continue to attend. Eleanor Gordon of Salem was also present, bringing with her a box of zeolites, most of them from a location near Kalama. We were happy to welcome Richard Walker, home on leave from Fort Ord. He informed us that he was leaving soon for some place in Europe, where he expects to spend the next two years. A Christmas greeting card from the Ford Wilsons, from Gallup, New Mexico, was passed around. Tom Matthews brought several specimens of clay from Hobart Butte. He reported the deposit was discovered in 1930, and commercial production started in 1933. Rudolph Erickson passed around a letter from Jack Wolfe and a list compiled by the Book Committee on suggested reading. Bruce Schminky gave a most interesting5-minute talk on "Ships of the Desert." At various times remains of ancient ships have been reported in the area around the Salton Sea. Bruce had prepared a map showing how it would be possible for ships to reach the areas where they have been reported. His talk led to considerable round-table discussion of the subject.

* * * * *

December 17, 1953

Fifteen members attended today's luncheon. Mr. Libbey brought a small bottle of monazite sand from Cascade, Idaho. Hollis Dole passed around a specimen of chlorite schist, containing ilmenite, from Baker, Oregon. Rudolph Erickson reported receiving several publications from Dr. Chaney, donated to the GSOC Library. These were spread out on the table for inspection. Leo Simon brought two specimens from Hobart Butte - realgar, a monosulfide, deposited by hydrothermal action; and scorodite, a rare arsenic mineral in clay gangue. Mrs. Jones announced Dr. Francis Jones would be in Portland over the holidays and would likely be present at the December 31 luncheon. Rudolph gave an interesting 5-minute talk on the Greenhorn area on the middle fork of the John Day River. This region is similar to the Wallowas, both being granitic and probably of the Idaho batholith. Announcement was made of the forthcoming Condon lecture series - information on these will be found on page 2 of this issue of the News Letter.

- A.K.

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CALENDAR FOR FEBRUARY 1954

Thursday Feb. 4 — Luncheon Meeting - Room 305 YMCA

Tuesday Feb. 9 — Library Browse Night, 1202 S.W. Cardinell Drive

Thursday Feb. 11 — Luncheon Meeting - Room 305 YMCA

Friday Feb.12 — Friday Night Meeting, Library Hall - 7:00 p.m.
Mr. Ralph S. Mason, mining engineer with the State Department of Geology and Mineral Industries, will speak on "The Geology Behind the Scenery in Oregon."

Sunday Feb.14 — The field trip will be to the slide area in Astoria.
Leader, Hollis Dole, State Department of Geology and Mineral Industries. Drive down Lower Columbia River Highway, to meet at Bradley State Park on Clatsop Crest at 10:30 A.M. Distance 80 miles. Grand view overlooking State of Washington and Puget Island. Meet trip leader in Astoria (about 25 miles beyond Bradley Park) at east approach of Ferry slip, at 11:30 A.M. Perhaps prepare to eat lunch in cars if no other place available. Weather and other conditions permitting, we may return to view Cannon Beach and geological formations in Ecola State Park and then home via Sunset Highway. Round trip 250 miles. Leo Simon, Chairman Trip Committee.

Thursday Feb. 18 — Luncheon Meeting - Room 305 YMCA

Tuesday Feb. 23 — Library Browse Night, 1202 S.W. Cardinell Drive

Thursday Feb. 25 — Luncheon Meeting - Room 305 YMCA

Friday Feb.26 — Friday Night Meeting, Library Hall
Annual Business Meeting
Moving pictures

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I M P O R T A N T N O T I C E

THE FIRE MARSHALL HAS NOTIFIED THE PUBLIC LIBRARY THAT THERE MUST BE TWO EXITS AVAILABLE AT ALL TIMES WHEN MEETINGS ARE HELD IN THE AUDITORIUM. AS THE EXIT THROUGH THE LOBBY IS CLOSED AT 9:00 P.M., LEAVING ONLY ONE EXIT - THE ONE TO THE STREET - THIS MEANS THAT OUR LECTURE MEETINGS MUST ADJOURN BEFORE 9:00 P.M. UNTIL OTHER ARRANGEMENTS ARE MADE. PRESIDENT BALDWIN HEREBY ANNOUNCES THAT THE LECTURE FRIDAY, FEBRUARY 12, WILL BEGIN PROMPTLY AT 7:00 P.M., AND THE AUDITORIUM MUST BE FULLY VACATED AT 9:00 P.M.

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ANNUAL BANQUET
Friday, March 12, 1954, at 6:30 P.M.
Mount Tabor Presbyterian Church

President Baldwin has given Mr. and Mrs. Glenn C. Hazelhurst and Mr. and Mrs. William F. Clark the responsibility of arranging for the annual G.S.O.C. banquet. The ladies of the Dorcas Association, who will cook and serve the banquet, ask that we state our preference, for turkey or fish, when making our reservations. But, according to Mrs. C. H. Crockett, Vice President of the Dorcas Association, there will be plenty of each, in case we forget.

Mr. Orrin E. Stanley has promised to show a 'few pictures' and give a "Report of Six Months in Mexico."

From the enthusiasm with which Mr. Stanley's pictures have always been received, it might be well to mention that the seating capacity for the banquet is limited. Reservations to be made with Leo and Johanna Simon, BE 0300. Tickets $1.75.

CC

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BIND YOUR NEWS LETTERS

Now that the index for 1953 is out it is time to bind the bulletins for the year. In preparing for binding, take index out of January (1954) issue, remove all staples, arrange the pages in consecutive order, with index either at beginning or at the end as your personal preference dictates, and bring to a regular meeting of the Society or to Thursday luncheon at the YMCA. Turn them over either to Business Manager Ed Kelham, or to the President.

We have several bound volumes of back issues for sale at $2.25 per volume - if you are in need of any back numbers NOW is the time to get them.

Ray Baldwin

****

NEW MEMBERS - G.S.O.C.

			Phone
Ransom, Maud Barroll	3317 S.W. 10th Ave., Apt. 4		AT 1738
Moltzner, Emily	7032 S.E. Stark St., Zone 16		TR 6856
(Secretarial Service)	503 Board of Trade Bldg.	4	CA 2420
Nestlen, Mr. and Mrs. Fred H.	11136 S.W. 64th Ave.	1	CH 3846
(Owner and Operator of 4th Ave. Garage)	2038 S.W. 4th Ave.	1	BR 8359
Junior Member			
Munson, E. Linda (13 years)	4072 N.E. 32nd Ave.	12	TR 6856

****

A CORRECTION

A misprint occurred in the letter sent recently to members. It should read: "Dues are now payable for 1954 as follows: $3.50 for regular members; $1.50 for Junior members; $2.50 for members living in counties not adjacent to Multnomah County.

Sincerely,
Mrs. Johanna M. Simon
Secretary

****

SIZE AND DISTANCE TO THE SAME SCALE
A Mental Picture of the Solar System

By
Carl Price Richards

It always helps to the understanding of a problem if one is able to visualize the circumstances of it. This is particularly true in regard to astronomy. To grasp satisfactorily some of its various aspects one must be able to picture mentally in their true proportions the sizes and distances involved. Maps and models are valuable aids in these respects and are much used in the teaching of the sciences.

In the case of astronomy, however, maps and models involve difficulties which are impossible to overcome where sizes of objects and their distances apart are to be represented to the same scale. Diagrams and models which are not to scale are always misleading. The general lack of understanding and appreciation of astronomical problems is largely traceable to faulty diagrams in atlases and school books.

Most of these include a diagram of the solar system, showing the orbits of the planets at their relative distances from the sun. Each planet, moreover, is often shown in size relatively to the others, but at a vastly different scale from that used for their distances. To combine size and distance to the same scale is impossible, especially within the compass of a page in a school book. If the distances are to scale, the sun and the planets to the same scale would be dots so microscopic as to be invisible and, per contra, if the planets are drawn large enough to be seen, then distances, even to the smallest practicable scale, would, literally, run into miles!

One can, however, describe a model which, though impossible to construct, conveys a correct impression of the proportion of size to distance. One of the best of its kind is the description of a model of the solar system to a scale of one yard equal to one million miles, which is a ratio of one to 1,760 million. At such a scale the planets can be compared to the sizes of familiar objects and their distances from the sun to easily imagined lengths. These may be tabulated thus:

Name	Diameter in inches	Comparison	Distance
Sun	31.	a ball 31 in. diameter	
Mercury	.10	a poppy seed	36 yards from the sun
Venus	.27	a small cherry stone	67 yards from the sun
Earth	.28	a cherry stone	93 yards from the sun
Moon	.08	a poppy seed	8½ inches from the earth
Mars	.15	a grape seed	141 yards from the sun
Jupiter	3.17	a large orange	¼ mile from the sun
Saturn	2.70	a small orange	½ mile from the sun
Uranus	1.10	a small walnut	1 mile from the sun
Neptune	1.20	a larger walnut	1½ miles from the sun
Pluto	.18	a grape seed	2 miles from the sun

Thus, at a scale of one yard equals one million miles, the outermost planet, represented by a grape seed, revolves in an orbit about four miles in diameter, about a sun which is thirty-one inches in diameter. From such a picture, it is not difficult to grasp the nature of our niche in space.

Let us now carry our description further and, still using the same scale, see where the nearest neighbor of the solar system would be. Alpha Centauri is the nearest star to the sun and is four and a third light-years distant. That is equivalent to 26 trillion miles (26,000,000,000,000) which, to our scale, is 14,800 miles. But that is the nearest star, one of a hundred billion which form our galaxy, of which the sun is merely an average-sized unit. The galaxy is 100,000 light-years in diameter, shaped like a watch, and about 15,000 light-years thick at the center, the sun being situated 18,000 light-years from the rim. Converting these figures to our adopted scale, we find that, whereas our solar system is four miles across, the galaxy would occupy an area larger than the orbit of Mars, or about 334 million miles in diameter, with our four-mile-sized solar system situated about 60 million miles from the edge.

Such figures merely indicate the vastness of the space encompassed by only one galactic unit of the universe. Modern research, however, has revealed that there are over a hundred million others, all of them great clouds of stars, more or less similar to our own and situated at colossal distances from each other. These statements of figures enumerate dimensions and facts, which, it is safe to say, are utterly beyond the capacity of man to comprehend or visualize, but sincere contemplation of them must add to his wonder and admiration of the magnificence and majesty of the universe of which he is a part. It is true that, physically, he is an exceedingly small part, but, don't forget, one which is endowed with an intellect capable of discovering these and other scientific truths. Furthermore, he possesses the ability to appreciate, though he cannot fully understand, the natural wonders which surround him and to which he belongs.

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"SOLAR TIDES"

There are "sun tides."

The great oceans are divided into tidal basins, some with sections in each of which the tidal movement responds in its own way to the gravitational pull of the moon.

These are some of the complications of tide prediction, explains Rear Admiral Leo O. Colbert, former chief of the United States Coast and Geodetic Survey, in the latest Annual Report of the Smithsonian Institution.

It would be quite simple if the whole earth had a smooth surface covered by a uniform depth of water. Then the height of the tide anywhere could be predicted fairly well from the position of the moon at any time. Actually, however, a great deal depends on the contours of sea bottoms and surrounding lands.

For tidal behavior, Admiral Colbert says, the Atlantic Ocean can be considered as consisting of two basins. The larger of these extends across the North and South Atlantic, with the eastern coast of North America at one end and the Antarctic Ocean at the other. Within this basis the moon-caused oscillation of the water is such that high tide along the North American coast occurs 12 hours after the moon passes over the meridian of Greenwich, and low tide comes approximately 6 hours later. The other, smaller basin is bounded by the northern coast of Brazil and the north Atlantic shores of Europe. Here the oscillation brings high water on the coasts of Iceland and Greenland on one end and on the coast of South America on the other 8 hours after the moon's transit of Greenwich.

The Indian Ocean is divided into three such tidal basins and the Pacific into two. One of these, however, includes the greater part of the world's largest ocean.

Tides are somewhat complicated everywhere by the gravitational pull of the sun, but in most places that is very small compared to that of the moon, owing to the fact that the effect of these forces varies with the mass of each body but inversely with the cube of the distance, or the cube of 92,000,000 miles to the sun compared inversely to 250,000 miles to the moon.

There are a few places, however, where the arrangement of land and water is such that the predominant tide-producing force is solar. This is the case with tides on the shores of Tahiti. High tides come each day at noon and at midnight and low water at six in the morning and six in the evening, regardless of the moon's position. The Tahitian tides are quite small. A much larger predominantly solar tide has recently been found, Admiral Colbert said, on Tuesday Island, a small island in Torres Strait off the northern coast of Australia. (From the Smithsonian Institution, October 9, 1953.)

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HAWAIIAN VACATION

GSOC Talk - January 8, 1954

Dr. Arthur Jones spoke on his recent trip to the Hawaiian Islands. His talk, well illustrated with maps and slides, featured their geology. They are peaks of a subterranean mountain chain, which rise about 30,000 feet from its base on the ocean floor. They are perfect examples of shield-type volcanoes. The lava is mostly basaltic, with small amounts of andesite. Many of the flows are very old, showing the effects of severe erosion. Others are very recent, having occurred in the past few years. The soil gets its red color from the decomposition of red lava.

The flora is lush and of tropical nature on the rainy side of the islands. The flowers are brilliant and exceptionally beautiful. The other side receives very little rainfall and is practically a desert. Dr. Jones had a short reel of the 1950 volcanic eruption. This unusual film showed actual scenes, with lava flowing down the slope of the mountain. It twisted and crept down until it finally met the ocean in a shower of steam. The night pictures showing a firey glow as the lava tumbled on its downward path were spectacular.

On the display table was an attractively arranged assortment of pamphlets, folders, books, and pictures of the islands. There were several samples of coral, red lava, olivine crystals, and black sand.

A most enjoyable evening was spent by our members and their friends.

S.K.

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CIVIL ENGINEERS SELECT OFFICERS

Oregon section, American Society of Civil Engineers, has elected Kenneth N. Phillips president for the coming year, succeeding Loren Thompson. Phillips is in charge of surface-water resources for the Portland district of the U.S. Geological Survey. (The Oregonian)

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WHAT'S NEW IN READING

1. Introduction to Washington Geology and Resources, by Charles D. Campbell, published by Washington Division of Mines and Geology, Olympia, Washington, as Circular no. 22. Free of charge.

This interesting booklet by Professor Campbell of the State College of Washington at Pullman, is a nontechnical description of the geology of the State of Washington, with particular emphasis placed on the origin of the present-day land forms that one sees on traveling about the State. In its 153 pages it includes four scenic photographs, an index map, and a list of selected references.

2. De Argento Vivo, Historic Documents on Quicksilver and its Recovery in California Prior to 1860. Published by California Division of Mines, Ferry Building, San Francisco 11, California. Price $1.00.

De Argento Vivo (living silver) is a very interesting collection of writings on quicksilver that date from 300 BC to 1860. The compiler, Elizabeth L. Egenhoff, has included numerous photographs of old drawings and etchings, together with reproductions of actual pages of ancient manuscripts and their translations.

M.L.S.

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LUNCHEON NOTES

December 24, 1953

Eighteen were present at today's luncheon. We were happy to have as guests Dr. and Mrs. Francis Jones. We were also glad to welcome two members of the GSOC southern branch, Ford and Alice Wilson. Ford has just finished an assignment as construction engineer at Gallup and will soon be located in El Paso, Texas, where his work will be in connection with guided missiles. Other members present were President Ray Baldwin, Margaret Steere, Mary Davenport, Mr. and Mrs. Edward Bushby, Hollis Dole, Leo Simon, Ed Kelham, Rudolph Erickson, Clarence Phillips, Bruce Schminky, Norris Stone, Mr. Palmer, and Al Keen. Rudolph Erickson brought some leaf casts, collected by Mr. Walstad in the Albany area. Hollis Dole displayed a new map of the Galice quadrangle by the U.S. Geol. Survey, published in cooperation with the State Department of Geology and Mineral Industries - price $1.00. Margaret Steere passed around a copy of Abstract of Geological Publications. Mr. Palmer gave a most interesting five-minute talk on the discovery and mining of borax, in the Mohave Desert. He told of many adventures in connection with the early mining days, where truth is sometimes stranger than fiction. We all thoroughly enjoyed Mr. Palmer's talk.

A.K.

* * * * *

December 31, 1953

Vice President Orrin E. Stanley was welcomed back after an absence of seven months in Mexico. He gave a short talk, saying he was a student five months at the National University of Mexico in Mexico City. He had lecture courses in Spanish and Mexican archeology, and modern and contemporaneous art, and two in Mexican history. One object of his trip was to take color pictures; he has about 1,000. He took several side trips; of special interest was one to a railroad he once worked on in an engineering capacity from Guadalajara to Manzanillo. . . Two young guests of Dr. Adams from Oswego were David and John Hedges. David is interested in geology and plans to attend the Colorado School of Mines after finishing high school this year. John's special interest is anthropology. Both boys were given the opportunity to ask a question about their favorite subject but were referred to special publications for the answers. Dr. Adams had a copy

of Arizona Highways magazine for December and passed around a box of specimens from several different states. Mr. Erickson had the November issue of the Journal of Paleontology. . .A New Years' card was signed by all to be sent to Lotus Simon Miller, a member now living in Madison, Wisconsin, and a printed Christmas letter from Dr. and Mrs. John Eliot Allen, in Socorro, New Mexico, was shown. Miss Ada Henley presented the group a box of sugared nuts, which all enjoyed. . .Leo Simon reported on the annual bird count by the Oregon Audubon Society, in which Mr. Kelham also participated. In their districts, the southeast and southern portions of Portland, they counted fifty-four different species. He also announced that the perlite mine visited by the GSOC several years ago is being dismantled. . . Mr. Keen told that a special citation will be awarded Mr. Hancock by Linfield College for outstanding scientific investigations in Oregon, at the Oregon Academy of Science meeting February 27. . .Eighteen were present, including five women. One first-time visitor was Miss Maude Ransom, a new member.

E.M.B.

* * * * *

January 7, 1954

Eighteen members and guests were present today - all men. Mr. Libbey introduced Norman S. Wagner, resident geologist at Baker, Oregon. We are glad to welcome Mr. Wagner and hope he will visit us again. Others present were Pres. Ray Baldwin, and Messrs. Adams, Schminky, Clarence Phillips, Travis, Palmer, Stone, Golden, Wilbur, Stanley, Simon, Dole, Matthews, Erickson, Elder, and Keen. Bob Wilbur brought a specimen of tetracera, from the Pittsburgh Bluff area - mid-Miocene in age - identified by Dr. Chaney. The question of the earth slides at Astoria was brought up. Hollis Dole explained that this area was on a syncline, with steep slopes toward the ocean. A sandstone layer overlies an impervious layer of shale. Water soaks down through the sandstone to the shale, which it cannot penetrate, and so provides a slick surface where slippage may occur. Mr. Elder gave us a very interesting five-minute talk on the metal bismuth. He explained that bismuth is contrary to most metals - expanding when it cools. About 50 percent of its production is used in medical work, with most of the balance in alloys with various other metals. These talks are becoming a highlight of the luncheons. Our thanks to Mr. Elder.

A.K.

* * * * *

January 14, 1954

For the fourth straight time we have had an attendance of eighteen. Present today were Ada Henley, Rose Jennings, Estelle Connor, Pres. Baldwin, Bruce Schminky, Norris Stone, Bob Wilbur, Orrin Stanley, Hollis Dole, Leo Simon, Rudolph Erickson, Mr. Travis, Fay Libbey, Tom Matthews, Mr. Palmer, and Al Keen. We were happy to have Mr. R. E. Corcoran, of the State Department of Geology and Mineral Industries, with us today. Mr. Palmer brought several specimens of razorite from the Mohave Desert borax area. Mr. Libbey passed around two specimens sent in by Dr. Underwood. One was a lead specimen from Round Mountain near Jordan Valley, and the other a piece of colored glass of some kind, obviously man made. Tom Matthews talked on a comparatively new metal - germanium. Although discovered in 1920, very little use was made of it until around 1940. It is recovered from flue dust as a by-product in the operation of smelters. It has been used in some kinds of radio and electrical work and is now coming into wide use in hearing aids, where its main use is amplification. We all enjoyed Tom's talk.

A.K.

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OREGON CAMERA CLUB HONORS MR. ORRIN E. STANLEY

Mr. Orrin E. Stanley was made an Honorary Member of the Oregon Camera Club at a meeting commemorating their 58th anniversary. Our congratulations to you, Mr. Stanley.

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IN PERMIAN TIMES

A part of the fantastic living world of 200,000,000 years ago has been dissolved out of about 30 tons of yellowish-brown limestone by Smithsonian Institution geologists.

Long ago the rocks that now make up a low mountain range in southwestern Texas - the Glass Mountains, about 250 miles east of El Paso - were muddy sea bottom. This was during the Permian geological period, when some of the earliest-known forms of plant and animal life appeared on land. Probably these rocks, or rather the mud from which they were made, were close to the shore of an ancient warm ocean. A bewildering array of creatures lived in that sea. Eventually they became buried in the mud. In some cases they were coated with silica. In other cases silica replaced the shelly tissues.

When these rocks are placed in hydrochloric acid the limestone is eaten away but the silicified shells remain. Years of skilled labor would be required to chip out of the rock what is accomplished in a few days in the hydrochloric-acid bath.

Most abundant animals of the ancient sea were brachiopods, a type of bottom-dwelling creature of which only a few inconspicuous species have survived in oceans of the present. They had two shells and were attached to sea-bottom rocks by the larger shell and sometimes by long spines. The shells, as is shown by those dissolved out of the rocks, often were beautifully sculptured. These brachiopods were defenseless little animals, largely incapable of motion and depending entirely on their hard shells for protection.

Probably the dominant invertebrate creatures of the ancient sea were the cephalopods, a high type of mollusk, closely related to the present-day chambered nautilus. Some were as large as washtubs, about 18 inches in diameter. They had heavy, hard shells from which grew spines an inch or more long. These animals could move about freely. They had powerful beaks and supposedly preyed at will on other sea creatures. No known marine animal of the time apparently reached any very impressive size.

The ancient rocks yielded a few corals, but the Glass Mountain area evidently was not a very rich coral country. Their place as reef builders was filled in part by Bryozoa - actually animals that looked like bushes. Some had bushlike stalks and branches. Others grew around stones like mosses. They were related, distantly at least, to the abundant brachiopods. Some sponges also grew like small trees, up to heights of about four feet or more and with trunks four to six inches across. Certain areas of sea bottom must have looked like sponge-tree forests through which darted the fearsome cephalopods feeding on any soft-bodied animal life.

The job of dissolving these fossils out of the rocks, which has been in progress for 13 years, now is nearly completed. The job of classification remains to be done. With the material already at hand, however, it is possible to reconstruct a vivid picture of the ancient sea-bottom habitat.

The Glass Mountains, according to Dr. G. Arthur Cooper, Smithsonian curator of invertebrate paleontology, have proved one of the richest fossil areas in the United States. Dr. Cooper has made most of the collections and carried out the work of dissolving the rocks in the hydrochloric-acid bath. (From the Smithsonian Institution, April 9, 1953.)

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ENGINEERS TO HONOR DR. J. C. STEVENS

At its annual dinner the Portland chapter, American Society of Civil Engineers, will honor John C. Stevens, widely known Portland engineer and inventor. Stevens is past president of ASCE. His engineering firm is Stevens and Thompson, and he is also a principal in the firm of Leupold and Stevens Instruments, Inc., for which he developed numerous devices. He holds honorary doctorates from Oregon State College and his alma mater, University of Nebraska. He founded the Oregon Museum of Science and Industry here, and has been active in conservation, power, and traffic safety and chamber of commerce groups. (The Oregonian)

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ROMANCE DEPARTMENT

The wedding of Miss Louise Jennette Lawrence to John Phillip Brogan, son of Mr. and Mrs. Phil F. Brogan of Bend, was an event of December 26.

* * * * *

The announcement of the engagement of Shirley Phillips, daughter of Mr. and Mrs. Clarence Phillips, to Hugh Harcourt, son of Dr. and Mrs. R. A. Harcourt, was made at a New Year's Eve party held at the home of Clarence Phillips.

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YOUR LIBRARY AND MINE

This is the first opportunity of your librarian to wish all the readers of the News Letter a very Happy New Year. Speaking library-wise, why could we not have a motto for the new year? It might be:

"Let's absorb more and more
Of geological lore,
From the GSOC Library
In nineteen hundred and fifty-four."

Although in this limerick the quatrain form has been borrowed from the Rubaiyat of Omar Khayam, let not his pessimism creep into any activity of the Geological Society of the Oregon Country. 1953 was an optimistic year for the library. It added to its shelves many excellent acquisitions. Library nights (of which there were about twenty) became very stimulating meetings although attended by a relatively small group. It is the desire of those who did attend to plan these "browses" so that a greater number of members can take advantage of the benefits offered. With this in mind it will be appreciated if each member would fill in the questionaire appearing at the end of this column, and return it to your librarian at your earliest convenience. Thank you.

Acquisitions from the A.D.Vance Library that have been recently catalogued are:

	Author
Paleontology of Tertiary Marine Formations, Vol. 5, 1942	Chas. E. Weaver
Tertiary Stratigraphy of Western Washington and Northwestern Oregon, Vol. 4, 1937	" " "
Invertebrate Paleontology, 1935	Twenhofel & Shrock
Origin of the Species, 1859	Darwin
Methods of Paleontology, 1937	Chas. Camp and G. Dallas Hanna
Elements of Geology, 1894	Jos. LeConte

	Author
Textbook of Geology, 1932	Longwell, Knopf & Flint
Rocks & Rock Minerals, 1926	Pirsson & Knopf
Economic Geology of Mineral Deposits, 1936	E. R. Lilley
Paleontology, 1929	E. W. Berry
Physical and Economic Geography of Oregon, 1940	Oregon State System of Higher Education
Guidebook of the Western United States - Part B. The Overland Route: U.S.Geol. Survey Bull. 612, 1915	W. T. Lee & Others

Donated by Rudolph Erickson:

Journal of Paleontology - published by The Society of Economic Paleontologists & Mineralogists and the Paleontological Society - Vol. 27, Nos. 1 to 5 (January through September 1953). Published bi-monthly	
Jurassic Stratigraphy of Central Oregon: Geol. Soc. Am. Bull., vol. 52, pp. 219-270, 1941	R. L. Lupher
Historical Geology (last ptg. of 1949)	Carl O. Dunbar
The Meaning of Evolution, 1952	G. G. Simpson

Purchased from library fund:

Thomas Condon, Pioneer Geologist of Oregon, 1928	Ellen Condon McCornack
Lower Tertiary Crinoids from Northwestern Oregon: U.S. Geol. Survey Prof. Paper 233-E, 1953	R. C. Moore & H. E. Vokes

On November 3, twelve members enjoyed the library facilities and showed great interest in publications of Roland W. Brown, of the U.S. Geological Survey, which had been made available by Rudolph Erickson. (These were listed in the December issue of the News Letter.) Mrs. Wm. F. Clark, our congenial co-hostess, provided "coffee and...." which never fails to make conversation flow after the more serious part of browse nights has come to an end.

November 24 found several members, both men and women, finding the answers to many questions in geology and paleontology. The "Zimmer Girls" were hostesses. Did those present enjoy themselves? Judge for yourselves - they stayed until early morning!

On December 10, those of us who had come to browse were overjoyed when Dick Walker joined us. Dick was here from Fort Ord where Uncle Sam has been entertaining him. He will be on the way to Germany by December 25. I am sure we all wish Dick good luck on his 'forced' traveling and hope that he will not have to spend very many Christmas days away from his family and his friends. Mrs. Al Keen was our co-hostess. Our "coffee and...." was magically changed into a Christmas party with appropriate table decorations and cookies just too good looking to eat. Mrs. Lon Hancock accompanied us in the singing of carols and GSOC songs.

May I take this opportunity to express my thanks and appreciation to each and everyone of the members who helped with the refreshments and the special programs for library nights throughout 1953.

Remember our motto and circle your calendar for the next browse nights.

Yours in the interest of YOUR LIBRARY AND MINE

Your Librarian, May R. Bushby.

GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE

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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Officers of the Executive Board, 1953 - 1954

			Zone	Phone
President:	Mr. Raymond L. Baldwin	4804 S.W. Laurelwood Drive	1	CY 2-1452
Vice-Pres:	Mr. Orrin E. Stanley	2601 S.E. 49th Avenue	6	VE 1250
Secretary:	Mrs. Leo Simon	7006 S.E. 21st Avenue	2	EM 0549
Treasurer:	Mr. Robert F. Wilbur	2020 S.E. Salmon Street	15	VE 7284

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Staff of the Geological News Letter

			Zone	Phone
Editor Emeritus:	Mr. Orrin E. Stanley	2601 S.E. 49th Avenue	6	VE 1250
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Asst. Editor:	Mr. Ford E Wilson	308 South Cliff Street, Gallup, New Mexico		
Assoc. Editors:	Mr. Phil Brogan	1426 Harmon Blvd., Bend, Oregon		266-J
	Mr. F. W. Libbey	2259 N.W. Everett Street	10	BR 2145
	Dr. Ruth E. Hopson	4709 N. Willamette Blvd.		TW 3441
	Miss Margaret L. Steere	2064 S.E. 72 Avenue	16	VE 0917
	Mrs. William Clark	5237 N.E. Wisteria	13	GA 3242
Library Editor:	Mrs. Edward Bushby	1202 S.W. Cardinell Drive	1	GA 2123
Business Manager:	Mr. Edward Kelham	14018 S.E. Linden Lane	22	EV 1-2196

Committee Chairmen

Programs:	Mr. F. W. Libbey	Service:	Miss Margaret Steere
Field Trips:	Mr. Leo F. Simon	Museum:	Dr. J. C. Stevens
Membership:	Mr. William F. Clark	Public Relations:	Mr. C. D. Phillips
Publicity:	Mr. H. Bruce Schminky	Librarian:	Mrs. Edward Bushby
Social:	Mrs. William F. Clark	Historian:	Miss Ada Henley
Research:	Mr. Rudolph Erickson	Display:	Mr. Albert Keen

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 between those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mr. William Clark, 5237 N.E. Wistaria, Phone GA 3242. Annual dues are $3.50 for residents of Multnomah and adjacent counties; $2.50 for others; and $1.50 for Junior members. Remittance should be made payable to the Society.

Society Activities

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. Tenth Avenue and Yamhill Street. 8:00 P.M.

FIELD TRIPS: Usually one field trip is scheduled for each month.

LUNCHEONS: Informal luncheons, with geological motif, each Thursday noon in Room 305, YMCA Building, S.W. 6th Avenue and Taylor Street. $1.00 per plate.

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

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CALENDAR FOR MARCH 1954

Thursday March 4	Luncheon Meeting - Room 305 YMCA
Tuesday March 9	Library Browse Night - 1202 S.W. Cardinell Drive
Thursday March 11	Luncheon Meeting - Room 305 YMCA
Friday March 12	Annual Banquet - 6:30 P.M. Mt. Tabor Presbyterian Church - S.E. 55th Avenue and Belmont
Thursday March 18	Luncheon Meeting - Room 305 YMCA
Tuesday March 23	Library Browse Night - 1202 S.W. Cardinell Drive
Thursday March 25	Luncheon Meeting - Room 305 YMCA
Friday March 26	Regular Meeting, Library Hall - 7:00 P.M. Dr. John Walstad, of the Bureau of Mines at Albany, will speak on "Iron Deposits of Columbia County." This should prove very interesting, as the field trip on the 28th is to this locality.
Sunday March 28	Field Trip - Scappoose, Oregon. Mr. James Orr will lead a trip through the mill and mine of his company. Drive out N.W. St. Helens Road to Scappoose. Meet at 1:00 P.M. at the plant which is one block north of the railway station at Scappoose. The quarry, which is about 3 miles N.W. of the plant, will require a walk uphill of one-half mile. Wear old clothes.

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ANNUAL BANQUET

If you have not already secured tickets for the Annual Banquet, March 12, call Leo Simon, BE 0300, and make reservations.

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CHANGE OF ADDRESS OR PHONE NUMBER

If your address or phone number has changed during the past year please send correct one to Mrs. Johanna Simon right away, as work on the new membership list will start soon.

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A THANK YOU FROM THE EDITOR

I would like to take this opportunity to thank all of the members who have helped in getting out the News Letter during the past year. The year had many surprises, many of them very pleasant ones. Through it all it has been a pleasure to work with such a fine group of people as we find in the membership of our society.

Sincerely
Stella Keen

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NEW MEMBERS - G.S.O.C. - FEBRUARY 1954

		Zone	Phone
Kerr, Miss Marguerite (Teacher)	5518 N. Williams Avenue	11	MU 8626
Stockwell, Mrs. H. Mildred (Accountant)	1015 S.E. 26th Avenue	14	EA 4281
Neuners, Mr. Walter F. (Nurseryman)	15107 S.E. Kellogg Ave. Milwaukie	22	

Junior

Robinson, Frederick Alvin	7056 North Seward	3	TW 1041

Change of Address

Steere, Miss Margaret L.	2064 S.E. 72nd Avenue	16	PR 4-6382
Davis, Greg	Alpha Kappa Lambda, Stanford University Palo Alto, California		

Members in the Service

Campbell, Donald PFC, US56121449
HQ Co 351 THTqpAPO20
c/o PM San Francisco, California

PFC Richard C. Walker, RA 19480062
Co "1" 172 INF. Regt 43rd Inf. Div.
APO 112 c/o PM, New York, N.Y.

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DISCUSSION GROUP PLANNED

A series of group discussions on the fundamentals of geology is being planned for the coming year. These will be held once a month in connection with Library Browse nights at the Bushby residence, 1202 S.W. Cardinell Drive. They are intended to give any of our members, and especially our new ones, an opportunity to become better acquainted with some of the basic facts and terms of geology. New members are urged to attend and ask questions and discuss geology with older members of the Society. This will afford an excellent opportunity to pick up a lot of information and also become much better acquainted with other members. This idea originated with Mr. William Clark and he will have charge of the discussions. Those interested may contact him or just show up at the Library Browse nights.

S.K.

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WANTED

Wanted: Chairs, folding type; to be used in the GSOC Library. Have you one not in use? If so would you please lend it to the library? Call May R. Bushby, librarian, on CA 2123. Thank you.

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A DISCARDED EXPERIMENT

Creatures about the size of large bears with incisor teeth that might have belonged to enormous rats, and in whose bones and teeth are found characters suggesting a half dozen types of present-day animals, apparently existed over a considerable part of the Northern Hemisphere between about 55,000,000 and 45,000,000 years ago.

This strange order of mammals, the tillodonts, with one striking hitherto unnamed genus, are described in a report just issued by the Smithsonian Institution - the result of a long and exhaustive study by Dr. C. Lewis Gazin, Smithsonian curator of vertebrate paleontology.

The tillodonts are known from only a few skulls and partial skeletons, but teeth and bone fragments are not uncommon. Most of these were in the Rocky Mountain area, although examples have been found in New Jersey, France, and China. They apparently represent a discarded experiment of nature. The ungainly creatures may have been one of the test tubes of evolution in which certain chance combinations were tried. There are even suggestions in some of the teeth, Dr. Gazin says, of the pattern of the primate family from which man arose.

The age of the tillodonts was from about the end of the Paleocene or "pre-dawn" age in geological history to about the middle Eocene, a time span of 10 to 12 million years. They have not been traced very far back into Paleocene time, the period in which many archaic mammal families made their first appearance.

In the beginning they appear, fossils in the rocks show, to have existed in considerable abundance, but during most of their early history they were all of one unspecialized species. Later they apparently became scarcer and more differentiated. At about the middle Eocene they disappear. This, Dr. Gazin points out, is a very short existence for an order of mammals.

The tillodonts left no descendants. There are no existing animals remotely like them. None of the relationships which has been deduced is valid, Dr. Gazin believes. Appearance of the same characters in other animals probably is the result of convergent evolution - a tendency to respond in the same general way to similar environmental conditions. Despite the very prominent incisor teeth, possibly used for gnawing bark from trees, they certainly cannot be classified as anything like big rats. This is the most obvious resemblence. Likewise no real relationship can be found to the great family of carnivores, despite the possible bearlike general appearance.

Apparently the tillodonts found life too difficult sometime in the middle Eocene. By that time various branches of the family presumably had become quite highly specialized. They may not have been able to cope with a change in climate in their habitat. In any event they disappeared without leaving any trace of descendants.

There were naturally very great changes in the course of 10 million years. In general, however, the climate of the Eocene can be considered as somewhat warmer than that of the present. The amount of moisture varied widely, however, with repeated droughts, during which there were great fluctuations in the levels of lakes.

The Green River country of Wyoming at the time when tillodonts apparently were quite abundant there has been described by Dr. Roland W. Brown, of the U.S.

Geological Survey, as a "broad, low-lying warm inland region with shallow ponds, lakes, and marshes fed by slow streams which meandered through muddy and sandy swamps as they flowed out of the cooler foothills and surrounding mountains."

"There is perhaps no exact duplicate on earth today," continues Dr. Brown, "but the climatic conditions of the southeastern Gulf States plus those of the Great Valley of California would, it seems to me, roughly approximate those of the Green River lake area."

This was the kind of environment in which the tillodont thrived. As they became more and more specifically adapted to it they found it harder to adjust to any change. (From the Smithsonian Institution, February 1, 1954.)

