

STATE OF WASHINGTON
ARTHUR B. LANGLIE, Governor

Department of Conservation and Development
W. A. GALBRAITH, Director

BIENNIAL REPORT No. 4

of the

DIVISION OF MINES AND GEOLOGY

For the Period Commencing October 1, 1950
and Ending September 30, 1952

by

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Supervisor



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GENERAL STATEMENT

The following report applies to the organization and activities of the Division of Mines and Geology for the period October 1, 1950 to September 20, 1952.

The technical staff for the full period consisted of Sheldon L. Glover, supervisor, and W. A. G. Bennett, Marshall T. Huntting, and C. Phillips Purdy, Jr., geologists. In addition, Robert H. Stebbins, assistant geologist, was on the staff until April 1951, when he resigned to enter the employ of Pend Oreille Mines & Metals Co. Due to the scarcity of trained personnel, this vacant position has not been filled, but it is expected that a replacement may be obtained this fall. The clerical staff consisted of Dorothy Rinkenberger and one assistant, Sandra Burdick, followed by Judith Juhl, then by Gloria Dermond.

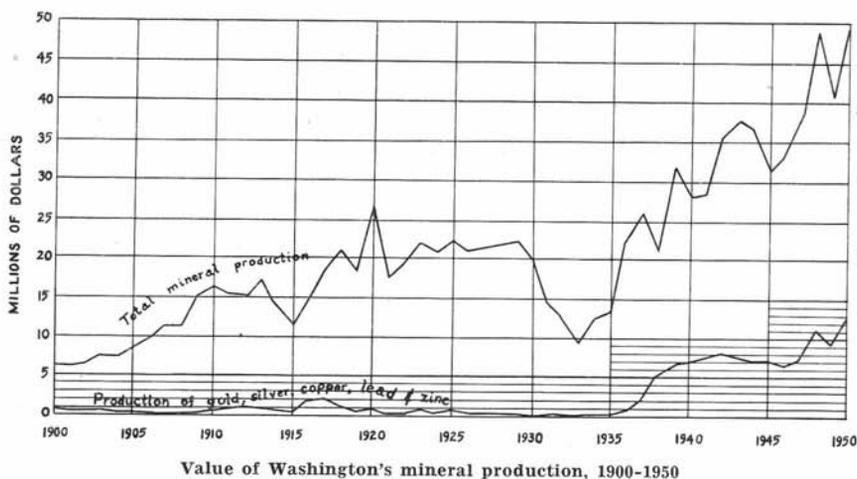
Temporary additions to the staff for special projects were Dr. George B. Rigg, Professor Emeritus, Botany Department, University of Washington, in charge of a peat investigation, and F. A. Nave, D. Walsh, and M. Morrison, field assistants at various times during the biennium.

As in former years, the Division has been actively engaged in acquiring further information on the mineral resources of the state and aiding in all possible ways in the economic utilization of those resources. Field investigations, followed by laboratory and office work, were carried on as usual, adding to the available data on metallic and nonmetallic mineral occurrences. Field and office conferences were held with prospectors, miners, and industrialists in the furtherance of the development and use of the state's minerals. Inquiries handled by correspondence were received, as in previous years, from every part of the state and from all over the country, asking for information on the greatest variety of subjects involving mining, geology, and specific mineral resources. Every effort was made to handle all requests as completely and expeditiously as possible and to cooperate fully with other state and federal agencies, with prospectors and miners, and with the representatives of industries that are looking to Washington as a logical place in which to initiate or expand their activities.

STATUS OF WASHINGTON'S MINERAL INDUSTRY

Washington could be celebrating the centennial of mining in this year 1952, for it was in 1852 that mineral production had its first crude beginning in a coal property on Bellingham Bay, Whatcom County. The industry has come a long way in this hundred-year period. The annual output had increased from nothing in 1851 to \$49 million at the end of 1950, the latest year for which complete statistics are available. The total value in new wealth produced will have nearly reached \$1 ½ billion by the end of 1952, with the completion of a full century of mining.

