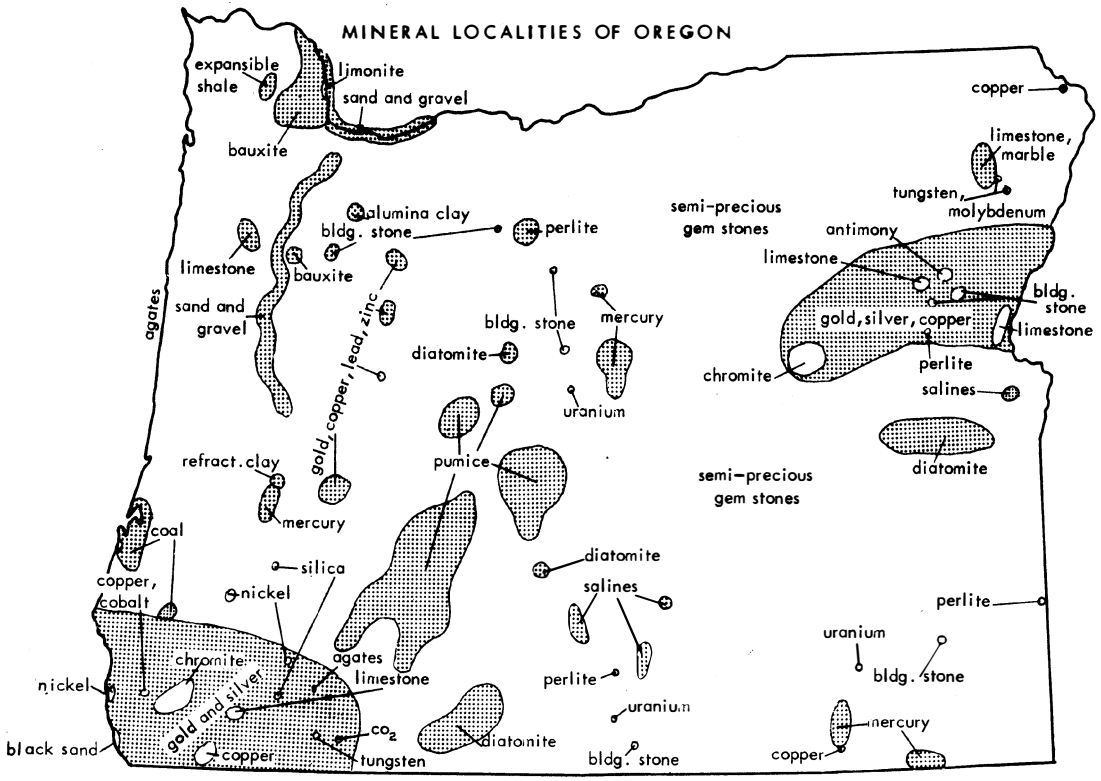
TWELFTH BIENNIAL REPORT
STATE OF OREGON

Department of Geology and Mineral Industries

1958-1960



BULLETIN 51

TWELFTH BIENNIAL REPORT

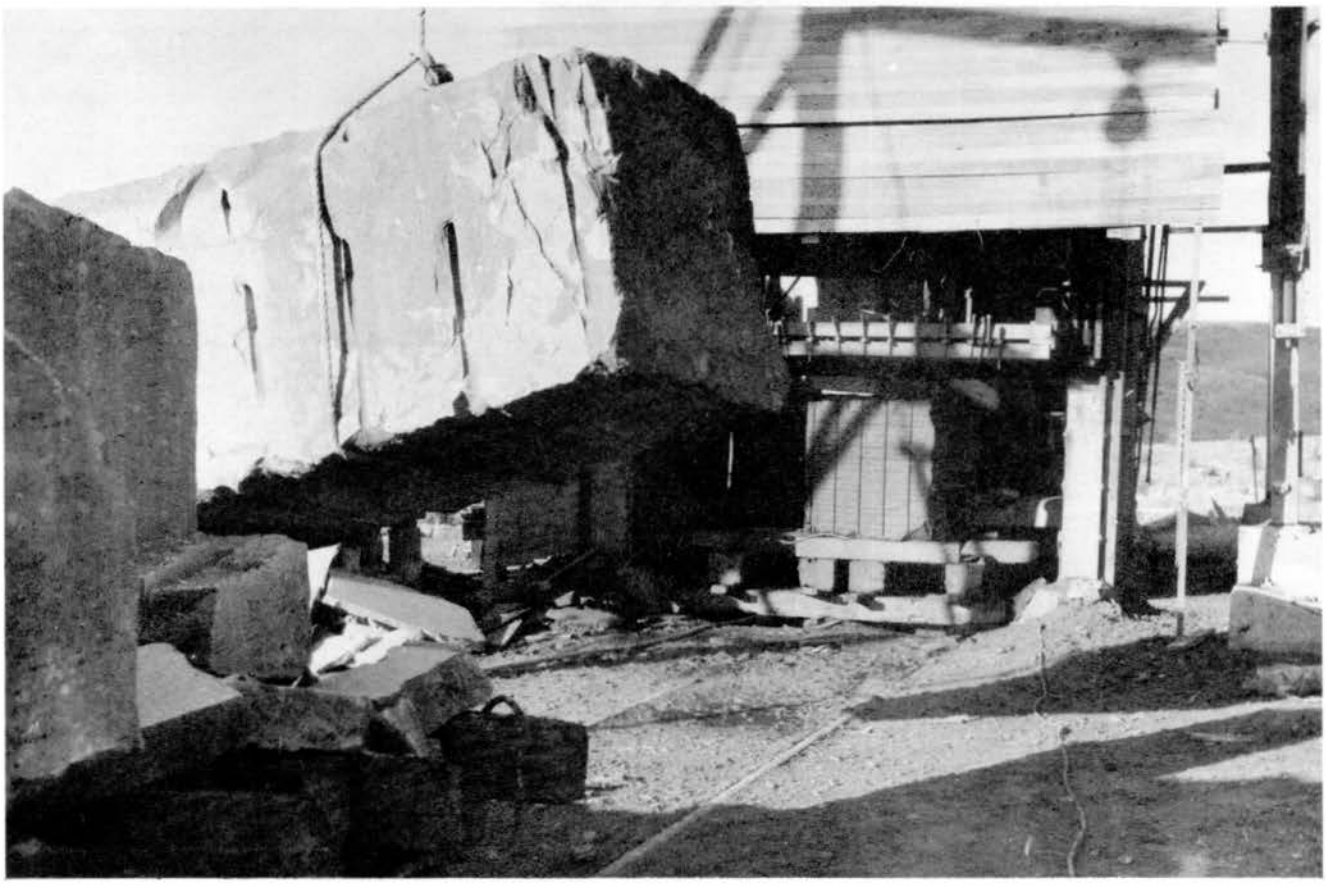
STATE OF OREGON

DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

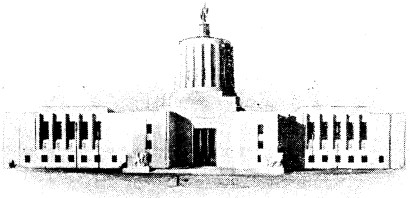
1958---1960

1960

Aerial view of Hanna Mining Company nickel mine, near Riddle, Douglas County, showing open pit benches and aerial tramway leading to smelter.



Eight ton quarry block on its way to gang saw, Oregon Rose Quarry, Jefferson County. Sawed block ready for splitting in background.



STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
1069 STATE OFFICE BUILDING
PORTLAND 1

To His Excellency Mark O. Hatfield
Governor of the State of Oregon
and to
The Fifty-first Legislative Assembly of the State of Oregon

Sirs:

We submit herewith the Twelfth Biennial Report of the Department of Geology and Mineral Industries, covering activities of the Department for the period from July 1, 1958, to and including June 30, 1960.