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FRIDAY NIGHT MEETING - JANUARY 22, 1954

West Africa

Dr. E. T. Hodge told of the territory he was exploring last year, Angola. He traced the early explorations of the Portuguese in this area, which lies south and west of the Belgian Congo in Africa. In size it would be about one-fourth that of the United States. The western coastal part is of a dense tropical rain forest. The central and eastern sections are a playa about a mile high. The vegetation is of a tough grass, flat-growing trees, and brush intermingled along the creeks and streams.

About half of the year they experience torrents of rain and foggy, damp, cold weather. The other half of the year seems to produce clear, warm-in-the-sunshine and cool-in-the-shade weather. They have about twelve hours of sunshine and then twelve hours of darkness, with no twilight. One item of their staple diet is the lung fish which thrive in the many streams and lakes on the playa, until they dry up in the hot summer season. Then the fish live in the mud until next year. Another staple of their diet is the manioc tubers and yams, which grow in the light, airy, more tillable spots of the jungle suitable for native gardening by the women and children. The terrain seems to abound with jungle animals of many kinds, especially lions, tigers, crocodiles, elephants, monkeys, gorillas, and many others.

The country produces for export coffee beans, sugar, manganese, and industrial diamonds.

The meeting proved very interesting.

S.K.

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LECTURES ANNOUNCED

Mr. Leo Simon, program chairman, announces he is lining up a series of lectures to be held at some of the Friday night meetings at Library Hall on the geology and paleontology of Oregon. Many of them will be illustrated with slides and drawings and material will be on display from the areas under discussion. The lecturers will be well-known geologists and paleontologists who know from personal investigation the sections of the state they will discuss. These lectures are designed to give all of us a better understanding of the geology and paleontology of the Oregon Country.

S.K.

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YOUR LIBRARY AND MINE

Browsing nights of January 12 and January 26 averaged eleven in attendance with Mrs. E. Cleveland Johnson and Mrs. Murray Miller hostessing. The Host or hostess for the evening brings the cake or cookies for refreshment period. That is all. (To be a hostess, one does not have to belong to the Library Committee mentioned elsewhere in this issue.) Men and women may volunteer. Won't you? Just call CA 2123 and your librarian will date you at your convenience. Thank you.

Recently the Mazamas donated to us their file of U.S. Geological Survey Bulletins. Some of them contain beautiful plates. They cover such subjects as: "Ammonites from the United States and Alaska" and "Lower Teriary Crinoids from Northwestern Oregon." Dr. Ralph W. Chaney has recently made available to us many of his own publications. He writes: "Throughout my life I have set aside three copies of most of my papers. It seems to me that the Library of the Geological Society of the Oregon Country is as good a place as I shall ever find for depositing a fairly complete set of my papers." I think we can feel pride in the fact that our library is becoming well known by and has a good reputation among persons and institutes of science. Mr. Rudolph Erickson, in recent correspondence with the Carnegie Institution of Washington, D.C., has been promised additional works of Dr. Chaney for our library. Still another recent acquisition has been a collection of twenty-five of Chester Arnold's works, donated by the author. For you who may not already know, Chester Arnold is a paleobotanist at the University of Michigan.

On January 26 the two ladies who came to browse decided to work. Your librarian wishes to thank Mrs. Leo Simon and Mrs. Murray Miller for helping her with the listing of the many pamphlets received recently. The men present were reading up on the Astoria area in anticipation of the trip scheduled for February 13. Library night affords you the benefit of studying an area in advance of a geological visit. Try it and you will get the maximum benefits out of a GSOC trip.

In December 1952, a Catalog Inventory of the GSOC Library was issued in dittoed form and a copy mailed to each member. Since that date the library has grown sufficiently to warrant supplemental catalog sheets. However, we are planning to approach this task by a different method this year. From time to time the acquisitions to the library will be listed and printed as extra pages of the News Letter; they will be attached at the back of the News Letter so that those who are interested may easily detach them and make them a part of their original catalog inventory.

Looking out my window I see Mt. St. Helens and Mt. Adams with the snow-clad hills between. Is there a name for these in-between mountains? Going to Your Library and Mine, I picked up a little book by Fred H. McNeil entitled WY'EAST "THE MOUNTAIN." In it an Indian legend is retold of Klickitat (Mt. Adams) and Yi-east (Mt. Hood) quarreling over a Beautiful Squaw Mountain. Klickitat won but the lady in question was not happy and sank into a deep slumber from which she has never awakened. She is known today as Sleeping Beauty, and you may see her lying just west of Mount Adams. Klickitat, until then, had a high straight head like Yi-east, but he grieved so much that he dropped his head and has never raised it since. But the fortune of Sleeping Beauty has been modernized. The United States Forest Service, looking for a link in their fire suppression system, hewed a trail across and up her features, dynamited off the tip of her nose and erected thereon a lookout station! Then the book continues to give a wonderful account of the past volcanic and erosion periods of Mt. Hood. It gives a romantic story of its glaciers, its canyons, its beauties, its majesty. What a vast array

of geological, historical, and legendary thoughts flash across my brain now when I view "The Guardians of the Columbia." I would wager that if you start to read this little book you will not put it down until you are finished.

Yours in the interest of YOUR LIBRARY AND MINE

May R. Bushby, Librarian

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LUNCHEON NOTES

January 21, 1954

Thirteen were present today. Rudolph Erickson passed around a copy of "A New Mastodont from the Miocene of Oregon" published by the University of California Press. Hollis Dole brought a copy of "Introduction to Washington Geology and Resources," Circular 2. This may be obtained free by writing the Washington Division of Geology at Olympia. Norris Stone gave a five-minute talk on "What the Geological Society Means to me." This was so inspiring that Ray Baldwin plans to use Norris and his talk to start off all the Friday night meetings hereafter.

A.K.

* * * * *

January 28, 1954

Eleven members attended today's luncheon. Tom Matthews passed around a copy of Service, published by City Service. R. E. Corcoran of the State Department of Geology and Mineral Industries, substituting for Hollis Dole, gave a very interesting talk on the geological structure of the United States. He explained that the stable continental mass (craton) was flanked on both sides by eugeosynclines with miogeosynclines on the edges. We would like to hear Mr. Corcoran give us a full-length lecture on this subject. He recommended Giants of Geology by the Fentons as excellent reading matter.

A.K.

* * * * *

February 4, 1954

Sixteen, including four women, were present at this luncheon, highlighted by a lively discussion pro and con over the proposed Echo Park Dam in Utah which would flood one of the canyons in the Dinosaur National Monument. Several organizations in Portland, interested in Natural History, have sent protests against the plan. . .Dr. Ruth Hopson, just returned from Boston, announced that she was elected President of the American Nature Study Society, having served as Vice President during the past year. . .President Baldwin read a letter from Dr. J. C. Stevens expressing his appreciation for a special certificate awarded to all past presidents at the 1953 annual banquet. He has had it framed to hang beside his desk. . .Mr. Minar passed around a specimen of pink Georgia marble, used extensively in western Oregon buildings. Mrs. Barr had a specimen from the Clarno having a worm track and containing a worm cast, also a worm cast from Fossil, Wyoming. . .Mr. Mason announced that a second edition of Howel Williams' Ancient Volcanoes of Oregon will be immediately available. . .Mr. Libbey gave a very interesting chalk talk about the missing Port Orford meteorite. He related a story of the discovery as told him by a man who claims to have seen it, and quoted from a published statement by Astronomer Hugh Pruett. He drew a diagram showing how the meteorite struck a mountain near the headwaters of the Sixes River in Curry County, close to the mountain top.

E.M.B.

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THE PETRIFIED FERN

In a valley, centuries ago,
Grew a little fernleaf, green and slender,
Veining delicate and fibres tender,
Waving when the wind crept down so low;
Rushes tall, and moss, and grass grew round it;
Playful sunbeams darted in and found it,
Drops of dew stole in by night and crowned it;
But no foot of man e'er came that way,
Earth was young and keeping holiday.

Monster fishes swam the silent main--
Mountains hurled their snowy avalanches,
Giant forests shook their stately branches,
Mammoth creatures stalked across the plain;
Nature reveled in wild mysteries,
But the little fern was not of these,
Did not number with the hills and trees,
Only grew and waved its sweet wild way--
No one came to note it day by day.

Earth one day put on a frolic mood,
Moved the hills and changed the mighty motion
Of the deep, strong currents of the ocean,
Heaved the rocks, and shook the haughty wood,
Crushed the little fern in soft moist clay,
Covered it and hid it safe away.
Oh, the long, long centuries since that day!
Oh, the agony, Oh, life's bitter cost
Since that useless little fern was lost!

Useless? Lost? There came a thoughtful man
Searching Nature's secrets far and deep;
From a fissure in a rocky steep
He withdrew a stone, o'er which there ran
Fairy pencilings, a quaint design,
Veining, leafage, fibres, clear and fine,
And the fern's life lay in every line.
So, methinks, God hides some souls away,
Sweetly to surprise us some sweet day.

--Anon.

(Submitted by Wilma Berg. Published by Nature Study Publishing Company.)

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LUNCHEON NOTES - February 11, 1954

Thirteen members were present today. Tom Matthews gave us information regarding slides on the west side hills. Leo Simon announced the field trip to the slide area at Astoria, February 14. Al Keen passed around two specimens of iron pyrite, found in a quarry near Taft, Oregon. Leo Simon in a five-minute talk spoke on his association with the GSOC. He told of the organization of the Society in 1935. Most of the charter members had taken extension courses in geology and desired to learn more about the geology of the Oregon Country. Leo told of several interesting trips and experiences.

A.K.

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FRIDAY NIGHT MEETING - FEBRUARY 12, 1954

Scenic Slides of Oregon with Geological Background

Ralph Mason talked to us tonight on the subject "The Geology Behind the Scenery in Oregon." He showed colored slides of many scenic spots in Oregon, which were beautiful in themselves, but which took on new significance as he explained the geological features of each one. All areas of the state were represented, from the coast to the Wallowas and from the Columbia River to Crater Lake. The geology is as varied as the scenery. His correlation of the scenery and geology of the various parts of the state will certainly make our next visit to these places more enjoyable. An unusually large crowd was in attendance, especially since the meeting started at the early hour of seven, and were well repaid with an excellent program.

Mr. Mason also explained a system of cards bearing identifications of minerals, which permitted quick selection of any minerals according to their hardness, specific gravity, streak, lustre, etc. This seems an excellent system and should be of interest to anyone interested in minerals.

A.K.

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ASTORIA SLIDE TRIP - February 14, 1954

Through sunshine, showers, and snowbanks, forty members and friends of G.S.O.C. traveled to Astoria to view some "rapid erosion" and to learn something of the causes.

Through efforts of Bob Wilbur and courtesy of the City Police of Astoria we were given the key to the Community House with its clean tables and other facilities. Here we were joined by our leader Mr. Hollis Dole and party from the State Department of Geology and Mineral Industries.

Assembling after lunch at the Astor Column nearby, a short introduction to the geology of the area was given by Mr. Dole. He pointed out the location of a westerly trending syncline through the city, indicating where the recent slide lay on the north limb of the syncline. The formation of the area is sedimentary shales and sandstones of Middle Miocene age with some sediments of possible Oligocene-Miocene age in some parts. Volcanics of the same age are present to the east. While at this stop some of our party climbed the Astor Column, a memorial which is erected on a basalt volcanic plug and which affords a fine view of the area.

Our next four stops were at the scene of the 1954 slide. At the bottom or "toe" we viewed the results of an avalanche of earth, trees, broken sidewalks, and concrete fragments from walls and foundations, which had "flowed" across a street from the sidehill above.

Our next stop higher up near the "waist" of the slide, gave us a view of several houses in various abnormal attitudes, lucidly demonstrating the damage which may be caused by the unstable bedrock, when saturated by rains. Mr. Dole explained that when water is absorbed by the clay minerals composing these sediments, they increase in size thus reducing the friction between particles and therefore the load-bearing qualities of the mass. In an attempt to check or retard slide action, an open ditch was constructed to drain a small pond which had formed behind one of the slumps of earth. Several large houses were in process of being moved off the slide area by the City of Astoria.

At the top or "throat" of the slide Mr. Dole traced the boundary of the slowly creeping earth and pointed out cracks and other evidence of movement, stating that he knows of no "practical" method of arresting movement permanently.

M.R.M.

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THEORIES ON GLACIATION

The last great glaciation of North America was about 11,000 years ago. Since then the progress of deglaciation has been very irregular. It reached its climax of warmth and dryness about 5,000 years ago. Since then conditions have become appreciably colder and wetter.

This is the picture presented by Dr. Richard F. Flint, professor of geology at Yale University, in the latest annual report of the Smithsonian Institution. Some of the glaciers in the western United States probably disappeared completely during the warm period and since have been reborn, Professor Flint says in a report article on the successive ice-sheet formations over the Arctic regions of this continent.

The ice age, he says, now is believed to have continued roughly for a million years, with a group of four glacial and three interglacial ages. The glacial periods are believed to have been much briefer than those which were relatively free of ice.

Temperature fluctuations between the ice stages and the interglacial periods apparently were much less than generally has been assumed. It may have been roughly 8 degrees centigrade colder than now, on the average, during the glacial periods and about 2 degrees warmer in the interglacial.

The cause of these repeated fluctuations appears to have been twofold, Dr. Flint says. "The first factor," he explains, "was a conspicuous world-wide elevation of lands in general, and of many mountain ranges in particular, during the epoch immediately preceding the Pleistocene (the last ice age) and continuing into the epoch itself. This elevation in itself reduced surface temperatures in several ways, although alone it cannot explain the temperature fluctuation. The second factor is an assumed fluctuation in the radiant energy emitted by the sun. Small present-day fluctuations are currently observed, but the larger fluctuations necessary to form glaciers on the highlands must be assumed. These two factors constitute a reasonable and probable explanation of the glacial and interglacial ages, though the second factor is not at present capable of proof."

There is little doubt, Professor Flint says, that at times during the Pleistocene there was a land bridge between North America and Asia over which came animals and probably man himself. "Bering Strait," he says, "is both shallow and narrow. It could have become land at one or more times as a result of a moderate lowering of sea level, such as is known to have occurred during each glacial age when water was abstracted from the sea to build the great terrestrial glaciers. A slight warping of the earth's crust in the Alaska-Siberia region could also have converted this shallow strait into land." (From the Smithsonian Institution, Dec. 18, 1953.)

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LUNCHEON NOTES - FEBRUARY 18, 1953

Today's luncheon had the very unusual distinction of being dominated by the distaff side, there being eighteen women and fourteen men present. Special guests of retiring president Baldwin were two of the "Three Musketeers" as they were popularly known in the early Geesocker days, Mrs. Florence Iverson Woodward (Clyde) and Mrs. Connie (Constance) Endres Swanson. The third Musketeer, Mrs. Helen Iverson Currier (Darrell), now living at ZigZag, was unable to come. Mr. Baldwin's other special guest was Miss Emma Nordgren, also a former long-time member. All three received violet corsages. Others introduced were former member Mrs. Miriam Sheppard Roberts and a brand new member, Miss Adeline Mix, attending the luncheon for the first time, also Mr. Baldwin's daughter, Mrs. L. H. Aungst. . .Mrs. Jones presented Miss Hildur Kane, Secretary of the interim committee on State Historical Institutions. Leo Simon reported the death of Mrs. Conner's son-in-law. . . Mr. Libbey had the only specimen, a hydrated nickel silicate, or garnierite, from Nickel Mountain. . .Mrs. Jones read a card from Arthur Greenhall, former curator of Portland's zoo, at present in Port of Spain, Trinidad. He is an expert in the study of the vicious blood-sucking bats. . .Mr. Erickson passed around a copy of the publication, Geological Abstracts, September 1953, covering several subjects, among them one on the meteor crater in Arizona, another on the Tenino Mounds, and one on the bays in the Carolinas. He also had the current issue of Journal of Paleontology. . .Bruce Schminky passed around the February Steelways magazine, which tells about the origin of the iron ores in the Lake Superior region. Issued by the California Bureau of Mines. . .Mr. Matthews reported a new find of titanium in southern Oregon in black pumice sands, the titanium being a very low content. . . Mr. Baldwin told of receiving a letter from Mrs. Vance stating that she is recovering nicely from her recent eye operation but has to use her vision with care and for only short periods at present. . .Announcements of future events included the Condon lectures February 23-24 at Portland State College, Dr. Arthur Jones' lecture on Hawaii before the Oregon Agate and Mineral Society Friday night, and the awarding of a citation by the Oregon Academy of Science to Mr. Hancock at Linfield College February 27 for outstanding contributions to science in Oregon. This is the first time one of our members has been so honored, stated Mr.Keen. Mrs. Simon reported that the February Mineralogist contains an article by Dr. Jones on the subject, "Minerals in Medicine." Mr. Erickson announced that a list of recommended subjects for reading by our members will be issued next week, and he told that Mr. Hancock appeared on radio KPOJ the previous Sunday evening on the program "Shooting for One Hundred". . .The luncheon meeting closed with two songs led by Dr. Jones, with piano accompaniment by Mrs. Hancock. They were: Hills of Oregon, composed by Mr. Hancock to the tune, Home on the Range, and a special Geesocker song, De Re Geologica, words by Kenneth Phillips, tune - The Old Gray Mare. . .Thus ended a happy "home coming" luncheon meeting and we all hope there will be more.

E.M.B.

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YOUR LIBRARY AND MINE

Wanted: Ten (10) volunteers for Library Comittee for 1954 (this is not the Library Purchasing Committee).

Qualifications: Willingness to devote a few hours to upkeep of library. No previous training required. Men and women accepted.

Benefits: (a) Acquaintance with the contents of the library.
(b) Satisfaction of having served in a worthwhile capacity for the Geological Society of the Oregon Country.

Note: Please contact me at Library Hall on lecture nights or call CA 2123.

May R. Bushby, Librarian

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GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE

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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

Officers of the Executive Board, 1953 - 1954

			Zone	Phone
President:	Mr. Raymond L. Baldwin	4804 S.W. Laurelwood Drive	1	CY 2-1452
Vice-Pres:	Mr. Orrin E. Stanley	2601 S.E. 49th Avenue	6	VE 1250
Secretary:	Mrs. Leo Simon	7006 S.E. 21st Avenue	2	EM 0549
Treasurer:	Mr. Robert F. Wilbur	2020 S.E. Salmon Street	15	VE 7284

Directors: Mr. E. Cleveland Johnson (1954); Mr. F. W. Libbey (1954); Mr. Rudolph Erickson (1955); Mr. Norris B. Stone (1955); Dr. Francis G. Gilchrist (1956)

Staff of the Geological News Letter

			Zone	Phone
Editor Emeritus:	Mr. Orrin E. Stanley	2601 S.E. 49th Avenue	6	VE 1250
Editor:	Mrs. Albert Keen	2715 N.E. 41st Avenue	13	GA 0229
Asst. Editor:	Mr. Ford E Wilson	308 South Cliff Street, Gallup, New Mexico		
Assoc. Editors:	Mr. Phil Brogan	1426 Harmon Blvd., Bend, Oregon		266-J
	Mr. F. W. Libbey	2259 N.W. Everett Street	10	BR 2145
	Dr. Ruth E. Hopson	4709 N. Willamette Blvd.		TW 3441
	Miss Margaret L. Steere	2064 S.E. 72 Avenue	16	VE 0917
	Mrs. William Clark	5237 N.E. Wisteria	13	GA 3242
Library Editor:	Mrs. Edward Bushby	1202 S.W. Cardinell Drive	1	GA 2123
Business Manager:	Mr. Edward Kelham	14018 S.E. Linden Lane	22	EV 1-2196

Committee Chairmen

Programs:	Mr. F. W. Libbey	Service:	Miss Margaret Steere
Field Trips:	Mr. Leo F. Simon	Museum:	Dr. J. C. Stevens
Membership:	Mr. William F. Clark	Public Relations:	Mr. C. D. Phillips
Publicity:	Mr. H. Bruce Schminky	Librarian:	Mrs. Edward Bushby
Social:	Mrs. William F. Clark	Historian:	Miss Ada Henley
Research:	Mr. Rudolph Erickson	Display:	Mr. Albert Keen

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 between those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mr. William Clark, 5237 N.E. Wistaria, Phone GA 3242. Annual dues are $3.50 for residents of Multnomah and adjacent counties; $2.50 for others; and $1.50 for Junior members. Remittance should be made payable to the Society.

Society Activities

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. Tenth Avenue and Yamhill Street. 8:00 P.M.

FIELD TRIPS: Usually one field trip is scheduled for each month.

LUNCHEONS: Informal luncheons, with geological motif, each Thursday noon in Room 305, YMCA Building, S.W. 6th Avenue and Taylor Street. $1.00 per plate.

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

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CALENDAR FOR APRIL 1954

Thursday April 1 — Luncheon Meeting - Room 305 YMCA

Thursday April 8 — Luncheon Meeting - Room 305 YMCA

Friday April 9 — Friday Night Meeting - Library Hall, 7:00 p.m.
Leroy Palmer, Speaker.
"Reminiscence of a Mining Engineer" covering Mother Lode of California and Comstock Lode of Nevada.

Tuesday April 13 — Library Browse Night, 1202 S.W. Cardinell Drive
(Please fill out and return the questionnaire which was included in the February News Letter.)

Thursday April 15 — Luncheon Meeting - Room 305 YMCA

Thursday April 22 — Luncheon Meeting - Room 305 YMCA

Friday April 23 — Friday Night Meeting - Library Hall, 7:00 p.m.
Dr. Fred D. Ayres, Associate Professor of Chemistry at Reed College, will present an illustrated talk on Arches National Monument in Southeastern Utah near the town of Moab. Dr. Ayres is an ardent mountaineer and will show unusual kodachrome slides in his presentation.

Sunday April 25 — Field Trip - The Dalles, Oregon. Mr. Lloyd Ruff of the Corps of Engineers will lead in a study of the archaeology of The Dalles area. Meet at the overlook for The Dalles Dam on the Columbia River Highway about 2 miles NE of The Dalles at 10:00 a.m. Several stops will be made from the dam to the mouth of the Deschutes River. A shovel and screen will help in discovering remains of past human culture. Lunch stop to be announced. Distance about 210 miles.

Tuesday April 27 — Library Browse Night, 1202 S.W. Cardinell Drive
There will be a question-and-answer period led by Mr. Clark.

Thursday April 29 — Luncheon Meeting - Room 305 YMCA

* * * * *

IT IS NOT TOO SOON to make plans for the three-day field trip to the Picture Gorge and adjacent fossil beds. This will take place over Memorial Day, May 29, 30, and 31. A plaque in honor of Thomas Condon will be dedicated.

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ANNUAL BUSINESS MEETING

The annual business meeting of the society was held Friday evening, February 26, in Library Hall. Mrs. Johanna Simon, secretary, reported a total of 268 members, including eleven junior members and four honorary life members. She announced the election by mailed ballots of the officers for the coming year: president, Albert Keen; vice president, Earl Minar; secretary, Johanna Simon; treasurer, Robert F. Wilbur; director, Fay W. Libbey; editor of the News Letter, Francis Gilchrist. It was voted to have the reports of the treasurer and committee chairmen in the News Letter. Resolutions of thanks to the Library Association for the use of Library Hall, and to the Journal and the Oregonian for publicity were approved. Thanks was given to Mr. Stone for printing the catalogue of the G.S.O.C. library, and for providing much-needed bookcases. Al Keen offered two resolutions drawn up by Clarence Phillips: The first asks the permission of the State Highway Department to erect a bronze plaque with appropriate wording in memory of Dr. Thomas Condon at a suitable site in the scenic area of the fossil beds adjacent to the John Day highway. The second suggests to the highway commission that it create a small park at this spot and name it the "Thomas Condon State Park." Mr. Libbey called attention to the citation to be bestowed on A. W. Hancock at the meeting of the Oregon Academy of Science, McMinnville, February 27, for his outstanding contribution to science in Oregon.

After the business session Tom Matthews presented films depicting U.S.Naval explorations for oil in northern Alaska. The first explained the logistics problems encountered; the second covered drilling operations. Mr. Keen exhibited 22 specimens of beautiful crystals. (E. M. Barr)

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ANNUAL REPORT OF PUBLICITY CHAIRMAN

During the past year the society has received 37¼ inches from the Oregonian and 33¼ inches from the Oregon Journal, or a total of 70½ inches of publicity space. In addition, the Astoria trip was given two inches of space in the Astoria paper. The society also received mention in news stories by Phil Brogan and write-ups on Lon Hancock, as well as the death notice of A. D. Vance.

/s/ H. B. Schminky, Chairman of Publicity.

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ANNUAL REPORT OF MEMBERSHIP CHAIRMAN

During the year from March 1953 to March 1954, twenty-seven new memberships were added to the roll; namely, twenty-three adult memberships and four junior members. Of the adult memberships thirteen are singles and ten are Mr. and Mrs.; so that makes thirty-seven individuals. There have been two resignations this year.

William F. Clark, Membership Chairman.

* * * * *

PLEASE PAY DUES THIS MONTH

Please NOTIFY SECRETARY OF NEW ADDRESS OR TELEPHONE NUMBER. Call Secretary BEacon 0300 or EMpire 0549.

New Member

Mix, Miss Adeline E. 1069 S.W. 10th Avenue, Apt. 303, Zone 1, BE 9320.

****

ANNUAL REPORT OF TREASURER FOR FISCAL YEAR 1953/54

Bank balance on hand 3/1/53			$929.48
Receipts:			
Memberships	$535.00		
Sale of News Letters	8.00		
Annual Banquets	297.50		
Miscellaneous: Special Library/Book Fund	79.50		
Sale of car cards	1.60		
Total receipts		$ 921.60	
Expenditures:			
Memberships overpaid and refunded	4.00		
News Letter publication and distribution	341.52		
Annual Banquets	319.28		
Stationery, printing, postage	56.69		
Miscellaneous: Meetings, lectures, field trips	190.31		
Donations	61.00		
Library maintenance	57.08		
Flowers	13.50		
Spec. Lib. Book Fund	26.70		
Annual picnic	11.53		
Treasurer's bond	5.00		
Bank charge for blank checks	1.45		
Total expenditures		$1,088.06	
Expenditures in excess of receipts			166.46
Bank balance on hand 2/25/54			763.02

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Furniture and fixtures:			
Carried over from 1952/53	53.33		
Acquisitions year 1953/54	132.20		
Total			185.53
Liabilities			none
Total net worth			$948.55

Respectfully submitted 3/1/54

/s/ R. F. Wilbur, Treasurer

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THE ANNUAL BANQUET

Once again we met in the reception hall of Mount Tabor Presbyterian Church. After introductions and songs, plates of turkey and dressing with all the trimmings began to appear in miraculous fashion. None of us will fail to be thankful to the ladies of the Dorcas Society for their well-cooked and ably served meal. . . During the program of the evening, through the medium of Mr. Orrin Stanley and his kodachrome slides, we were temporarily transported to Old Mexico. With his usual wit he led us from the frivolous to the serious, from the rural to the metropolitan, from landscapes to cathedrals - without neglecting the geological aspect of it all. Thus a pleasant gathering came to an end, and we wended our ways home under a bright moon shining over us all. (R.S.G.)

* * * * *

THE G. S. O. C. BANQUET FROM A GREETER'S EYE-VIEW

By

Viola L. Oberson

Who better can see ALL the GSOCers at their best than a Greeter who stands at the door of the banquet hall to welcome each person to an evening of food and fun? When Mrs. William Clark pinned on me the lovely camelia corsage made by Mrs. Ben Smith I felt joyously ready to cooperate with Hazel and Ruby Zimmer and Ada Henley in greeting all comers and sending them on their way to find their names on the shiny shells which Mrs. Glenn Hazelhurst and the Clarks collected on the Oregon sea shores.

Why is this Geological Society of the Oregon Country so important in the lives of so many people? In trying to capture the answer I observed and will long remember: the mantle of pride worn by Dr. Edwin C. Hodge because of the bounding energy and developing importance of his 19-year-old brain child; the infectious warmth and unity inspired by the song leadership of Dr. Arthur Jones; the satisfaction of a job well done as expressed by Ray Baldwin in his swan song after a year's hard work in making the society click; the depth of feeling of Al Keen when, upon accepting his office of presidency, he so sincerely said, "This is the greatest honor which has come to me"; the butterflies-in-the-stomach feeling of Lon Hancock when 150 people stood up and sang his "Long the Oregon Shores" for the first time; the admiration we all had for Master of Ceremonies Lloyd Ruff in his complete control of the evening's events and for his special brand of humor which kept the crowd laughing "When his tale was 'told'"; the memories brought to mind when Mrs. Pansy Petunia Yokum Minar related her original "Huntin' Rocks is Dreadful Good Exercise" monologue; our pride when ten of the 19 past-presidents, the three Salem GSOCers, the ten Mazamas, and the 18 Agate and Mineral Society members stood up; the always pleasant smile of Eddy Bushby as his blinking eye flashed a bulb in your direction; the button-bursting joy of the Schminky's at the birth of their first grandson, Donald Henry Rowe; the beam on the face of Rudy Erickson at the mention of acquiring new books for the Society's library; the sigh of relief by Fay Libbey at having completed his term as program chairman; the complimentary comments made by everyone for the accomplishment of Mrs. William Clark in making this 19th Banquet of the Geological Society of the Oregon Country such a satisfaction to attend.

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In answer to the WANT AD for folding chairs for the Library Mr. Golden promptly delivered two. Thanks. More please.

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ADDRESS BY RETIRING PRESIDENT, RAY BALDWIN

MEMBERS OF THE GEOLOGICAL SOCIETY AND GUESTS: One year ago I stood before you, and looking into the Crystal Ball I told you some of the things I thought I saw in the year ahead for this Society. Let us take an inventory and see just where we stand. But first I would like to introduce to you the officers in the Society and Committee chairmen for the past year, for they have been doing the work and deserve credit for anything that has been accomplished. Let's give them a big hand.

Last spring our Librarian, Mrs. Bushby, put out a plea for more filing places, and thanks to our Cabinet Maker, ex-president Norris Stone, this was taken care of by the addition of two new sections of book cases. Besides the books purchased, we have had gifts of books from several sources. We must not fail to mention the gift by Mrs. Vance of Al Vance's geological library. Our book purchasing committee has added new books to the library; but just as important is the work they have done in getting contributions of the writings of leading men, such as "The Published Papers and Addresses" of Dr. John Merriam, a gift from the Smithsonian Institute. Throughout the years Dr. Ralph Chaney has set aside three copies of his most important papers, and this year he turned over to our Library one of the sets. Dr. Rowland Brown of the National Museum and Dr. Chester Arnold of Michigan both turned over to us copies of their most important publications. This committee also did fine work in compiling a list of books particularly for new members.

We supported the Museum of Science and Industry summer camp at Camp Hancock, and the Museum's Science Exposition at Portland State College. Some of our members gave of their time and talent to these worthwhile projects.

Our program chairman provided us with a series of good lectures, and we held one joint meeting with the Portland Astronomical Society.

We have had our usual number of trips, and for the most part they were well attended. Our excursion to Marys Peak on May 24 led by Dr. Ewart Baldwin was a joint trip with the Salem group. We also had a fine boat trip up the Columbia to the vicinity of Bonneville Dam.

During the years we have been meeting at Library Hall we have had frequent complaints of the acoustics in that room. So we decided to do something about it; and tonight you have the benefits of the public address system which the committee finally secured for us. Al Keen and his committee deserve a lot of credit for this accomplishment.

To me this is a unique organization. Founded in the spring of 1935 as an outgrowth of the Extension Course in Geology taught by Dr. Hodge in old Lincoln High School, the objects of the Society were and are:

1. To become better acquainted with the geology of the Oregon Country.

2. To establish and maintain a library and a museum.

3. To encourage the study of geology among amateurs.

4. To designate, preserve, and interpret important geological features of Oregon.

5. To become better acquainted with those interested in the subject - Geology.

Our founders showed wisdom in selecting a name for the society, Geological Society of the Oregon Country, from the Rockies to the Pacific, from the Canadian border to the California line - a wonderful country in which to carry on our studies of geology.

I first became acquainted with this society when I noticed an announcement in the paper that Dr. Hodge would speak to the newly formed Geological Society on the subject, "The History of the Columbia River." I attended the meeting and was so impressed by the friendly atmosphere that I joined and became a charter member. All who joined before October 1, 1935, were charter members. By the way, how many charter members do we have with us tonight? (About 35 held up hands.) Of the 17 living past presidents, ten are present this evening, or 60 percent; which is a good batting average in any league.

This past winter we tried something new at our Thursday luncheons in that we appointed one member to give a short talk at the next luncheon on any subject he thought would be of interest to the group. Norris Stone took as his subject what the Geological Society meant to him, and Fay Libbey remarked afterward it might be a good thing to have Norris open all our meetings with his pep talk. Later Leo Simon spoke in much the same vein. If a few of those who held up their hands as charter members were to tell what the Society has meant to them, they could easily take up the remainder of the time allotted to me.

We have an organization now beginning its twentieth year, which gets out a monthly News Letter, has two lectures a month, holds a field trip nearly every month, has weekly luncheons, Library Browse nights, an annual picnic, and an annual banquet. What holds the group together? Interest in geology? Yes, but I think it is not all of the story. The fine type of membership without the bad traits of the "Tater" family accounts for the rest. You do not know the Tater family? Well, let me introduce them. Pa Tater, Ma Tater, and the Little Fellow - Richard Tater, commonly called Dick-Tater. We like leadership in our group but we do not want dictators. Ma Tater, commonly called Agelina, Agi-Tater for short: going in all directions at the same time, keeping things continually stirred up. We welcome new ideas and constructive criticism, but we want no stirring up of anything which will form cliques. And lastly the little fellow, freckle-faced and commonly called Spec-Spectater. We expect new members to be spectators until they get their feet on the ground, and then we want every member to get in and work on some committee and have a part in the work of the society, for we get out of this society just what we put into it.

Now, Al, it is my pleasure to turn over to you the reins of this society and to present you with your working tools: Our Book of Robert's "Rules of Order"; our Gavel to call the society to order, made perhaps from the timbers of the legendary wax ship which was wrecked on the Oregon Coast centuries ago; and our copy of Dr. Condon's "Two Islands," a treasure for any library, and this copy is especially valuable because on the flyleaf Charles Ross, who once owned this book, has written, "This book was used by me as a reference while studying under Dr. Condon in 1902," thus linking our generation with the generation of that great and good man. Al, members of this society are 100 percent with you and I know you will have a successful year.

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SONG SHEETS WANTED

Will anyone who has a sheet of any GSOC songs please send a copy to Mrs. A.W. Hancock, 2720 S.E. 84th Avenue, Zone 6. Mrs. Hancock is chairman of a committee to assemble all our songs with the thought in mind of re-publishing them in a single pamphlet or booklet. Your cooperation will be appreciated. (A.K.)

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"A GLIMPSE OF 1954"

By Our New President, Albert Keen

Members of the Geological Society of the Oregon Country and guests: I am both humble and proud in accepting these tokens of office from Mr. Raymond Baldwin. Humble when I look back over the list of men who have served as your presidents during the past nineteen years. I would be dismayed at following in their footsteps if I did not know that we have many people of exceptional ability among our members who are always willing to help in the society's activities. These are the people I am going to depend on for help and advice and who are going to do most of the work of running the society during the coming year.

Many of the committees have been busy making plans. Our program chairman is planning a series of lectures for some of our Friday night meetings at Library Hall on the geology and paleontology of Oregon. Many of these will be illustrated with slides and drawings, and with material on display from the areas under discussion. Another of our members is organizing discussion groups to be held in connection with our Library Browse nights at the Bushby residence. These are intended to give our members, and especially our newer ones, an opportunity to become better acquainted with some of the basic facts and terms of geology and at the same time to become better acquainted with their fellow members. It is also intended that at either the lecture or browse night immediately preceding each of our field trips we will have an explanation of the geology of the area to be visited. Another important feature of our society is our library. Under the capable leadership of our librarian, and due to a lot of hard work on her part and that of her helpers, a large amount of material has been catalogued, cross indexed, and made available to members. With the establishment of a permanent book fund we are assured of a continual flow of new books into the library, for both the beginner and those more advanced. I might add here that our trip chairman is planning a field trip into the John Day country over Memorial Day. The main feature of this trip will be the dedication of a plaque honoring Dr. Thomas Condon.

It takes a large number of people to run a society such as ours. I would like to introduce some of them. (Introduction of executive board, editor of News Letter, business manager, committee chairmen, and discussion group leader.) Many of these committees will require from two or three to eight or ten members to perform their work efficiently. I hope when any of you are asked to help on any of these committees you will do so if it is at all possible. It is our intention that everyone who is willing and able shall have a hand in the operation of the society's affairs in some form or other during the coming year.

I am proud that you have given me the privilege of serving the society as its twentieth president. No greater honor has ever come to me. I can assure you that no effort will be spared to maintain the high standards set in previous administrations, and I feel that with the help and cooperation of all our members we can look forward to another year of successful activities and good fellowship.

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Our charter member and past-president whose illness last year caused quite a bit of anxiety among us, was with us at the banquet and introduced his gracious recent bride. Congratulations to Dr. and Mrs. J. C. Stevens.