Some details of recent production are useful in evaluating the present mineral industry of the state. The total value of production of all minerals and mineral aggregates during the decade from 1941 to 1950, inclusive, amounted to nearly \$380 million, by far the largest amount of all similar periods in the state's history. The value of average annual production in that decade was only slightly less than \$38 million. The metallic minerals—chiefly gold, silver, copper, lead, and zinc—had an average annual value of more than \$8½ million, or 22.6 percent of the total; while the industrial minerals—portland cement, sand and gravel, coal, stone, magnesite, and various others of less importance—had an average annual value of nearly \$29½ million, or 77.4 percent of the total.



The ratio of production value of metallic to industrial minerals has been increasing markedly since 1947, a reflection of the greatly increased metallic-mining activity in Chelan, Stevens, and Pend Oreille Counties and the high prices that have prevailed for the base metals. The metals accounted for approximately 18.5 percent of the total mineral production in 1947, 22.4 percent in 1948, 23.2 percent in 1949, and 25.0 percent in 1950. The 1948 output of the metals broke all previous records, amounting to more than \$11 million in value. A decline was experienced in 1949, but even then the output of more than \$9½ million exceeded all previous records except that of 1948. All records were again broken in 1950 when the output reached more than \$12½ million, and the preliminary figures of the U. S. Bureau of Mines indicate a still greater record production, more than \$14 million, for 1951. Correspondingly, the value of total mineral production in 1948 broke all previous records, reaching \$48,928,000. This is a revision of an earlier figure of the U. S. Bureau of Mines which showed an output for that year of \$50,498,000. The 1949 production declined to a value of \$40,863,000, but the total production of 1950 reached the all-time high of \$49,055,000. Present indications are that when the complete 1951 statistics become available it will be found that all state records will again be broken.

CURRENT MINING OPERATIONS

During the biennium, the 1951 and 1952 annual directories of mining operations were prepared and published by the Division. These include the names of all operators; their addresses; the location of the mine, pit, or quarry; and the mineral that is being produced. An individual or concern is considered to be active if there is current production, or if development work now underway indicates that production may be expected shortly, or if the property has been in production within the past year or so and may be expected to resume shipments in the near future.

The 1952 canvass shows that 82 metallic mining properties were active as compared to 98 in 1951, an operational decrease of 16 due chiefly to various prospects failing to reach an expected production or near-production status. Stevens County led in 1952 with 23 metallic operations, followed by Pend Oreille County with 10, Okanogan and Chelan Counties with 9 each, Kittitas County with 6, and eleven other counties with 1 to 5 operations each. As to the principal metallic minerals involved, zinc-lead headed the list with 33 operations. Gold-silver was next with 24 operations, then copper with 10, lead-silver with 9, and finally tungsten, molybdenum, manganese, antimony, mercury, and iron with from 1 to 4 operations each.

In 1952 there were 293 operations involving industrial minerals, of which 137 were sand and gravel and 156 were other nonmetallics. Disregarding the widespread sand and gravel operations, twenty-two counties had active properties. King County led with 44 operations, followed by Stevens County with 16, Snohomish and Spokane Counties with 10 each, Pierce County with 9, and seventeen other counties with from 1 to 8 operations each.

Total mineral production 1941-1950

Year	Metallic minerals	Nonmetallic minerals	Total
1941	\$ 7,874,886	\$ 20,631,996	\$ 28,506,882
1942	8,172,609	27,486,934	35,659,543
1943	7,838,012	29,754,988	37,593,000
1944	7,195,136	29,287,864	36,483,000
1945	7,140,242	24,160,758	31,301,000
1946	6,886,748	26,189,252	33,076,000
1947	7,313,398	30,737,602	38,051,000
1948	11,171,715	37,756,285	48,928,000
1949	9,613,307	31,249,693	40,863,000
1950	12,652,000	36,403,000	49,055,000
Totals	\$85,858,053	\$293,658,372	\$379,516,425

SPECIAL INVESTIGATIONS

Special projects that were underway were mostly initiated during an earlier period, the investigations being carried on during the present biennium as time permitted. The result of a state-wide study of antimony resources, made in the preceding biennium, was published in 1951. A small amount of additional field work, six weeks in all, was done on an investigation of the peat resources of the state, and good progress was made in the preparation of the manuscript which embodies the description and evaluation of these deposits. Some additional field work was done on projects involving the molybdenum and chromite occurrences of the state, and the laboratory and office work connected with these studies was nearly completed. Work was almost continuous on the compilation of a metallic-mineral inventory which, when completed, will provide information similar to that now available on industrial minerals. This is an

arduous, time-consuming project which may require another year or two to complete, but the information is constantly being requested by the mining industry.