Respectfully,

William Kennedy

William Kennedy, Chairman

Harold Banta

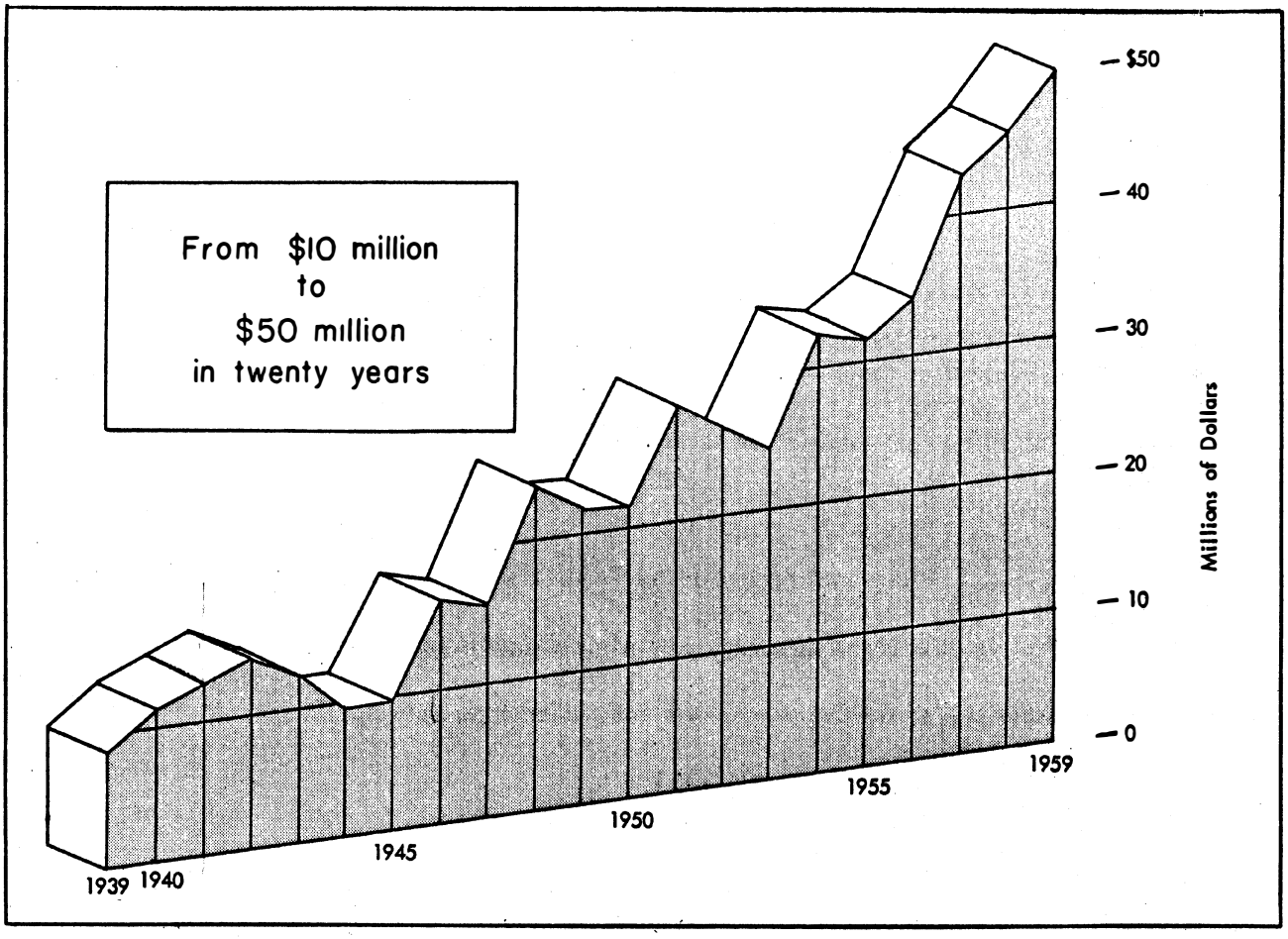
Harold Banta, Member

Earl S. Mollard

Earl S. Mollard, Member

Portland, Oregon
December 30, 1960

OREGON'S MINERAL PRODUCTION



Mineral Production in Oregon, 1958 - 1959

Mineral	1958 Short tons (unless otherwise stated)	1958 Value (thousands)	1959 Short tons (unless otherwise stated)	1959 Value (thousands)
Chromite - gross weight	4,133	1/	-	-
Clays - thousand short tons	252	$293	294	$308
Copper (recoverable content of ores, etc.)	10	5	-	-
Gold (recoverable content of ores, etc.) - troy ounces	1,423	50	686	24
Lead (recoverable content of ores, etc.)	1	-	-	-
Mercury - 76-pound flasks	2,276	521	1,224	278
Nickel (content of ore and concentrate)	12,697	1/	12,374	1/
Pumice and volcanic cinder - thousand short tons	138	331	1/	1/
Sand and gravel - thousand short tons	10,464	10,265	18,087	15,506
Silver (recoverable content of ores, etc.) - troy ounces	2,728	2	242	-
Stone - thousand short tons	15,077	15,621	13,341	16,126
Value of items that cannot be disclosed: Carbon dioxide, cement, diatomite, gem stones, iron ore (pigment material) 1959, lime, uranium (1959), and values indicated by footnote 2.		19,311		18,596
Total 2/		45,190		49,831

1/ Figure withheld to avoid disclosing individual company confidential data.
2/ Total adjusted to eliminate duplicating value of clays and stone.

OREGON'S MINERAL INDUSTRY TODAY

The value of raw minerals mined in Oregon in 1959 increased 10 percent over the previous year to an all-time high of $49,800,000. Oregon's mineral industry has been on an "increased yield" basis for the past 20 years. During this period the value of minerals produced has increased a spectacular 477 percent. Crushed stone and sand and gravel continue to be the most valuable mineral commodities produced, accounting for nearly two-thirds of the total value. These commodities serve as good indexes of the development and growth of an area since they are basic construction materials. Oregon is fortunate in having both of these products in ample supply and fairly well located with respect to population centers. Production of limestone for cement likewise continued to increase in response to area construction. Limestone was also used in the manufacture of calcium carbide, and a new plant erected during the year began producing vinyl acetate, using limestone as one of the raw ingredients.

The State's lightweight aggregates, expanded shale and pumice, found a ready market in construction and architectural applications. Pre-stressed concrete girders, beams, and slabs made with lightweight aggregate enabled builders to erect more economical structures embodying the latest design features. The popularity of Oregon building stones increased tremendously during the biennium. Nineteen quarries were in operation in 1960, with the expectation that this number will increase. Oregon has a wealth of volcanic products suitable for ornamental and building stone, nearly all of which are relatively light in weight, easy to shape, and have an interesting texture and color. The recent discovery of a large deposit of high-grade silica in Douglas County greatly increases the State's reserves of this important mineral used extensively by the electro-process industry.

A payroll of $61,431,000 was reported for the mining and metallurgical industry in 1959. This is not a complete figure since many employees who earn their living working for a mining or metallurgical company fall into non-productive classifications not credited to the industry as such. The true payroll figure should probably amount to $100 million.

Electro-process plants in Oregon are turning out a wide variety of products, many of which have appeared during the past few years. "Space age" or "reactive" metals such as hafnium, zirconium, tantalum, columbium, and titanium are now refined from ores or semi-refined products shipped from points outside Oregon. Vermiculite, perlite, talc, salt, and bauxite are imported for processing locally into finished products. Imported ores also provide two aluminum plants, one silicon and one glass plant with raw material.