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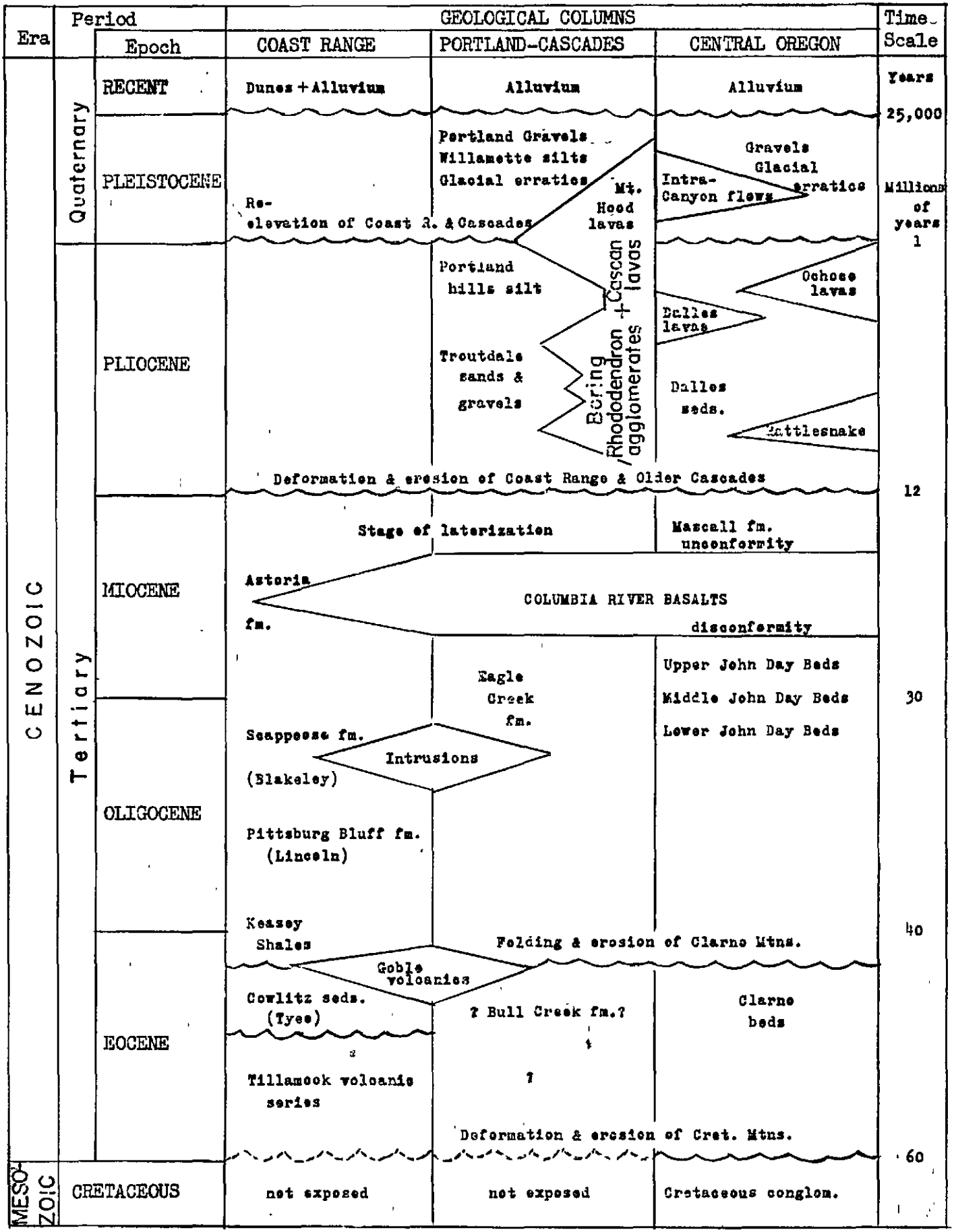
GEOLOGICAL FORMATIONS OF NORTHWEST AND NORTH-CENTRAL OREGON



Adapted in part from Lowry and Baldwin, 1952, and from Williams, Ancient Volcanoes of Oregon, 1948.

LUNCHEON NOTES

The Thursday noon luncheons this past month were attended by 19, 14, 15, 18, and 12 members respectively.

On February 25th Ray Baldwin passed around two bound volumes titled Thirty Thousand Miles, records of a trip of this distance taken by Mr. and Mrs. Baldwin in 1948-1949. Rudolph Erickson announced the recent purchase by the library of Life of the Past by George Gaylord Simpson, Introduction to Paleobotany by Dr. Chester Arnold, and Fundamentals of Earth Science by Thompson. Leo Simon passed around a fine specimen of silicon carbide obtained from the carborundum plant at Vancouver, Washington. Tom Matthews had a uranium specimen from Calif. Hollis Dole explained at some length geosynclines and eugeosynclines, illustrating with blackboard drawings. He also explained the composition of the various layers beneath and including the earth's crust. This is a very interesting subject and one that requires a great deal of study. (A.K.)

At the March 4th luncheon Mr. Palmer told the group some of the history and legend of the Calaveras skull which was unearthed during the gold-mining days of California at a depth of 130 feet below the surface of gravels of the Tertiary (Pliocene) times. The skull was shown to Dr. Whitney (for whom Mt. Whitney is said to have been named); and he said that he believed it to be the earliest known human remains yet discovered. Later developments, however, seem to prove that it had been washed out of an Indian burying ground and "planted" by a practical joker with some knowledge of geology, in the location where it was found. (O.E.S.)

March 11th Mr. Erickson passed around a specimen of tuffaceous sandstone which is said to contain wood and leaves badly ground up and small lenses of coal. He collected it from Alder Flat on a trip up the Clackamas River with Murray Miller. The formation (Bull Creek formation, oldest in this part of the Cascades) stands vertically for four or five miles along the Clackamas River. President Keen had a small micromount of a new azure-blue mineral, callaghanite, sent from New Mexico by Ford Wilson. Mrs. Barr showed two specimens of quartzite from Aquerreberry Point, Death Valley, and one of granodiorite from Isabella, California, both localities adjacent to the Sierras. Margaret Steere had a copy of the new second edition of Howel Williams' Ancient Volcanoes of Oregon, and a copy of Dr. Gaylord Simpson's Condon lecture, Evolution and Geography. Mr. Palmer had two pictures of the Calaveras skull which he had discussed at the previous luncheon. He read Bret Hart's poem "To the Pliocene Skull." (E.M.Barr)

At the March 18 luncheon there were two guests: Mrs. Schminky's sister, Mrs. Bill, a Tillamook school teacher; and Kenneth Phillips' guest, William Griffin, who is with the water resources division of the U.S. Geological Survey in Tacoma. Mr. Matthews exhibited a specimen of carnotite, a highly radioactive sulfur-colored mineral, and President Keen had three small clusters of black crystals from St. Paul Island in the Bering Strait. They were not identified. Mr. Leroy Palmer read a description of a device for detecting the location of gold or silver, even in small quantities, but not yet having invested in one of the instruments, he is not willing to back the inventor's claims with his personal guarantee. (O.E.S.)

March 25th was a turkey dinner. There was not one mineral specimen to look at. A copy of the November 13, 1953, Territorial Enterprise and Virginia City News, containing several interesting articles on the early history of this Nevada mining camp, made the rounds. Also circulated was the March issue of the Mineral Information Service Bulletin of the California Division of Mines,

which had articles on "Fluorescence in Minerals," "Manganese Mining in Southern California," and "Building Stones." Ray Baldwin announced that Miss Hughes, who enjoyed the banquet with us, had fallen and injured her hip. She is now in Providence Hospital. Bruce Schminky covered the early history of the iron mines and furnaces at Oswego in his five-minute talk, in preparation for the coming Friday lecture and Sunday field trip. (H.B.S.)

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YOUR LIBRARY AND MINE

Browsing night of February 9 found 15 members eager for geological knowledge. Mrs. Hancock, our friendly hostess, served refreshments informally upstairs so no one would have to tear himself away from a good book or an interesting discussion. She also accompanied our singing of old tunes with new geological words in preparation for our banquet singsong. March 9 a lucky thirteen attended the informal evening of study in defiance of the chilly wet weather. Outgoing and incoming presidents were on hand; Mrs. Raymond Baldwin graced the coffee pouring. An animated talk followed regarding Bill Clark's ideas for informal question-and-answer sessions on fundamental geological topics. Such informal and spontaneous discussion periods should appeal to all, especially to members who wish to bolster their interest in geology with concrete information. Mr. Clark's plans include studying an area to be visited before a GSOC field trip. Thus the maximum benefits from the trip will be derived. We were happy to have Linda Munson, a Junior member, browsing with us. Actually Linda was doing much more than browsing: research was required for an 8th-grade paper on mineral industries, and several of us helped to load her with material.

May R. Bushby, Librarian.

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1954 METALS AND MINERALS CONFERENCE

Members of the GSOC are invited to take part in the Pacific Northwest Metals and Minerals Conference at the Multnomah Hotel, April 29, 30, and May 1. The Oregon Section of the American Institute of Mining and Metallurgical Engineers will be host for a series of plant tours and technical sessions on geology, industrial minerals, extractive and physical metallurgy, and minerals industry education.

A symposium on ground water and how it may influence industrial mineral production and processing is featured. Serving on the panel will be H. A. Swenson, District Chemist, Quality of Water Branch, U.S. Geological Survey, who will speak on the quality and character of Northwest waters; R. C. Newcomb, District Geologist, Ground-Water Branch, U.S. Geological Survey, who will give a summary of the ground-water provinces in the Northwest and their water-yielding potentialities; and John W. Robinson, consulting ground-water geologist, Tacoma, Washington, who will discuss special or peculiar problems encountered in developing ground water for industrial mineral uses. Moderator A. M. Piper, Staff Scientist, U.S. Geological Survey, will summarize. The Geology session, headed by Lewis E. Scott, Chief Geologist, Oregon State Highway Commission, will present papers on "Permeability Studies in Basalt at the Dalles Dam," "Methods of Shallow Depth Geophysical Exploration," "Engineering Geology of the Chief Joseph Dam," "Engineering Geology of the Portland Area Quadrangles," and "Dip and Strike from Three Not Parallel Drill Cores Lacking Key Beds."

Dr. William E. Pearl, new head of Bonneville Power Administration, will address the Metals Branch luncheon, and Robert C. Stephenson, Chairman of the Industrial Minerals Branch of the AIME will speak at the Industrial Minerals luncheon. The banquet Friday evening will feature Felix E. Wormser, Assistant Secretary, Department of Interior, for Mineral Resources.

Complete programs are available at the Department of Geology and Mineral Industries, 1069 State Office Building, Portland. (T.C.M.)

GEOLOGICAL NEWS LETTER

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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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Secretary:	Mrs. Leo F. Simon	7006 S.E 21st Avenue	2	EM 0549
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Mr. Raymond L. Baldwin (1956) — Dr. Francis G. Gilchrist (1956)
Mr. Fay W. Libbey (1957)

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Librarian:	Mrs. Edward D. Bushby	Service:	Miss Margaret L. Steere
Membership:	Mr. Edward D. Bushby	Museum:	Dr. J. C. Stevens
Publicity:	Mr. H. Bruce Schminky	Public Relations:	Mr. Clarence D. Phillips
Social:	Mrs. William F. Clark	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 between those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mr. Edward D. Bushby, 1202 S.W. Cardinell Drive, Phone CA 2123. Regular annual dues (single or family memberships) are $3.50 for residents of Multnomah and adjacent counties; $2.50 for others; and $1.50 for Junior Members. Make remittances payable to the Society.

Society Activities

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. Tenth Avenue and Yamhill Street. See Calendar of the Month for time of meeting.

FIELD TRIPS: Usually one field trip is scheduled for each month.

LIBRARY BROWSE NIGHTS: Twice a month. See the Calendar of the Month.

LUNCHEONS: Informal luncheons, with geological motif, each Thursday noon in Room 305, YMCA Building, S.W. 6th Avenue and Taylor Street. $1.00 per plate.

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

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CALENDAR FOR MAY 1954

Thursday May 6	Luncheon Meeting - Room 305 YMCA
Tuesday May 11	Library Browse Night, 1202 S.W. Cardinell Drive
Thursday May 13	Luncheon Meeting - Room 305 YMCA
Friday May 14	Friday Night Meeting - Library Hall, 7:00 p.m. "Pictures of the John Day by Word and Screen" will be Lon Hancock's topic in preparing us for this month's field trip.
Thursday May 20	Luncheon Meeting - Room 305 YMCA
Tuesday May 25	Library Browse Night, 1202 S.W. Cardinell Drive. There will be an open discussion of John Day geology.
Thursday May 27	Luncheon Meeting - Room 305 YMCA
Friday May 28	The regular Friday-Night Meeting will be omitted because of the field trip which starts the next day.
Saturday Sunday Monday May 29-31	Three-day Camping Field Trip to the Picture Gorge area on the John Day River in Grant County. The high light of the trip will be the dedication of a plaque and State Park in honor of Dr. Thomas Condon, "the first geologist to collect in and call attention to the now world-famous John Day fossil beds." See next page for details of the trip.

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LAST AUDUBON SCREEN TOUR OF THE SEASON

Thursday, May 13, 8:00 p.m., at Benson High School

"Panama Venture" by Lorus and Margery Milne.

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NOTICE TO MEMBERS. The names and addresses of G.S.O.C. members will be printed in the June issue of the News Letter. Please make certain that the secretary has your correct address and telephone number; and be sure that your current dues have been paid.

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A REMINDER

Fossil leaf localities in the Cascade Range are still needed. The announcement asking for localities which appeared in the December 1953 News Letter was answered by four people. Surely more Geesockers than that know of fossil leaf localities. Don't put it off any longer - turn in your locations right away. Be a contributor to the construction of the State Geologic Map by sending your information to H. M. Dole, State Department of Geology and Mineral Industries, 1069 State Office Building, Portland 1, Oregon.

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THREE-DAY FIELD TRIP TO THE PICTURE GORGE FOSSIL AREA

This camping trip over the Memorial Day holidays promises to be a major event of our year. The principal events of the three days will be:

Saturday May 29

3:00 p.m. Assemble at the View Point on the John Day River opposite Sheep Rock. This is on State Route 19 about 2 miles north (downstream) from its junction with U.S. 28. It is some 60 miles south of Fossil and 9 miles northwest of Dayville, near Cant's Ranch. Watch for G.S.O.C. signs.

3:30 p.m. Dedication of State Park and plaque honoring Dr. Thomas Condon, at View Point opposite Sheep Rock.

5:00 p.m. Caravan proceeds to camp site for those camping. The camp is about 1 mile south (upstream) from the dedication area toward Picture Gorge.

7:00 p.m. Evening Camp Fire. These camp fires will be enlivened with group singing and historical accounts of the region.

Sunday May 20

8:00 a.m. to 12:00 noon. Side trip to points of interest. Phil Brogan of Bend is expected to be present and share in the leadership of some of these trips.

1:00 p.m. to 5:00 p.m. Side trip to points of interest.

7:00 p.m. Evening Camp Fire.

Monday May 31

8:00 a.m. to 12:00 noon. Side trip to points of interest.

Disband.

Points of interest which may be visited on the side trips include, beside the vertebrate fossil beds for which the region is noted, geological formations of the Mesozoic and Cenozoic Eras, dikes, leaf localities, Spanish Gulch and other historic mining areas, Indian paintings, etc.

Everyone should bring his own camping equipment, food, water, and fuel for cooking. Total distance about 550 miles.

Limited hotel accommodations are available at Dayville (9 miles) and Mitchell (30 miles). Arrangements should be made in advance. (MRM)

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LEWIS AND CLARK COLLEGE PLANS AUGUST FIELD COURSE IN THE WALLOWA MOUNTAINS WILDERNESS AREA

The departments of biology and geology of Lewis and Clark College offer a 2-week field course into the Wallowas from August 16 to August 28. There will be numerous field trips to points of geological and biological interest, including a 4- or 5-day packing trip to the high lake basin around Eagle Cap. Any person interested is invited to contact Dr. J. Stauffer or Dr. F. G. Gilchrist of Lewis and Clark College for further information.

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GEOLOGY OF THE JOHN DAY COUNTRY

By
Margaret L. Steere*

Introduction

About the map

The accompanying geologic sketch map of the John Day Country was compiled from various published and unpublished sources (see bibliography) and should be considered only as a reconnaissance map subject to changes. Because of the small scale, many details of formation boundaries and structure had to be omitted.

It is suggested that you color your own map. This will make the geology more readable and acquaint you with the distribution of the various formations. No system of coloration has been established for geologic formations in Oregon; consequently, in order that copies of this map be consistent, the following colors are proposed: Cretaceous (K) green; Clarno (C) blue; John Day (Jd) orange; Columbia River basalt (Cr) red; Mascall (M) yellow; and Rattlesnake (R) brown. The symbols in the legend should be correspondingly colored.

What is the John Day Country?

The John Day Country is generally considered to be the mountainous territory lying between the Cascade Range and the Blue Mountains, drained by the John Day River and its tributaries. The portion of this large region shown on the accompanying sketch map covers an area bounded roughly by the towns of Mitchell, Fossil, and Dayville, and includes Picture Gorge and the famous John Day fossil beds. Several surfaced highways cross the map area, following the valleys of the John Day River and its tributaries. The streams have cut through the rocks to expose at least 100 million years of geologic history.

Geologic History

Pre-Tertiary and Cretaceous rocks

Very ancient, metamorphosed rocks of probable Paleozoic and lower Mesozoic age underlie the John Day region and crop out in a few places; but so extreme was the squeezing and folding of these strata that in their meager outcrops the record of life and the accompanying geologic events has been almost entirely destroyed. These rocks are generally referred to as pre-Tertiary.

The oldest rocks of the John Day region in which fossils are sufficiently well preserved to make possible an age determination are late Mesozoic (Cretaceous) sediments. In Cretaceous time one or more great seaways covered most of the State of Oregon, and ammonites and other forms of shell life were abundant. Dark gray shales and slates bearing these marine fossils crop out along the highway in the Ochoco Mountains a few miles west of Mitchell. Conglomerates and sandstones also comprise part of the Cretaceous sediments. About 2 miles north of Picture Gorge an indurated conglomerate believed to be of Cretaceous age crops out on either side of the John Day River for a distance of about 1 mile. A few poorly preserved fossil leaves have been found in this conglomerate, which is thought to have been a shore-line deposit (Coleman 1949).

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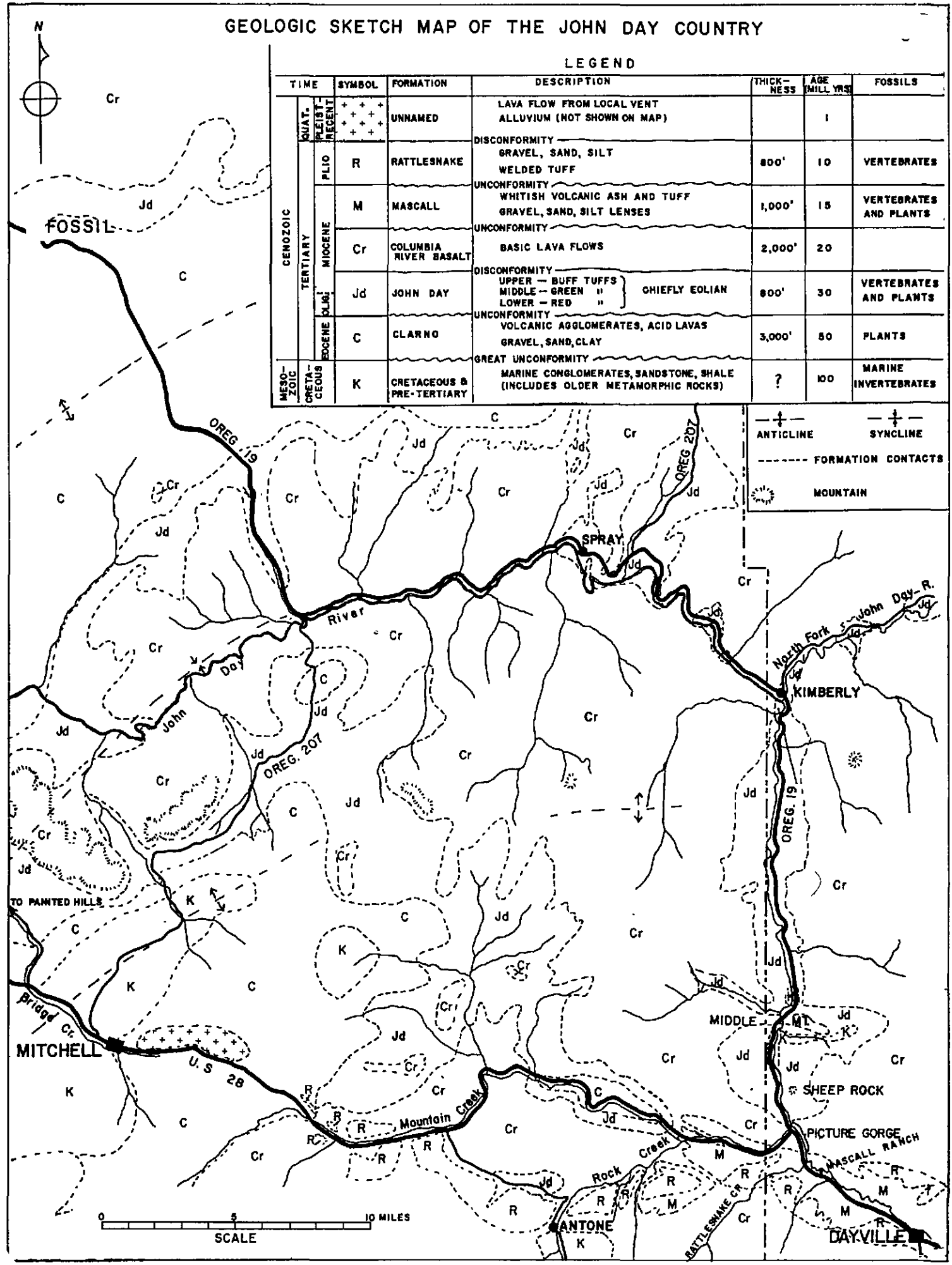
*Geologist, Oregon Department of Geology and Mineral Industries.

GEOLOGIC SKETCH MAP OF THE JOHN DAY COUNTRY



At the close of the Mesozoic era the land was uplifted and the rocks steeply folded. The sea withdrew far to the west, beyond what is now the Cascade Range, and never again returned to invade the John Day Country. The uplifted land underwent a long period of erosion, and the formations of the Cenozoic era which followed were laid down as terrestrial or land deposits on this old erosion surface. A marked unconformity exists where rocks of the two eras are seen in contact.

Clarno formation

Accumulation of terrestrial volcanic material began in late Eocene time when numerous explosive volcanoes in the John Day Country covered the region with as much as 3000 feet of volcanic debris. At first the material consisted of agglomerates, breccias, and tuffs; but later it changed to acid lava flows (rhyolite). Some of the material was worked over and re-deposited by streams. These rocks which crop out over wide areas in the John Day region have been named the Clarno formation after exposures near Clarno Bridge. That the climate was warm and humid in Clarno time is indicated by the presence of fossil fruits and leaves of semi-tropical plants in the deposits. Although fossil plants are abundant, fossil animal remains appear to be extremely rare.

The Clarno and older formations were subjected to folding and considerable erosion at the end of the Eocene so that all later formations lie unconformably on these folded and eroded rocks.

John Day formation

Beginning in late Oligocene and continuing until middle Miocene another period of volcanism took place during which ash was carried away from exploding volcanoes by the wind and deposited periodically over the land to form the colorful and fossiliferous John Day beds. Some geologists believe that the source of most of this material was from volcanoes in the young Cascade Range and that the volcanoes which deposited the Eagle Creek formation in the Columbia Gorge also contributed ash to the John Day region. The intervals between ash falls were long enough for plant and animal life to become re-established many times over. The beautifully preserved leaf imprints near Bridge Creek in the Painted Hills State Park north of Mitchell is an example of the flora of the John Day formation. Other similar floras are found at various places in the lower part of the John Day formation, two of which occur in the area shown on the sketch map: one in Deer Gulch north of Picture Gorge, across the John Day River from Humphrey's Ranch; the other in the bluff behind the High School in Fossil. The dominant trees were Metasequoia, birch, and alder.

More than 100 species of fossil mammals have been recognized in the John Day beds from the area along the John Day River between Picture Gorge and Spray. These include many extinct forms of cats, dogs, camels, rodents, and rhinoceroses. The primitive three-toed horse, Miohippus, was also present. Most common animals were the oreodonts, extinct, cud-chewing, piglike beasts, whose skulls were collected in large numbers as curios in the early days by settlers in the region.

Three divisions have been recognized in the John Day beds and described in detail by Coleman (1949), namely Lower, Middle, and Upper. The Lower John Day formation of upper Oligocene age is composed predominantly of red tuffs and contains much fossil plant material but only a small amount vertebrate remains. The Middle John Day formation, which is predominantly green tuff, and the Upper John Day formation, which is chiefly buff-colored tuff, are of lower Miocene age and contain abundant vertebrate fossils. A thick flow of welded tuff from some local vent forms a distinct line of demarcation between the middle and upper members of the John Day formation. A complete section of the Upper John Day

formation, together with the welded tuff beneath it, is exposed on the west face of Sheep Rock.

The bright colors of the John Day formation are caused by chemical action on iron minerals in the tuff. Reds and yellows are due to various degrees of oxidation of these minerals to form hematite and limonite, while the greens are due to reduction and hydration of the iron minerals under conditions of low oxygen and the presence of organic material to form ferro-ferric iron compounds. The fantastic castellated shapes one sees in the John Day beds are due to the differential erosion of the hard and soft layers of the rock.

Following the deposition of the John Day beds, the formation was warped slightly and then underwent a short period of erosion resulting in a highly dissected topography.

Columbia River basalt

In middle Miocene time Oregon, Washington, and Idaho were the scene of the most extensive accumulation of basic lavas in the world. The whole region of the John Day Country was turned into a desolate waste by tremendous flows of lava known as the Columbia River basalt. This welled up out of many fissures in the earth and spread over all earlier formations like a black pavement. Early flows filled in topographic irregularities on the eroded John Day formation, as at Picture Gorge where the basalt apparently filled a low area in the former erosion surface.

The Columbia River basalt forms a protective capping layer on the soft John Day beds, retarding erosion, as may be observed at Sheep Rock.

Mascall formation

In upper Miocene time the flows of Columbia River lava gave way to intermittent showers of ash from volcanoes. A down warping of the Columbia River basalt south of Picture Gorge formed a syncline in which wind- and water-laid ash, together with lesser amounts of silt and gravel, accumulated to a maximum depth of 1000 feet. This series of nearly white ashy deposits was named the Mascall formation for the typical exposure near the Mascall Ranch on the John Day River south of Picture Gorge.

Fossil leaf imprints of the Mascall flora are well preserved in the white ashy shale in various outcrops east of Dayville. According to Chaney (1948), Metasequoia, characteristic of the Lower John Day formation, occurs only in small numbers in the Mascall formation, the dominant conifer being swamp cypress. Oak and beach are abundant. Fossil bones of mammals and fish have been found in the Mascall formation.

The close of the Miocene epoch was marked by considerable folding and faulting over much of Oregon. A series of large folds developed trending northeast to east across the John Day region as shown on the sketch map. It was during this period of deformation that the Cascade Mountains were greatly uplifted to form a climatic barrier between western and eastern Oregon.

Rattlesnake formation

Erosion of the faulted and tilted strata in the vicinity of Picture Gorge resulted in the deposition of about 800 feet of gravel, sand, and silt on top of the Mascall formation. A single flow of welded tuff from a local vent was

interbedded in this series of sediments. Along the sides of the John Day valley between Picture Gorge and Dayville recent erosion has removed the upper gravels so that the resistant welded tuff stands out as horizontal rim rock above the white, tilted Mascall formation.

Fossil bones of camels, antelopes, and grazing horses, discovered near Rattlesnake Creek (type locality of the Rattlesnake formation) date the deposit as Pliocene in age.

Pleistocene and Recent rocks

The course of the John Day River was established near the end of Pliocene time and was controlled by structural features. The synclinal basin south of Picture Gorge had filled with sediments of the Rattlesnake formation to an elevation that covered the Columbia River lavas at Picture Gorge. Continued aggrading of the floor of the basin raised the stream level to a point where drainage found an outlet through the anticline to the north by way of a local north-trending syncline (not shown on the map) near Middle Mountain. Thus the John Day River, as it cut down through the Mascall and Rattlesnake formations, became superimposed on the Columbia River basalt at Picture Gorge. Farther to the north, the course of the stream swung westward in the east-west syncline near Kimberly.

In more recent times, the John Day River and its tributaries have enlarged and deepened their valleys by erosion and removal of the rocks encountered. Where the formations are soft the valleys widen out, and where the rocks are hard the streams are confined to narrow canyons. East of Mitchell a local lava flow filled part of one of the valleys tributary to the John Day River.

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BONES IN THE CLARNO!

After some sixty million years of silence on the subject, the hills of Clarno which have supplied us with so many plant fossils have now condescended to reveal to us secrets of the animal life of the day.

"Bones" was the magic word that sent A. W. ("Lon") Hancock scurrying in high hopes but still somewhat skeptical. And "bones" they proved to be, not one but literally hundreds. Lon had gotten the word from Albert L. McGuinness who first located the deposit through the finding of a piece of bone. Mr. McGuinness then accompanied Lon to the locality. Murray Miller and Lon Hancock later made a trip into the Picture Gorge to view the site of the proposed Thomas Condon marker and on their return stopped at the bone locality and found a great quantity of material. Then on Saturday and Sunday, the 17th and 18th of April, Leo Simon and Rudolph Erickson returned with Lon to the area and helped unearth several hundred pieces more. Among these is a fairly well preserved leg bone some 20 or more inches long.

For many years geologists and others have searched the Clarno formation convinced that fossilized animals should be there. None has been more tireless in this search than Mr. Hancock. With the exception of the jaw of the brontothere found last year by Lon, and a few other pieces, this is the first find of any size to reward the seekers.

Steps have been taken to determine the identity and age of the fossils. Judging from the great number of the specimens, it is quite possible that Lon has uncovered a "bog" that could include a veritable museum full of different types.

Congratulations, Lon, and your informant on this the fruits of long years of patient investigations. (J.E.)

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NEW MEMBERS

Van Dermark, Miss Phyllis	9000 S.W. Garden Home Road	1	CH 3830

Junior Member

Howard, Linda	1909 S.E. Courtney Road	EV 1-5730

Change of Address

Rydell, Mr. and Mrs. L. E.	907 Woodlawn, Walla Walla, Washington

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REMINISCENCES OF A MINING ENGINEER IN THE GOLD BELT OF CALIFORNIA AND NEVADA

Abstract of Talk by Leroy A. Palmer, April 9, 1954

The Gold Belt of California lies midway along the west flank of the Sierra Nevada Mountains extending north-northwesterly 250 miles with a width of 60 miles. By far the greater part of the gold produced in California has come from this area. Geologically it is divided into two rock series, the Bedrock and the Superjacent. The Bedrock, in turn, is divided into the Calaveras formation, Carboniferous, and the Mariposa formation, Jurassic. In general appearance and lithology the two are similar. They were deposited on the ocean bed, and during their deposition there were extensive submarine eruptions, principally of rhyolite and andesite.

During the great Nevadan orogeny of the late Jurassic these beds were elevated, intensely folded, and metamorphosed so that they now appear as slates and schists with large included bodies of "greenstone," the name generally given to metamorphosed volcanics without differentiation. Toward the close of the Jurassic occurred the tremendous intrusion of the granodiorite batholith which forms the backbone of the Sierra Nevada Range. This was accompanied by tilting of the whole area and profound fissuring and faulting, the fissures being subsequently healed by quartz veins many of which carried gold. From what we can see of the stumps of these veins that have been uncovered during the past hundred years and of the placers derived from them many must have been very rich indeed.

Following the Jurassic there was a prolonged period of erosion, so that when we reach the Miocene, between 75 and 100 million years later, the country had been worn down from the rough mountains caused by the elevation and folding of the sediments to a peneplain with broad rivers flowing on gentle grades among low rounded hills and ridges.

During the Miocene volcanic activity started, increasing to extreme intensity in the Pliocene and finally expiring in the early Pleistocene. These eruptions were so extensive that they filled the valleys and submerged the intervening ridges, with the result that when they finally died out there was nothing left but a plain of steaming volcanic mud. The volcanic activity was accompanied by a southwesterly tilting, so that the newly formed streams flowed on steep grades and cut rapidly through the soft volcanics and deep into the underlying bedrock. Thus were formed the steep V-shaped canyons that we see in the Sierra today, whose bottoms are sometimes thousands of feet below the old bedrock surface as shown by its contact with the volcanics. The volcanics and the alluvials of the streams form the Superjacent series, and are barren except for the placer deposits in the alluvials. As these were derived from the Bedrock series and all of the veins are in the latter, we can say that the Bedrock is the only productive formation in the Gold Belt.

There are two principal productive areas in the Gold Belt; the Mother Lode and the Grass Valley-Nevada City District. The Mother Lode extends 90 miles northwesterly from the southerly portion of the Gold Belt and is a mile wide. The veins are in the Calaveras formation adjacent to the Mariposa and have a dip approximating 65°. The gold occurs in quartz and in pyrite associated with the quartz.

The principal producing centers of the Mother Lode are in the vicinity of Angel's Camp and Jackson. The best known mine at Angel's Camp is the Utica, 3000 feet deep, with an authenticated production of $17,000,000. At Jackson are the deepest gold mines in the United States. The Argonaut, opened by an

incline 6300 feet long, has a vertical depth of 5570 feet. Adjoining it is the Kennedy which has attained a vertical depth of 5912 feet. The Argonaut has 62 miles of underground workings and has produced in excess of $25,000,000. The Kennedy has 150 miles of underground workings and has produced more than $34,000,000. The 12 miles of Mother Lode northerly from Jackson to Plymouth is credited with a production of $160,000,000.

About 30 miles beyond Plymouth, at Georgia Slide, the Mother Lode "feathers out," and 30 miles beyond that we get to the Grass Valley district, not over 10 miles long but with production at least equal to that derived from the 90 miles of the Mother Lode. The general geology is that of the Gold Belt, but locally it is different from the Mother Lode in that the veins are in igneous and meta-igneous rocks and in basic crystalline rocks. The ores are similar to those of the Mother Lode. The North Star Mine has followed the vein to a depth in excess of 10,000 feet, but as the dip is low this gives a vertical depth of only 4400 feet.

We now return to Placerville, a Mother Lode town, and then cross the Sierras by way of Echo Pass to Virginia City, Nevada, and the Comstock Lode, the greatest bonanza of all time, with a production record of $400,000,000. Production started in 1859 and the bonanza days were over by 1879; but in those 20 years the Lode yielded $350,000,000. Greatest of the mines was the Consolidated California and Virginia (the "Big Bonanza") which is credited with $190,000,000 from 1871 to 1879.

The Comstock Lode is 4 miles long in a fault breccia zone 200 to 1500 feet wide with the veins in the breccia and branching into the hanging wall. The hanging wall is of Tertiary and older volcanics and the footwall is in plutonic rocks, metamorphosed sediments, and Mesozoic volcanics. Mining was very difficult and expensive as the wide veins and friable ore made supporting excavation a major problem; and the excessive heat, caused by reaction between ascending alkaline solutions and the sulphuric acid waters of the upper levels, created a condition such that men could only work a short period before resting and cooling off. This made it necessary to keep two shifts of men at work on a single job.

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ANNUAL REPORT OF THE LIBRARIAN

This report is brief because the monthly column YOUR LIBRARY AND MINE keeps readers up to date on the progress of the library. A library Journal was started January 1953 in which every article added to the bookshelves is listed. The entries include 47 books (given numbers according to Dewey decimal system), 121 bulletins and periodicals, and 55 pamphlets.

More material has been donated and purchased which for lack of help in the many routine duties of the library remains as yet uncatalogued. The library is growing by leaps and bounds. A total of $57.08 was spent on the library for binding certain volumes and books, for miscellaneous supplies, for materials for two book cases (labor donated by our Norris Stone), and for book purchases. The suggestion that members include a little extra for the Book Purchasing Fund when they pay their yearly dues resulted in a cash fund of $55.75. Please remember more volunteers to help in the library are needed.

May R. Bushby, Librarian.

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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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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 between those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mr. Edward D. Bushby, 1202 S.W. Cardinell Drive, Phone CA 2123. Regular annual dues (single or family memberships) are $3.50 for residents of Multnomah and adjacent counties; $2.50 for others; and $1.50 for Junior Members. Make remittances payable to the Society.

Society Activities

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. Tenth Avenue and Yamhill Street. See Calendar of the Month for time of meeting.

FIELD TRIPS: Usually one field trip is scheduled for each month.

LIBRARY BROWSE NIGHTS: Twice a month. See the Calendar of the Month.

LUNCHEONS: Informal luncheons, with geological motif, each Thursday noon in Room 305, YMCA Building, S.W. 6th Avenue and Taylor Street. $1.00 per plate.