Office work was carried on in connection with a stratigraphic and structural survey of the south half of the Colville 30-minute quadrangle of Stevens County. This was preparatory to work planned for 1952 that should complete studies undertaken some years ago in one of the most active mining areas of the state. A manuscript embodying the results of similar work in the north-east quarter of the Newport 30-minute quadrangle of Pend Oreille County was received and is in the hands of the printer. This work was done under a co-operative arrangement with the State College of Washington, whereby the Division paid the field expenses, only, of the geologist engaged in the survey. Finally, in late 1950 and 1951, canvasses were made throughout the state to collect information on active mining operations, the resultant data being published and distributed as Information Circulars 19 and 20.

OIL AND GAS

The marked interest on the part of major oil companies and independent operators in the oil and gas possibilities of Washington required the continual attention of the Division. Since 1934, a determined effort has been made to collect and catalogue all possible information on the progress and results of test drilling. These data are made available to geologists and oil men who desire them, and assistance in every way possible is given to those who are actively engaged in trying to prove that the resources of the state include oil and gas.

LABORATORY WORK

No additions were made to the laboratory equipment of the Division during the biennium, it only being necessary to purchase small amounts of reagents from time to time. However, constant use was made of the laboratory facilities and of the Division's optical equipment, in connection with continuing research which is supplemental to field investigations.

These facilities were also used regularly in identifying and evaluating mineral samples submitted for study and comment by citizens of the state. No assays or chemical analyses are made, but anyone may send in specimens originating in Washington for information on mineral content and possible economic use. In the first 12 months of the biennium 386 samples were examined and the senders advised as to the identity of the materials and their possible value. There were 742 samples submitted by prospectors, miners, and others during the biennium. No charge is made for this service, as the Division gains information on mineral substances occurring throughout the state and occasionally learns of new deposits of value that would not otherwise come to its attention.

TOPOGRAPHIC MAPPING

Topographic mapping was actively continued during the biennium, both under the usual cooperative arrangement between the State and Federal governments and as an independent activity of the Federal government alone. Through the courtesy of Mr. C. A. Ecklund, Pacific Regional Engineer, Topographic Division of the U. S. Geological Survey, Sacramento, California, the following information on the progress of mapping in Washington has been supplied.

- 485 linear miles of levels were run.
- 86 new triangulation stations were established and monumented.
- 3,630 square miles were controlled by 2nd and 3rd order triangulation.
- 6,700 square miles of photography were completed.
- 2,180 square miles were compiled by multiplex and field surveys.
- 25 new 15-minute quadrangles were published.

Quadrangles worked on and financed as cooperative projects between State and Federal governments included the following. (Names in parentheses are the new official names for these sheets.)

<i>Names of quadrangles</i>	<i>Counties in which located</i>
Bald Knob	Okanogan
Deer Park	Spokane
Freeman (Greenacres)	Spokane
Keller	Ferry
Lake Annum (Nespelem)	Ferry and Okanogan
Penawawa	Garfield and Whitman
Seventeen Mile Mountain.....	Ferry
Twin Lakes	Ferry

Under this program the following quadrangles were completed and published: Deer Park, Freeman (Greenacres), Lake Annum (Nespelem), and Penawawa. Also during the biennium the following quadrangle maps were completed and published solely through the use of Federal funds:

<i>Names of quadrangles</i>	<i>Counties in which located</i>
Alameda (Alameda Flat).....	Adams and Grant
Benge	Adams and Whitman
Bodie Mountain	Ferry and Okanogan
Clayton	Stevens and Spokane
Corfu	Adams and Grant
Curlew	Ferry
Eltopia	Benton and Franklin
Endicott	Whitman
Hay	Columbia, Garfield, and Whitman
Kettle Falls	Ferry and Stevens
La Crosse	Adams and Whitman
Orient	Ferry and Stevens
Priest Rapids	Benton, Grant, and Yakima
Prosser No. 2 (Grandview).....	Benton and Yakima
Red Rock (Smyrna)	Grant
Republic	Ferry
Scooteney Lake	Adams and Franklin
Sherman Peak	Ferry
Timentwa (Boot Mountain).....	Douglas and Okanogan
Togo Mountain	Ferry
Wauconda	Ferry and Okanogan