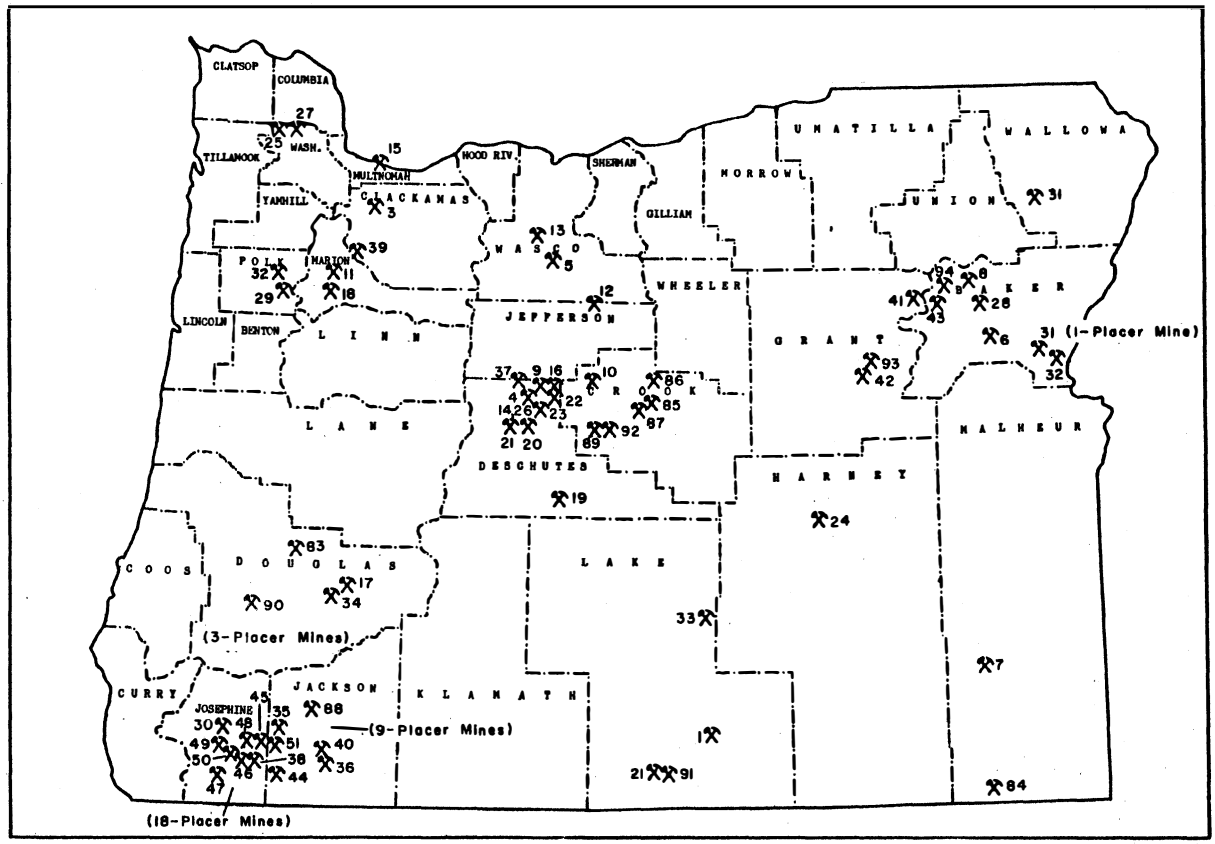
The only nickel mine and smelter in the United States is at Riddle, Douglas County, where approximately 1 million tons of ore are mined and processed annually. Other mineral and metallurgical plants use Oregon ores to produce uranium yellow cake, burnt lime, cement, dry ice, mercury, brick and tile, diatomite, calcium carbide, and ferrosilicon.

Oregon Mineral Industry Employment and Payrolls*

	1958		1959	
	Employment	Payrolls	Employment	Payrolls
Mining	1,330	$7,381,000	1,227	$6,955,000
Mineral manufacturing	2,500	13,140,000	2,552	14,341,000
Primary metals	5,023	30,814,000	5,650	35,586,000
Miscellaneous	736	4,089,000	762	4,549,000
Totals	9,589	$55,424,000	10,191	$61,431,000

* Oregon State Unemployment Compensation figures.

ACTIVE MINES



Building Stone Quarries

1. Banasco
2. Bartell
3. Carver
4. Cinder Hill
5. Hawaiian Travertine
6. Moon Mesa
7. Natural Stone
8. Northwestern Granite
9. Ochoco Stone
10. Oregon Emerald
11. Oregon Tuff Stone
12. Oregon Rose
13. Oregon Rainbow
14. Red Rock
15. Rocky Butte
16. Sahara Tan
17. Snow Bird
18. Stayton Flatrock
19. Williamson

Lightweight Aggregates

20. Cascade Pumic Corp.
21. Central Oregon Pumice Co.
22. Cinder Hill Quarry
23. Deschutes Concrete Products Co.
24. Harney Concrete Tile Co.
25. Northwest Aggregates, Inc.
26. Red Rock Mine
27. Smithwick Concrete Products Co.

Limestone

28. Chemical Lime Co.
29. Dewitt's Polk County Lime Co.
30. Ideal Cement Co.
31. Greely Lime Co.
32. Oregon Portland Cement Co.

Miscellaneous Nonmetals

33. Alkali Lake Sodium
34. Big Quartz Mine
35. Bristol Silica Co.
36. Gas-Ice Corp.
37. Great Lakes Carbon Corp.
38. Leverett Marble
39. Wilhoit Coal Mine

Gold Lode Mines

40. Ashland
41. Buffalo
42. Cobalt-Gold
43. Columbia-North Pole
44. Ducharme No. 6
45. Greenback
46. Humdinger
47. M. C. Claim
48. Oro Grande
49. Reno
50. Snow Bird
51. Warner

Gold Placers (52-82)

Anderson
Baker Flat
Buddy
Bear
Brown
California Bar
Can Can
Coarse Gold Creek
Crump
De Janvier
Edmonds
Esterly
Forest Queen
Goff
Golden Bar
Golden Lyon
Gold Nugget
Hogum Creek
Johnson
King
Last Chance
Lucky Strike
Maloney
Oregon Bar
Rocky Gulch
Ruble
Schaffer
Schoemaker
Sterling
Sutter
Upper Hogum