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

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CALENDAR FOR JUNE 1954

Thursday June 3	Luncheon Meeting - Room 305 YMCA
Tuesday June 8	There will be no Library Browse due to the absence of the Bushby's on a vacation.
Thursday June 10	Luncheon Meeting - Room 305 YMCA
Friday June 11	Friday Night Meeting - Library Hall, 7:00 p.m. "Beautiful Oregon," kodachrome slides by Mr. Rudolph Erickson.
Sunday June 13	Joint Field Trip to the McMinnville-Forest Grove area. Dr. Edwin T. Hodge, our first president, will lead a joint trip with the Salem Geological Society to the location of the Bellevue erratic and other points of geological interest. We shall meet the Salem group at 10:00 a.m. at the Bellevue Store on State Highway 18 about ten miles southwest of McMinnville and four miles northeast of Sheridan. Our lunch stop will be at the McMinnville City Park, after which our caravan will proceed north toward Forest Grove. Total distance about 110 miles.
Thursday June 17	Luncheon Meeting - Room 305 YMCA
Tuesday June 22	Library Browse Night, 1202 S.W. Cardinell Drive.
Thursday June 24	Luncheon Meeting - Room 305 YMCA
Friday June 25	Friday Night Meeting - Library Hall, 7:00 p.m. "Geology of the Portland Area," by Donald E. Trimble, geologist, Engineering-Geology Branch U.S. Geological Survey, Denver, Colorado.

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LABOR DAY TRIP IN PROSPECT

Murray Miller, our trip chairman, is working out the details for a 3-day trip to Mount Adams over the Labor Day holidays in early September. Mount Adams has a great deal to offer in glaciology, vulcanology, flowering meadows, and ripe huckleberries. The more strenously inclined may want to examine some of the higher reaches of the mountain while others plan for pies. Details will come in due time; but plan now, and save the dates.

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YOUR LIBRARY AND MINE

On March 23, seventeen members met to browse in the library. After a quiet period of reading, Mr. Clark asked Mr. Miller, our Trip Chairman, what we would see on the trip to Scappoose. Leo Simon gave forth definite answers as to how bauxite and limonite are formed, etc. Those who went on the Scappoose trip say they received added benefits because of what they learned on that browsing night. Mr. Munson and daughter Linda (a Junior member) stopped to return an armful of books and to announce that Linda was one of 45 to win an award at the recent Science Exposition. Congratulations, Linda!

On April 13, fifteen members, including two of our Juniors, looked over the new acquisitions to our library, including four publications by Ralph W. Chaney just received from Carnegie Institution of Washington, D.C.

On April 27, only ten members were present. Really, you newer members are missing a great opportunity when you do not attend these browsing nights. Watch your calendar page and circle dates on your calendar.

On May 11 our ego went up by leaps and bounds when Reynolds W. Ohmart from Salem made eleven in attendance. We welcomed Dr. Ruth Hopson of Portland State who brought with her one of her students. Eugene Hampton also dropped in after his college class. Isn't it convenient to join the library group at any hour between 7:30 and 10:30? Ed Bushby showed the photographs of the banquet. Editor Gilchrist passed on compliments he had received on the fine article written by Margaret Steere on John Day geology in the May issue of the News Letter.

A thank-you to Mesdames Simon, Clark, and Keen who "hostessed" for three of the above meetings. Would you like to be hostess some evening?

Yours in the interest of YOUR LIBRARY AND MINE

May R. Bushby, Librarian

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The librarian wishes to thank Mr. Leroy Palmer, Mrs. Amza Barr, and Miss Joan Erickson for their help in the library during March and April. More help is needed. Will YOU please volunteer for routine clerical duties of the library?

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MUSEUM ALL SET FOR SUMMER CAMP AT CLARNO

The roll of teen-age campers at Oregon Museum's Camp Hancock in the Clarno is nearly full. Besides Mr. and Mrs. Stanley Shirk, the counselors include Mr. and Mrs. Lon Hancock, Mr. Lloyd Ruff, and Dr. John Pierson. The first round, starting June 20th, is for boys only. The second begins July 4th and includes both boys and girls. An especial attraction this year will be the further excavation of the bone deposits recently discovered in the Clarno formation. By vote of the G.S.O.C. Executive Committee, the Society is sharing this year in the campership of a young budding geologist, Ralph Cole of Salem.

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SCAPPOOSE IRON

This was the title of a talk given by Dr. John Walsted of the U.S. Bureau of Mines, Albany, Oregon, at the regular Friday night meeting March 26, at Library Hall. The speaker sketched briefly the history of the making of iron in the Pacific Northwest which included the Oswego project in Oregon and one near Port Townsend in the state of Washington. He pointed out that the failure of the Oswego project was due in good part to disagreements among the owners.

There are substantially some four-million tons of iron ore in the Scappoose locality. However, due to erosion and subsequent refilling, it does not lie in any uniform pattern but rather in a hit-or-miss manner. The objection has also been raised that the iron made from Scappoose ore contains a large amount of phosphorus which tends to add to its brittleness. This, however, in Dr. Walsted's opinion is not a material objection, since iron of the southern area of the United States also contains phosphorus, and the foreign countries that buy it do not find it objectionable.

Dr. Walsted pointed out that there is discrimination against pig iron users in the Northwest due to their being obliged to pay the basic rate at the nearest production point plus freight. The rule applies in reverse to scrap iron, the price here being relatively lower due to the freight differential. As a result northwest foundries use as much scrap as they possibly can in the manufacture of their product, with only as much of the higher-priced pig iron as is absolutely necessary.

Dr. Walsted does not recommend that a large project be undertaken, but feels that a small plant producing say 100 tons per day would easily find a ready market for its product. Three-quarters of a million dollars was mentioned as a possible sum necessary for installation of such a plant. (J.E.)

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FIELD TRIP TO SCAPPOOSE

The Sunday following Dr. Walsted's lecture a goodly number of G.S.O.C.'ers visited the mill at Scappoose where Mr. James Orr processes iron ore (limonite) for industrial purposes. The company's limonite quarry in the hills above Scappoose was next investigated, after which some went to the location of a recent drilling operation in the search for oil. A more adequate account of the Scappoose operation is in preparation.

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NEW ITEM ADDED TO JONES' COLLECTION

Dr. and Mrs. Arthur Jones report the birth on May 24, 1954, to their daughter, Ardis Jones McKay, of their first grandchild, Bruce Arthur McKay.

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AYERS REPORTS ON THE ARCHES NATIONAL MONUMENT IN SOUTHEASTERN UTAH

Dr. Fred D. Ayers of the Reed College chemistry department illustrated his talk Friday evening, April 23rd, with beautiful kodachrome slides. Until recently it has been hard to get into the Monument, but now there are good roads. Last summer he and a friend established a camp and spent considerable time climbing around on the sandstone formations, visiting and photographing the different arches. Some of the climbing was difficult and hazardous, both because of overhangs, and because the rock was slick and hard to walk on - worse when it was wet. They used nylon rope and pitons but wore rubber-soled shoes. The trip was in the middle of July when rains occur more often than later in the season. Arches of special interest were Delicate, Turret, Ribbon, Klondike, and the Devil's Garden. Double arches were many; and there were arches in process of erosional formation, one section being called Cove of Caves. Spectacular features were the many fins and some "courthouse" towers. The tops of some arches were so thin the climbers were afraid to negotiate them. High on one arch there was a large pothole containing water. Another arch is said to be the longest in the world.

In a section called the Fiery Furnace, Dr. Ayers was surprised to find cool spots in shady places. Two of his slides showed Indian petroglyphs. He saw one deer, a lizard, and one small rattlesnake. (E.M.Barr)

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ARCHEOLOGICAL FIELD TRIP TO THE DALLES DAM

Twenty-eight cars assembled Sunday, April 25, at the point overlooking The Dalles Dam. Here Lloyd Ruff explained features of geological and engineering interest connected with the building of the dam, one being that on the downstream end of the dam site the depth of the river is 325 feet, which is about 225 feet below sea level.

The next stop was Five Mile Locks, across the river from which on Wakemap Island the University of Washington is carrying on extensive excavations in the search for Indian artifacts. On the Oregon side there are places to be excavated which are reserved for the present but which may be opened to the public this fall.

About 9 miles farther on artifacts are being continually covered and uncovered by the shifting sand dunes; and it was here the group spent half an hour digging with varied success. A few arrowheads and some beads were found.

At lunch on the west bank of the Deschutes River, Mr. Ruff spread out a blanket and on it displayed Indian tools, drills, and axes which he had gathered at various times. Others also displayed their finds; and although the total was not impressive, we learned quite a bit of Indian lore.

After the caravan disbanded a number of us visited a spot on the east side of the mouth of the Deschutes where a party of amateur archeologists were feverishly digging. Since the artifacts in this locality had been covered by drifted sands, some of the diggers had to go down 6 feet or more. One had a gas engine to operate a rocking screen. Others had their wives

operating the rockers while they themselves did the shoveling.

Some of our party visited the salmon feast at the Indian village beside Celilo Falls. This incidentally will be the last feast before the dam impounds the water and Celilo Falls will be no more. (R.G.)

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LUNCHEON NOTES

The recent luncheon meetings have been notable for the "five-minute" talks given by different members.

On April 1 Mr. Travis gave an interesting account of the dry lake beds in the vicinity of Lake Mead, where the old lake shores can be traced for many miles. Seven of these lake outlines were seen on one trip. He said that temperatures as high as 120° to 138° in the shade are not uncommon, and that sometimes it is 95° at five o'clock in the morning. The average rainfall is 5 to 8 inches, but one year they had 28 inches. Then wild flowers not usually seen blossomed all over the desert from seeds that had lain dormant for many years. A great deal of valuable mineral is scattered about Hoover Dam. The talus slopes yield gold, silver, and turquoise. One man brought back $250,000 worth of gold in his pick-up truck on one trip.

Past President Ray Baldwin was the "five-minute" speaker on April 8th, taking the group on a trip to New Jersey where the "mountains" are from 300 to 400 feet high, and where the first iron mines in America were opened. The area is the terminal moraine of a glacier from the northeast. Great difficulties were encountered by the early builders of railroads, canals, and highways because of the mixed-up topography.

At the April 15th meeting Bruce Schminky made a formal presentation of a geologist's pick, beautifully polished and engraved, to Orrin Stanley, the speaker at the 1954 Annual Dinner of the Society. Orrin has nailed the pick to the wall in his front hall to remind him that he may yet become a geologist if he perseveres. Bob Wilbur held the interest of the group in a non-geological subject: "Plant Quarantine." He told of his inspection of imported plant materials such as timber, seeds, fibers, etc., which might bring pests into our country. He had a shell of an African snail that was three inches by seven, and said that the creature was capable of devouring a head of lettuce in one night.

April 22 Rudolph Erickson boiled thousands of years of geological history from the time of the Troutdale deposits to the present into about 25 minutes. He said that in the northern part of the Willamette Valley south of the Portland hills there are gravels 200 feet below the present surface, while in the gorge at New Era there are no gravels and the rock is only 25 feet below the surface. He believes that once the course of the Willamette River was east of Oregon City and that the Tualatin River flowed east to join it; but that the course of the river was choked by Troutdale gravels filling the channel to a depth of more than several hundred feet forming a large lake which eventually silted up. The sediments south and east of Oregon City were later capped by Boring lavas, and a new channel was cut by the Willamette between Oregon City and West Linn. Later erosion cut through the Portland hills and eventually provided a separate channel for the Tualatin River through the present Oswego Lake area. In fairly recent times flood waters of the Spokane flood swept eastward through the Oswego

Lake gorge and carried gravels to the west end of Oswego Lake damming the then course of the Tualatin River. This is supported by limonite material from deposits located on both banks of the lake having been transported to the west dam. The draining out of the immense lake formed in the Willamette Valley by the Spokane flood carried material eastward and dammed the east end of the old Tualatin channel. Thus the present Oswego Lake was created.

At the May 6th luncheon George Elder told about the Wall Lakes in northern Iowa which at one time held water to a height of three or four feet above the ground level outside the walls. Later they dried up and the owners of adjoining farms started suits to determine their rights to the lake bottom lands; but before they got the matter settled the lakes refilled. It was then observed that in the spring break-up of the ice the winds drove it with its burden of rocks from the northerly sides of the lakes to the southerly sides where the melting ice deposited the rocks which were later pushed up on the shore by the wind-driven ice the following spring, forming new walls to replace those taken away by the farmers to use for foundations. Leo Simon acting as chairman commended the speaker for finishing his talk within the allotted five minutes. (O.S.)

On May 13th the seventeen members present heard an interesting talk on the lowly earthworm. Most of us knew little about them beyond the fact that they make good fish bait; but Norris Stone told us how important they are in agriculture, keeping the soil loosened up, sweetening it, and providing needed food for growing things. He had statistics showing the average number per acre, which varied with localities but which seemed unbelievably high. (A.K.)

Tom Matthews at the May 20th meeting told interestingly about the "grating" used in the spectroscope, made by ruling 15,000 parallel lines per inch on a glass surface to an accuracy of one millionth of an inch; and how it is used in analyzing metals. (O.S.)

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DR. SCOTT OF CLARNO-NUT FAME VISITS THE SOCIETY

A most agreeable surprise at our meeting on May 14th was the presence of Dr. and Mrs. R. H. Scott of Harvard University who have an especial interest in the Clarno nut beds. Dr. Scott spent some time in the summers of 1949 and 1951 at the beds, and shipped back perhaps a half ton of fossil nuts and matrix. Later he visited the British Museum and compared the fossils with those of the London clay. The nuts, he said, tell us three things: First, they picture to us the tangle of tropical vines and broad-leaf trees which was Oregon in Clarno times. Second, they confirm even better than leaf fossils that the plant genera then present were those now growing not only in Central America but also in Malaysia. The walnuts combine the features of nuts of the two continents. The "peach pits" are the fruit of a climbing vine of southeastern Asia which is also found in the London clay. Was there at that time a connection between the two continents at middle latitudes? Lastly the fruits, even better than the leaves, reveal the evolution which has occurred since Clarno times.

The rest of the meeting was the announced preview of our coming 3-day field trip to the John Day fossil area. It consisted of slides shown by Leo Simon, and of vertebrate fossils which Lon Hancock had collected from that area. (F.G.)

****

MEMBERSHIP LIST - G.S.O.C.
As of May 27, 1954
Compiled by Mrs. Johanna M. Simon

Name	Address	Zone	Telephone
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Campbell, Robert M.	1700 S.E. 6th Avenue	2	EA 4633
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*Fellow - past president.

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Miller, Mr. & Mrs. Murray R.	1018 Promontory Ave., Box 465 Oregon City, Oregon		OC 6724
Miller, Mr. & Mrs. Wilmer J.	1821 University Ave., Madison 5, Wisconsin		

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*Stone, Mr. & Mrs. Norris B.	16450 Glenmorrie Drive Oswego, Oregon		BL 1-1154
#Strong, Mrs. F. H.	2755 N.E. 51st Avenue	13	GA 8278

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Triol, Miss Ella	2547 S.E. 27th Avenue	2	EM 0989
#Underwood, Dr. Herbert L.	5226 S.W. Menefee Drive	1	BR 4692
Van Dermark, Miss Phyllis	9000 S.W. Garden Home Road	1	CH 3830
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*Wilson, Mr. & Mrs. Ford E	2924 Mountain Avenue, El Paso, Texas		
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Zimmer, Miss Ruby M.	805 S.E. 60th Avenue	15	EM 8319

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Davenport, Miss Mary	Rte. 6, Box 353, Vancouver, Washington		
Davis, Greg	Alpha Kappa Lambda, P.O.Box 1333, Stanford, Calif.		
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Wolfe, Jack A.	4530 S.E. Clinton St.	6	FI 1307

News Letter Subscriber

Trumbull, Mrs. Ellen James	3062 Buchanan, Apt. 2, Arlington, Virginia		

Summary

Adult members 152
Junior members 8
Total . . . 160 membership

NEW MEMBER
(May 28, 1954)

Hammill, Mrs. Dorothy	9124 N.E. Broadway	20	KE 7749

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GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE

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GEOLOGICAL NEWS-LETTER
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Geological Society of the Oregon Country
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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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Mr. Fay W. Libbey (1957)

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Membership:	Mr. Edward D. Bushby	Museum:	Dr. J. C. Stevens
Publicity:	Mr. H. Bruce Schminky	Public Relations:	Mr. Clarence D. Phillips
Social:	Mrs. William P. Clark	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 between those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mr. Edward D. Bushby, 1202 S.W. Cardinell Drive, Phone CA 2123. Regular annual dues (single or family memberships) are $3.50 for residents of Multnomah and adjacent counties; $2.50 for others; and $1.50 for Junior Members. Make remittances payable to the Society.

Society Activities

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. Tenth Avenue and Yamhill Street. See Calendar of the Month for time of meeting.

FIELD TRIPS: Usually one field trip is scheduled for each month.

LIBRARY BROWSE NIGHTS: Twice a month. See the Calendar of the Month.

LUNCHEONS: Informal luncheons, with geological motif, each Thursday noon in Room 305, YMCA Building, S.W. 6th Avenue and Taylor Street. $1.00 per plate.

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

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CALENDAR FOR JULY 1954

Thursday July 1 — Luncheon Meeting - Room 305 YMCA

Thursday July 8 — Luncheon Meeting - Room 305 YMCA

Friday July 9 — Friday Night Meeting - Library Hall, 7:00 p.m. "Echoes from the John Day Field Trip." Members and friends are asked to bring colored slides and specimens obtained on the recent three-day trip into the John Day Country.

Tuesday July 13 — Library Browse Night - Bushby Residence, 1202 S.W. Cardinell Drive. Come and look over our growing library.

Thursday July 15 — Luncheon Meeting - Room 305 YMCA

Thursday July 22 — Luncheon Meeting - Room 305 YMCA

Friday July 23 — Friday Night Meeting - Library Hall, 7:00 p.m. Showing of the motion picture film: "The Eruption of Krakatoa." This is a sound movie of one of the spectacular geological events of recent time.

Saturday Sunday Monday July 24-26 — Three-day camping trip to Spirit Lake and Mt. St. Helens for G.S.O.C. members and friends.

Mr. Kenneth N. Phillips, who will lead the trip, hopes to have Dr. Donald B. Lawrence of the Botany Department of the University of Minnesota as a co-leader. Dr. Lawrence has made some "startling" geological discoveries along with his botanical studies.

Take Highway 99 north to Castle Rock, then the Spirit Lake Highway east 45 miles to Spirit Lake. Meet at the office of the District Ranger, U. S. Forest Service at Spirit Lake at 1:00 p.m. Saturday, July 24. There are excellent forest camps at Spirit Lake. Cabins may be obtained by addressing the Harry Truman Lodge, Castle Rock, Washington.

Tuesday July 27 — The second Browse Night this month will be omitted.

Thursday July 29 — Luncheon Meeting - Room 305 YMCA

ANNUAL PICNIC JUST ONE MONTH OFF

Plans for the Annual Picnic Friday Night, August 13, are shaping up with Mrs. William Clark in charge of the picnicking and Mr. Norris Stone planning the program. Beware Friday the 13th at the Little Volcano, Mount Tabor Park.

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THE JOHN DAY COUNTRY

A poem by
T. Herbert Laurence

In that beautiful land called the John Day Country
A plaque and conglomerate monument stand
Paying tribute to Condon, who all will agree
Was a man of vigor, courage, and sand,
Who overcame dangers often unseen
Here where nature has painted her hills red and green.

Although Dr. Condon was a reverent man,
He was father of Oregon geology;
He lived his life by the Master's plan,
And fathomed the treasures of paleontology.
In those oddly contorted and castellated rocks
He found fossils of mammals that grazed there in flocks.

Here where the meandering John Day flows
This marker is placed as a constant reminder
Of the labors of Condon whose torch ever glows;
For Turtle Cove thrills us as much as the finder.
And the world is indebted for what he could see,
As today we bring honor to his memory.

This place where the highway threads Picture Gorge,
Where the ancestral Indian put signs on the walls,
Was shaped eons ago in the Creator's forge,
And delicately etched by each raindrop which falls—
The carvings may warn of treacherous waters
But to a field mouse my sandwich crumbs are all that matters.

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NEWS OF MEMBERS

The John Day trip was for Past-President and Mrs. Ray Baldwin only the first leg of a 4300-mile journey that took them through Idaho and Utah to Cedar Brakes, Zion, and Bryce Canyon National parks, and both rims of the Grand Canyon. They returned bia San Diego and the California coast. Good weather all the time. They had a nice visit with Mrs. Al Vance at Sherman Oaks, and with Mr. E. N. Bates, another past-president, and Mrs. Bates at Sausilito. It took the Baldwins three weeks to make the big circuit.

****

NEW MEMBERS

		Phone
Boyd, Mr. & Mrs. C. A.	434 Riverside Blvd., Bend, Oregon	1013 W
Stauffer, Mr. & Mrs. James	717 - 8th Street, Oswego, Oregon	BL 1-3825
Griffith, Mr. & Mrs. Norman N.	1969 S.W. Park Avenue, Apt. 815, Portland, Ore.	

OLD MEMBERS NOT IN JUNE MEMBERSHIP LIST

Lindeman, Mr. & Mrs. B. J.	2531 S.E. Vineyard Way, Milwaukie, Oregon	EV 1-5841

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THE STORY OF THE CONDON MEMORIAL

Once again the Geological Society of the Oregon Country has performed a public service. In 1938 the Society christened Lake Ben Morrow from which the Portland area draws its fine water supply. In 1940 it placed a plaque on the prehistoric petroglyph now located on the lawn of the Portland City Hall. Two years ago, 1952, it placed a plaque in Mt. Tabor Park describing the scene which took place at the little volcano ages ago. We now record the events of another great day in the history of our Society, when at long last we honored the memory of Dr. Thomas Condon, Oregon's first geologist.

Preparations for today's celebration started a little more than a year ago when Mrs. Jane Erickson suggested that we erect a plaque in memory of Dr. Condon. A committee was appointed by then president Ray Baldwin with Lloyd Ruff as chairman, and Phil Brogan and Bill Clark to assist him. A location at The Dalles where Dr. Condon first became aquainted with Oregon geology was first considered; then the campus at the University of Oregon at Eugene, where Condon taught geology for so many years, was proposed; but the final decision was in favor of the John Day region where Condon found so many of the fossils which made him and Oregon famous. It was suggested that the John Day Fossil Bed State Park be renamed the Thomas Condon State Park. Rudolph Erickson found a place for the monument and plaque at the little roadside park facing Sheep Rock.

This spring our new president, Al Keen, appointed a plaque committee consisting of Phil Brogan, chairman, with Bill Clark and Murray Miller to assist him. Clarence Phillips drew up resolutions to present to the State Highway Commission. Mrs. Johanna Simon, our efficient secretary, wrote many letters regarding the project. (R.B.)

And now about the monument. At first the search was for an ice-rafted granite erratic. Several persons suggested where such boulders could be found, and trips were made to investigate them. The stone which was finally selected for the monument, however, is a massive piece of Cretaceous conglomerate from the outcropping of this formation just a short way north of Sheep Rock. Ray Golden, Murray Miller, and Lon Hancock selected it; and the State Highway Commission bridge crew headed by W. G. Jacobs of the John Day Section hauled it to its present site and raised it into position. To them goes great credit, for the stone weighs more than three tons. The monument is a conglomerate of the well-rounded cobbles and pebbles of an ancient sea shore so well indurated with silica that when the rock is fractured the face is smooth. Most of the cobbles are quartzite, but andesite, granite, and other igneous rocks are also present. Standing upright the block is 7 feet 2 inches above its concrete base, and 4 feet 3 inches across its face, and weighs about three and a quarter tons.

The inscription which appears on the plaque was written by Fay Libbey. Bill Clark handled the work of getting the letters for the plaque, and the molding, casting, and finishing of the plaque. The final cementing of the plaque in place was done after the dedication ceremonies by Murray Miller, Ray Golden, and Bob Wilbur.

The Dedication Ceremonies

The dedication took place Saturday, May 29th, at 3:30 p.m., at the wayside state park and historical marker facing Sheep Rock. Some eighty members of the Society and participating friends were present. As though to remind us of the authority of the elements, a biting north wind joined, uninvited in the ceremonies. It blew, a la Shakespeare: "with restless violence round about the pendent world." Nevertheless, with our president Albert Keen presiding as master of ceremonies, there were some excellent speeches. Fay Libbey briefly sketched the life of Doctor Condon. Ray Baldwin told of the inception of the idea of the memorial. Lon Hancock interpreted the area for us, with his usual cosmic grasp, and accentuated its challenge to us today. Phil Brogan placed the values of the amateur's study of geology over against the distractions and inanities of our modern time. Representatives of the State Highway Department, who contributed substantially to the enterprise, were present. Authentic Scottish folk dances, bagpipes and all, added to the occasion.

It is our hope that in the years to come the passing motorist, driving along Highway 19 and admiring the colorful formations of the John Day Valley, will pull off at the little roadside park just north of Picture Gorge, and on a huge boulder at the canyon's rim, will read in the glint of bronze the following inscription:

TO

THOMAS CONDON
(1822-1907)

Pioneer Oregon geologist, teacher, author, clergyman; who came to Oregon around Cape Horn as a pioneer missionary in 1853; who provided a church home at The Dalles for all Christian faiths; who was the first investigator of the fossil beds of the John Day country; who at the founding of the University of Oregon in 1876 became its first professor of geology and continued as professor and teacher until 1907; whose geological classroom was the great outdoors and whose book, "The Two Islands," was the foundation for the study of the historical geology of Oregon; this plaque is dedicated by the Geological Society of the Oregon Country.

May 29, 1954

(J.E.)

Lon Hancock's Speech at the Dedication

Some people claim that love is the greatest thing in the world. Others believe it is money. I insist that both sides are wrong; for to me curiosity is the greatest thing in the world. We begin as a child by being curious about everything with which we come into contact; and this thing we call curiosity sticks to us throughout life.

A short time ago I became curious about what happens at a dedication ceremony, since I had never attended one; and by being too curious I landed in this hot spot, the speaker's rostrum.

Some years ago a man found some bones in one of these canyons. They seemingly had turned to stone. He wrote a book. Then some of us read the book, and we became curious. We wondered if possibly by following in his footsteps we might find something similar. So we organized a group of people, purchased some suitable equipment, and moved into this same area. And believe it or not we also found bones. And ever since the discovery we have just been dying of curiosity to know to what strange beasts these bones belonged. So throughout life, curiosity becomes the stimulus which prods us on into success or failure.

But in a more serious vein, fellow members, I appreciate the honor which you have conferred upon me by permitting me to assist in this very constructive and worthwhile endeavor. As we are all aware, the dedication of a memorial is a very commonplace affair; monuments are to be seen at every turn. But too often these monuments are placed without serious thought, or in moments of hysteria, and our hero instead of having contributed anything of value to society has been a destroyer of the same. Hence it is highly gratifying and deeply encouraging when occasionally we see a monument being erected to a builder.

Dr. Condon was by no means the type of hero who rode to fame over the wrecks of less fortunate individuals. He was every man's friend and helper: gentle, kind, unassuming, a lover of simplicity-- true attributes of real greatness; a rare philosopher, a prophet of wide vision, mentally and physically a man of boundless courage. As a minister Dr. Condon lived in an age when many people viewed science and religion as two powerful forces diametrically opposed in every respect. Dr. Condon calmly appraised the situation, and then, carefully selecting what he considered best from each side, he was undisturbed.

Condon never shrank from danger or hardships. Leaving the safety and comforts of home he would join for long periods of time with groups of rough and rugged frontiersmen, or move into areas infested with wild beasts and hostile Indians, ofttimes spending days alone.

It was mainly through his efforts that the attention of the scientific world was focused on this remarkable area in which we now are. To his discerning mind these mountains of cold stone became archives of priceless histories. Standing as we do this afternoon, virtually squeezed between these multicolored cliffs, we are in the very heart of the John Day world, built from the evidence which Dr. Condon wrested from these tilted hills. Beyond the lower hills to the west rise the higher and older formations, the Aldrich Mountains--one great anchor. To the east are the Greenhorn or Blue Mountains, also older and higher--these form the other anchor or support. Between these two huge supports there swings like a glorified hammock the entire series of Tertiary formations covering the age of mammals. The bottom of the series rests upon the cold floor of the old Cretaceous sea, a fact first called to our attention by Dr. Condon. Then piled upon this floor in orderly array are the strata of the Paleocene, Eocene, Oligocene, Miocene, Pliocene, and Pleistocene epochs; and on top the sage and juniper blanket of the present.

These stony folds are the ashen beds in which sleep the populations of numerous lost and forgotten worlds. As the eager eyes of Dr. Condon fell upon these mineralized forms they remained no longer silent creatures. He would pick them up tenderly and fondle them; and then as in the prophet Ezekiel's vision of the valley of dry bones, they would take on life again, and in his enthusiasm Condon would join with them. The moon which lighted his pathway in the eventide was the same moon which lighted the rippling waters of old Oregon's nameless seas. As he walked along the sandy beaches perfumed tropical breezes would once more cause a rustling in the nearby trees. The singing breezes which we feel this afternoon became to him the voices of the jungle, and above the low rumble of the waters of the John Day he would hear the far-away exploding volcanoes throwing forth the ashes which form the warp and woof of the present John Day hills. Thus through the stony eyes of these strange creatures of the past Condon became an eye-witness of the Oregon Country of millions of years ago. And through his eyes we became eye witnesses.

In humble appreciation for the legacy he left our generation we dedicate this slab of the old Cretaceous sea floor and this plaque of bronze. It is our sincere hope that these will receive the love and protection from all generations yet to come.

The Camp Near Sheep Rock

There was just one sunny day during the three-day field trip to the John Day fossil beds—Sunday was beautiful. Nevertheless some seventy-five people pitched their tents and baked their steaks beneath the cliffs. At the night camp fires they sang songs and heard Phil Brogan and Lon Hancock tell of the lore of the John Day country. Indeed we had a visit from the grisly specter of old John Day himself, who announced that once a year, at this very day and hour he returns to haunt the scenes of his lifetime. A few minutes later an Indian appeared with a tomahawk seeking the scalp of John Day, but the evanescent gentleman had evanesced.

Sunday night our camp fire was visited by friends from nearby ranches, who added much to our pleasure: Mr. James Cant who came into the region before there were roads, Mr. and Mrs. Wayne Stewart, and Mr. and Mrs. Mascall of the nearby Mascall Ranch, on whose property so many Pliocene fossils have been found.

The first field trip Sunday morning was to the pictographs in Picture Gorge with Dr. Arthur Jones telling us something of the Indian lore connected with them, and then on to the Mascall Ranch viewpoint where Phil Brogan and others explained the geology so clearly visible around us. Next Lon Hancock took us to a leaf fossil location on a hillside west of the Cretaceous beds. The afternoon saw us peering and picking for mammal remains in famous Turtle Cove—and not without some success, for four skulls and several fossil fragments were found.

Monday morning most of the group scattered this way and that on their way home. Some under the leadership of Leo Simon visited a Cretaceous area north of Mitchell to hunt for ammonite fossils.

Great credit is due our trip chairman, Murray Miller, who engineered the entire enterprise. He scouted the trip and arranged for the camping and side tripping. We salute him. And to Ray Golden and all he did to make our camp and campfire a pleasant experience, we owe our gratitude.

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PILTDOWN MAN — THE ENIGMA OF THE CENTURY

By

Dr. W. Claude Adams

(Dr. Adams, long time Portland dentist and amateur geologist and charter member of this Society, has followed the Piltdown controversy closely ever since 1915 when he became acquainted with Dr. J.L. Williams, the dentist who studied the controversial teeth of the supposed fossil man.)

The recent pronouncement by English scientists that the famous Piltdown skull known as Eoanthropus or dawn man was a hoax recalls to mind the controversy that raged for more than forty years as to whether the simianlike mandible belonged with the cranium which appeared to be of human type. For years after the skull had been tentatively accepted as evidence of a prehistoric man who lived some 100,000 to 600,000 years ago, doubt as to its authenticity still lingered in the minds of some scientists, and the learned wrote articles and books expressing their doubts. Hence it is not too surprising that scientists after further specific tests have overturned pre-existing theories and now proclaim the Piltdown skull to be a hoax. The lower jaw is definitely that of a chimpanzee and the age of the cranium, undoubtedly human, appears likely to be only 50,000 years old.

In 1908 Charles Dawson, a lawyer of Lewes, England, and an amateur archeologist, was attracted by some unusual brown flints with which a country road in Piltdown Common, Sussex, had been repaired. He learned that the flints had come from a gravel bed on a farm several miles away. He asked the workmen to save any fossils they might find in the material, and later was given a small piece of a parietal bone which they had found in the gravels. Continual visits to the site finally yielded, three years later, a frontal bone including a portion of an eye socket. These two bones he took to Sir Arthur Smith-Woodward of the British Museum who saw in them something important. The two placed a crew of workmen at the location to sort over the gravels. This search produced a temporal, an occipital bone, and the left half of a lower jaw with two molar teeth in place. Besides the skull bones were found rude flint implements, a large bone implement fashioned from the thigh bone of an elephant, and fragments of the bones of hippopotamus, horse, and beaver which gave a clue to the age of the skull fragments if the animal bones could be proved to be contemporary with the skull bones. Two nasal bones were discovered in 1913 by Dawson and Sir Smith-Woodward and the same year Père Teilhard de Chardin found a canine tooth of apelike type.

Sir Smith-Woodward identified and assembled the bones, making the first restoration of the skull known as the Piltdown Man, which he named Eoanthropus dawsoni, "Dawson's dawn man." In 1915 still other bones, thought to be those of a second individual, were found among loose gravels in a new site two miles away from the first location. Those consisted of a frontal bone, an occipital bone, and the left first molar tooth, which remains he classified as probably human and used them to bolster up his previously formed theories relative to the Piltdown specimens.

Dr. J. Leon Williams, an American dentist well known in scientific circles as an authority in the field of comparative anatomy, was at that time residing and practicing in London. Dr. Woodward granted him the privilege of examining and photographing the Piltdown bones and teeth before they were assembled. When Dr. Woodward's restoration of the skull was placed on exhibit, Dr. Williams criticized his arrangement of the incisor teeth, discussing with Sir Arthur Keith, Hunterian lecturer of the Royal College of Surgeons, the error in making the lower incisor teeth wider than the upper incisors, which is never found in either human

or animal dentition. Furthermore, a relationship between the mandible and maxilla had been established, especially in the placement of the cuspid teeth, by reason of which a lateral movement of the jaw was rendered impossible. In the restoration of the jaws the missing teeth had to be supplied and a knowledge of dental anatomy was necessary to a proper alignment of the teeth.

Dr. Williams suggested to Sir Arthur Keith that he make a critical study of Sir Smith-Woodward's restoration. Over a period of thirty years Dr. Keith had pursued thorough anatomical investigations in the comparison of chimpanzee with gorilla and of simian with man. Dr. Keith then made his own restoration of the Piltdown skull, asking Dr. Williams to take over the restoration of the jaws and teeth while he reconstructed the cranium. This restoration was shown at the meeting of the International Medical Congress in London, at which time, on invitation of Professor Keith, Dr. Williams presented his criticism of Sir Smith-Woodward's restoration, explaining the reasons for the corrections he had made in the dentition. In addition to correcting the size, placement, and articulation of the incisor teeth, he had placed the cuspid tooth of the "find" in the upper left jaw instead of the lower right jaw. Thus by correcting the articulation he removed the interlocking of the teeth and made possible a lateral mandibular movement which evidently had been a function of the original jaw as indicated by the worn occlusal surfaces of the molars.

Even at that time, Dr. Williams recognized the disparity between the development of the brain case and the mandible, the latter being markedly more primitive than the skull, and identified the human characteristics in the cranium, while those of the mandible appeared to be simian in type. This led him to doubt that the cranium and the mandible belonged to the same animal, and gave rise to his theory that the mandible might be that of a chimpanzee or gorilla, a premise that is now being sustained long years after by the recent investigations by British scientists. However, he tried to reconcile the unequal development of the brain case and the mandible by taking into account the view held by some scientists that "the evolution of the cranium from primitive and unknown ancestors toward the characteristics found in Homo sapiens may have long preceded the development of human characteristics in the mandible."

The audience before whom he presented his theories accepted Dr. Williams' arguments as feasible; and in recognition of the contribution which he had made to the knowledge of dental anatomy in connection with the Piltdown skull he was elected a Fellow of the Royal Anthropological Institute of Great Britain and Ireland.

The skull, about medium in size, is hard and unusually thick, with steeper forehead and less prominent eye ridges than in the skulls of the Neanderthal Man. In his paper on Prehistoric Man, Dr. Williams stated that "the brain of a modern man united to a jaw of a gorilla is the most astounding fact in the history of anthropology."

Other scientists, including Sir Grafton Elliot-Smith, authority on the brain, and J. Howard McGregor of Columbia University made their own restorations of the Piltdown skull, until the number of restorations by various men eventually reached six or seven, all differing from one another in more or less essential points. The investigators ranged themselves into two factions, the one supporting Sir Smith-Woodward's contention that the mandible possesses enough human characteristics to warrant the belief that it belongs with the cranium, and that the canine tooth was from the lower jaw rather than the upper jaw. This faction included Henry Fairfield Osburn, W. P. Pycraft, Sir Elliot-Smith, and most British authors. Opposed to this group were Gerrit S. Miller, who enunciated his theories in two papers in 1915 and

in 1917, William K. Gregory, curator of the department of comparative anatomy American Museum of Natural History and author of a book The Origin and Evolution of Human Dentition published in 1921, and the late Dr. Ales Hrdlicka, famed anthropologist of Smithsonian Institution. These men favored the conclusion that the jaw belonged to a chimpanzee of the Pleistocene era.

Sir Arthur Smith-Woodward visited the United States as a delegate to the sixteenth annual meeting of the International Congress of Geologists at Washington, D.C., in 1933 and later toured the Pacific Coast area with a party of fifty scientists from seventeen foreign countries, visiting the fossil beds of the John Day region of Oregon. This tour through Oregon gave a favored few local geologists an opportunity of meeting Dr. Woodward and the other distinguished scientists. Another internationally known personality who was a member of the party which toured Oregon was Père Teilhard de Chardin, French Jesuit priest and brilliant paleontologist who had found the controversial cuspid tooth of the Piltdown Man.

Stone Marker on the Site of the Discovery of the Piltdown Remains (Erected in 1938)

Dr. J. Leon Williams paid Portland a visit in 1915 and gave a talk before the Portland District Dental Association and was entertained by members of the profession. He was enroute from London to the Pan-Pacific Dental Congress at San Francisco where he delivered an address and exhibited replicas of the skulls of ancient man. At an open meeting in the evening he lectured on the Piltdown Man and showed motion pictures of prehistoric man. The motion picture was then in its infancy and the fanciful figures of ape-like men crouching and running through the woods was a novelty and created a lively interest.

By 1938 the battle over the authenticity of the Piltdown skull had subsided in England to the extent that a stone marker was erected that year on Piltdown Common at the site of the discovery of the fragments of bones which were later assembled into the famed Piltdown skull, supposedly the remains of the first known man to have inhabited Britain. Then in 1953 two Oxford professors, W. E. Le Gros Clark and J. E. Weiner analyzed bits of the bones chemically and found that there was not enough fluorine in them for them to be as ancient as had been supposed. Fluorine gradually accumulates in bones that lie buried in

the ground, and the amount of fluorine in the cranial fragments indicated an age of perhaps 50,000 years. The jaw fragment, moreover, was modern. It was that of an ape, and had been artificially colored with iron salts to make it look old and yellow, and the teeth had been filed to make them appear more human. The question arises as to what now will be done with the monument; and whose face will be red?

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JOINT FIELD TRIP WITH THE SALEM GEOLOGICAL SOCIETY
June 13, 1954

Incidents in Oregon's geological history were vividly illustrated on our recent tour in the Bellevue-Amity-Eola Hills area with Professor Clark of Willamette University as our leader. More than fifty people in twenty cars from the Salem and Portland societies gathered first at Bellevue to view a huge argillite erratic located high on a nearby hillside and to ponder its significance in a location where such rocks are not "indigenous." Various articles in the G.S.O.C. library give the account of how these rocks were ice-rafted down the Columbia by the Spokane Flood at the time in the late Ice Age when Lake Missoula broke loose.

Professor Clark then took us east of Amity to an area where sediments and recent fillings predominated, and there he showed us a small lava flow in a depression in Oligocene fossiliferous sediments. It did not leave much to the imagination to see what had taken place as Professor Clark took us right into the crater of the small volcano which is said to have been the source of the short lava flow, and showed us the start and finish of the flow. Around it were Oligocene sediments with their marine fossils. He showed us the baked contact of the flow on Oligocene soil, and Miocene basalt columns with their jointing and attitudes.

At Maud Williamson Memorial State Park on State 221, 12 miles north of Salem, we found a beautiful place to picnic. From here Professor Clark led the caravan south and west up the gentle dip-slope of Eola Hills and surprised us with a grand view east over the Willamette Valley and west to Marys Peak. Considerable interest and discussion were aroused over the occurrence of a row of rocks seen on the west or scarp-slope of these hills. These had the 5- or 6-sided shape of dark lava columns; and it was finally decided they must be remnants of lava flows cropping out on the scarp faces of the fault blocks which compose the Eola Hills and other mountains of the region. (MBM)

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SOCIETY ENJOYS SLIDES OF "BEAUTIFUL OREGON"

The G.S.O.C. meeting Friday evening, June 11, was attended by an unusual number of visitors to make up for the members of the Society who were away on vacation. We were rewarded by excellent color slides taken down the Oregon coast, along the Columbia, across the Cascades, and in central Oregon by the Ericksons. Rudolph Erickson cannot resist a big wave or a pounding sea. Jane's weakness is for picturesque dead trees. A generous proportion of the slides were of geological interest.

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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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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 between those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mr. Edward D. Bushby, 1202 S.W. Cardinell Drive, Phone CA 2123. Regular annual dues (single or family memberships) are $3.50 for residents of Multnomah and adjacent counties; $2.50 for others; and $1.50 for Junior Members. Make remittances payable to the Society.

Society Activities

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. Tenth Avenue and Yamhill Street. See Calendar of the Month for time of meeting.

FIELD TRIPS: Usually one field trip is scheduled for each month.

LIBRARY BROWSE NIGHTS: Twice a month. See the Calendar of the Month.

LUNCHEONS: Informal luncheons, with geological motif, each Thursday noon in Room 305, YMCA Building, S.W. 6th Avenue and Taylor Street. $1.00 per plate.

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

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CALENDAR FOR AUGUST 1954

August is vacation month for the Geological Society of the Oregon Country. Except for the popular annual picnic and the regular Thursday noon luncheons there will be no activity. There is to be no second Friday-Night Meeting and no Field Trip. Concerning the Library Browse Night see the letter from Librarian May Bushby on page 68.

Thursday August 5 — Luncheon Meeting - YMCA

Thursday August 12 — Luncheon Meeting - YMCA

Friday August 13 — Annual Picnic - 6:30 p.m. at the Little Volcano in Mount Tabor Park.

The picnic is one of the big events in the G.S.O.C. year. Come and bring guests. Bring either a hot dish, a salad, or a dessert, enough for three times the number in your party. Bring your own silver and dishes. Coffee and rolls will be provided.

A program of song and skit is being worked up under the chairmanship of Norris Stone. Jane Erickson has produced a hectic script that will throw the Little Volcano into convulsions. And how we do sing our sedimental songs!

Thursday August 19 — Luncheon Meeting - YMCA

Thursday August 26 — Luncheon Meeting - YMCA

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The proposed Labor Day field trip has been called off due to the annual convention of Agate and Mineral societies at Eugene over that weekend.

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FIELD TRIP FOR FOSSIL DIGGERS COMING UP

Sharpen your picks and chisels. Mr. John Walsted of the U.S. Bureau of Mines Metallurgical Laboratory at Albany will guide us to fossil beds around Lebanon, Scio, and Sweet Home on Sunday, September 26th. Details will appear in the September News Letter.

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CHANGE OF TELEPHONE NUMBER

Mr. and Mrs. Ray Mackenzie now have the number EVergreen 1-8621.

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YOUR LIBRARY AND MINE

Browsing nights were held only twice during the months of June and July, but attendance was almost as large as during the winter months. June 22nd we had a discussion on the GSOC John Day field trip, and July 13th Ed Bushby showed slides of the Mt. Rainier country which the Bushbys visited over the 4th-of-July holiday. These short special programs always follow the quiet reading hour.

Your librarian wishes to announce that the Bushbys are planning to move in the near future. No, not out of Portland! But the move will necessitate housing the library in new quarters - a matter which your Executive Board is handling. I wish to reiterate that Ed and May Bushby have enthusiastically enjoyed being host and hostess for the members who have assembled to read and discuss geology in their home, with the library at hand for technical reference. It is unpleasant to be compelled to announce there will be no more browsing nights at this particular address. I wish to thank everyone who has supported the library program by contributing to the special 15-minute programs, helping with the refreshments, working on the library, or just bringing their welcome enthusiastic selves.

May I urge you to contribute to the physical upkeep of your library. It should be a source of pride to all members, for it contains many out-of-print publications by persons prominent in the fields of paleontology and geology. Those who have not used this fine library are passing up a great opportunity.

Lastly, Mr. Bushby and I wish to extend an invitation to all our GSOC friends to visit us wherever our residence may be in the future.

Yours in the interest of YOUR LIBRARY AND MINE,

May R. Bushby, Librarian

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RE HOMO SAPIENS

Two of our past presidents, now residents of California, Ray Treasher (1938-39) and E. N. Bates (1944-45), have lately discovered that they are comparatively near neighbors, living but 5 miles apart. Both were recently called on by Dr. and Mrs. Arthur C. Jones, who revealed this interesting situation. The Bates's, retired, are in Sausalito; the Treashers in Corte Madero, where Ray is still pursuing his geological profession.

Dr. Ruth Hopson is in the process of becoming a householder. Plans are under way for the construction of a modern dwelling in a sightly location in southwest Portland near Terwilliger Blvd. The landscaping, we understand, is to be left sufficiently undisturbed to keep the natural beauty of this wooded site.

Via the grapevine we hear that Jack Wolfe, one of our junior members and a Science Talent Search winner of last year, has become expert in correctly identifying and naming fossil leaves. Jack is now continuing his education at Harvard. Speaking of junior members, Donald O'Connell, another former junior, received his degree from Harvard last year, and is now on the staff of John Hopkins.

Dr. Hodge, now convalescing at home after two weeks in the hospital as a result of a rather nasty fall, reports that he expects to be as good as new, if not better, when strength returns to the injured leg. Three hours of surgery were required to mend the torn muscles. (A.H.)

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ANCIENT BEASTS COME TO LIGHT IN THE CLARNO

By
Jane Erickson

It was a steaming day in the jungle. Stifling heat beat down with a copper-like glare. A huge beast standing some sixteen hands high came lunging through the thicket and stood on the edge of a small opening. In front of him was a smooth, claylike expanse to the far side of which lush vegetation beckoned and cool looking palms spread their enticing branches. The animal started across. In his urgency he did not see that, as he plunged, the center of the smooth expanse of earth moved and the mud trembled in a circling cone. As the beast lunged ahead a great hollow, sucking sound enveloped him and he began to sink. Plunging this way and that he was soon mired into the bog of clinging mud. His immense head swayed from side to side as the claylike mass enveloped him. In a matter of minutes the only vestige of his great hulk were his immense jaws with their tusks pointed heavenward. Soon they too sank out of sight and the wide, clay-like expanse again became smooth and quiet. Animals of other types and species followed from day to day; and gradually through the centuries there accumulated a great chimney of skeletons.

What was Nemesis to these beasts of a faraway time is now proving a bonanza to Mr. A. W. ("Lon") Hancock and the Natural History Expedition of the Oregon Museum of Science and Industry, who are uncovering bones that have lain dormant and untouched for nigh onto 60 million years. A new chapter in the paleontological history of the Eocene is being written at Camp Hancock in the Clarno.

Several of us yesterday had the privilege of looking at a preliminary sample of Lon's new find — parts of nine or ten of these jungle denizens: an immense femur, a tibia, several skulls and jaws, many of which, luckily, have their teeth intact. In a search for identification, we measured, surmised, and scanned illustrations of pantadonts and uintatheres, brontotheres, and rhinoceros-like beasts in various texts illustrating the fauna of the Eocene period. None of the illustrations quite fitted, although we did find some exciting areas of comparison. One skull 32 inches long had teeth as large as 2-3/4 by 3 inches. A jaw 22 inches long, a rib bone over a yard in length, a 2½-foot femur, and a 1½-foot tibia gave further indication of the immense hulk of these animals. Most intriguing of all was a small specimen of jaw with several teeth that gave rise to the speculation that it might be Eohippus, the little horse that Lon feels some day is certain to be found in the Clarno formation.

The finding of these specimens is to Mr. Hancock the culmination of a long-cherished dream. For some 20 years he has trekked annually to the Clarno beds, always searching and hoping to find some evidence of fossilized animal remains. Leaf prints of various kinds, fruit and nut specimens were brought to light, but no animals; until some ten years ago he picked up the first indication of their existence, the tooth of a rhino. Three years ago, a specimen of brontothere was located. Last fall, a fellow agate collector, Albert L. McGuinnes, discovered the present location of bones (see note in May 1954 News Letter, p. 44); and this summer, Lon and the youngsters of the Oregon Museum of Science expedition have carried on excavations that have paid off in some three thousand pieces of fossilized specimens, presenting an intricate piecing-together job for many long winter evenings to come. Lon Hancock and Stanley Shirk, Director of the Museum, have been on the job almost continuously ever since rescuing more souvenirs of the past.

All of us in the Geological Society thrill to the news of what is happening on the sun-drenched plains at Clarno. We do not know, of course, that the accumulation occurred in the dim past exactly as was pictured at the beginning of this article. That is one of the ways in which it could have happened, and which would account for so many different species lying together in one place. What we do know is that the bones are there, and that finding them is an exciting discovery. We look forward to the time when some qualified paleontologist can look over Lon's collection and identify these many specimens for him. We hope to tell their story in the News Letter.

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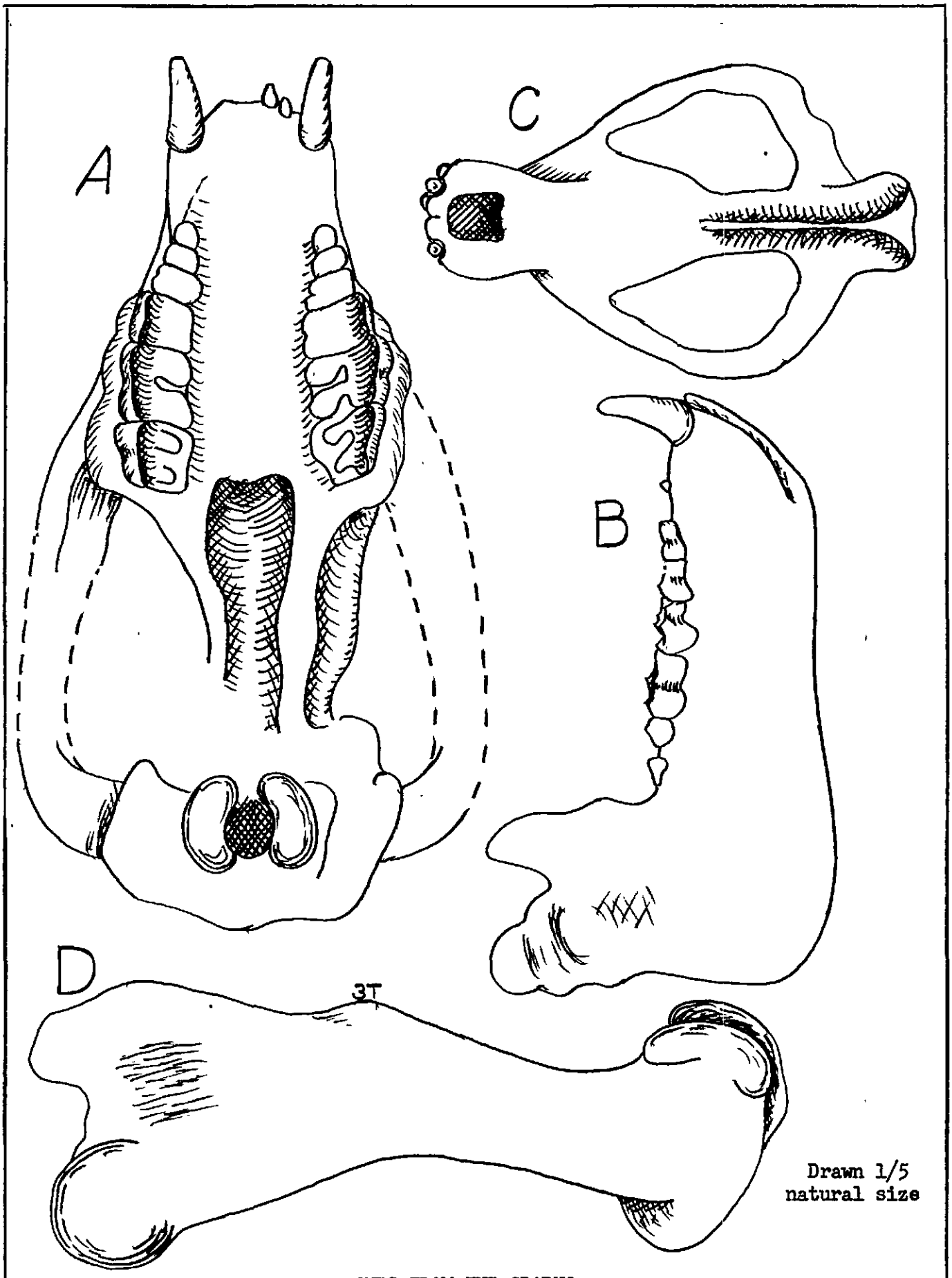
NOTES ON THE DRAWINGS

On the opposite page are figures of four of the larger of Hancock's specimens from the Clarno mammal beds. The editor drew these hastily to a scale of one-fifth their natural size.

Figure A is the underside of the largest cranium. It is 32 inches long and 14 inches broad. Two of the original six incisors remain. The canines project 2-3/4 inches and are flattened on their anterior surface due possibly to rubbing against the canines of the lower jaw. Then there is a diastema followed by premolars 2, 3, and 4. The three molars are huge teeth, the largest being 2-3/4 by 3 inches. The animal was an old one, for the molar teeth are worn down except for sharp high ridges along the lateral edges. These ridges indicate that there was no lateral movement of the jaw. In the specimen the posterior part of the skull (occipital region) is distorted to the animal's left and downward, due to movement of the rock matrix. The lateral distortion but not the downward distortion has been corrected in the drawing. This skull is of a generalized mammal type, in shape not unlike that of a primitive carnivore. In the Eocene the "lion" was not far from the "ox." But the upper molar teeth have the square shape of an ungulate (hoofed animal), rather than the triangular shape of a primitive carnivore, and the outer ridge and the two inner V-shaped ridges suggest a rhinoceros type.

Figure B. The huge jaw, 22 inches long and 12 inches from the angle to the condyle, did not belong with the large skull, for the teeth are different. They have cusps (bunodont) instead of ridges (lophodont). The incisors are missing in the specimen. There is a large canine. The cheek teeth increase in size from the rudimentary first premolar to the large first molar. The last two molars are again small, a feature hard to match in ungulate jaws. The teeth had become only slightly adapted to a herbivorous diet. It has been suggested that the jaw is that of a pantodont (amblypod), a primitive sort of ungulate which grew to huge dimensions early in the Eocene.

Figure C. This skull is viewed from above. It is 18 inches long and nearly a foot wide. A remarkable feature is the extremely small braincase at the rear of the skull, and the high ridge (sagittal crest) which surmounts it. Mr. Hancock says that originally the crest was 3 inches high; but part was lost in excavation. The huge openings (temporal fossae) immediately posterior to the eyes permitted powerful jaw muscles to ascend to their origins on the sagittal crest and the sides of the braincase. In the figure the lower canines are shown projecting upward between the upper canines and incisors. Among living animals one finds such features as these in the opossum, a marsupial, one of the most primitive and generalized of all mammals.



Drawn 1/5
natural size

BONES FROM THE CLARNO

Figure D. The femur is 28 inches long, and is that of a heavy-bodied (graviportal) herbivore with short postlike limbs. The presence of a large third trochanter, marked 3T in the drawing, is a primitive feature. The femur might have belonged either with the large skull or with the jaw.

For pictorial restorations of some of these ancient ungulates reference may be made to the October 19, 1953, issue of Life. In the article on the "Age of Mammals" there is vividly portrayed Coryphodon, a pantodont of the Eocene; Brontops, a huge titanothere of the Oligocene; and Subhyracodon, an early rhinoceros of the Oligocene. (F.G.)

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TRIMBLE DISCUSSES GEOLOGY OF THE PORTLAND AREA

The meeting of the Society on June 25th was addressed by Donald E. Trimble on the "Geology of the Portland Area." Most significant was the preview which he gave us of the results of the investigations which he has carried on for the past six or seven years as geologist in the Engineering-Geology Branch of the U.S. Geological Survey. His assignment is the geological structure and history of four 15-minute quadrangles; namely, the Camas, Portland, Hillsboro, and Oregon City quadrangles.

In his talk Mr. Trimble summarized facts already known through the work of others, and added certain important contributions of his own. He has worked out the stratigraphy of the so-called Troutdale formation as he finds it exposed in the valley of the Sandy River east of Gresham. He considers that it dates from late Miocene time, through the Pliocene, and into the Pleistocene. He has investigated numerous lava buttes (Boring lavas) from Battle Ground, Washington, on the north through the Portland area, to Highland Butte south of Oregon City. He has studied the history of advance and retreat of the glaciers in the Sandy River drainage as it is recorded in alternating layers of outwash and till. His observations on the distribution of boulders, gravel, sand, and silt in the Portland basin strongly support the concept of a flood of tremendous energy (Bretz' "Spokane Flood") which occurred when the ice dam that held glacial Lake Missoula gave way. The silt which covers the Portland hills he considers to be a wind-blown loess of late mid-Pleistocene date.

We shall look forward to such time as Mr. Trimble completes his studies and releases his findings for publication. (F.G.)

****

ECHOES OF THE JOHN DAY FIELD TRIP

Twenty-nine visitors were introduced by hostess Mrs. Davis at the meeting of the GSOC on July 9th, when we heard reports and saw kodachrome slides taken on the May 29-31 field trip of the Society to the John Day Country. Members expressed their appreciation of Murray Miller and Ray Golden for their work in arranging for the camp. President Keen also thanked those on committees who had done so much to make the dedication ceremonies and trip an enjoyable one.

The slides comprised the best shots taken by several members of the society: Ed Bushby, Rudolph Erickson, Arthur Jones, Murray Miller, and Bruce Schminky. As arranged by Ed Bushby and Bruce Schminky they made a vivid and colorful record of the quarrying and erection of the monument, of the dedication ceremonies of the Dr. Condon memorial plaque, and of our visits to the surrounding country. There

were striking pictures of Sheep Rock, Picture Gorge, and colorful Turtle Cove. The latter resembles Bryce Canyon in its pinnacles, spires, and unique contours. The pictures showed GSOC'ers digging fossils - and some of us were envious.

There was much interest in the exhibit of fossils collected on the trip. (M. Fowler)

****

THE SCAPPOOSE IRON OPERATION

By
John P. Walsted

(Mr. Walsted has just completed a report of an investigation for the Bureau of Mines on the subject of the metallurgical testing of Scappoose iron ore, which will be published soon in Washington, D.C. He sends us the following notes on the trip which our Society recently took to the Scappoose mine and mill.)

The field trip to the Scappoose iron deposits, March 28, 1954, was interesting because these deposits are the only known potential iron ore supply in Oregon. A company of us gathered at the rendevous, the Orr Engineering and Chemical Plant at Scappoose, to witness the treatment of the iron ore to produce a calcine product used to purify city gas. The ore is passed through a ball mill, where it is finely ground. Next the addition of a caustic solution causes the formation of a slurry, which is then fed into the upper end of a tilted rotary kiln. As the kiln rotates, the material is gradually dried and then calcined by the heat from an oil burner at the lower or discharge end. The discharge, nodular or pebbly in character, is again finely ground in a hammer mill and discharged into hopper-bottom bins from which it is withdrawn for shipment.

The interesting feature of this operation is the novel way in which Mr. Orr has solved one of the most pressing problems of rotary kiln operation where slurry feed is employed. There is a tendency for a ring of partially dried material to build up near the feed end of the kiln which if allowed to continue would prevent the passage of material through the kiln. No method has ever been discovered for preventing the build-up of this ring. Mr. Orr, however, has mounted a boring bar near the feed end of the kiln which can be advanced from time to time to bore out the accumulated ring. The cutting bits which perform the actual boring would last but a short time if they were made of ordinary steel; but Mr. Orr has substituted a high-speed steel tool for this service which is of such a composition that it retains its hardness and wear-resistance at the comparatively high temperature of the calcining kiln.

After hearing a description and seeing a demonstration of the operation of the plant the field party proceeded to the mine. A number of deposits of iron ore occur in the general vicinity of Scappoose, only one of which is now being worked. They are what remains of a once fairly large iron-bearing zone. A later overfill and a subsequent erosion cycle has dissected the deposits and removed much of the iron-bearing strata. The original iron-bearing deposit was derived from the Columbia River basalts, which have since been largely removed by alteration and erosion. The iron was leached from these basalts by the copious rainfall of the region and was then deposited in lake beds or streams. Because of the nature of the deposition the ore beds lie fairly flat. The overburden, which is the result of the later overfill previously mentioned, is in most cases thin enough to permit its removal by bulldozing. Thus nearly all of the iron ore may be recovered by strip mining methods as now employed by

the Orr Engineering and Chemical Company. Indeed the iron-bearing zone is so sharply defined that the shovel operator is able to make a clean separation of the ore from the overburden and from the underlying strata.

This is the only iron-mining operation now being carried on in the State of Oregon, and its product is utilized only for the manufacture of paint pigments and gas purifiers. The iron ore deposits, however, represent a potential source of iron for the industries of the Pacific Northwest.

A few of the field party took advantage of their presence in the vicinity to visit the area where one of the larger aluminum companies has explored the possibility of the development of ferruginous bauxite. These latter deposits are widely scattered throughout Columbia and Washington counties and are found in scattered areas throughout the Willamette Valley. While these ores are high in iron, they are of a different type from those of the Scappoose iron deposits. These latter ore deposits were formed by leaching out and subsequent deposition of the iron-bearing material. The ferruginous bauxite on the other hand was formed by the leaching away of the other materials (silicates), leaving in place the aluminum ore which is high in iron. The two types of materials taken together represent a large potential mining resource for the area.

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LUNCHEON NOTES

Mr. and Mrs. Davis, members, were newcomers at the luncheon May 27th. Mr. Davis brought about a dozen specimens of rocks from the floor of Death Valley for identification, but no one would hazard a statement as to their identities. Rudolph Erickson reported that state highway work is threatening to destroy the rock ridges near the old highway west of Mosier and urged that some attempt be made to preserve them as they are. He does not believe the general idea that they were constructed for fortifications, but did not advance any more plausible theory. (OES)

On June 10th Mr. Leroy Palmer talked on the desert and noted that because of lack of vegetation and soil covering the structural features and the nature of the rocks are more easily observed than in a country covered by trees and brush. The once popular conception of the desert as a land of limitless sand dunes with no vegetation is giving way to a better understanding of it as one of varied topographic features with a great variety of life, both animal and vegetable. Pictures were passed around showing the general nature of the country and its vegetation. One of these showed two mountain sheep, an animal which few realize is fairly plentiful in the desert.

The large group who attended July 1st heard Dr. Adams give a brief resumé of the history of paper making in the Pacific Northwest. The first paper mill was in the early 1850's when a newspaper publisher converted a flour mill in Northern California to the manufacture of paper. The first paper mill in Oregon was established in 1866 and the industry grew steadily. Fifty-two mills have been built in the northwest states, including British Columbia, of which forty are now operating. Twenty of these are independently owned and the other twenty have been acquired by large corporations, ten of them by Crown-Zellerbach.

At the July 15th luncheon Ed Kelham reviewed Stewart Holbrook's book Burning an Empire, an account of notable forest fires in the United States and Canada from 1825 to the Bandon fire in Oregon in 1936. The author lays

emphasis on the fact that, except for occasional "Acts of God," such disasters can invariably be traced to human carelessness - settlers, hunters, and lumbermen being the worst offenders.

July 22nd Ray Baldwin introduced Mrs. Van Alstine, a cousin of George Elder. Mrs. Van Alstine said that Mr. Elder is too modest to talk about himself so gave us a brief review of his interesting background.

Tom Matthews talked on the Cornucopia gold mining district northeast of Baker, on Pine Creek, a tributary of the Snake River. The district was discovered in the 70's and worked continuously until 1927, with some desultory production since that date. Total production to 1941 is estimated at $10 million. The most important mine is the Cornucopia, discovered in 1885. The basal formation of the country is granodiorite. The gold occurs associated with galena, chalcopyrite, and pyrite in a quartz or calcite gangue. The veins are generally narrow and tend to split. Seven veins have been identified but only three have been worked. Near the surface the gold was found in a free state and was recovered easily, but in depth the ores became more complex and two cyanide mills were built. The district is now inactive except for maintenance work at some of the mines. (L.A.P.)

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COLOR REPRODUCTION OF GEOLOGIC MAPS

By

John Eliot Allen

Few people not involved with color reproduction of such complicated pieces of printing as geologic maps realize the numerous steps that must be gone through to produce a map, with, say four different colors to represent some twenty or thirty different geologic units.

Up to some ten or fifteen years ago it was even more difficult than now, for each color plate had to be engraved on a lithographic limestone block. With the advent of photographic reproduction this process has been much simplified, but still involves numerous steps with arduous detailed work by draftsman and engraver.

The New Mexico Bureau of Mines and Mineral Resources has just completed a map of the Fort Defiance and Tohatchi quadrangle, northwestern New Mexico and Arizona, which will be published in August as Bulletin 36. Let us enumerate the steps involved in the preparation of this 36 by 48-inch colored sheet.

Since the area to be mapped had no topography, field work was plotted upon aerial photographs on a scale of 1/31,680 and 1/20,000, and the contact lines and formational symbols transferred to an aerial photomosaic of the two quadrangles at a scale of 1/48,000 furnished by the Soil Conservation Service. Over thirty different geologic units ranging from Precambrian to Recent were differentiated on this sheet, and the contacts between them indicated by solid, dashed, or dotted lines.

The draftsman then prepared, upon a stable acetate sheet, a tracing of all these lines and symbols. To this he added the title, explanation, list of symbols, and names of topographic features such as mountains, streams, villages -- all the material which is to appear in black upon the final sheet.

Prints taken from this sheet were then colored in by hand by the geologists, so that the engraver would have a guide for the color pattern. The photomosaic,

the black line print, and the colored sheets were then sent to the engravers, where each color was separated and the four color plates were built up with solid colors and pattern colors in blue, red, yellow, and orange. Numerous colors can be made by such combinations as above, so that in the case of this map, twelve different colors, all in fine-textured patterns and shades which did not obscure the photomosaic background, could be constructed.

The map was then printed six times; once for the photomosaic in gray, once for the black, and once for each of the four colors. It was then sent back to the geologist who checked every tiny line and patch of color, and corrected all errors and omissions of the draftsman and the engraver; and the map then went to its final printing.

The use of the photomosaic map for a base is new in geologic work, only having been used a few times previously to its use by the Bureau. It produces an attractive map, which can be read easily by the uninitiated, every little glade in the forest can be located, and individual groves of trees can be spotted, while the color accurately denotes the underlying geology.

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GEM AND MINERAL SHOW

The Northwest Federation of Mineralogical Societies will hold their annual convention and gem and mineral show at Eugene, Oregon, September 3-4-5, at the county fairgrounds. All are invited to attend.

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PLIOCENE MAMMALS IN EASTERN OREGON

A letter from Phil Brogan calls attention to articles which have appeared in the Pendleton Eastern Oregonian telling of important mammal fossils being unearthed by Dr. Arnold Shotwell and students from the University of Oregon, near Hermiston, Oregon. The bones are those of camels, horses, peccaries, and ground sloths. Brogan comments that he had presumed the fossils to be Pleistocene, but Shotwell identifies them as mid-Pliocene, and refers to the horse as a three-toed animal, possibly Pliohippus. "The pony still carried two of its three toes as spares," comments Brogan.

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GEOLOGICAL NEWS LETTER

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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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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 between those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mr. Edward D. Bushby, 1202 S.W. Cardinell Drive, Phone CA 2123. Regular annual dues (single or family memberships) are $3.50 for residents of Multnomah and adjacent counties; $2.50 for others; and $1.50 for Junior Members. Make remittances payable to the Society.

Society Activities

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. Tenth Avenue and Yamhill Street. See Calendar of the Month for time of meeting.

FIELD TRIPS: Usually one field trip is scheduled for each month.

LIBRARY BROWSE NIGHTS: Twice a month. See the Calendar of the Month.

LUNCHEONS: Informal luncheons, with geological motif, each Thursday noon in Room 305, YMCA Building, S.W. 6th Avenue and Taylor Street. $1.00 per plate.

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

CALENDAR

THURSDAYS - September 2, 9, 16, 23, 30 - Luncheon Meetings, YMCA

FRIDAY Sept.10 — Friday Night Meeting - Library Hall, 7:00 p.m.
"Dinosaur National Monument" - A sound and color motion picture of this interesting and controversial area of Colorado and Utah. The plan of the U.S. Reclamation Bureau to build a dam in this park has aroused conservation and outdoor clubs to save this scenic wonder for the public. We hope to present the geology of the district.

FRIDAY Sept.24 — Friday Night Meeting - Library Hall, 7:00 p.m.
"Spirit Lake" and other trips of this past summer (?) to be shown by members' color slides. Please submit your slides to Bruce Schminky at the September-10th meeting or not later than September 17th.

SUNDAY Sept.26 — Field Trip for leaf fossils.
Dr. John P. Walsted, metallurgist in U.S. Bureau of Mines, Albany, will lead a trip to some fossil leaf localities on Thomas Creek in the Santiam country. These striking leaf impressions were discovered by Dr. Walsted on recent explorations. Drive south to Salem, take 99E and old road about 15 miles to Jefferson, drive about 9 miles east to Scio. Meet at 10:00 a.m. in Scio at the junction of Jefferson, Crabtree, and Lyons roads; caravan 8 miles east on the Lyons road to Wilson Park and Fred's Store. Fossils are partly in the creek beds in shale. Wear old clothes, take extra pair of old shoes and bathing suit for best digging. Good swimming holes available.

****

SILVER EXCHANGE

The serving spoons were hopelessly mixed at the picnic. Will anyone in possession of silver, kettle covers, etc., taken by mistake bring them to the next regular meeting? (C.C.)

****

NEW MEMBERS

		Zone	Phone
Duckwall, Mr. and Mrs. John C.	811 Oak Street, Hood River, Oregon		3562
Elliott, Mrs. Everett	1530 N. 99 W., McMinnville, Oregon		
Fink, Mr. and Mrs. V. Carl	7025 N. Oatman Avenue	3	TW 0188
James, Mr. and Mrs. Don W.	7257 S.W. 53rd Avenue	19	CH 4401
Pierce, Mr. and Mrs. Hayward	7236 S.E. Salmon Street	16	KE 8046
Sato, Mr. Joe	714 N. Killingsworth, Apt. 3	11	
Touring, Mr. R. M.	2570 Kincaid St., Eugene, Oregon		

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Neuberger, Mr. and Mrs. Carl	1535 S.E. Henry Street	2	EA 9810

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Butler, Mr. Donald L.	831 S.W. 6th Avenue	4	BE 6161

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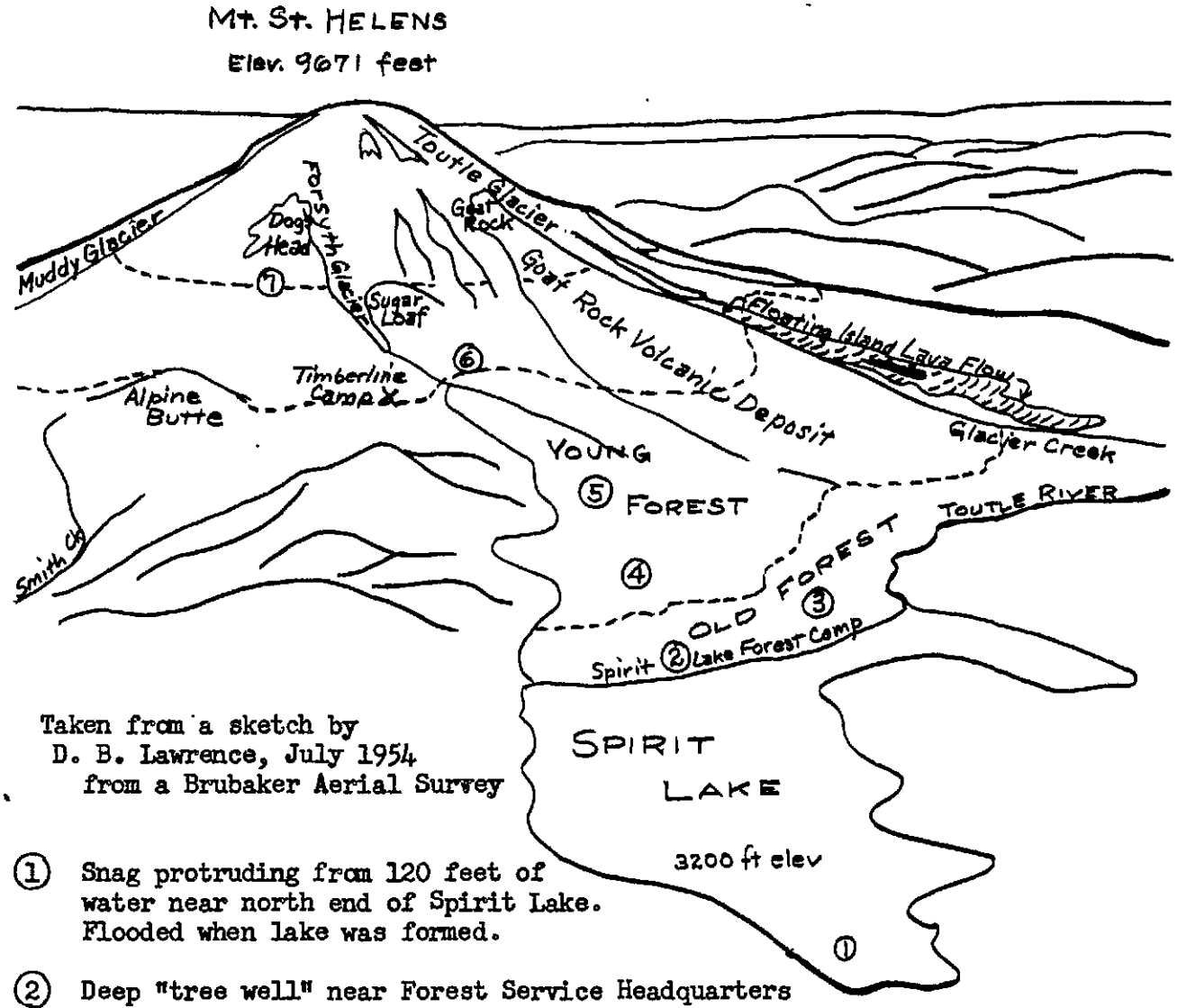
MOUNT ST. HELENS AND SPIRIT LAKE FROM THE NORTHEAST



Taken from a sketch by
D. B. Lawrence, July 1954
from a Brubaker Aerial Survey

(1) Snag protruding from 120 feet of water near north end of Spirit Lake. Flooded when lake was formed.