Mercury Mines

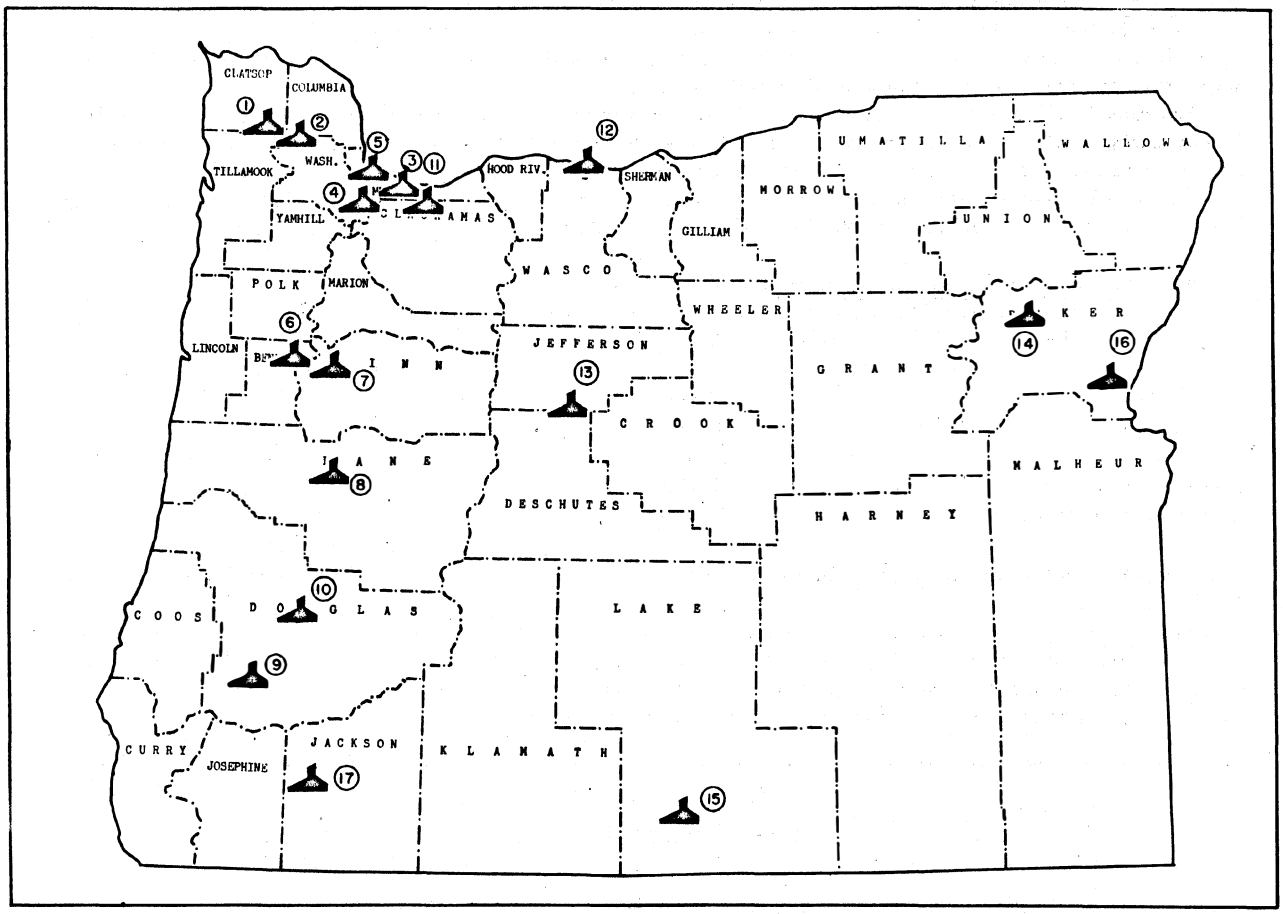
83. Bonanza
84. Bretz
85. Maury Mt.
86. Mother Lode
87. Towner
88. War Eagle

Miscellaneous Metals

89. Bear Creek Mining Company (uranium)
90. Hanna Nickel Smelting Co. (nickel)
91. Lakeview Mining Co. (uranium)
92. Sage Hollow Mine (uranium)
93. Standard Mine (copper, gold)
94. Twin Mt. Mining Co. (molybdenum)

(Exact locations of gold placers not shown.)

MINERAL AND METALLURGICAL PLANTS



Map No.	Company and Plant Location	Product
1	Empire Building Materials Co. Sunset Tunnel	Expanded shale
2	Smithwick Concrete Products Co. Vernonia	Expanded shale
3	Pacific Carbide & Alloys Co. Portland	Calcium carbide, acetylene, vinyl acetate
4	Oregon Portland Cement Co. Oswego	Portland cement
5	Electrometallurgical Co. Portland	Calcium carbide, ferroalloys
6	Wah Chang Corp. Albany	Columbium, tantalum, zirconium, hafnium, titanium
7	Oregon Metallurgical Corp. Albany	Zirconium and titanium ingots, forgings and castings
8	National Metallurgical Corp. Springfield	Elemental silicon
9	Hanna Nickel Smelting Co. Riddle	Ferronickel
10	Bonanza Oil & Mine Corp. Sutherlin	Mercury
11	Reynolds Metals Co. Troutdale	Aluminum
12	Harvey Aluminum Co. The Dalles	Aluminum
13	Great Lakes Carbon Corp. Lower Bridge	Diatomite
14	Chemical Lime Co. Baker	Burned lime
15	Lakeview Mining Co. Lakeview	Uranium yellow cake
16	Oregon Portland Cement Co. Lime	Portland cement
17	Ideal Cement Co. Gold Hill	Portland cement

OIL AND GAS DRILLINGS

Exploration: Five major oil companies and one large independent oil company made geological and geophysical surveys in the State during the biennium. Gravity surveys were made in central Oregon and in the Willamette Valley while seismic surveys were run in the northwestern portion of the State. Limited geologic studies were carried out by several small groups who planned "wilcat" ventures.

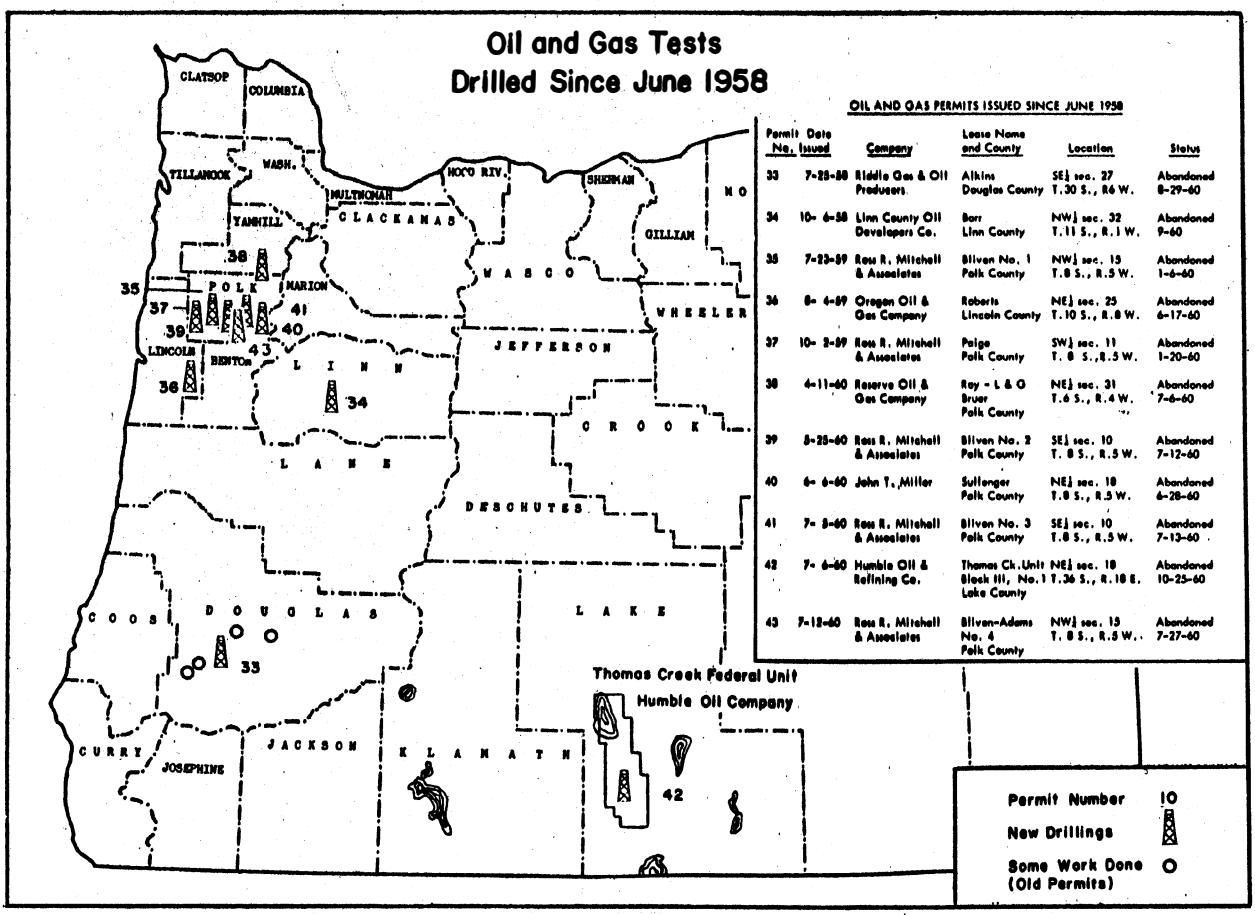
The Humble Oil & Refining Company assembled a very large block of leases for oil exploration in southern Lake County during 1959 and 1960. This block was estimated to be nearly 500,000 acres, of which about 300,000 acres were incorporated into a Federal Unit Lease Agreement. A drilling was begun in late July, 1960, and was abandoned at 12,093 feet in October after the loss of a string of tools in the hole. Reserve Oil & Gas Company of Bakersfield, California, drilled a 5,500 foot test hole in northern Polk County during May, 1960.