(2) Deep "tree well" near Forest Service Headquarters at Spirit Lake. Formed by 1550 mud flow.

(3) Stump of tall douglas fir felled in 1952. Rings date tree from 1575 and record ten years of stunted growth about 1800, when shower of four inches of lapilli fell around it.

(4) One mile above lake the pumice layer is 14 inches deep.

(5) Two miles from lake the lapilli are five feet deep. Stump killed by the 1800 fall of pumice.

(6) Present timber line, 4400 feet elevation. Pumice is ten feet deep.

(7) Potential timberline for latitude of Mount St. Helens, 6500 feet.

G.S.O.C. FIELD TRIP TO MOUNT ST. HELENS

Mount St. Helens gained increased respect to the large group of us who went on the weekend field trip, July 24, 25, and 26, as Dr. Donald B. Lawrence unfolded to us the story of the mountain. Dr. Lawrence is a member of the Botany Department of the University of Minnesota, and for some years has been interested in the history of the mountain as recorded in its forests.

Our party gathered Saturday at one o'clock beside the guard station at the Spirit Lake Forest Camp. Here Kenneth Phillips introduced Dr. Lawrence who gave us a preview of what we were to see. It appears that the ground upon which the forest camp is situated is a mud flow (or is it glacial debris) which slid down the face of the mountain some time before 1550 A.D. and dammed the valley of the Toutle River thus forming Spirit Lake. A tree stump, which we later visited, still protrudes at the north end of the lake from 120 feet of water. The forest which grew at the site of the campground was killed by the mud. The tree stumps have since decayed completely away leaving deep "tree wells" in the forest floor. We visited one of these near the Forest Service Headquarters. A new forest then sprang up on the mud flow and is represented today by the tallest trees. How do we know when the flow took place? The rings on the stump of a recently cut old douglas fir nearby reveal that it was a young tree about 1575.

The rings on this stump also record another event. About 1800 this tree was injured, and for ten years its growth was stunted. The cause was a fall of pumice lapilli which fell around its base and covered its roots. Dr. Lawrence dug a pit beside the stump. Beneath the forest duff there was a four-inch layer of lapilli overlying an older ground surface.

After visiting the tree well our caravan proceeded up the mountain side toward timberline. At the one-mile stake we stopped to examine another pit which Dr. Lawrence had dug beside the road. The lapilli layer here was nineteen inches deep. Stumps around showed that many trees were killed by the 1800 fall of pumice, and a younger forest was growing on top the pumice layer. Continuing up the road a mile we came to a cut where the pumice at the side of the road was some five feet thick. A rotting stump still stood with its roots in the ancient soil below the pumice.

The present timberline is at an elevation of 4400 feet. The layer of pumice lapilli is here ten feet thick and includes many larger fragments. A young forest is gradually crawling up the mountain side and will ultimately reach about 6500 feet, the normal limit of tree growth at the latitude of St. Helens. A biologist finds much of interest in the plant succession by which nature is here reclothing the barren pumice waste. The pioneer plants are lichens (Stereocaulon tomentosum) and mosses (Rhacomitrium). A few hardy herbs have gained a foothold - pentstemon, strawberry, and lupine. There are also shrubs. The struggling trees are a mixed group of conifers: douglas fir, alpine fir, silver fir, mountain and western hemlocks, white pine, and lodgepole pine.

Saturday evening many of us enjoyed a launch ride on Spirit Lake. As we left the shore the snowy mountain seemed to rise up out of the forest. The symmetry and smoothness impressed us. We studied its features, from left to right: Muddy Glacier, the Dog's Head, Forsyth Glacier, Sugar Loaf, the two Lizards, Goat Rock, and Toutle Glacier. We circled the snag that rises through 120 feet of water, evidence that the lake flooded a forest of tall trees.

Eight a.m. Sunday morning saw us again at our rendevous at the guard station, this time for a climb up and through the forest to the "Floating Island Lava Flow" which Dr. Lawrence described several years ago in Mazama (Dec. 1941). We left our cars by the road about three miles west of camp, crossed Toutle River, and hiked along the west bank of Glacier Creek. It was a pleasure to have many children along, who entered heartily into the spirit of the enterprise. The foot of the flow is a wall of large andesitic blocks. We noted how the advancing lava had pushed over and engulfed large trees and had killed the trees for a space of forty feet in front, yet never charring them. Now this lava flow is not covered by lapilli; hence it must be younger than 1800. Cores taken from trees near the flow have indicated to Dr. Lawrence that it must have occurred within two or three years after the fall of pumice. There is, however, in protected places upon this flow a layer of fine ash, presumably dating from 1842 when the mountain is recorded to have been in eruption and ash fell in The Dalles.

Lack of soil and the consequent lack of water have prevented a young forest from growing over most of the flow. But on top of the flow, as Dr. Lawrence showed us, there are "islands" of healthy forest with trees standing vertically. It appears that the lava issued from beneath Toutle Glacier, and in doing so carried isolated masses of glacial till as "float" on its back. Upon this morainic material a soil developed and in time, possibly in twenty-five years, a forest was able to seed itself. (F.G.)

* * * * *

GEOLOGICAL HISTORY OF MOUNT ST. HELENS

From a summary which Herbert Laurence kindly made of Jean Verhoogen's paper: Mount St. Helens: a Recent Cascade Volcano. Univ. Calif. Publ. Geol. 24:263-302, 1937.

Mount St. Helens rises from a platform, the oldest formations of which are sands and mudstones with a southeast dip. These are tentatively considered to be Eocene because similar marine sediments of Eocene date occur west of the area. Probably in late Eocene or Oligocene volcanic activity caused deformation to take place. Then came the Keechelus andesite lavas, the most widespread formation of the region, followed in course of time by the intrusion of quartz-diorite masses into the Keechelus lavas and the eruption of an old volcano near the site of the present Mount St. Helens. This vent ejected tuffs, obsidians, dacites, and hornblende andesites; but it probably never attained any great height.

(Verhoogen dates the Keechelus andesites as late Miocene and the intrusions as late Tertiary. It is possible that the Keechelus is older. Baldwin (1947) 1/ thinks that the intrusions may be upper Oligocene and comparable in time to other quartz-containing intrusions in the Cascades and Oregon Coast Range. Is it possible that Verhoogen's "old Mount St. Helens" was an Eagle Creek volcano?) *

By late Pleistocene the old mountain had been worn down, and the surrounding area was a gently upbowed peneplain. It was then that Mount St. Helens began its career, first erupting olivine basalts, followed alternately by andesites and basalts until very recent time. Pyroclastic materials were ejected largely at very early and late stages of the eruptions.

The lack of glacial scars or deep gullies on the cone, which is truncated, indicates the fact that the mountain is post-glacial (post-Pleistocene) in age.

1/ Baldwin, Ewart M., Geology of the Dallas and Valsetz quadrangles, Oregon: Dept. Geol. and Min. Ind. Bull. 35, pp. 35-36, 1947.

* Notes in parentheses are by the editor.

There are five glaciers which, with one exception, are short and broad and occupy shallow beds. They have many crevasses and ice-falls so that great care must be exercised when climbing them. The very large and remarkable cleft on the southeast side of the crater is probably due to volcanism rather than to glacial erosion. The glaciers and snow fields conceal the upper part of the almost perfect cone, so that it is difficult to find outcrops of solid rock above 6000 feet. Instead the slopes are made up of loose fragments, mostly talus from the summit rocks, which are constantly avalanching; hence one must use great caution when climbing this part of the peak. Interesting features are the domes or plugs which are scattered around the perimeter. They are dark gray andesite. Goat Rock on the northern side is typical.

The talus covers many of the lava flows. There are abundant mudflows on the north side below 5000 feet elevation. Only their confused bedding keeps them from being mistaken for glacier deposits. Most of the olivine basalts and pyroxene andesites are covered by them. (This is the 1550 mud-flow which forms the forest floor around the Spirit Lake Forest Camp and dammed the lake.)

On the north side of the mountain below Goat Rock is the "Goat Rock pyro-clastic deposit" consisting of angular blocks, some of them weighing several tons, and huge bombs of the "bread-crusted" type in a matrix of loose somewhat muddy materials. The blocks are porphyritic andesite and have inclusions of coarse gabbro.

The best exposed ropy (pahoehoe) basalt lava flows are on the southern and southwestern slopes. Issuing from the flank they flowed down a grade of 600 feet to the mile to a small plateau 500 feet above the Lewis River, finally cascading over the brim and temporarily damming the stream. The area is one of wild violence cast in stone, colloquially called "The Devil's Punch Bowl," "Hell's Kitchen," and "Satan's Stairway." Other features are tree casts, lava caves, tubes, and flumes whose walls show layers of successive flows several miles long. The age of the lavas, judging from the vegetation, may not be more than two or three hundred years.

On all flanks of Mount St. Helens there are fingers of blocky (aa) pyroxene andesite flows. A very large flow emerges from the 6000-foot level on the north-west side and almost reaches Toutle River. (This is the lava flow which the society visited on its recent field trip. Verhoogen thought it might date from 1854, but trees indicate a date fifty years earlier.) Verhoogen admits that it is not an easy matter to decide whether a lava is basalt or pyroxene andesite.

The whole north and east side of the mountain is covered by a yellowish pumice of glass, andesine, and hypersthene. (Verhoogen thinks this might date from the recorded eruption of 1842, but as already noted tree rings indicate a date around 1800. An explosion of fine ash dates from 1842.)

* * * * *

RECORDS OF ERUPTIONS OF MOUNT ST. HELENS

Bruce Schminky has recently visited the archives of the Oregon Historical Society and copied several accounts of the eruptions of Mount St. Helens.

Eruption of August 1831

Rev. Samuel Parker, 1846. Journal of an exploring tour beyond the Rocky Mountains.

". . .there was in August 1831, an uncommonly dark day, which was thought

to have been caused by an eruption of a volcano. The whole day was nearly as dark as night, except a slight red, lurid in appearance, which was perceptible until near night. Lighted candles were necessary during the day. The atmosphere was filled with ashes of wood, all having the appearance of having been produced by great fires, and yet none were known to have been in the whole region. The day was perfectly calm, without any wind. For a few days after, the fires out of doors were noticed to burn as though mixed with sulphur. There were no earthquakes.

"By observations which were made after the atmosphere became clear, it was thought the pure white perpetual snow of Mount St. Helens was discolored, presenting a brown appearance, and therefore it was concluded that there had been a slight eruption."

A footnote by the author says: "I have been creditably informed that lava was ejected at that time from St. Helens."

Eruption in November 1842

D. Lee and J. H. Frost, 1844. Ten Years in Oregon, page 257.

"In November (1842) the writer went again to the Walamet and returned to the Dalles on the 30th, accompanied by Mr. and Mrs. Littlejohn and Mr. Geiger, going to the interior missions; and Dr. White and Messrs. Cornelius Rogers and Thomas M'Kay, bound there on an agency to the Indians. The evening of our arrival there was an eruption of Mount St. Helen; and the next morning the ejected ashes were falling with a mist-like appearance, covering the leaves fences and stones with a light, fine, gritty substance in appearance like hoar frost, some specimens of which were collected."

Letter dated January 13, 1892, Salem, Oregon

J. S. Parish (From Steel Points, October 1906)

W. G. Steel, Esq.

Dear Sir:

Yours of the 6th inst. before me, and in reply would say, that on the 22nd day of November 1842, I was in the old Mission house, ten miles below Salem, with a number of the other old missionaries - Dr. Babcock, Jason Lee, Alanson Beers and a number of others - when I stepped outside and noticed the eruption of Mount St. Helens, when I returned to the house and informed those inside what I had seen and they, of course laughed the idea to scorn; but upon looking for themselves, were soon ready to admit that my assertion was correct; for upon looking at the mountain we saw arising from its summit, immense and beautiful scrolls of what seemed to be pure white steam, which rose many degrees into the heavens. Then came a stratum just below those huge scrolls of steam, which was an indefinite shade of gray. Then down next the mountain's top the substance emitted was black as ink. The next day after the eruption I was in French Prairie where I had a good view of the mountain, and I noticed that she had changed her snowy dress of pure white for a somber black mantle, which she wore until the snows of the ensuing winter fell upon her.

The ashes fell at The Dalles to the depth of half an inch, so I was informed by the missionaries stationed there.

The eruption was on the south side of the mountain about two thirds of the distance from the bottom to the top. I had occasion to pass down the river about a year or two later after the eruption and could still see distinctly the fire burning on the side of the mountain.

Hoping that this description of the only eruption I have ever seen upon that venerable peak may prove satisfactory, I am

Very truly yours,
J. S. Parish

P.S. I shall be 86 tomorrow.

Eruption February 16, 1844

Peter H. Burnett. Letter dated December 28, 1844, Linnton, Oregon Territory. Oregon Historical Society Quarterly, vol. 3, p. 421.

"From Linnton you have a very fair and full view of Mount St. Helena, about fifty miles distant; but it looks within reach. This peak is very smooth, and in the form of a regular cone, and nearly if not quite as tall as Mount Hood, and also covered with perpetual snow. This mountain is now a burning volcano. It commenced about a year since. The crater is on the side of the mountain about two thirds of the distance from its base. This peak, like Mount Hood, stands far off and alone in its solitary grandeur, far above all surrounding objects. On the sixteenth of February, 1844, being a beautiful and clear day, the mountain burned most magnificently. The dense masses of smoke rose up in one immense column, covering the whole crest of the mountain in cloud. Like other volcanoes, it burns at intervals."

Eruption (?) of 1847

Paul Kane, from"Wanderings of an Artist."

"March 26th (1847). When we arrived at the mouth of the Kattlepoutal River, twenty-six miles from Fort Vancouver, I stopped to make a sketch of the volcano, Mount St. Helens, distant, I suppose, about thirty or forty miles. This mountain has never been visited by either whites or Indians; the latter assert that it is inhabited by a race of beings of a different species, who are cannibals, and whom they hold in great dread; they also say that there is a lake at its base with a very extraordinary kind of fish in it, with a head more resembling that of a bear than any other animal. These superstitions are taken from the statement of a man who, they say, went to the mountain with another, and escaped the fate of his companion, who was eaten by the "Skoocooms," or evil genii. I offered a considerable bribe to any Indian who would accompany me in its exploration, but could not find one hardy enough to venture. It is of very great height, and being eternally covered with snow, is seen at a great distance. There was not a cloud visible in the sky at the time I commenced my sketch, and not a breath of air was perceptible; suddenly a stream of white smoke shot up from the crater of the mountain, and hovered a short time over its summit; it then settled down like a cap. This shape it retained for about an hour and a half, and then gradually disappeared.

"About three years before this (1844) the mountain was in a violent state of eruption for three or four days, and threw up burning stones and lava to an immense height, which ran in burning torrents down its snow-clad sides.

"March 30th. We landed at the Cowlitz farm, which belongs to the Hudson's Bay Company. Large quantities of wheat are raised at this place. I had a fine view of Mount St. Helens throwing up a long column of dark smoke into the clear blue sky."

Smoking in August 1853

Article in The Oregonian, Saturday, September 3, 1853, giving an account of an ascent of the south side of Mount St. Helens.

"The crater has been represented to be on the south-west side of the mountain which is not the case. We took the bearing from the top of the compass and found it to be on the northeast side. The smoke was continually issuing from its mouth, giving unmistakeable evidence that the fire was not extinguished."

Eruption of 1854

Article in the Oregon Weekly Times, February 25, 1854. (Oregon Historical Society Quarterly, vol. 38, page 73, as footnote.)

"We learn from W. H. H. Halls, Esq., Pilot of the Whitcomb, that he witnessed an eruption of Mount St. Helens on the last trip down of the Whitcomb. The volumes of smoke which were thrown out at intervals left no doubt in his mind but that an eruption had taken place."

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FILM ON "KRAKATOA" SHOWN TO SOCIETY

The motion picture, "The Eruption of Krakatoa" was shown to a large audience at the G.S.O.C. meeting, Friday evening, July 23, through the courtesy of Reynolds Ohmart. Before the delayed arrival of the projector, Mr. Ohmart read a description of the catastrophic explosion from the book, Dragons in Amber, by William Lay. This is a compilation from reports by British, Australian, and German naval observers. While no pictures were made of Krakatoa's explosions on August 27, 1883, such a record was made of the latest eruption in 1918. The film recorded also several other volcanic upheavals. The pictures made vivid the awesomeness of such events.

Krakatoa, an old volcanic wreck in the Sundra Straits between Java and Sumatra, had been dormant for two hundred years, a great caldera with three small volcanic islands in the rim. Moderate eruptions began in May 1883, steadily increased in violence - steam, pumice, and ash issuing all through the month of July. On the morning of August 27 formidable detonations were heard every ten minutes and there were four stupendous explosions. Krakatoa was uninhabited but enormous sea waves swept over the low coasts of Java and Sumatra drowning 36,000 people. Two-thirds of the island disappeared, leaving a submarine hollow 1,000 feet deep where there had been eight square miles of land. This was probably the greatest volcanic eruption in historic times. The explosion was heard as far away as 3,000 miles, and the air waves produced by the concussion traveled around the earth several times. For months afterward sunrises and sunsets all over the world were brilliantly beautiful due to the dust particles in the atmosphere. Some of these are estimated to have reached a height of 70 miles. Pumice floating on the sea was so dense ships had difficulty passing through it. It drifted as far as the east coast of Africa in a little more than a year. Eruptions occurring at intervals until 1933 have built up a cinder cone known as Anak Krakatoa, meaning "child of Krakatoa." The film included eruption scenes on Vesuvius, Etna, Stromboli, Kilauea, and volcanic activity in Japan. (E.M.Barr)

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ERUPTION ON MOUNT TABOR, AUGUST 1954

There was no jinx on the evening of Friday the thirteenth of August, the date of the 1954 annual picnic of the Society in the Little Volcano at Mt. Tabor Park. The sky was overcast but no rain fell and the air was warm and calm.

Some 200 hungry G-Sockers, their guests and friends, filled their plates from the many kinds of hot dishes, salads, and desserts. Hot rolls and pitchers of coffee were passed frequently until the pleasant business of eating and visiting was finished and the dirty dishes put back into the cars.

Something much more important was about to happen - the program. When all were seated, Norris Stone, program chairman for the evening, presented President Albert Keen who welcomed friends and guests and expressed appreciation to committees and individuals for their help: to H. Bruce Schminky for park arrangements and to Sam Allen of the Portland Park Bureau for his continuous availability for all emergencies including an additional public address system; to Mrs. William F. Clark, Chairman of the Social Committee, who in turn came to the stage and thanked her helpers; Mrs. Amza Barr, telephoning; Misses Myrtice Fowler, Marguerite Kerr, L. Kate Rosa, and Almeda Smith, coffee; Mrs. Ray Golden and guest, Mrs. Stanton, and Mrs. Fred Nestlen, salads; Mrs. Bruce Schminky and her sister and brother-in-law, Mr. and Mrs. Eyrle Bills of Tillamook, and Mrs. Leslie Davis, tables.

Norris Stone then took over and called upon Dr. Arthur C. Jones to lead us in singing the Society's perennial theme song, "The Oregon Country Ain't What She Used to Be," by Mr. and Mrs. Ken Phillips. Lon Hancock's song, "The Hills of Oregon," brought out some "basalt" basses and falsetto tenors, loosed diaphragms, and created some fairly creditable harmony.

Next came the long-awaited moment - the "unveiling." We beheld a most mysterious looking cabinet with dials, thermometer, cabalistic figures and drawings, and a screen resembling TV. "Ohs," "Ahs," and "What the heck?" came from the audience. Presented by Norris Stone, Prof. (Bruce) Schmelly explained that this device was a "Wish-om-e-ter" or "Wishing Meter." All one needed to do was to enter it, make a wish, and it would be granted forthwith. Whether for health, wealth, romance, release from frustrations or any of the countless dreams of mankind - here was the magic instrument to give it. One strict rule governed its functioning - the wisher must tell only the absolute truth. Otherwise the machine would create a disintegrating ray and destroy the patient.

Then Doctor Crackpot (Clarence) Kinsey was introduced. Shrieks of laughter from the audience mingled with the groans and screams of the wishers and patients as the good professor and crackpot doctor ground their prey through the Wishing Meter to the sound of sawing, hammering, thumping, puffs of smoke, and a noise resembling the starting of a stubborn model T Ford, while weird blue, red, and green streaks and dots of light flashed and danced on the screen. One by one each wish was granted or the wisher was liquidated.

All too soon it was over and calls for the author brought Mrs. Rudolph (Jane) Erickson to the stage under escort. She modestly accepted the enthusiastic tribute of her admiring audience and thanked the actors for their fine performance. Singing of "Auld Lang Syne" closed the scheduled part of the program.

Your reporter feels sure that all who were there are wishing we didn't have to wait a whole long year for the next picnic. (E. Moltzner)

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LUNCHEON NOTES

On July 29th Dr. Roland Brown, paleobotanist of the U.S. Geological Survey, gave a talk on his work in Oregon this season in which he acknowledged by name many who had been of assistance to him. By request he then described his forthcoming book on the origin of the scientific names, a very complete work which may be described as a thesaurus of scientific nomenclature.

At the August 5th meeting Norris Stone talked on phosphates, principally from the commercial and economic angles. Phosphorus was first identified as an element in 1669. It is vitally necessary for plant and animal life. In the latter it combines with calcium as calcium phosphate to form 50 percent of the bones of the body. (L.P.)

(To be continued in October issue.)

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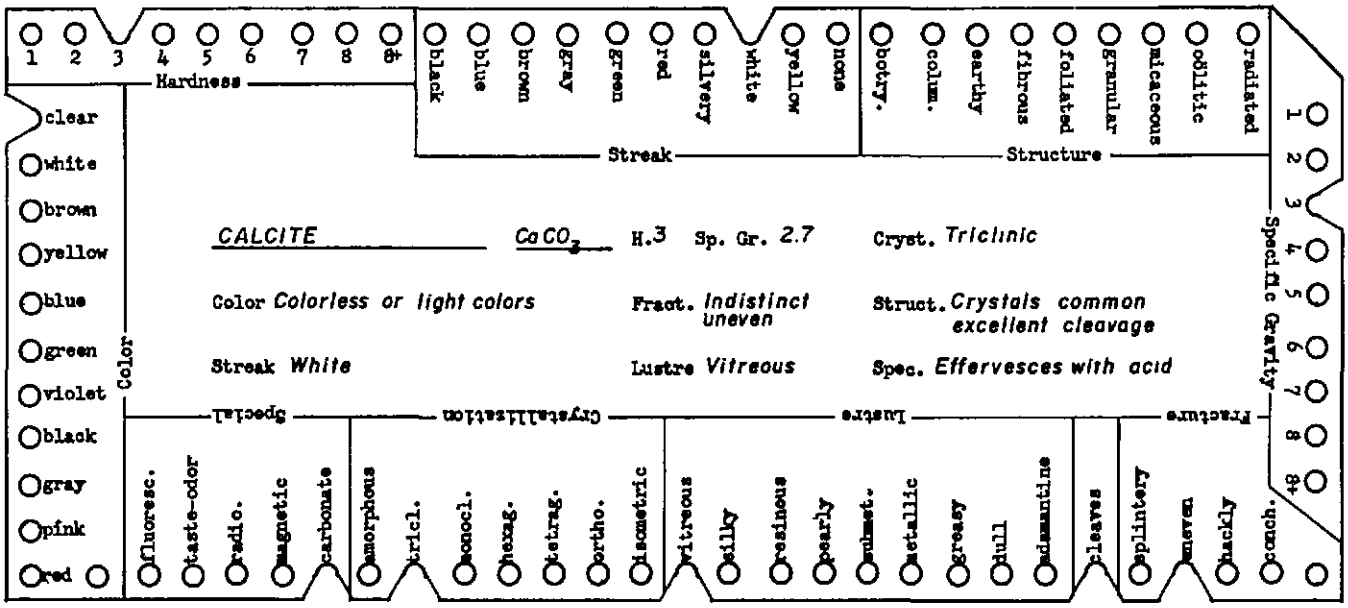
MINERAL IDENTIFICATION CARD SET

By Ralph S. Mason

The Society has arranged for the printing of some punched mineral-identification cards which will be available about the last of September. The cards will sell for $1.50 per set of 100 cards. Briefly, the cards are printed on tag-board stock with a series of small holes punched all around the border. The various physical properties of a mineral which can be determined in the field with simple tools such as a streak plate, knife blade, and acid bottle are printed opposite the holes. The cards are prepared by simply filling in the blanks on the face with the properties of a mineral and then notching out the holes opposite the properties. Once a stack of cards has been prepared it is a simple matter to identify an unknown specimen after its physical properties have been determined. A wire skewer is inserted into the



pack through the holes marked for the properties of the mineral in question and a rapid sorting is made.

The illustration shows a mineral card which has been made out for the mineral calcite and then notched. Special notchers are available although scissors work reasonably well. Information may be filled in either by hand or by typewriter. To make a rapid check for an unknown mineral it is suggested that the skewer be inserted first into the proper "Streak" hole. The cards falling out of the deck will then all be for minerals having this same streak. Next sort for "Hardness," "color," "Fracture," etc. Unless there are more than 100 cards in the deck it will be found that the third or fourth sort will reduce the number of cards to two or three and the final selection can then be made by inspection of the individual cards.

Information on the physical properties of minerals can be obtained from many standard texts on geology and mineralogy. Dana's Textbook of Mineralogy is recommended, although the information required for the cards must be obtained by sifting through a great deal of extra material. The Department of Geology and Mineral Industries has published an inexpensive ($1.00) handbook, Field Identification of Minerals, which has a table giving the properties of about 200 minerals. Next month a table will be printed in the News Letter giving the physical properties of some of the commoner minerals. This list will serve as a "starter" for those wishing to work up a set of cards. There is no limit to the number of cards that can be added to a set, but a collection of about 100 cards would cover most of the minerals that are likely to be needed by nonprofessional users.

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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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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 between those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mr. Edward D. Bushby, 1202 S.W. Cardinell Drive, Phone CA 2123. Regular annual dues (single or family memberships) are $3.50 for residents of Multnomah and adjacent counties; $2.50 for others; and $1.50 for Junior Members. Make remittances payable to the Society.

Society Activities

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. Tenth Avenue and Yamhill Street. See Calendar of the Month for time of meeting.

FIELD TRIPS: Usually one field trip is scheduled for each month.

LIBRARY BROWSE NIGHTS: Twice a month. See the Calendar of the Month.

LUNCHEONS: Informal luncheons, with geological motif, each Thursday noon in Room 305, YMCA Building, S.W. 6th Avenue and Taylor Street. $1.00 per plate.

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

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CALENDAR FOR OCTOBER

Thursday Oct. 7 — Luncheon Meeting - Room 305 YMCA

Friday Oct. 8 — Friday Night Meeting - Library Hall, 7:00 p.m. "Adventure in Gems," a talk by Dr. H. C. Dake, Editor of The Mineralogist. There will also be an exhibit of gem material.

Tuesday Oct. 12 — Library Browse Night - Biology-Geology Building, Lewis and Clark College, 7:30 p.m. This will be the first Browse Night in the new location. A good attendance is expected. Our hostess, Mrs. Clark, will be in charge of refreshments. For directions to get there see below.

Thursday Oct. 14 — Luncheon Meeting - Room 305 YMCA

Thursday Oct. 21 — Luncheon Meeting - Room 305 YMCA

Friday Oct.22 — Friday Night Meeting - Library Hall, 7:00 p.m. Sound and color motion picture of "The Mining and Geology of the Black Hills and the Badlands of South Dakota."

Sunday Oct.24 — Field Trip to Coast. Dr. James Stauffer of the Geology Department of Lewis and Clark College will round out our field trip schedule with a study of some geology of the coastal area near Cascade Head. Meet at 10:00 a.m. at the Widow Creek quarry which is on the north side of State Highway 18 (Salmon River Highway southwest of McMinnville) about 13 miles west of Grand Ronde and 6 miles east of Otis Junction.

Tuesday Oct. 26 — Library Browse Night - Biology-Geology Building, Lewis and Clark College Campus, 7:30 p.m.

Thursday Oct. 28 — Luncheon Meeting - Room 305 YMCA

* * * * *

Direction for those who wish to attend Library Browse Nights on the Lewis and Clark Campus may be in order. Either follow the Lewis and Clark College signs southward from the traffic circle at the intersection of S.W. Barbur and Terwilliger Boulevards; or follow signs westward from the intersection of Macadam Road with Taylor's Ferry Road or with Palatine Hill Road. Once on the campus go past the Information Booth and down the Belgian-block road to the parking space next the Biology Building, formerly a plant conservatory. Bus connections to the campus are poor at night; the last bus leaves the Trailways Bus Station on Salmon Street at 6:15 p.m.

* * * * *

RE HOMO SAPIENS

"A delightful vacation" says Mrs. Nellie Lange, who has been going places and seeing things. A 5-week bus tour included Bryce, Zion, Cedar Breaks, Grand Canyon, Hoover Dam, and Mammoth and Diamond caves in Kentucky. Returning through Canada, she stopped at Banff and Lake Louise. At Calgary she visited the famous collection of dinosaur skeletons and replicas of other prehistoric monsters. And here's one for the book: Passing limestone plants in Nevada, a prehistoric sea bottom, she asked the bus driver whether marine fossils had ever been found in the vicinity. "No," he replied, "but down at Hawthorne there is a big navy base and there are lots of marines there!" (She pursued the subject no further.)

Seen at the luncheon on August 12 was Linda Munson, aged 13, one of our newest and youngest junior members. Linda acquired an interest in geology and paleontology during her last year in the Alameda grade school and this summer participated in the Natural History Expedition at Camp Hancock. She showed some interesting snapshots, including one of a tree cast which she found and which was claimed by the Museum. Another showed a porcupine being held by the venturesome lad who caught it. We learned that these animals can be safely caught if grabbed by the tail. Linda will continue her scientific trend at Grant High School.

Miss Hughes is now comfortably located at the St. Joseph's Home, 3060 S.E. Stark Street. Her private telephone number is East 2994.

Dr. and Mrs. John Eliot Allen and Sally will soon be in our midst again - we hope. On Saturday, October 9, they will attend the dedication ceremony at the formal opening of the Eric W. Allen Hall, the new home of the School of Journalism at the University of Oregon in Eugene, where John's father was for many years Dean of the School of Journalism.

We understand Orrin Stanley will be returning to his home here in the near future, having finally closed the sale of his late brother's home in Seattle, including the furnishings. Some rare antiques were disposed of, but some will be preserved by Mr. Stanley. (A.H.)

Congratulations to Mr. and Mrs. Alonzo Stafford (neé Jeanne Pruett) on the birth of daughter Carrie Lee on June 3, 1954, at Ellensburg, Washington.

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NOVEMBER ISSUE TO STRESS ROCKS AND MINERALS

The next issue of the News Letter will be dedicated to rocks and minerals. Ralph Mason's list of important minerals and their properties, which was promised for this issue, will be included. The Editor would appreciate suggestions and contributions from members of the Society (and others).

THE COLLAWASH FLORA OF THE UPPER CLACKAMAS RIVER BASIN, OREGON

By
Jack A. Wolfe

(Many GSOC members will recall the field trip of June 15th, 1952, up the gorge of the Clackamas River to the then recently discovered leaf locality high on the divide between the upper Clackamas River and its tributary, the Collawash River. See the News Letter, September 1952, pp. 89-92. During the past two summers our fellow member, Jack Wolfe, who is now a sophomore in paleobotany at Harvard University, has collected extensively in this locality and here gives us a preliminary account of his findings.)

On an Ant in Amber

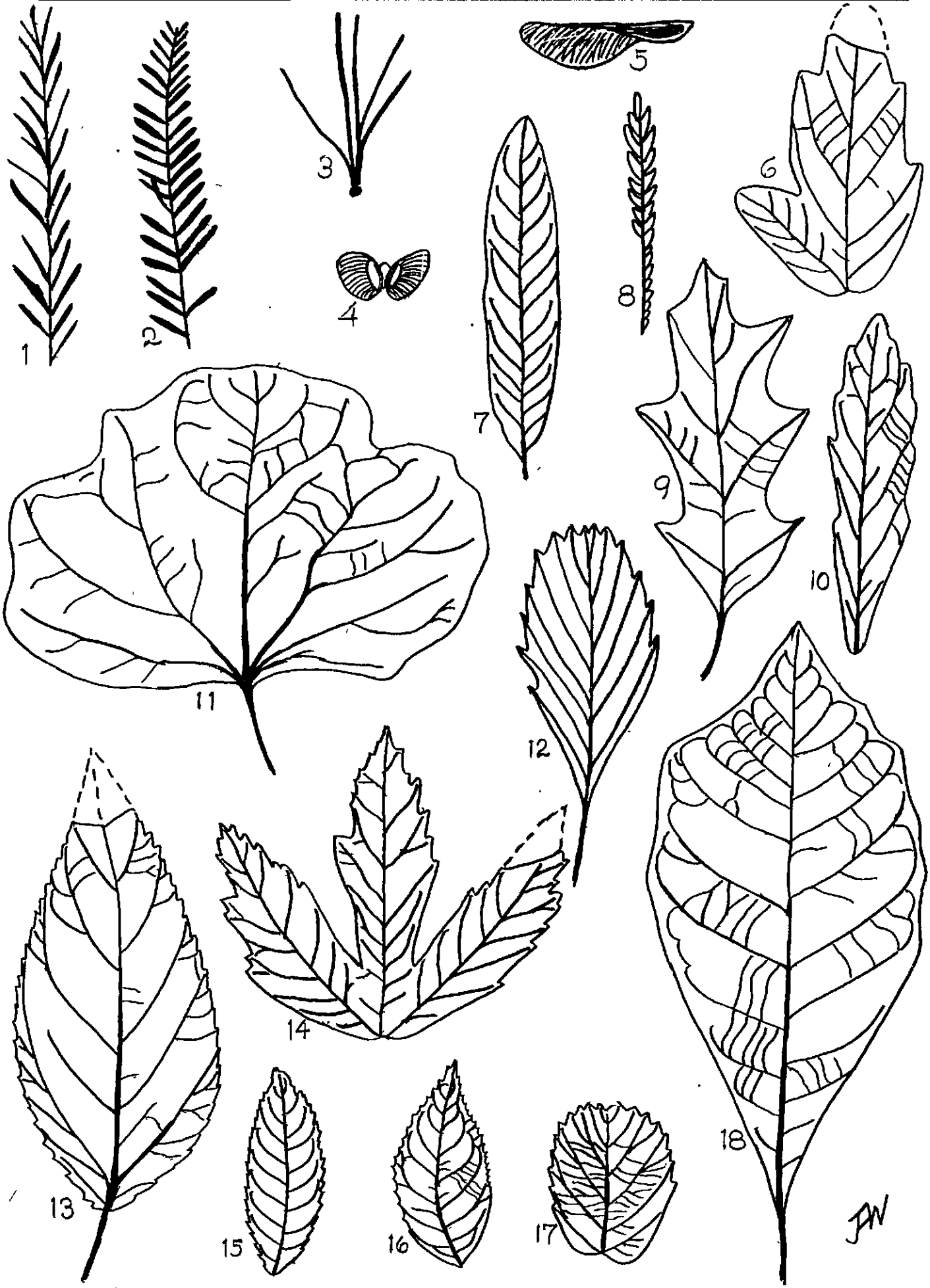
The amber dripped from Phaeton's fair tree
And whelmed a petty ant that wandered there,
And though of little worth in life was she,
Now in her death she is a treasure rare.
Martial (A.D. 40-102)

Although no insect remains have yet been collected in the Collawash fossil beds, amber or fossil pitch has come to light in small quantities; so it appears that conifers have lived in Oregon for many years. But was the amber from a fir, such as the magnificent Douglas fir which now graces the slopes of the Cascades, or did a different type of forest exist during Collawash times? If it was different, then to what extent was it different? These are a few of the questions which have to be answered in connection with this fossil flora, one of the most important discovered in recent years. Work has just been started by the writer and will be carried on for several years to come. Yet enough material has already been collected to make some preliminary and tentative statements about the flora.

The locality where the material was collected is high in the Cascades at an elevation of about 3,000 feet. Geographically, the locality is above the Collawash River, a few miles from its junction with the Clackamas. Geologically, the leaf-bearing strata appear to belong to the Eagle Creek formation; although nothing definite can be said. Similar strata are overlaid by Columbia River basalt along the Clackamas River Road; but possibly these strata are also underlaid by Columbia basalt, or at least by some volcanics. Certainly the Collawash material seems to have been deposited before the main outpourings of basalts began.

Composition of the Flora

A discussion of the composition of the flora will serve to acquaint the reader with this ancient forest. Thus far, 97 species have been identified. In view of the fact that less than 1,000 specimens have been collected, this great number of species is surprising. Less than 40 species have been identified in the Bridge Creek flora which has produced 30,000 specimens, and the Mascall flora contains only 68 species from 10,000 specimens. Many specimens in the Collawash still remain to be identified; and with more collecting the flora is likely to total more than 100 species. The only other floras in the western United States which compare in richness are the Florissant of central Colorado and the Latah of eastern Washington.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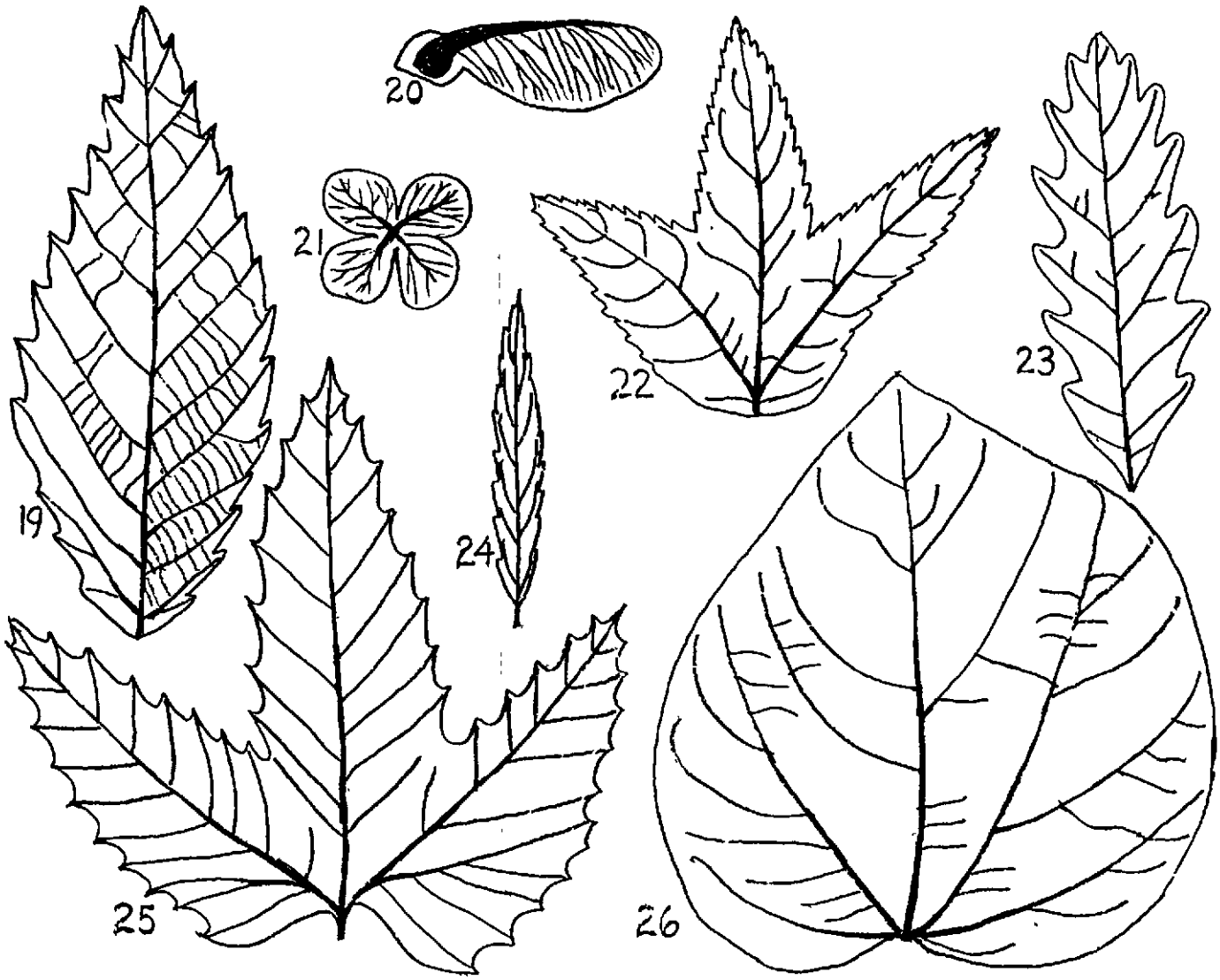

Plant Fossils of the Collawash Flora

1. Taxodium dubium (Stern) Heer - Swamp Cypress
2. Metasequoia occidentalis (Newb.) Chaney - Dawn Redwood
3. Pinus sp. - a White Pine
4. Pterocarya mixta (Knowl.) Brown - Wingnut (fruit)
5. Acer negundoides MacGinitie - Box Elder (fruit)
6. Acer negundoides MacGinitie - Box Elder (leaflet)
7. Quercus simulata Knowlton - Live Oak
8. Comptonia hesperia Berry - Sweet Fern
9. Quercus pseudolyrata Lesq. - Black Oak
10. Quercus simulata Knowlton - Live Oak
11. Cocculus heteromorpha (Knowl.) Brown - Moonseed
12. Cercocarpus antiquus Lesq. - Birch-leaf mountain Mahogany
13. Populus eotremuloides Knowlton - Cottonwood
14. Acer cf. ginnala - a Maple
15. Pterocarya mixta (Knowl.) Brown - Wingnut (leaflet)
16. Carya bendirei (Lesq.) Chaney and Axelrod - Hickory (leaflet)
17. Amelanchier coulleana (Berry) Brown - Service Berry
18. Nyssa knowltoni Berry - Black Gum (Tupelo)
19. Zelkova oregoniana (Knowl.) Brown - Zelkova (an elm)
20. Acer glabroides Brown - Red Maple (fruit)
21. Hydrangea bendirei (Ward) Knowlton - Hydrangea (flower)
22. Liquidambar cf. formosana - Sweet Gum
23. Quercus columbiana Chaney - White Oak
24. Salix sp. - Sandbar Willow
25. Platanus dissecta Lesq. - Sycamore
26. Cercis sp. - a Redbud

(Drawn natural size)

Anyone who has collected in the Collawash has undoubtedly come out with specimens of a conifer. More than likely it will be the dominant tree of the swamps of southeastern United States; namely, the swamp cypress (Taxodium). The abundance of this fossil shows that it also dominated the Collawash. Also fairly common is the dawn redwood (Metasequoia) and its relative Glyptostrobus. The coast redwood (Sequoia) was also a member of the forest. An interesting member of the flora is the incense cedar (Libocedrus), a tree familiar to Californians. As in most temperate fossil floras, pines are present: both a three-needled pine and a five-needled pine. As a group, the conifers are interesting because of the comparatively large number of species which apparently grew close together.

The monocotyledons are represented by three species: an unidentified grass, the cat-brier (Smilax), and a cattail (Typha). This scarcity of monocots is characteristic of most fossil floras.

The largest group in the flora is the dicotyledons, the broad-leaf trees, most of them deciduous but some of them evergreen. Among these several families are outstanding: the Walnut Family (Juglandaceae), the Willow Family (Salicaceae), the birches and alders (Betulaceae), the oaks (Fagaceae), the Rose Family (Rosaceae), the maples (Aceraceae), the Buckthorn Family (Rhamnaceae), and the Heath Family (Ericaceae). Other important species are in many instances, the sole representatives of their families in the flora.

In any deposit containing fossil leaves of a temperate aspect one expects to find willows (Salix) or poplars (Populus). These trees have a stream-side habit, and quite often one group will exclude the other because of competition. But the Collawash contains an abundance of both willows and poplars: three willows which have living equivalents in western United States and three poplars, including the aspen and the cottonwood.

One of the typically Asiatic aspects of the Collawash flora is the dominance of the walnuts, hickories, and their relatives. Even though several species of hickory are native to eastern United States, and the walnut is not a stranger to our southwest, this family has reached its greatest diversity in the old world, particularly in eastern Asia. It is therefore not surprising to learn that all of the living equivalents of the Collawash Juglandaceae now inhabit China. Besides the hickory (Carya) and two species of walnut (Juglans), there are the wingnut (Pterocarya) and its relative Platycarya. It is interesting to note that Chaney (1920)* records three species of Juglandaceae from the Columbia River gorge localities of the Eagle Creek formation.

The Collawash birches and alders are represented in the modern floras both of Asia and of western United States. The two species of birch which are present are related to an Asiatic species. The fossil alders include the equivalents of the mountain and the white alders. Comparatively few specimens of this family have been collected.

The oaks form an important element in the Collawash flora both from the standpoint of number of species and of number of specimens. There are at least six and possibly eight species of oak, representing the three divisions of the genus Quercus; namely, the black, the white, and the live or nonlobed oaks. The live oaks are related to Asiatic species, whereas the black and white oaks resemble trees now native to eastern United States. Other members of the oak

*Chaney, Ralph W., Flora of the Eagle Creek formation (Washington and Oregon): Chicago Univ., Walker Museum Contr., vol. 2, no. 5, 1920.

family which are present are the beech (Fagus) and the chinquapin (Castanopsis). Again, the oaks are dominant at the Columbia gorge localities (Chaney 1920).

The members of the Rose Family present in the Collawash are probably familiar to the western reader. Among them are the service berry (Amelanchier), the birch-leaf mountain mahogany(Cercocarpus), and the hawthorn (Crataegus). A cherry (Prunus) has also been identified, and there are several rosaceous leaves that remain to be pinned down more exactly.

At least six or seven maples are present in the flora, representing the three major areas where the modern equivalents of the Collawash species live today; namely, eastern United States, western United States, and eastern Asia. No strangers to the reader are the broad-leaf, mountain, sugar, and red maples. There is also the box elder, another member of the maple genus (Acer). The maples are a successful group, and are typical of the temperate forests throughout the northern hemisphere.

The Buckthorn Family is represented by the buckthorn (Rhamnus) and by three Asiatic genera, one of which is new to the western Tertiary. Another genus, Paliurus, is typically Asiatic, although it has been recorded from several localities in the American Tertiary.

Members of the Heath Family include two species of madrona, one of which is the equivalent of the madrona (Arbutus) now inhabiting Oregon and California. Another interesting species is Rhododendron chaneyi, which Brown (1937)* first described from the Bridge Creek deposits on the Crooked River. It resembles a species quite common in the forests of eastern United States rather than our western rhododendron.

Many other species might be mentioned, but space permits attention to only a few. Among these are the elm (Ulmus)and its Asiatic relative Zelkova. As has probably been apparent to the reader, the Asiatic element is large and is in fact the most abundant. Other members of this element are the katsura (Cercidiphyllum), Magnolia, Lindera, Hydrangea, Exbucklandia, sweet gum (Liquidambar), a sycamore (Platanus), redbud (Cercis), Gordonia, and several others. The sycamore and redbud, which also show some resemblance to American species, are among the more abundant species in the flora.

In floras in which the Asiatic element is dominant, the eastern American element is usually next in importance; but in the Collawash flora such is not the case, for the western American element has more species present than the eastern. Besides the species already cited there are the dogwood (Cornus) and a species of huckleberry (Vaccinium).

In a flora the size of the Collawash it was expected that some species of the lower plants would be found; and the search has not proved unfruitful. There are two ferns, one of them a species common to the flora of eastern United States, namely the cinnamon fern (Osmunda). The horsetail is also present, although it is not abundant. Two very interesting specimens represent a moss and, even rarer, a liverwort.

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*(Reference will be given in future issue.)

Ecological Relations of the Flora

Now that the reader knows something of the composition of the Collawash flora, he can perhaps guess what type of climate then existed. Actually even the "experts" must guess, for little can be stated dogmatically about the conditions which allowed a forest of this type to grow. First, as mentioned before, the Collawash plants fall into three main groups, all of which require a great deal of rain. For instance the western American element today receives more than 40 inches of rain per year. The Asiatic element probably required warm summer rains, since most of the plants in that group today have that requirement. The large size of most of the leaves indicates that much moisture was present. The best guess that can be made is that the climate then was like that of central China today, especially Hupeh province. It should be noted that Chaney (1951)* considers the climate of the Bridge Creek flora to be similar to that of Hupeh.

A quick glance easily shows the modern topography of the Collawash region, but it requires several careful inferences to discover the ancient topography. Since the most abundant species in the sediments is the swamp cypress, it is likely that the fossils were laid down in an upland basin where there was a fair-sized grove of these trees. Growing with the cypress and perhaps in groves at the edge of the swamp were the sweet gum, sycamore, and tupelo. As has been observed by Chaney (1951), Metasequoia favors well-watered slopes; hence adjacent to the swamp there probably arose some hills, or at least a hill, on which grew Metasequoia, oaks, hickories, and other members of the forest. On a few trees grew climbers, such as the grapelike genus Ampelopsis or a moonseed genus Cocculus. The pines, live oaks, and mountain mahoganies indicate that there was a higher elevation nearby. Perhaps the swamp was in a basin on the slopes of a large mountain.

Age of the Flora

One of the questions most frequently asked a paleobotanist by the layman is: "How old is it?" Quite often the paleobotanist replies dogmatically, "Oh, about 30 million years." The layman is overwhelmed and questions no more, much to the relief of the scientist. Actually, many of the ages which have been determined for various floras are now in need of revision, for each new flora described sheds light on the Tertiary sequence. The Collawash flora presents important data on the relationships of the Latah, Bridge Creek, and Mascall floras to one another.

Before work had progressed very far, it became evident that the Collawash was a Latah-type flora; that is, it contained many species which characterized the Latah. The age generally accepted for this flora is middle or upper Miocene, which is also the age of the Mascall. However, both the Collawash and Latah differ in a rather striking manner from the Mascall in that they possess a warm-temperate element of such plants as Magnolia, laurels, Cocculus, and Tetracera. Although some of these elements are present in the Mascall, they are not as common there as they are in the Latah and Collawash. These two floras also differ stratigraphically from the Mascall; that is, the Mascall lies on top of the Columbia River basalt, while the Collawash and Latah underlie it. In places the Latah is interfingered with basalt. If the middle Miocene age for the basalt is accepted then the Latah-Collawash must be lower Miocene, or at least not younger.

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*Chaney, Ralph W., A revision of fossil Sequoia and Taxodium in western North America based on the recent discovery of Metasequoia: Am. Philos. Soc. Trans., n.s. vol. 40, pt. 3, 1950 (1951).

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SOUND FILM ON DINOSAUR NATIONAL MONUMENT SEEN BY SOCIETY

On September 10 the G.S.O.C. had the privilege of viewing the sound movie taken in Dinosaur National Monument when the Sierra Club of California made a boat trip down the Yampa and Green rivers. The film, shown through the courtesy of the Mazamas, who own it, is an excellent example of the photographer's art, and gives the viewer an experience akin to the excitement and inspiration of the trip itself. It shows vividly the sheer rock walls rising hundreds of feet above the now placid, now turbulent, but always muddy rivers, to the art lover a study in ever-changing form and color, to the geologist a record of ancient land spaces, marshy places where dinosaurs once roamed, now folded and up-thrust into a mountain range.

The river trip, about 75 miles in length, was made in large rubber rafts which glided easily through more quiet waters but took the rapids with a dip and a splash. The trip took six days. The camps at night allowed the party good opportunities to examine the canyons. Indian pictographs were found in several caves and on canyon walls.

The film is part of a propaganda for the preservation of these beautiful canyons which will be destroyed if the Echo Park Dam, which has been approved by the Department of the Interior, is built near the confluence of the Yampa and Green rivers. To flood these canyons and destroy their beauties would be an irreparable loss; and a needless one, because other sites are available. (H.Z.)

Miss Hazel Zimmer, who took the trip this summer and who supplied the above notes, added to our pleasure by telling us something of her own experiences. She also told of the quarry near the monument headquarters where massive skeletons of dinosaurs are being unearthed.

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LUNCHEON NOTES

By
Leroy Palmer

The talk at the August 5th luncheon, as noted in last month's News Letter, was by Norris Stone on the subject of phosphates. The first production of phosphates in this country, he said, was in Florida in 1887; and this state is still the leading producer, although discoveries of vast deposits of rock phosphates in the West far exceed resources elsewhere. Idaho has reserves estimated at more than six million tons, equal to five-sixths of the total known resources in the United States. Current production is 431,000 tons of phosphate compounds annually.

Mr. Stone spoke briefly of potash, another plant food, and said that the alarming shortage during World War I has been relieved by the discovery of deposits in New Mexico greater than the reserves of all Europe.

On August 12th Leo Simon showed photographs and specimens from the vacation trip that Mrs. Simon and he took between June 8 and July 31. They were present at Madison, Wisconsin, on June 18th, Leo's birthday, when the University of Wisconsin conferred the degree of Doctor of Philosophy on their son-in-law, Wilbur J. Miller. From Madison they toured Wisconsin, Michigan, and Illinois and brought back many unusually fine specimens of a fern leaf from the Pennsylvanian coal measures. Thence through Kentucky, Missouri, where they went down 380 feet in

one of the Eagle-Picher zinc mines; Oklahoma, Texas, New Mexico, where, of course, they visited Carlsbad Cavern and were deeply impressed by its beauty; then home by way of Colorado, Wyoming, Montana, and Idaho. The Simons brought home outstanding specimens of ruby zinc, a form of sphalerite, enargite, rhodochrosite, and a micaceous variety of specular hematite.

Leo laid stress on the fact that his Geological Society card proved an "open Sesame" wherever he went. Many institutions, such as museums and libraries, are often cool toward sight-seers and curiosity seekers but are glad to extend every courtesy to one who has a legitimate interest.

On the August 19th meeting Tom Matthews circulated specimens of uranium minerals from San Juan County, Utah, and some copper ore found to be radioactive, from the Wallowa Mountains. Mr. Elder brought some specimens from Montana: calcite, graphite, and a high-grade copper ore containing cuprite, malachite, and azurite.

Rudolph Erickson took over as "five-minute speaker" and read a letter from his stepson, J. H. Bartholemew, who is working on the construction of a dam on a tributary of the Indus River for the Indian Government. He said the dam is a "tremendous" project, and because of poor foundations and remote locality it is one of the most difficult ever attempted. Long established racial customs of the East Indians and their lack of "knowhow" add to the difficulties.

Norman Sipple talked at the August 26 meeting on the causes of the weather in this area and on the influence of rainfall on geology and topography. He explained that Siberia is covered by a blanket of cold air which drifts across the Gulf of Alaska and thence along the Pacific Coast. When these cold currents from the north meet warm air currents from the south we have rain. Our wet summer this year is due to the fact that the "Pacific high," which usually brings fair weather, has lain farther from the coast than usual, for reasons unknown.

The September 2 talk was by Fay Libbey on the United States mining laws. Originally the government tried leasing the mineral deposits but this was not satisfactory. Next, mineral lands were sold to the highest bidder. With the very rapid settlement of the west by the gold seekers of the 1850's and 1860's the need for mining laws was realized, and in 1866 Congress passed the first Federal mining law. This applied the principle that the basis of a mining claim is not a certain area on the surface but a definite length along the lode. This was not applicable to placer claims, so in 1870 the law was amended to provide for the location of placers. In 1872 an entirely new law was passed and although it has been modified by amendments, court decisions, and administrative orders its fundamental principles have not been changed and it is still the basic mining law of the country.

September 9th Leroy Palmer talked on "Mining and Civilization." He stated that the progress of civilization is marked by man's mastery of the metals. Before man learned the use of metals he plowed with a forked stick. Then he discovered the use of hard rocks such as flint and obsidian, and made tools from them. This was the stone age. Next he discovered accidentally that he could obtain metals by heating certain rocks, and this brought about the bronze age in which such civilizations as Egypt and Babylon and Ninevah developed. The bronze age overlapped the iron age in which we are still living and which has marked a steady progress of civilization. The discovery of steel brought the steam engine and induced the great "industrial revolution" of the 19th century. Then came the great electrical expansion made possible by copper. We are now entering the "atomic age" and no one can predict the future, but we can be sure it will involve the use of metals and that mining will play an important part.

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GEOLOGICAL NEWS LETTER

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GEOLOGICAL SOCIETY OF THE OREGON COUNTRY

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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 between those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mr. Edward D. Bushby, 1202 S.W. Cardinell Drive, Phone CA 2123. Regular annual dues (single or family memberships) are $3.50 for residents of Multnomah and adjacent counties; $2.50 for others; and $1.50 for Junior Members. Make remittances payable to the Society.

Society Activities

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. Tenth Avenue and Yamhill Street. See Calendar of the Month for time of meeting.

FIELD TRIPS: Usually one field trip is scheduled for each month.

LIBRARY BROWSE NIGHTS: Twice a month. See the Calendar of the Month.

LUNCHEONS: Informal luncheons, with geological motif, each Thursday noon in Room 305, YMCA Building, S.W. 6th Avenue and Taylor Street. $1.00 per plate.

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

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CALENDAR FOR NOVEMBER

Thursday Nov. 4 — Luncheon Meeting - Room 305 YMCA

Tuesday Nov. 9 — Library and Discussion Night - Biology Building, Lewis and Clark College, 7:30 p.m. The subject of the conference will be mammalian fossils. Those with specimens are invited to bring them. Lon Hancock will bring some of the material which he has recently collected from the Clarno beds. Books on mammalian fossils will be on display. A good attendance and an interesting discussion is expected.

Thursday Nov. 11 — Luncheon Meeting - Room 305 YMCA

Friday Nov. 12 — Friday Night Meeting, Library Hall, 7:00 p.m.
"Crater Lake" - Motion pictures and slides in color about the geology and other natural history. Dr. Ruth Hopson - speaker - has for some years studied this area.

Thursday Nov. 18 — Luncheon Meeting - Room 305 YMCA

Sunday Nov. 21 — Basement Field Trip. We shall visit three "basements" for the purpose of examining collections of rocks, minerals, and fossils. Meet at the corner of NE 40th Avenue and Hancock Street (just north of Sandy Blvd.) at 1:00 p.m.

There will be no second Library Night or second Friday-Night Meeting this month on account of Thanksgiving. The last luncheon meeting of the month also will not be held.

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THE OREGON MUSEUM OF SCIENCE AND INDUSTRY will hold its annual dinner on Tuesday, November 16, at 6:30 p.m., in the Rose Room of the University Club. The guest speaker will be Dr. Arnold Shotwell, curator of the Natural History Museum of the University of Oregon at Eugene. Dr. Shotwell is a vertebrate paleontologist and has recently examined Lon Hancock's collection of bones from the Clarno and has identified many of them He will speak on "Fossil Vagabonds." Tickets may be reserved by calling the museum, EA 3807. Those who wish to attend the lecture only may come at 8:00 p.m.

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NOMINATING COMMITTEE SELECTED

At a meeting of the GSOC executive board held October 17, 1954, the following nominating committee was approved: H. Bruce Schminky, Chairman; Mrs. A. W. Hancock; Dr. Ruth E. Hopson; Edward Kelham; and Leo Simon.

Candidates are to be nominated for the following positions: President, Vice-president, Secretary, Treasurer, Director (3 years), and Editor of the News Letter.

Nominations should be in the hands of the secretary, Mrs. Leo Simon, no later than December 15, 1954. Thanks to these people for accepting the responsibility of being a member of this important committee.

Albert Keen, Pres.

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NEW MEMBERS

Wiles, Mr. and Mrs. Elwood H., 425 S.E. 32 Avenue, Zone 15, FIlmore 2800.

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SHALL DUES BE INCREASED?

At the meeting of the executive board on October 17th it was decided to submit to the membership a proposal for a raise in dues. Two things have made this necessary: first, due to rise in prices the Society has been operating at a deficit for the past several years. This has been possible because there was a surplus in the treasury; but that surplus has been shrinking. Second, the multigraph on which the News Letter is printed was purchased eight years ago and while it is still in good condition it will eventually have to be replaced. The original cost was $468 and the cost of replacement will be at least twice that. The present cost of printing the News Letter is about $160 a year. This does not include the cost of stapling, mailing, etc. Estimates from three private firms ran from $600 to $900 a year for the same job so it is obvious that it is much cheaper to get out the News Letter under the present arrangement.

Good business practice requires that a sinking fund be set up to pay the cost when replacement of the machine becomes necessary. The board took action to set up a budget that will provide for the sinking fund and keep current expenditures under closer control. They also authorized a raise in dues to $5.00 for adult members and $2.00 for Junior members. Memberships for those living in distant counties will remain at $2.50. The matter will be submitted to a vote of the membership at the annual election of officers.

Edward A. Kelham, Business Manager

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G. S. O. C. LIBRARY NIGHTS

A group of sixteen members of the Geological Society gathered October 12th for the first Library Night at the Library's new location in the Biology-Geology Building of Lewis and Clark College. The library of the Society is housed in a room with ample space for reading. An adjacent classroom offers opportunity for those who want to talk. After some time spent in reading we enjoyed a period of fellowship while Mrs. Bill Clark, our hostess, served coffee and doughnuts. There seems to be no end to conversation when like-minded folks get together.

It has been proposed that at least one library night each month be devoted in part to an informal discussion on some theme of geology, illustrated when possible with rocks, minerals, fossils, maps, or slides. The theme for November 9th is to be mammal fossils. It is suggested that December 14th be devoted to igneous rocks. The attempt will be made to have books and specimens at hand dealing with the theme of the evening. (F.G.)

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RE HOMO SAPIENS

Present at the luncheon of October 10, when Dr. John Eliot Allen, past president in 1946-47, gave an entertaining talk, were six other past presidents: Messrs. C. Phillips (1936-37), Schminky (1942-43), Hancock (1945-46), Simon (1949-50), Stone (1952-53), and Baldwin (1953-54). This is believed to be a record.

Incidentally, John's imposing title is "Economic Geologist, Bureau of Mines and Mineral Resources, division of the New Mexico Institute of Mining and Technology, State of New Mexico."

Speaking of past presidents, it is sadly regrettable to note that the only face missing from the biographical record book of our presidents is the noble countenance of Norris B. Stone. We trust this omission may be rectified before the passing of another year. "Hope deferred, etc." (A.H.)

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MINERAL IDENTIFICATION CARD SET - PART II

By
Ralph S. Mason

(The first installment of this paper will be found on page 86 of the September 1954 News Letter.)

The preparation of the G.S.O.C. Mineral Identification Cards is a simple, straightforward process. Information should be added to the face of the card either by a typewriter which has a not too juicy ribbon or by good, black, permanent ink. No particular order need be observed in preparing the cards, but it is suggested that a master list of minerals be kept as a check against making duplicates, particularly if the cards are not all made at the same time. After the information has been added the notches should be made, care being taken to make smooth cuts. Once the cards are prepared it is a good idea to proof them by needling each hole and inspecting the cards which drop out for similarity of information corresponding with the notch needled. The sorting process is simplified by inserting the needle in a hole through the deck, swinging it horizontally to a 45-degree angle to the face of the deck, grasping the entire deck at one end with the other hand and then returning the needle to its original orientation. This fans the cards apart slightly and allows the notched ones to drop out readily when the deck is raised a few inches above the table top. The drop-out cards should be gathered together and the needling process repeated. One corner of each card is cut off to aid in keeping them properly positioned. The location of a card in the deck is unimportant, and repeated sortings or shufflings may be made without interfering with the operation of the deck.

A text should be mentioned in addition to the two referred to in the September News Letter; A Field Guide to Rocks and Minerals by Pough, published by Houghton Mifflin as one of the Peterson Field Guide Series. The book has excellent pictures, many of them in color, and crystal forms are clearly shown by line drawings.

The following brief notes on the physical properties of minerals are intended as a general guide to the method to be used in preparing the cards:

Name. The mineral name should be typed or written on the line provided and the chemical formula may be added immediately after it.

Color. Ten mineral colors plus 'clear' are provided on the cards. Shades of colors such as yellowish-brown, blackish-green, etc., are achieved by notching both colors and needling both holes.

Streak is the color of a finely powdered mineral and is most easily obtained by forcibly rubbing a mineral across a piece of white, unglazed porcelain. Nine streak colors are provided on the card plus a hole for 'none.' Minerals having a hardness close to or greater than that of the streak plate (H = 6) will leave poor streaks if any. As in the case of the holes for colors, various shades can be coded into the cards by double notching.

Hardness. Although Mohs scale of hardness lists ten minerals which increase in hardness from talc, which is given an arbitrary value of H = 1, up to diamond which is rated at H = 10, only values of from 1 to 8+ are used since it is extremely difficult for the average layman to distinguish hardnesses greater than H = 7 or 8 under field conditions.

Mohs Scale of Hardness

1.	Talc	6.	Orthoclase
2.	Gypsum	7.	Quartz
3.	Calcite	8.	Topaz
4.	Fluorite	9.	Corundum
5.	Apatite	10.	Diamond

Specific Gravity is the ratio of the weight of a given volume of a substance to the weight of an equal volume of water. A mineral having a specific gravity of 2 for instance will weigh exactly twice as much as the same volume of water. In the field the specific gravity of a mineral can only be guessed at, but simple laboratory equipment, consisting of a balance giving values in metric units and a cylinder graduated in cubic centimeters make the determination an easy one. After weighing the specimens of pure mineral (which should be of a size that will fit easily into the cylinder) partially fill the cylinder with water and record the number of cubic centimeters added. Then gently immerse the mineral pieces, record the new volume, compute the volume of the mineral added by subtracting the first reading from the second, and divide the weight of the mineral in grams by the volume in cubic centimeters. The dividend is the specific gravity. Example: The mineral specimen weighs 4 grams and when immersed in the water in the cylinder is found to have a volume of 2 cubic centimeters. Dividing the weight of 4 grams by the volume of 2 cubic centimeters gives a specific gravity of 2 (Sp. Gr. = 2). Care should be exercised in avoiding soluble minerals or those having voids or irregularities which might trap air bubbles and give erroneous values. Since many minerals have specific gravity values lying between those printed on the card, the holes bracketing the recorded or determined values should be notched.

Fracture is the manner in which a mineral breaks. It is sometimes helpful in mineral identification. Conchoidal or shelly fracture is often observed in the glassy minerals, although the most familiar example of this occurs in obsidian which is a glassy rock, not a mineral.

Cleavage. Roughly half of the minerals have a fair degree of cleavage. This permits a rapid winnowing out of mineral cards; and if a mineral exhibiting cleavage is being sought the proper hole in the crystallization section should be needled next. Cleavage is the tendency for a mineral to break in smooth flat planes. Mica, calcite, and galena for example have excellent cleavage while other minerals possess varying degrees of perfection.

Crystallization. Minerals formed from cooling molten solutions or deposited from aqueous solutions tend to form angular, smooth-sided masses called crystals. If the crystals have grown freely without meeting an obstruction they can often be identified by their characteristic shape. All crystals belong to one of six crystal systems, and if the crystal is large enough and perfect enough it is fairly easy to determine which system it belongs to. Although a mineral may crystallize in many different forms, it always sticks to the same crystal system. Calcite crystallizes in the triclinic system, but it has dozens of distinct forms and combinations of forms, all having the symmetry of the triclinic system. Some minerals display no visible crystal form and are said to be amorphous. Chalcedony, a variety of quartz, a mineral belonging to the hexagonal crystal system, commonly occurs in smooth, rounded or banded masses which have no crystal form apparent to the eye, although actually it is composed of tiny microscopic crystals.

Lustre of a mineral falls into two main groups. Many of the metal minerals have a metallic or submetallic lustre. The nonmetals have various types of lustre ranging from the adamantine lustre of the diamond to the silky sheen of asbestos. Fresh surfaces should be used for the determination of lustre since some minerals, particularly metallic ones, tarnish with exposure.

Structure. Minerals occur in a variety of forms which are often distinct aids in their identification. The mica minerals are noted for their perfect sheet-like cleavage; malachite forms botryoidal masses resembling a bunch of grapes; bauxite may be oölitic, which is a term derived from the Greek oö meaning egg and refers to masses resembling fish eggs. The remaining structure terms are self explanatory. It should be remembered that any one mineral may assume one or more external forms.

Special properties include the test for carbonates with dilute acid such as a 1:1 mixture of hydrochloric acid. Calcite and aragonite effervesce readily in such an acid, other carbonates less readily and some will 'fizz' only with warm acid. A small horseshoe magnet is useful to determine whether or not a mineral is magnetic. Radioactivity is becoming increasingly important, and many previously unsuspected rocks have been found to contain one or more uranium-bearing minerals. Tests for radioactivity can be made readily with the familiar geiger counter or some other radiation-detection equipment. Taste and odor of some minerals is helpful in their identification. The soluble salts such as halite, saltpeter, and alum give distinct taste reactions, while some of the metallic minerals such as pyrite, chalcopyrite, marcasite, and arsenopyrite have a "brassy" taste. When rubbed briskly or struck with a series of glancing blows some minerals emit odors. Sulphides may produce a sulphurous smell, while arsenic minerals may emit a garlic odor. Kaolin has an earthy smell, particularly when freshly moistened. Of all the special properties possessed by minerals that of fluorescence is the most spectacular. The ultraviolet lamp is a standard prospecting and examining tool for the tungsten miner, because sheelite gives a bright blue-white fluorescence. This makes this otherwise difficult mineral an easy one to identify. In addition to the natural fluorescence found in many minerals, it has been discovered that by heating certain other minerals briefly to a red heat they acquire fluorescence, and their identity can often be established. Some minerals possess both fluorescence, which is the ability to glow in the presence of ultraviolet rays, and phosphorescence, which is light emitted after a mineral has been subjected to ultraviolet radiation for a short time.

Extra holes. The mineral cards have two extra, unassigned holes. Some users may wish to notch one of these to indicate that he has a specimen of the mineral described on that card in his collection. The second hole could be used to indicate that the mineral occurs in the state, of for some other purpose.

The back side of the card is a handy place to put notes on good localities for collecting the various minerals, possibly a note on the origin of the name of the mineral, or a brief description of simple tests which serve to distinguish this particular mineral from others.

"Starter" List of Minerals

Since each mineral card is a separate entity, the minerals selected for the cards in a set may vary widely. However, any set should have certain basic minerals, including some of the native elements, the rock-forming, the ore-forming, and the industrial minerals. To these may be added special groups in which the user is particularly interested such as the zeolites, the radioactive minerals, and those which fluoresce.

The following lists may help to select a nucleus upon which to build a working set of cards:

Native Elements

antimony	copper	graphite	platinum
arsenic	diamond	lead	silver
bismuth	gold	mercury	sulphur

Rock-Forming Minerals

augite (a pyroxene)	garnet	quartz
biotite (a mica)	hornblende (an amphibole)	tourmaline
calcite	muscovite (a mica)	
feldspar	olivine	

Ore-Forming Minerals

arsenopyrite	cinnabar	limonite	psilomelane	spalerite
azurite	cuprite	magnetite	pyrite	stibnite
bauxite	franklinite	malachite	pyrolusite	tetrahedrite
cassiterite	galena	marcasite	pyrrhotite	willemite
chalcocite	gibbsite	molybdenite	realgar	zincite
chalcopyrite	hematite	orpiment	rhodochrosite	
chromite	ilmenite			

Industrial Minerals

agate	beryl	fluorite	monazite	talc
asbestos	corundum	halite	rhodonite	witherite
barite	dolomite	magnesite	rutile	zircon

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MINERAL CARDS NOW AVAILABLE

A supply of Mineral Identification Cards has been received and they are available at a cost of $1.50 per hundred cards. They may be obtained from Ralph Mason at the State Department of Geology and Mineral Industries, 1069 State Office Building, Portland 1, Oregon.

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KODACHROMES OF THE SPIRIT LAKE TRIP SHOWN

The Friday night meeting, September 24, was a resumé of the field trip which our Society took July 24-26 to Spirit Lake and Mount St. Helens. Excellent colored photos taken by several of our members were shown. Once again we had reason to appreciate the trip leader, Dr. Donald Lawrence, who opened before our eyes a recent chapter in earth history. We shall look back to this trip as one of the highlights of the year.

Mr. Bruce Schminky gave a running account as they were thrown on the screen. Ruth Hopson showed ektachrome slides of the forest advancing up the pumice slope of the volcano.

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THE CHEMISTRY OF IGNEOUS ROCKS

By
F. G. Gilchrist

The rocks of the Oregon Country are predominantly of igneous origin; that is, they have formed by the cooling of a molten magma. Hence anyone who is interested in Oregon geology should know something about igneous rocks. Indeed even the sedimentary rocks of Oregon are mostly made up of materials of volcanic origin which have been transported and deposited by water, wind, or ice.

Eight elements make up 98.6 percent of the earth's crust by weight. In the order of their abundance these are oxygen, silicon, aluminum, iron, calcium, sodium, potassium, and magnesium. Oxygen alone composes nearly one-half of the crust, and silicon about one-fourth.