Revenue Received from Oil and Gas Activity: Besides drilling activity, leasing of oil and gas mineral rights comprises a large share of exploration expense. Leasing activity in Oregon has been fairly active since the early 1950's. Below are totals for land leased this biennium.

Ownership	Acreage	Rental collected during the biennial period
Federal land	632,410	\$182,795.50*
State land	60,648	30,747.50
County land	21,008	10,178.84
Private land (estimated)	500,000	150,000.00
	1,195,058	\$373,721.84

*Each county receives 37½ percent of the revenue collected on Federal land within its boundaries.

Administration: Eight new drilling permits were issued by the Department between June 30, 1958, and June 30, 1960. All but two of these drillings were shallow tests. Seventy field trips were made during the same two years to inspect drilling work and oversee abandonment operations. Sixteen drillings were abandoned in the biennial period; included in these were six old wells which had been left unplugged by the operators.



OIL AND GAS PERMITS ISSUED SINCE JUNE 1958

Permit No.	Date Issued	Company	Lease Name and County	Location	Status
33	7-25-58	Riddle Gas & Oil Producers	Atkins Douglas County	SE¼ sec. 27 T.30 S., R6 W.	Abandoned 8-29-60
34	10- 6-58	Linn County Oil Developers Co.	Barr Linn County	NW¼ sec. 32 T.11 S., R.1 W.	Abandoned 9-60
35	7-23-59	Ross R. Mitchell & Associates	Bliven No. 1 Polk County	NW¼ sec. 15 T.8 S., R.5 W.	Abandoned 1-6-60
36	8- 4-59	Oregon Oil & Gas Company	Roberts Lincoln County	NE¼ sec. 25 T.10 S., R.8 W.	Abandoned 6-17-60
37	10- 2-59	Ross R. Mitchell & Associates	Paige Polk County	SW¼ sec. 11 T. 8 S.,R.5 W.	Abandoned 1-20-60
38	4-11-60	Reserve Oil & Gas Company	Roy - L & O Bruer Polk County	NE¼ sec. 31 T.6 S., R.4 W.	Abandoned 7-6-60
39	5-25-60	Ross R. Mitchell & Associates	Bliven No. 2 Polk County	SE¼ sec. 10 T. 8 S., R.5 W.	Abandoned 7-12-60
40	6- 6-60	John T. Miller	Sullenger Polk County	NE¼ sec. 18 T.8 S., R.5 W.	Abandoned 6-28-60
41	7- 5-60	Ross R. Mitchell & Associates	Bliven No. 3 Polk County	SE¼ sec. 10 T.8 S., R.5 W.	Abandoned 7-13-60
42	7- 6-60	Humble Oil & Refining Co.	Thomas Ck. Unit Block III, No. 1 Lake County	NE¼ sec. 18 T.36 S., R.18 E.	Abandoned 10-25-60
43	7-12-60	Ross R. Mitchell & Associates	Bliven-Adams No. 4 Polk County	NW¼ sec. 15 T. 8 S., R.5 W.	Abandoned 7-27-60

RELATION OF THE DEPARTMENT TO THE MINERAL INDUSTRY

July, 1962, will mark the 25th year of the Department of Geology and Mineral Industries. In this period Oregon's mineral industry has changed from one principally concerned with the mining of the nonferrous metals (gold, copper, lead, and zinc) through a war-time one supplying the much needed strategic minerals (mercury, chrome, nickel, and uranium) to the present industry producing industrial minerals (limestone, silica, building stone, and other nonmetallic minerals) for our newly established electroprocess plants and our expanding plant and housing construction. Today's mineral picture is not entirely lacking in metals; there is still some gold and mercury production and the yearly value of the nickel produced at Riddle is greater than the yearly value ever shown by gold.

Mineral needs of the Nation and the State have never been static. Modern uses for old metals, utilization of new metals, improved technologies, availability and kinds of energy, and changes in transportation costs and patterns are some of the factors that create demands or reduce the need for mineral materials being produced at any one time. This is not peculiar to Oregon's mineral industry; this is standard operating practice in the minerals field.

To meet our ever-changing mineral needs, the Department of Geology and Mineral Industries functions as a vital link between raw materials and industry. The Department collects basic information on the geology of the State and conducts studies on the occurrence, distribution, and geologic environments of mineral materials. The data and experience gained by Department experts are made available to public and private organizations through publications, consultations, lectures, field inspections, and reports. The prospector and small miner are encouraged to investigate in Oregon by the free assay service of the Department and by technical assistance from field geologists and engineers. Industries using or needing geologic information or mineral raw materials have in the Department a central source for information and advice. Federal organizations and the Department cooperate on many projects to the mutual benefit of State and Nation.

The success of Oregon's Department of Geology and Mineral Industries in guiding the State's mineral industry is indicated by the fact that in the past 20 years the value of mineral production has increased five times from about $10 million in 1939 to nearly $50 million in 1959. In this same period, industry has spent more than $50 million in Oregon on mineral and industrial developments directly attributable to investigations and publications of the Department. The Department has established itself as the recognized spokesman for the State's mineral industry, and as a result industry, State agencies, and the general public turn to the Department for information on Oregon's geology and mineral resources.

DUTIES OF THE DEPARTMENT
(Chapter 516, ORS)

Conduct geological and mineral resource studies.

Carry out economic studies pertaining to utilization of mineral raw materials.

Cooperate with Federal and other agencies in studies of value to the State.

Serve as a bureau of mineral and geological information, compile and keep up-to-date a mines catalog, prepare and publish reports of investigations, mineral statistics, etc.

Conduct a State geological survey.

Collect a mining and geological library.

Collect specimens and develop a museum of mineral and geological specimens, maps, and other objects representative of mineral industry activities.

Make qualitative mineral determinations.

Study minerals and ores as well as processes for improved ore treatment.

Make quantitative determinations of ores and minerals.

Make spectrographic analyses.

Administer act regulating drilling, prospecting for, production, and conservation of natural gas and oil (Chapter 520 ORS).

THE APPROPRIATION

(1959 - 1961 FISCAL BIENNIUM)

Salaries and Wages	$ 278,933	75.5 percent
General, Operating, Maintenance	65,890	17.7
Capital Outlays	10,098	2.7
State Geologic Map	15,000	4.1
TOTAL	$ 369,921	100 percent

AND WHAT IT PAID FOR

(1958 - 1960 REPORTING PERIOD)

1,299 Square miles geologically mapped

362 Field investigations

10 Commodity studies

9 Engineering-geology studies

26 Cooperative projects with other agencies

5 Publications issued

51,050 Copies of the ORE.-BIN

480 Mineral sets

7,450 Visitors

3,788 Mineral identifications

5,269 Chemical analyses

2,506 Radiometric determinations

1,119 Spectrographic analyses

510 Petrographic examinations

89 Talks

41 Field trips for groups

5 Office tours

20,157 Pieces of mail sent (excludes bulk mail)

24,900 pieces of mail received

THE DEPARTMENT SERVES OREGON

The Department serves industry

The Department is strongly conscious of its responsibility to broaden Oregon's economic base. It performs mineral resource studies and detailed geologic mapping in order to call the attention of industry to significant mineral deposits or favorable geologic environments. It compiles mines catalogs to answer inquiries of companies investigating location and occurrence of mineral commodities. Each geologist and engineer within the Department is an expert on certain minerals and areas and is thus able to furnish information quickly and accurately to investigating engineers. Of the 22,000 letters written during the biennium, a great many were concerned with inquiries from industry. The subscription list of THE ORE.-BIN, the Department's monthly news publication, reveals that many major mining and oil companies of the country look to the Department for current information on Oregon. Large numbers of the Department's publications are purchased by industry, and the Department's geological library is used extensively for research.

The Department serves the prospector and small mine owner

The prospector and small mine owner look to the Department of Geology and Mineral Industries for help in almost all fields of their activities. During the biennium the laboratories made 7,361 mineral analyses and mineral identifications, most of which were for prospectors. In addition, many field examinations and conferences were conducted by members of the staff. The Director appeared before the U. S. House of Representatives Committee on Interior and Insular Affairs in June, 1959, in behalf of the chrome miners and prospectors. Assistance was given on many legislative items on the national level.

A primary purpose of THE ORE.-BIN is to keep the prospector and small miner informed of new publications, legislation, and mineral markets. Other Department publications are issued at a small charge in order to be available to all.

The Department serves the general public

Great public interest in Oregon's geology and mineral industry is shown by the numerous requests made to the Department for talks to school children and adult groups and for conducted field trips. Members of the staff give instruction at the Oregon Museum of Science and Industry, help in the Boy Scout merit badge program, and assist 4-H Club and Campfire Girl groups. These services are the responsibilities of the regular staff members and generally take place in the evenings or on weekends. The Department welcomes the opportunity to appear before groups as it feels a better understanding of Oregon's mineral potential by the public is necessary if the State's resources are to be used wisely.

The Department maintains a large and growing library of books on geology and mining that are available to the public for study. A file of geologic and mineral-industry photographs is continually being expanded. Additional museum space at the Portland office was provided for in the present biennial budget, and modest displays of rocks and minerals are on exhibit in the field offices. Sets of typical rocks and minerals of Oregon are loaned to science classes of grade and high schools. The Department feels an educational responsibility to the public, for a sign of an enlightened society is a better understanding of its surroundings.

The Department serves other agencies

The Department, in its capacity as the State organization responsible for geological and mineral resource information and studies, is called upon by many governmental agencies and civic groups for technical information. Generally it makes no charge for its services but if the request involves considerable time or expense, provisions are made in the Department's enabling act to charge the actual cost. Work through the spectrographic laboratory, however, must be on a fee basis.

Fifteen state agencies, four counties, seven cities, five Federal agencies, and ten nonprofit scientific organizations were given assistance by the Department during the biennium. This help varied from furnishing geologic data for some immediate need to conducting major geologic and mineral resource studies for community planning projects.

PROJECTS OF THE DEPARTMENT

Projects of the Department can be considered as "building blocks" for the job of completing the work assigned by the Legislature. Proposals for projects are presented to the Governing Board by the Director after a careful examination has shown that the need for the study exists. The Board authorizes a project when it establishes that the study would be in the best interest of the State, that it falls within the duties of the Department as prescribed by law, and that the Department's financial capacity suffices to complete it. Department projects fall into four broad divisions, as follows:

Geologic mapping

Geologic maps provide the basis for an understanding of the rocks and their structures in an area. With the assistance of geologic maps, mining and petroleum companies can use the information to guide sound exploration programs for hidden new resources. Known mineral resources can be related to the distribution and structure of the rocks that contain them. Engineers can most effectively select optimum sites for construction of highways, dams, buildings, and the like, and can efficiently plan flood control, water supply, sewage networks, and programs for land utilization. Geologic mapping projects completed or under way include the following:

STATE GEOLOGIC MAP, a cooperative project with U. S. Geological Survey. Work concentrated in northeastern and southeastern parts of State during biennium. Western Oregon completed in 1956. This basic mapping project probably most important work of Department. SPARTA AND BAKER-1 QUADRANGLES, two 15-minute quadrangles in Baker County, being mapped primarily for Department's resource study on copper. Work begun in 1959 to be completed in 1961. IRONSIDE MOUNTAIN QUADRANGLE, a 30-minute quadrangle in Baker, Grant, and Malheur counties, mapped for State Geologic Map and mineral resource studies. Completed in 1960. PRE-TERTIARY INLIER of central Oregon, a large irregular area chiefly in northwestern Harney County that includes all outcrops of pre-Tertiary rocks. Mapping being done for State Geologic Map and mineral resource studies. STRATIGRAPHY AND MICROPALEONTOLOGY OF PALEOZOIC ROCKS, a basic work primarily for State Geologic Map but will be used in future detailed mapping of areas enclosing Paleozoic rocks.

Resource studies

Investigation is made of rocks and their structures with emphasis on certain minerals as an aid in the development of Oregon's mineral resources. The purpose is to call attention to mineral occurrences as well as to delineate the distribution and environment of mineralization. Results are published as bulletins, short papers, or THE ORE.-BIN articles. Projects under way during the biennium were:

URANIUM IN OREGON, for which a large area in southwestern Lake County was mapped at both detailed and reconnaissance scales. Field work started in 1956 and completed in 1960. LODE MINES OF CENTRAL PART OF GRANITE MINING DISTRICT, Grant County, established geologic setting of mineralization in this area. Project started in 1958 and published as Bulletin 49 in 1959. QUICKSILVER IN OREGON, a study of all mercury deposits in State based on new work and compilation of existing data. Project started in 1958 and field work completed in 1960. COPPER IN OREGON, a long-range project begun in Baker County in 1959 and entailing geologic mapping and geochemical studies. BUILDING STONES OF OREGON, a study designed to call attention to the many and varied native building stones. Field work begun in 1959 and completed in 1960. INTRUSIVES IN CENTRAL COAST RANGE OF OREGON, a cooperative project with U. S. Geological Survey and Bureau of Mines. Designed to contribute information on "basement" rocks of Coast Range and to furnish data on distribution and properties of igneous rocks for construction purposes. Geologic mapping and petrographic studies entailed. Project started in 1958 and field work completed in 1960. MISCELLANEOUS INDUSTRIAL MINERALS projects completed on expansible shale (in cooperation with Bureau of Mines), silica, carbon dioxide, and limestone.

Engineering studies

These projects are concerned mainly with surficial deposits and geologic structure of rocks. They are to assist in community planning for urban development, in locating building sites, and in delineating areas of aggregate for building and construction. Projects under way during biennium were as follows:

LANDSLIDE AREAS IN PORTLAND HILLS, a study to determine extent of landslide areas and to assist in future development of Portland, where loss of property due to landsliding has been very high. Project started in 1960. AVAILABILITY OF AGGREGATE IN SALEM AREA, a study undertaken at request of Mid-Willamette Valley Planning Commission, Salem, to assist in future developments in Salem area. Project started in 1960.