Now, when the crust was very hot, as probably was true at one time, it consisted of a liquid magma in which these and other elements existed as individual ions. An ion is an atom or group of atoms bearing an electric charge. Oxygen ions carry negative charges. The other seven commonest ions carry positive charges. When the magma was very hot there was too much thermal agitation for the ions to stay together in groups; but as the crust cooled the ions got together to form combinations of increasing complexity. One of the first groups to form was the silicate ion, $(SiO_4)^{4-}$, consisting of a silicon atom in the center with four oxygen atoms equally spaced around it. The silicate ion thus had the shape of a tetrahedron and bore four negative electric charges. Now ions of this sort compose nearly 90 percent of the earth's crust.

When a magma slowly cools, crystals progressively form in a sequence known as Bowen's reaction series. First the silicate tetrahedrons with their negative charges begin to be cemented together by positively charged magnesium and iron ions. The results are heavy yellowish-green crystals of olivine. Olivine is one of the first minerals to form at a certain temperature in magmas of basaltic composition.

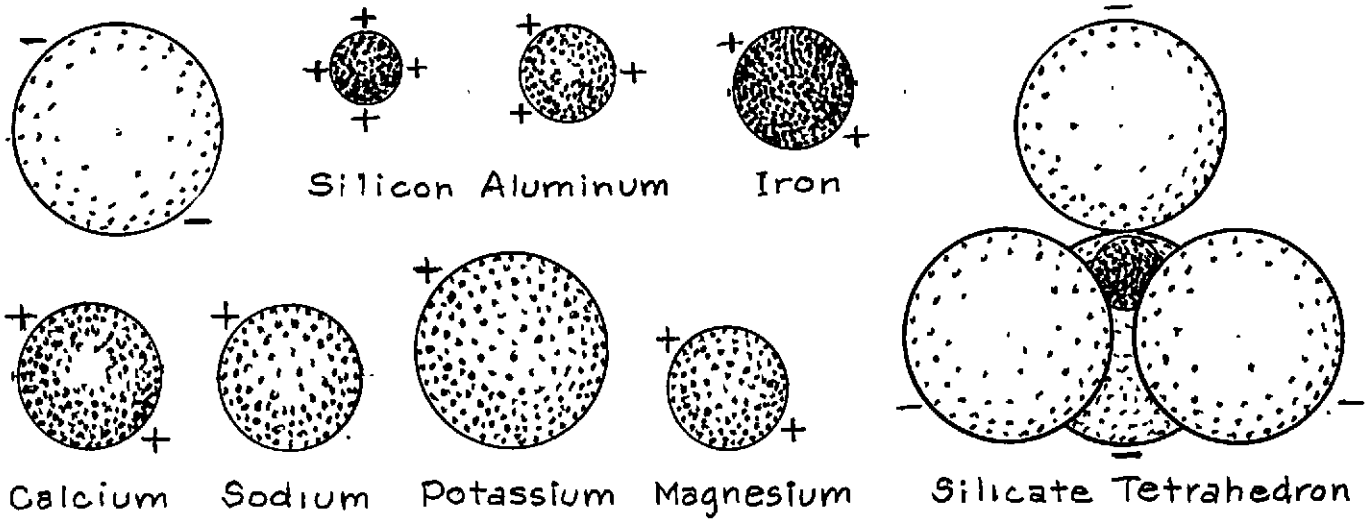
As further cooling takes place the silicate tetrahedrons lose some of their thermal agitation and join with one another to form long chains. These chains in turn become cemented together by calcium, magnesium, iron, or aluminum ions to form bundles; that is, to form crystals with a fibrous cleavage. When the silicate tetrahedrons unite in simple chains, the results are heavy, dark, stout crystals which cleave (split) in two planes nearly at right angles to each other. Such minerals are known as pyroxenes, of which augite is the most important. At a somewhat cooler temperature the silicate tetrahedrons are able to exist as double chains which become cemented into black, needlelike crystals known as amphiboles. The most characteristic one of these is hornblende. Amphibole crystals, like the pyroxenes, cleave in two planes, but the planes meet each other at angles of 60 degrees and 120 degrees instead of 90 degrees.

With continued cooling, still more linking takes place between the silicate tetrahedrons, and a sheet pattern like chicken wire is formed. These sheets become cemented together in pairs. The double sheets thus formed are bonded loosely together like the pages of a book to form crystals known as micas. In biotite or black mica the cementing into double sheets is by iron or magnesium ions. In muscovite or white mica the cementing is by aluminum ions. In both cases the double sheets are rather weakly held together by potassium ions, and hence they split readily into thin layers.

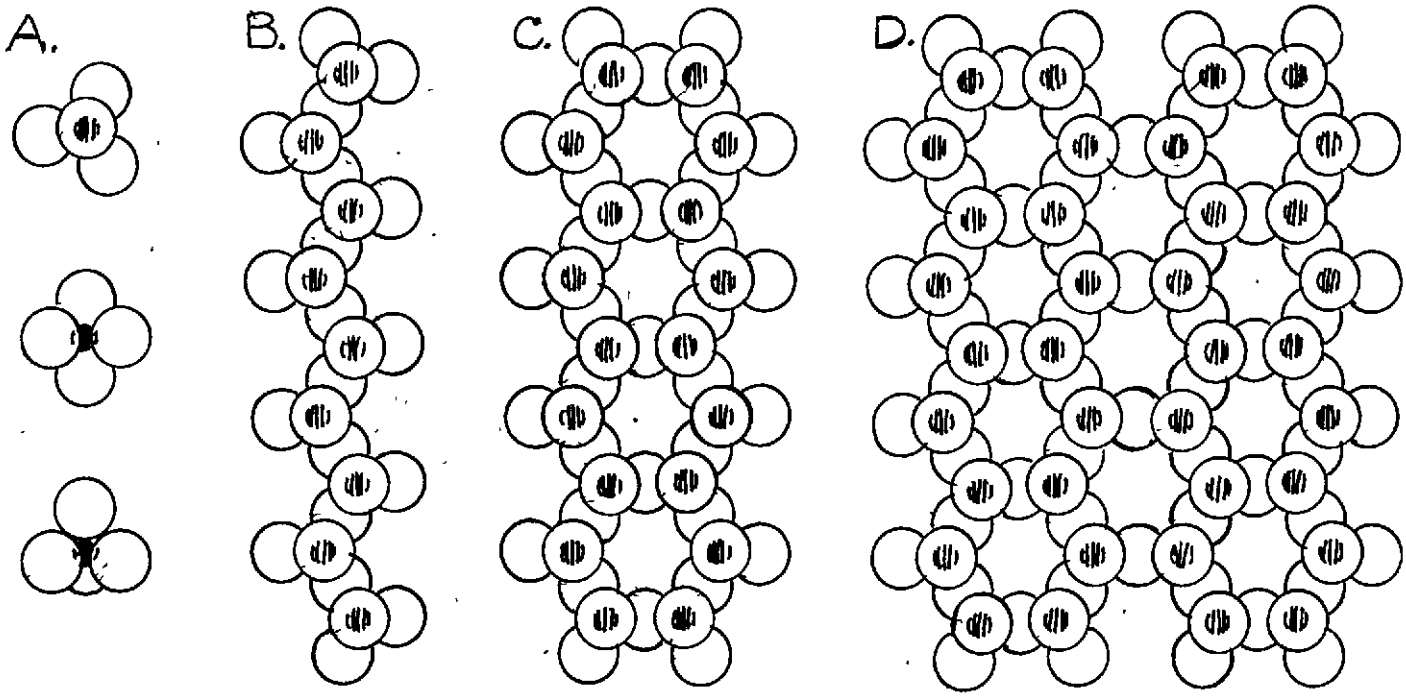
Finally with more cooling the silicate tetrahedrons join together to form a three-dimensional mesh or "space lattice." The resulting crystals have no need of other ions to cement the tetrahedrons together, so the result is pure silica or quartz in its various forms. Quartz shows no cleavage.

IONS OF IGNEOUS ROCKS

Magnified 10,000,000 times. 1 mm. = 1 Ångström.
Number of dots used in shading is proportional to mass.



ARRANGEMENT OF SILICATE TETRAHEDRA IN MINERALS OF IGNEOUS ROCK



A. Single silicate tetrahedra, as in olivine, drawn in different orientations. Each consists of a small silicon atom (dark) surrounded by four larger oxygen atoms.

B. Silicate tetrahedra arranged in single chains by the mutual sharing of oxygen atoms, as in augite. In this and the following figures the tetrahedra are viewed from above so that the silicon atom is hidden by the top oxygen atom.

C. Silicate tetrahedra arranged in double chains, as in hornblende.

D. Silicate tetrahedra arranged in a plane or sheet, as in the micas.

Note: A figure showing the tetrahedra arranged in a 3-dimensional lattice, as in quartz or feldspar, has not been attempted. The diagrams are similar to those in Leet and Judson's recent (1954) Physical Geology.

But this is only about one-half the story of the crystals which form when a magma cools. There is another and more complicated type of space lattice which is formed by silicate tetrahedrons and aluminate ions with ions of calcium, sodium, or potassium enclosed in the meshes of the lattice. These are the feldspars. The first to form are calcic feldspars (anorthite). With cooling, sodium progressively replaces the calcium to form sodic feldspars (albite). Such feldspars are called plagioclases. Another feldspar, and the last to crystallize out, is potassic feldspar or orthoclase. Lacking as they do, both iron and magnesium ions, the feldspar crystals are light in color and light in weight. They are commonly lath-shaped and cleave in two planes nearly at right angles to each other. One of the planes in the case of plagioclase crystals shows striations when viewed under a hand lens by reflected light.

The texture of an igneous rock depends largely upon the rate at which the magma cooled, and this in turn depends on the size and shape of the mass of magma. A lava flow three feet thick will solidify in three days. On the other hand a mass of magma underlying a mountain range might take a million years to cool. When cooling is exceedingly rapid no visible crystals have time to form, and the result is a glass such as obsidian, or a glassy froth such as pumice. Most lava flows, however, cool slowly enough that crystals form which can be seen under the microscope. These according to their composition are basalts, andesites, or rhyolites. Magmas which solidify slowly far below the surface form crystals which are large enough to be seen with the naked eye and studied with a hand lens. Numerous names are given to those rocks of "granitic" texture, such as granite, granodiorite, diorite, and gabbro. A special case is that in which crystals have already begun to form before the magma is intruded as a dike or sill. The resulting texture is named porphyritic, and the visible crystals which are imbedded within the microcrystalline or glassy matrix are called phenocrysts. It is of interest to note that a lava may continue to flow even after 60 percent of it is crystallized.

Just which minerals will form when a magma solidifies depends upon the composition of the magma, and also upon the gases which are present, the pressure under which crystallization occurs, and the speed of cooling. If the cooling takes place slowly the first crystals which form, such as olivine or augite, have time to settle downward, or the remaining liquid may get squeezed out of the meshwork of crystals. Possibly it is because of such crystal settling that the magma changes in composition, and that the later lavas which flow from a volcano often contain less ferromagnesian minerals (olivine, augite, hornblende, etc.) and more quartz and alkaline feldspar than do the lavas which flowed out earlier; that is, they are andesitic and even rhyolitic rather than basaltic in composition.

Now it is a remarkable and unexpected fact that about 98 percent of all extrusive rocks, namely the rocks which formed from magmas that poured out of volcanoes or from cracks in the ground, are basalts. These are dark and heavy and rich in ferromagnesian silicates and in plagioclase feldspars. At the other extreme, about 90 percent of all intrusive rocks, that is, rocks which solidified slowly deep within the earth to form batholiths and stocks, are granites and granodiorites. These great granitic masses could hardly have formed by the process of crystal settling or the squeezing out of liquid from an original basaltic magma. Ninety-five percent of a basaltic magma would have had to settle out to leave a granite. There is good evidence that many of the great granitic masses were formed, not by the cooling of a magma, but by a process of soaking of hot volatile fluids through sedimentary masses, transforming them into granite. This process, known as granitization, has been a subject of much controversy among geologists.

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FIELD TRIP TO THE THOMAS CREEK AND BILYEU CREEK FOSSIL LEAF LOCALITIES - SUNDAY, SEPTEMBER 26, 1954

Perfect weather brought a good turnout of some sixty people in 22 cars. After assembling at Scio at 10:00 a.m., the caravan proceeded 7 miles east on the Lyons road to Thomas Creek. Here, following a short talk by Dr. John Walsted, our trip leader, the serious business of collecting leaf fossils began. They are found in volcanic ash and pumice material along the banks and in the stream bed. Many leaves, as well as two ferns, were found.

After lunch we visited a part of the Bilyeu Creek area where more leaves including fine Metasequoia were collected. Both the Bilyeu Creek and the Thomas Creek areas are believed to be lower to middle Oligocene, although some disagree. It will require a more intensive study of the entire area to definitely determine the age. Due to lack of time most of the leaf fossils which were collected remain unidentified.

Late in the afternoon some thirty people availed themselves of the opportunity to visit the home of Ted and Eleanor Gordon where a welcome buffet supper was served. A most enjoyable evening was spent viewing their fine collection of fossils, minerals, and crystals.

The Gordon's hospitality, Dr. Walsted's fine leadership, and the work of trip-chairman Murray Miller in scouting and setting up the trip all combined to make this a most enjoyable experience. (A.K.)

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DR. DAKE TALKS ON GEMS

By Joan Ericksen

At the Friday night meeting, October 8, the GSOC heard an interesting talk on "Adventures in Gems," by Dr. Henry Dake. Agates have been found in Oregon for about 75 years. They were first found near Antelope, Oregon. Although the beach agates are famous, more and better ones are found in Central Oregon. Money isn't necessary in a gem collection. Just find some rhyolite or any other high-silica rock and look for agates and thunder eggs. By searching debris in stream beds one finds out what the entire mountain is made of. The diamond pipes of Africa were found in this way. Gems have always been valued from the earliest times. They were security for borrowing money. The value of most gems depends on the quantity of that kind. The more there are the less the value is. A lot of Central Oregon is still unexplored, and a collector has a good chance to get something worthwhile. Now chemists can make synthetic stones almost as good as the original; but they have yet to make them as equal to those nature makes. The collecting of gems is one hobby that will be always of some importance.

Glenn Pickens showed a display of some of his gems. It showed different types of material cut in a number of ways. He also had some synthetic stones which looked almost real.

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LUNCHEON NOTES

On September 16th the society had the pleasure of greeting the Ford Wilsons, who are now living in El Paso, Texas. They were in Portland during Ford's vacation from his work with the Army Engineers at the White Sands proving ground, New Mexico. Mr. Wilson took over for the talk and described with a sketch the area in which he is living and carrying on his work, the general topography and geography of the region with some discussion of the geology of the White Sands area. The sketch showed the location of the proving grounds in relation to El Paso and Almagordo. He described as much as he felt advisable of the tests of guided missiles at this station. (L.P.)

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GEOLOGICAL NEWS LETTER

OFFICIAL PUBLICATION OF THE

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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 between those engaged in the above objectives.

Persons desiring to become members should contact the Membership Chairman, Mr. Edward D. Bushby, 1202 S.W. Cardinell Drive, Phone CA 2123. Regular annual dues (single or family memberships) are $3.50 for residents of Multnomah and adjacent counties; $2.50 for others; and $1.50 for Junior Members. Make remittances payable to the Society.

Society Activities

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. Tenth Avenue and Yamhill Street. See Calendar of the Month for time of meeting.

FIELD TRIPS: Usually one field trip is scheduled for each month.

LIBRARY BROWSE NIGHTS: Twice a month. See the Calendar of the Month.

LUNCHEONS: Informal luncheons, with geological motif, each Thursday noon in Room 305, YMCA Building, S.W. 6th Avenue and Taylor Street. $1.00 per plate.

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

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CALENDAR FOR DECEMBER

Thursday Dec. 2 — Luncheon Meeting - Room 305 YMCA

Thursday Dec. 9 — Luncheon Meeting - Room 305 YMCA

Friday Dec.10 — Friday Night Meeting - Library Hall, 7:00 p.m.
Leo and Johanna Simon will show slides and specimens taken on their 8000-mile trip this past summer, on which they visited the Middle West from Oregon to Wisconsin, south to Kentucky and Oklahoma, then west through New Mexico, north to Montana, and back to our own Portland.

Tuesday Dec. 14 — Library and Discussion Night - Biology Building, Lewis and Clark College, 7:30 to 10:00 p.m.

Specimens of igneous rocks and the minerals which compose them will be on display. There will be plenty to read, to see, and to talk about; so come and bring friends.

Thursday Dec. 16 — Luncheon Meeting - Room 305 YMCA

Thursday Dec. 23 — Luncheon Meeting - Room 305 YMCA

Friday Dec. 24 — No meeting - too near to Christmas.

Thursday Dec. 30 — Luncheon Meeting - Room 305 YMCA

Note: There will be no field trip nor second Friday-night meeting in December.

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NEW MEMBER

Wiles, Mr. and Mrs. Elwood H.	425 S.E. 32nd Avenue	FI 2800

CHANGE OF ADDRESS

Bushby, Mr. and Mrs. Edward D.	2626 Ravensview Drive, Zone 1	AT 3021
Clark, Mr. and Mrs. William	3613 S.E. 9th Avenue, " 2	FI 9076
Golden, Mr. and Mrs. Ray S.	3223 S.E. 19th Avenue " 2	FI 3921

PFC Richard C. Walker, RA 19480062
HQ Co. 3rd Bn., 2nd Inf. Regt. 5th Divn.
APO 29, c/o Postmaster, New York, N.Y.
Dick would like to hear from home so please drop him a line.

****

Mrs. Donald Rowe (neé Carol Ann Schminky), who with her husband and baby Donald recently spent their vacation with their parents, has returned from Biloxi, Mississippi, for a more protracted stay with the Schminkys. Her husband, who has been an instructor in radar in the Air Corps, has been ordered to Newfoundland for special work there.

Introduced by Mrs. Arthur Jones at the luncheon on October 21 was Mrs. Fred W. Stone, an older sister of Dr. Jones, from near Morgan Hill, California. That, by the way, is one of the locations where the comparatively rare orbicular jasper is found. (A.H.)

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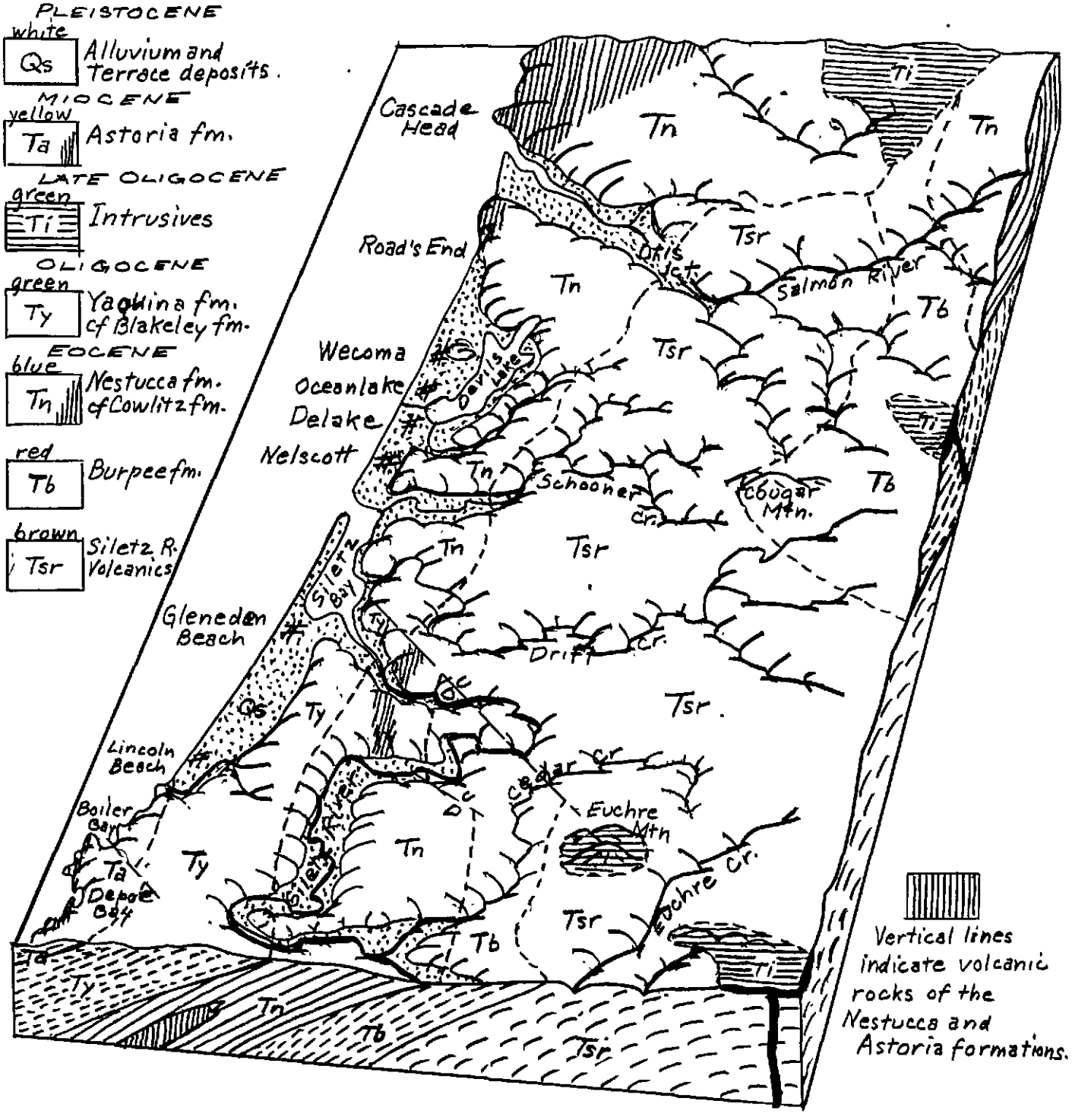
BLOCK DIAGRAM OF OREGON COAST
CASCADE HEAD TO DEPOE BAY
GSOC Field Trip - October 24, 1954



The topography is far more dissected than the drawing indicates.

The map may be colored with crayons or colored pencils.

TRIP TO THE OREGON COAST
October 24, 1954

Ten o'clock Sunday morning, October 24th, found sixteen carloads of GSOCers gathered at the old Widow Creek quarry on the Salmon River Road (State Highway 18) about five miles east of Otis Junction for the purpose of studying the geology of the Oregon coast. Our trip leader, Dr. James Stauffer of the Department of Geology of Lewis and Clark College, led us first across to the south side of the river where a new quarry presents an outstanding exposure of pillow lavas; that is, of lava which flowed out beneath the sea and hardened into pillow-shaped structures piled up one on another like sacks. The fractures of the pillows characteristically radiate from the center outward. This lava is a dark basalt, often containing vesicles in which zeolite or calcite has crystalized. Such structures are called amygdules. The formation was named the Siletz River volcanics by Snavely and Baldwin (1948), who consider it lower Eocene and compare it to the lower levels of the Tillamook volcanic series farther north. The quarry lies near the axis of a north-south trending anticline.

Leaving the quarry we drove westward toward Otis Junction, and thus descended the west limb of the anticline. We soon crossed an unconformity (which we did not stop to examine) and entered younger beds, namely the northwest-dipping sediments, mostly siltstones, of the Nestucca formation. (The Burpee formation which is present farther south is here missing.) Snavely and Vokes (1949) list the Nestucca as upper Eocene, and compare them with the Cowlitz formation farther north. We saw this formation to good advantage later in the day when we visited Road's End.

From Otis we journeyed southward along the coast, stopping briefly at Wecoma to see an excellent unconformity between the northwest-dipping Nestucca beds beneath and Pleistocene beach deposits above. Going on we passed Siletz Bay where out upon the tidal flats decaying logs are overgrown with bushes and small trees and look like Chinese Ming gardens. To the left as we continued south upon the raised beach terrace, were hills of the Yaquina formation (cf. Blakely formation upper Oligocene), but we did not stop to examine them.

Our lunch stop was on the beach south of Lincoln Beach where fossiliferous beds of the Astoria formation, mostly sandstones of Miocene age, outcrop next the sea. At this point the sandstones have been intruded by igneous rock. Excellent examples of stoping, i.e., of pieces of the sandstone (xenoliths) which have broken loose and been surrounded by the molten magma. Many fossils of bivalves and sea snails were collected by bursting apart the loose sandstone boulders at the foot of the sea cliff.

On the return trip we left the main coastal highway to view the cliffs of Road's End. Here the Nestucca (cf. Cowlitz) formation, dipping gently northwestward, is cut by sand dikes. The latter are an interesting phenomenon. Apparently cracks opened in the sea floor and sand flowed in, sometimes carrying shells with it. The headland itself is a breccia, the remains of a volcano which burst forth during Nestucca times. There is considerable carbonized wood within it.

The accompanying diagram gives an idea of how the several formations are related one to another. They lie on the west or seaward limb of the Coast Range anticline. The deformation which produced the Coast Range must have taken place in several stages: first during the Eocene the Siletz River volcanics and the Burpee formation were folded and eroded before the Nestucca formation was laid

down; again in the Oligocene before the Yaquina formation (which we did not visit) was deposited; then in the Miocene before the Astoria formation was formed; and finally in the Pliocene and Pleistocene when the present coastal terrace and beach deposits were formed. (F.G.)

References

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LINDA AND BILLY SPEAK

By
Ken and Dorothy Hammill

"This was the funnest trip of all," mused six-year old Billy on our way home from the field trip to the coast.

"Not funnest, Billy," corrected Linda from the superior height of nine-year old knowledge. "It was the most funnest —— I mean the best trip of all. The leaders must do lots of exploring to find all the good places they take us."

"Did you enjoy this trip more than the Mt. St. Helens one?" we asked.

"I forgot about that," Billy answered. "It was good, too. I liked seeing that tree sticking out of 120 feet of water, and the tree casts, and Dr. Lawrence putting Skipper in his knapsack so his feet wouldn't get sore when we crossed the rough lava and——"

"And hiking in that woodsy place on the soft moss, and all the different flowers," interrupted Linda, "and the jig-saw-puzzle rocks."

"And crossing the snow that was this slanty /," put in Billy. "It was good that I was 46 inches high."

They lapsed into contemplative silence. Then, "You know, Mommy, that unconformity tasted salty." I was still mentally on Mt. St. Helens but Linda had effortlessly jumped back to the present. "I guess it got salty from being in the ocean," she added. We wonder whether her ingrained habit of tasting the earth's crust in its various forms is an indication of hidden hunger due to vitamin deficiency or hunger for scientific knowledge.

"Amygduloids come in pigmeous rocks," this was from Billy who was apparently pursuing some thought of his own.

"Billy, not pig, ig. Igneous rock. And besides I bet you don't know what amygduloid even means," this from Linda.

"Yes, I do. It's lava that has gas bubbles in it, of course, and it hardened under water and the water brought minerals that filled up where the gas bubbles had been."

We changed the subject by mentioning the Fort Rock and Bellevue trips. They were equally enthusiastic. "I like putting up the sign and being in a caravan and wherever you look are GSOCers and they're all my friends," came from Billy.

"Mine, too," Linda agreed. "They don't laugh at me when I ask them things, and if they don't know they always tell me who does know. Even the teen-agers (a favorite word) are nice to me."

Silence again. Then Linda, "All the trips were best. I hope next summer we can go on every single geology trip because we have a chance to learn more about the things around us and we know what we are looking at when we see it."

"If we joined something else we'd still be mostly GSOCers wouldn't we?" Billy asked a little anxiously.

We assured him we would be. We are grateful parents.

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FRIDAY NIGHT MEETING - October 22, 1954

The film promised for the meeting failed to arrive. Instead, through the kindness of Mr. V. Carl Fink of the Eastman Kodak Company we enjoyed an illustrated talk on the Black Hills and Bad Lands of South Dakota. Then Reynolds Ohmart and Murray Miller reported with pictures on the trip which the Salem Geological Society took to the Fort Rock area of southern Oregon on September 11 and 12. The GSOCers who went along included the Millers, Clarks, and Hammils, the latter with their children Linda and Billy. The rest of us who heard the report decided right then and there that on our first opportunity we also wanted to see Moffitt Butte, Big Hole, Hole-in-the-Ground, Fort Rock, and the caves and beach terraces left by the old Pleistocene lake. Were the holes, three-fourths of a mile in diameter and 500 feet deep, made by huge volcanic explosions, or are they meteor craters? How does one account for Fort Rock and the buttes which stand out above the volcanic plain? It appears that there is still room here for geological study and speculation. (F.G.)

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G S O C LIBRARY NIGHT THROUGH THE EYES OF A NEWCOMER
By Ruth and Woody Wiles

November 9th we enjoyed an interesting evening in the new GSOC library at Lewis and Clark College. We entered a cozy meeting room where we met several friends, and then following them down a hall we joined others in the "Bushby Reading Room" for an hour of uninterrupted browsing. There were books of many types on geology and paleontology.

At nine o'clock we were directed to the lecture room, where Lon Hancock had a collection of fossils on display, mostly mammals that he excavated last summer from the Clarno beds of central Oregon, and also nuts from the nearby

nut deposits. He described each fossil and told us that he has found them to a depth of about six feet. Among the fossils were teeth of an amphibious rhinoceros (he did not bring his huge skull of this beast) and the skull of a smaller running rhino. There was the great jaw of a pantothere, and the large skull and also a jaw of a species of Hyaenodon, a primitive carnivorous mammal. He explained the difference between the browsing and grazing animals of the time as it is revealed in their well-preserved teeth. He also had with him the skull of an Oreodont from the John Day beds farther east. These were very prevalent animals of their day, for their fossils compose about twenty-five percent of the fossils which have been found. They were native to this country and did not migrate to other countries as did the camels, tigers, and horses.

We were brought out of our trance of the past by the delicious aroma of coffee served with cookies by our hostess, Mrs. Catherine Clark, and her assistants. Twenty-four of us, in all, were present; but there was room for a lot more. Try to come with us on a visit to the wonderland of geology when we meet again.

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DR. RUTH HOPSON TALKS ON CRATER LAKE

By
Mary Davenport

The meeting Friday night, November 12th, was devoted to a lecture by Dr. Ruth Hopson, Associate Professor of Natural Science at Portland State College, on Crater Lake. Her talk was high-lighted with numerous colored slides and a motion picture.

Crater Lake, some six miles across, occupies the collapsed top of an ancient volcano, Mount Mazama. Here one is able to go inside a volcano and see how it was made. In the far distance to the north the slides showed us the sharp summit of Mount Thielson, an ancient Pliocene shield volcano, now eroded to its core. In our imaginary trip in and about the lake we saw Wizard Island, a volcanic cone rising about 780 feet high. It is a true crater, whereas the lake itself is a caldera.

The Devil's Backbone on the west side of the lake is a prominent dike, which sticks out from the sheer wall. Near it is Llao Rock, an immense dacite flow which filled an ancient V-shaped glacial valley on the side of the old mountain. It is the largest single flow of its type known. If the back slope of Llao be projected upward it indicates that the original mountain was some 12,000 feet in height.

Across the lake are Karr Notch and Sun Notch, also excellent examples of glacial valleys. Dutton Cliff between them is covered with pumice, although none is to be found in the valleys on either side.

Cloudcap on the east side is the highest point on the rim. Below it the water reaches its greatest depth. From the top of Cloudcap to the deepest point in the water is a difference in elevation of nearly 4000 feet. A rare fern, the pumice grape fern, grows at the top of Cloudcap. It has also been found on Newberry Crater and on Broken Top.

Cleetwood Cove, named after the boat used by the U.S. Geological Survey party which surveyed the lake in 1886, is one of the spots of bluest water. It also attracts floating pollen and driftwood. The blueness of the water is

due to its extreme purity and its great depth. It contains only 55 parts of mineral matter in a million parts of water, whereas city drinking water may reach 500 parts to the million.

Because of its size and depth the lake has been known to freeze completely over only once. In the winter of 1949 two men were able to walk across to Wizard Island and back.

The water of the lake contains a species of salamander which has developed since the lake was formed. It differs from closely related salamanders in the pigment pattern of its legs.

Boundary Springs on the northwest side of the park is the beginning of the Rogue River. Here the water bubbles out at the level of the surface of the lake. This fact leads one to speculate as to whether the spring may be an outlet from the lake.

The animal life of the park is varied. Bear, chipmunks, and squirrels are the most common. In fact the squirrels and chipmunks compete with the lake as entertainment for the visitor. Less commonly seen are conies, marmots, and martens. Birds are abundant.

Flowers grow in profusion in some areas. One of the best places to see them is at the foot of Garfield near Government Camp, a location not generally known to tourists.

Following the talk by Dr. Hopson, Mr. Minar presented a display of some fine specimens of alabaster, jasper, black jade, marble, and fossil palm wood.

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LUNCHEON NOTES

The talk September 30th was by Hollis Dole on the ultrabasic minerals of southwest Oregon. Serpentine and peridotite, said he, are among man's best friends because they are associated with mineral deposits of chromite and nickel. In the past, copper, gold, and platinum have been mined in the vicinity of ultrabasic rocks, and the future may see cobalt and asbestos obtained in these areas. The presence of serpentine with strong foliation, or in a location away from large masses, delineates a fault zone. An area of serpentine is commonly barren of foliage because of its lack of fertility and shallowness of soil. Hence it often supplies a natural trail through wooded areas for the prospector to follow.

Ray Baldwin had been scheduled as the speaker at the October 7th meeting but was unable to attend because of the serious illness of his daughter. Leroy Palmer was asked to take his place. He has recently returned from the annual fall meeting of the American Mining Congress in San Francisco. The meeting was one of the most successful ever held with an attendance of more than 7000, an outstanding machinery exhibit, and a variety of papers of general and technical interest. An outstanding machinery exhibit attracted a great deal of attention, much interest being shown in some very large earth-moving equipment that was so completely under automatic controls that it was operated by girls. Of the many papers presented those on uranium stole the show, all of the meetings on this subject playing to standing room only. Other papers were on political and economic subjects and on various technical phases of mining and metallurgy. Before returning to Portland Mr. Palmer made a professional trip to examine a group of chrome properties in Northern California. He described briefly the geology of

chromite and passed around specimens of high-grade ore from South Africa and "leopard chrome" and concentrates from California.

The October 14th meeting was the best attended in a long time, 23 members and guests being present, among them seven past presidents. Guest of honor was Past President Dr. John Allen on a visit from New Mexico with Mrs. Allen and daughter Sally. Dr. Allen was the speaker and gave an informative talk on New Mexico, describing the geology briefly and giving some figures on mineral production, particularly natural gas, uranium, and potash. The figures bore evidence of the vast mineral wealth of the state. He also described work on which he has been engaged for the past two years in a detailed survey and mapping of two quadrangles on the Navajo Indian Reservation to determine their oil and gas possibilities. Incidentally "Lo, the poor Indian" isn't as poor as he once was if he happens to be a Navajo. In recent years the tribe has been paid about $9 million as oil and gas royalties and a comparable amount as uranium rentals and royalties.

On October 21st the speaker who was scheduled to give the "five-minute talk" was unable to appear, but the time was filled very well by Mr. Erickson and Mrs. Jones. Mr. Erickson read a letter from his daughter-in-law who is with her husband while he is engaged on the construction of a dam in India about 200 miles north of Delhi. The letter told of a native celebration in connection with the work on the dam and described very entertainingly a trip by rail from Delhi to the damsite. She said that in spite of their progress along certain lines, such as the building of a large dam for the benefit of the country as a whole, the people have not kept pace by a corresponding change in their habits of thought and living. The caste system still prevails, and the gap between the different castes is as wide and pronounced as ever. The poor are just as ignorant and in as bad shape as before, suffering from malnutrition and the diseases that malnutrition and ignorance bring about. Although they have ample evidence of the benefits to be derived they are still averse to seeking help from a doctor or going to a hospital and only do so as a very last resort.

Mrs. Jones' letter was from a Korean doctor who is in this country for some special work. It stressed the straitened conditions under which doctores in Korea are obliged to work, the lack of hospital facilities, shortage of supplies, trained help, etc.

The scheduled speaker October 28th was unable to be present, but we were fortunate in having as a guest Dr. John Walsted of the Experiment Station of the U.S. Bureau of Mines at Albany. At President Keen's request he took over and gave us an interesting talk on the work that he has been carrying on at the Experiment Station, particularly with reference to iron, manganese, and spigeleisen. The object of this work is to find practical methods by which different ores, heretofore considered noncommercial, may be treated so as to yield useful products. Dr. Walsted's report on the Scappoose iron ores has just been published by the U.S. Bureau of Mines as Report of Investigations No. 5079, and is now in the Society's library.

November 4th Fay Libbey continued his talk on the mining laws, the first part of which he gave on September 2. He took the subject from 1872, the date of the present law. He explained the method of locating a claim, maintaining it, and finally securing a patent. The law of extralateral right was once very important and the cause of much litigation but now is almost wholly disregarded. Such questions are usually settled by agreement between the parties. A tunnel claim can be located along a line 3000 feet long, and a tunnel driven thereon with rights to any veins discovered. In 1920 Congress made a radical change when it removed certain nonmetals from the purview of the mining laws and made them subject to leasing. A modification in 1954 permits locating mining claims for other minerals on leasing act lands. (L.P.)

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