General information

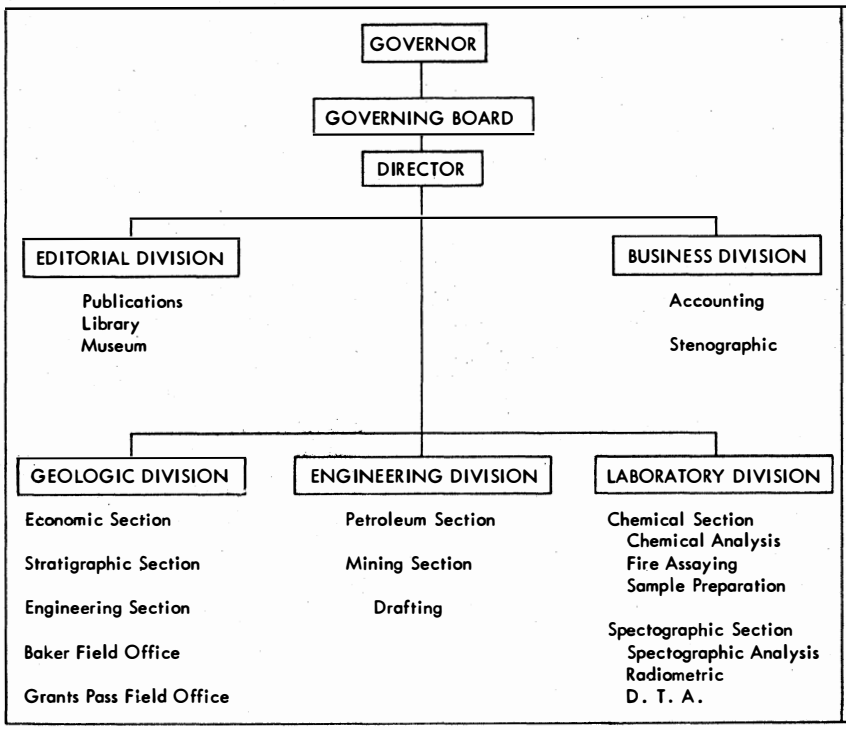
Projects within this division make available a variety of information of widespread public interest. Some are continuing studies, such as the periodic issuance of accumulating data, others are of very short duration.

ORGANIZATION OF THE DEPARTMENT

General charge and control of the Department are placed in a three-member Governing Board appointed by the Governor and subject to approval of the State Senate or Mining Board Interim Committee. The Board appoints a Director for the Department whose qualifications are set by law. The Director is responsible for the work of the Department. Progress reports, plans, and budgets are presented by him at each meeting of the Governing Board. The Director is authorized to employ the staff necessary for execution of Board approved plans and for operation of the Department.

The head office of the Department is in the State Office Building, Portland. Field offices are located in Grants Pass and Baker. The assaying, chemical, and spectrographic laboratories and the accounting functions are centralized in the Portland office. The library and museum are also located at Portland, but rock and mineral displays and literature of local interest are kept in each of the field offices. These offices are maintained to enable the Department to give better, faster, and more economical field inspections and to make the other services of the Department more readily available to miners, prospectors, and the general public.

The Department's duties are separated into five divisions: geologic, engineering, laboratory, editorial, and business. The geologic division makes mineral resource studies, petrographic examinations of rocks and minerals, field examinations of prospects, geologic-engineering studies, stratigraphic studies, geochemical studies, and does geologic mapping at both the State Geologic Map and quadrangle map scales. The engineering division is responsible for the Department's purchases and inventory, investigations under the Oil and Gas Act, compilation of data on Oregon's mineral industry, resource studies, and drafting. The laboratory division has chemical, assaying, spectrographic, radiometric, and differential thermal analysis equipment for making qualitative and quantitative determinations on Oregon rocks and minerals. The spectrographic laboratory also does work for other State agencies, private laboratories, and industrial firms on many kinds of material as provided for under ORS 516.060. Personnel in all three divisions make rock and mineral identifications, consult with callers at the office, handle correspondence, and make public appearances in behalf of the Department. The editorial division prepares manuscripts for publication, compiles THE ORE.-BIN, and maintains the library and museum. The business division performs the necessary stenographic, typing, accounting, and receptionist duties of the Department.



GOVERNING BOARD

William Kennedy, Chairman, Portland
Harold Banta . . . . . Baker
Earl S. Mallard . . . . . Riddle

DEPARTMENT PERSONNEL

H. M. Dole, Director
L. M. Killian, Secretary
J. A. Roberts, Secretary
R. P. Zobl, Accountant
M. R. Roberts, Editor
M. L. Steere, Staff Geologist
*R. A. Hansen, Student worker
L. L. Hoagland, Assayer-Chemist
*P. C. DeBok, Sample preparator
T. C. Matthews, Spectroscopist
R. S. Mason, Mining Engineer
M. P. Christianson, Draftsman
V. C. Newton Jr., Petroleum Engineer
R. G. Bowen, Economic Geologist
R. E. Corcoran, Stratigraphic Geologist
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N. S. Wagner, Field Geologist, Baker
*T. M. Myers, Secretary, Baker
N. V. Petersen, Field Geologist, G. Pass
L. Ramp, Field Geologist, Grants Pass
A. M. Jacques, Secretary, Grants Pass

*Part-time employees

FINANCIAL STATEMENT

The Department's activities are financed by money appropriated by the Legislature out of the State's General Fund. Appropriations received by the Department are divided into accounts classified as follows: Personal Services; General, Operating & Maintenance; Capital Outlays; and State Geological Map. Funds appropriated for use under one classification may not be used for expenditures in a different classification. All departmental expenditures are evidenced by warrants drawn on the State Treasurer and are audited by the office of the Secretary of State.

Funds received by the Department through the sale of publications, spectrographic fees, oil and gas test permits, and miscellaneous receipts amounted to $9,225 in the period covered by this report. All receipts of the Department are now returned intact to the General Fund. The Geology and Mineral Industries Account, established by the Department's enabling act, was terminated July 1, 1959, in accordance with an act of the 1957 Legislature and the balance was turned over to the General Fund. Prior to this act, funds appropriated to the Department by the Legislature were augmented by Legislative authorization to spend from the Geology and Mineral Industries Account.

The following table gives a summary of Department expenditures in the 1957-59 biennial period, the amount appropriated for the 1959-61 biennium, and the request for appropriations for the 1961-63 biennium. A detailed statement on the three biennia is given on the facing page for comparative purposes.

	Expended	Appropriated	Requested
	1957-1959	1959-1961	1961-1963
Personal Services	$ 244,322.76	$ 278,933.00	$ 282,251.00
General, Operating, & Maintenance	60,139.72	65,890.00	68,198.00
Capital Outlays	12,050.39	10,098.00	2,200.00
State Geologic Map	10,081.59	15,000.00	15,000.00
TOTAL	$ 326,594.46	$ 369,921.00	$ 367,649.00

The increase in Personal Services in the 1961-63 budget request is entirely due to new wage scales. The increase in General, Operating & Maintenance is largely due to an increase in rent of office space at the State Office Building in Portland and an increase in funds for printing of Department findings. The request for Capital Outlays for the first time does not include money for replacement or purchase of new laboratory equipment. Requests for the State Geologic Map, a cooperative project with the U. S. Geological Survey, is matched by Federal expenditures.

	Expenditures 7/1/57-6/30/59	1957 - 1959 G&MI Expenditures 7/1/57-6/30/59	Total Expenditures 7/1/57-6/30/59	1959 - 1961 Estimated Expenditures 7/1/59-6/30/61	1961 - 1963 Funds Requested 1961 - 1963
Personal Services:	$244,322.76	-	$244,322.76	$278,933.00	$282,251.00
General, Operating & Maintenance:	$ 47,140.11	$ 12,999.61	$ 60,139.72	$ 65,890.00	$ 68,198.00
Office Supplies	1,586.13	487.58	2,073.71	1,800.00	1,800.00
Telephone & Telegraph	2,608.51	198.55	2,807.06	3,200.00	3,608.00
Postage, Freight, Express	2,570.83	12.60	2,583.43	3,100.00	3,000.00
Printing	-	6,070.07	6,070.07	5,000.00	10,000.00
Rents	22,744.80		22,744.80	22,865.00	25,155.00
Premiums & Assessments	573.35		573.35	700.00	700.00
Auditing	819.47		819.47	800.00	950.00
Industrial & Laboratory	3,013.62	331.21	3,344.83	3,300.00	3,000.00
Heat, Light, Power	607.36		607.36	600.00	600.00
Library	594.50	142.65	737.15	600.00	600.00
Laundry	86.65		86.65	125.00	85.00
Photos & Blueprints	467.64	237.05	704.69	500.00	600.00
Gas & Oil Well Law Administration	270.40	18.26	288.66	400.00	400.00
All other	184.25		184.25	150.00	600.00
Building & Ground	730.76	2.67	733.43	3,750.00	700.00
Travel Expenses: In State	8,341.19	5,498.97	13,840.16	17,000.00	14,600.00
" " : Out of State	1,940.65		1,940.65	2,000.00	1,800.00
Capital Outlays:	$ 8,203.85	$ 3,846.54	$ 12,050.39	$ 10,098.00	$ 2,200.00
Office Furniture, Equipment	1,082.70	503.94	1,586.64	683.00	-
Motor Vehicles	5,300.00	500.00	5,800.00	1,650.00	1,800.00
Laboratory & Field	1,644.74	2,722.60	4,367.34	5,015.00	-
Library & Others	176.41	120.00	296.41	2,750.00	400.00
Special Requests:	$ 10,081.59		$ 10,081.59	$ 15,000.00	$ 15,000.00
State Geological Survey	10,081.59		10,081.59	15,000.00	15,000.00
Total Expenditures	$309,748.31	$ 16,846.15	$326,594.46	$369,921.00	$367,649.00

COMPARATIVE STATEMENTS OF EXPENDITURES

AVAILABLE PUBLICATIONS*

	Prices (subject to change)
BULLETINS	
2. Progress report on Coos Bay coal field, 1938: F. W. Libbey	0.15
3. Geology of part of the Wallowa Mountains, 1938: C. P. Ross	0.50
8. Feasibility of steel plant in lower Columbia River area, rev. ed., 1940: R. M. Miller	0.40
14. Oregon metal mines handbooks: by the staff	
C. Vol. II, Section 1, Josephine County, 1952 (2d ed.)	1.25
D. Northwestern Oregon, 1951	1.25
26. Soil: Its origin, destruction, and preservation, 1944: W. H. Twenhofel	0.45
27. Geology and coal resources of Coos Bay quadrangle, 1944: J. E. Allen and E. M. Baldwin	1.00
33. Bibliography (first supplement) of the geology and mineral resources of Oregon, 1947: J. E. Allen	1.00
34. Mines and prospects of the Mt. Reuben mining district, Josephine County, Oregon, 1947: E. A. Youngberg	0.50
36. (1st vol.) Five papers on foraminifera from the Tertiary of Western Oregon, 1947: J. A. Cushman, R. E. Stewart, and K. C. Stewart	1.00
(2nd vol.) Two papers on foraminifera from the Tertiary of Western Oregon and Western Washington, 1949: Cushman, Stewart, and Stewart; and one paper on mollusca and microfauna of Wildcat coast section, Humboldt County, California, 1949: Stewart and Stewart	1.25
37. Geology of the Albany quadrangle, Oregon, 1953: Ira S. Allison	0.75
40. Preliminary description of the geology of the Kerby quadrangle, Oregon, 1949: Wells, Hotz, and Cater	0.85
41. Ground-water studies in Umatilla and Morrow counties, 1949: Norman S. Wagner	1.25
44. Bibliography (2d supplement) of the geology and mineral resources of Oregon, 1953: M. L. Steere	1.00
45. Ninth biennial report of the Department, 1952-54	Free
46. Ferruginous bauxite deposits in the Salem Hills, Marion County, Oregon, 1956: R. E. Corcoran and F. W. Libbey	1.25
47. Tenth Biennial Report of the Department, 1954-56	Free
49. Lode mines of the central part of the Granite Mining District, Grant County, Oregon, 1959: Geo. S. Koch, Jr.	1.00
50. Field guidebook - geologic trips along Oregon highways, 1959: Prepared under direction of W. D. Wilkinson	1.50
SHORT PAPERS	
2. Industrial aluminum - a brief survey, 1940: Leslie L. Motz	0.10
4. Flotation of Oregon limestone, 1940: J. B. Clemmer and B. H. Clemmons	0.10
7. Geologic history of the Portland area, 1942: Ray C. Treasher	0.25
12. Prelim. report on high-alumina iron ores in Washington County, Oregon, 1944: Libbey, Lowry, and Mason	0.15
13. Antimony in Oregon, 1944: Norman S. Wagner	0.25
14. Notes on building-block materials of eastern Oregon, 1946: Norman S. Wagner	0.15
17. Sodium salts of Lake County, Oregon, 1947: Ira S. Allison and Ralph S. Mason	0.15
18. Radioactive minerals the prospectors should know (2d rev.), 1955: White and Schafer	0.30
19. Brick and tile industry in Oregon, 1949: J. E. Allen and R. S. Mason	0.20
20. Glazes from Oregon volcanic glass, 1950: Charles W. F. Jacobs	0.20
21. Lightweight aggregate industry in Oregon, 1951: Ralph S. Mason	0.25
22. Preliminary report on tungsten in Oregon, 1951: Harold D. Wolfe and David J. White	0.35
GEOLOGIC MAPS	
Geologic map of the Salem Hills and North Santiam River basin, Oregon, 1939: T. P. Thayer	0.25
Geologic map of the Medford quadrangle, Oregon, 1939: F. G. Wells and others	0.40
Preliminary geologic map of the Sumpter quadrangle, 1941: J. T. Pardee and others	0.40
Geologic map of the Portland area, 1942: Ray C. Treasher	0.25
Geologic map of the St. Helens quadrangle, 1945: Wilkinson, Lowry, and Baldwin	0.35
Geologic map of the Dallas quadrangle, Oregon, 1947: E. M. Baldwin	0.25
Geologic map of the Valsetz quadrangle, Oregon, 1947: E. M. Baldwin	0.25
Preliminary geologic map of the Kerby quadrangle, Oregon, 1948: Wells, Hotz, and Cater (also in Bull. 40)	0.80
Geologic map of the Albany quadrangle, Oregon, 1953: Ira S. Allison (also in Bull. 37)	0.50
Geologic map of the Galice quadrangle, Oregon, 1953: F. G. Wells and G. W. Walker	1.00
Reconnaissance geologic map of the Lebanon quadrangle, Oregon, 1956: Ira S. Allison and Wayne M. Feits	0.75
Geologic map of the Coos Bay quadrangle, 1944: J. E. Allen and E. M. Baldwin (sold with Bull. 27)	----
Geologic map of the Bend quadrangle, and reconnaissance geologic map of the central portion of the High Cascade Mountains, Oregon, 1957: Howel Williams	1.00
MISCELLANEOUS PAPERS	
1. A description of some Oregon rocks and minerals, 1950: Hollis M. Dole	0.40
2. Key to Oregon mineral deposits map, 1951: Ralph S. Mason	0.15
3. Facts about fossils (Reprints), 1953	0.35
4. Rules and regulations for the conservation of oil and natural gas (Revised Edition), 1955	0.50
5. Oregon's gold placers (Reprints), 1954	0.25
6. Oil and gas exploration in Oregon, 1954: R. F. Stewart	1.00
6. (Supplement) Oil and gas exploration in Oregon, 1960: V. C. Newton, Jr.	0.35
7. Bibliography of theses on Oregon geology, 1959: H. G. Schlicker	0.50
8. Well records of oil and gas exploration in Oregon, 1960: V. C. Newton, Jr.	0.25
MISCELLANEOUS PUBLICATIONS	
The Ore.-Bin. Issued monthly by the staff as medium for news about the Department, mines, and minerals. (Available back issues 5 cents each.) Subscription price per year	0.50
Oregon mineral deposits map (22 x 34 inches) rev., 1958	0.30
Oregon quicksilver localities map (22 x 34 inches) 1946	0.30
Landforms of Oregon: a physiographic sketch (17 x 22 inches) 1941	0.25
Index to topographic mapping in Oregon, 1958	Free
Index to published geologic mapping in Oregon, 1960	Free

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*A complete list of publications will be mailed upon request. Please include remittance with order. Postage free.