

*M.T.H. Reports*

STATE DEPARTMENT OF CONSERVATION HAS RECORD YEAR

(1962)

By

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The Division of Mines and Geology of the State Department of Conservation set a new record in 1962, as measured by the number of technical reports the Division published on mineral resources and geology of the State. Printed during the year were three bulletins and five other reports giving detailed information on coal, limestone, sodium sulfate, ludwigite (a boron mineral), mineral rights and mineral-land ownership in the State, geology and resources of Washington, and detailed geology of a mineralized area in King County.

These reports and the prices at which they may be purchased from the Department of Conservation, 335 General Administration Building, Olympia, are:

"Coal Reserves of Washington," Bulletin 47, by Helen M. Beikman, Howard D. Gower, and Toni A. M. Dana, \$1.75.

"High-Calcium Limestones of Eastern Washington," Bulletin 48, by Joseph W. Mills, \$4.00.

"Saline Lake Deposits in Washington," Bulletin 49, by W. A. G. Bennett, \$1.50.

"Introduction to Washington Geology and Resources," Information Circular 22R, by Charles D. Campbell, 25 cents.

"Mineral Rights and Land Ownership in Washington," Information Circular 36, by Wayne S. Moen, free.

"Stratigraphy of Eocene Rocks in a Part of King County, Washington," Report of Investigations 21, by James D. Vine, 50 cents.

"Preliminary Geologic Map of the Hobart and Maple Valley Quadrangles, King County, Washington," Geologic Map GM-1, by James D. Vine, 75 cents.

"Mineralogy and Geochemistry of the Read Magnetite Deposit, Southwestern Stevens County, Washington," by W.A.G. Bennett, and "Ludwigite from the Read Magnetite Deposit, Stevens County, Washington," by W. T. Schaller and A. C. Vlisidis, Reprint No. 7, 25 cents.

At the end of the year two other reports were completed and ready for publication:

"Geology and Mineral Resources of the North Half of the Van Zandt Quadrangle, Whatcom County, Washington," Bulletin 50, by Wayne S. Moen, and "Tertiary Geologic History of Western Oregon and Washington," Report of Investigations 22, by Parke D. Snavely, Jr., and Holly C. Wagner.

A report that should be ready for publication in March is "Directory of Washington Mining Operations, 1962," Information Circular 37, by Gerald W. Thorsen.

Other reports in various stages of completion include "Caves of Washington," by William R. Halliday; "Preliminary Geologic Map of the Cumberland Quadrangle, King County, Washington," by H. D. Gower and A. A. Wanek; "Limestone Resources of Western Washington," by W. R. Danner; "Barite in Washington," by Wayne S. Moen; "Road Log of the Snoqualmie, Swauk, and Stevens Pass Highways," by V. E. Livingston; and "Ferruginous Laterite in the Kelso-Cathlamet Area," by V. E. Livingston.

#### OTHER PROJECTS

Other projects on which work was in progress during the year included: "Geology and Mineral Resources of the South Half of the Colville Quadrangle, Stevens County," "Bibliography and Index of the Geology and Mineral Resources of Washington, 1957-1962," "Black Sand at Grays Harbor," "Geology and Mineral Resources of the East Half of the Kettle Falls Quadrangle, Stevens County," "Geology of the Wynoochee Area, Grays Harbor County," "Geology of the Northern Cascade Mountains," "Geology and Mineral Resources of the Methow Quadrangle, Okanogan County," and "Mineral Resources as Related to Planning Requirements in King County."

#### Duties of the Division of Mines and Geology

Geologic investigations as a function of State Government were established by the first State Legislature and have been carried on almost continuously since that time. The duties of the Division of Mines and Geology, as set out in the laws that established the Division, are: to examine the mineral deposits and map the geology of the State and publish reports and maps of this work; to collect and publish statistics on mining; to assemble mineral exhibits; to maintain a library on mining, milling, metallurgy, and geology; to examine samples of ores, minerals, and rocks sent in by taxpayers for identification; to administer the Oil and Gas Conservation Act; and to cooperate with the U.S. Geological Survey in making topographic and geologic maps. This work, giving service to a mineral industry that had a raw product value of \$64<sup>61.7</sup><sub>1</sub> million in 1962, is carried on by a staff of seven veteran geologists and four nontechnical people, as compared with a staff of only two less people 14 years ago, when the demands for services were much smaller than at present.

#### Topographic Mapping

During the year the Division continued to cooperate with the U.S. Geological Survey in topographic mapping within the State. Two topographic maps, the Bandera and Mount Si quadrangles, of areas in King County were published, and work was continued on two other maps, the Doe Mountain and Mazama quadrangles, in Okanogan County. This mapping is conducted by the U.S. Geological Survey, the State contributing half of the funds through a cooperative matching agreement. Additional topographic mapping is carried on and paid for solely by the Federal agency.

The first topographic quadrangle map in Washington was published in 1895 by the U.S. Geological Survey. In order to speed up the mapping program the State Legislature of 1903 authorized expenditure of State funds on a 50-50 matching basis, and the Legislature of 1909 appropriated \$10,000 for this purpose. Since that time the State has provided matching funds almost every year. The total amount expended from 1909 through 1961 is \$414,717, and 75 quadrangle maps have been completed or are in progress under this cooperative program. In spite of greatly increased mapping in recent years by the U.S. Geological Survey independent of the cooperative program, there still remain large areas in the State for which no topographic maps are available, and there are other large areas for which the available maps are of inadequate scale or accuracy.

The Industrial Raw Materials Advisory Committee has pointed out that topographic maps are an indispensable tool for the development of Washington's natural resources and are an important aid in overall economic development in the State. These maps are required by planners, builders, engineers, geologists, foresters, farmers, soil conservationists, hydrologists, river-resource developers, and hunters and fishermen. The committee has recommended that greatly increased funds be made available to augment the cooperative program so that topographic mapping of the State may be completed in the next 10 years.

Late in the year the Legislative Council announced its support of an accelerated program of both topographic and geologic mapping to be conducted cooperatively by the State Department of Conservation and the U.S. Geological Survey. Governor Rosellini's budget request to the 1963 legislature included items of \$50,000 for topographic mapping and \$69,500 for geologic mapping—a considerable increase over the amounts available in previous years but only a small fraction of the amounts necessary to carry out the programs recommended by the Industrial Raw Materials Advisory Committee and the Legislative Council.

#### Mineral Industry in 1962

The mineral industry comprises <sup>a more</sup> ~~an~~ important part of the overall economy of Washington ~~more important~~ than is generally recognized. In comparison with the other extractive industries in the State, mining in 1962 produced minerals having a raw product value of \$61,172,000, which is about one-tenth the value of unprocessed agricultural products for that year, about one-fourth of the value of the logging industry's output, and more than three times the value of the products of the commercial fisheries. Likewise, the value of mineral production in Washington is larger in comparison with that for the adjacent states of Idaho, Oregon, and Alaska than most people realize. Washington's mineral production for 1962 exceeded that of two of these three neighbors. Figures supplied by the U.S. Bureau of Mines show Washington's production of \$64,527,000 in 1961 to have been slightly less than Idaho's figure of \$68,846,000, more than Oregon's \$51,730,000, and almost double Alaska's production of \$34,708,000. During the past 10 years (1953-1962) mineral production in Washington had a total value of \$620 million, an increase of more than \$150 million over the previous 10 years. With minor fluctuations, the State's mineral production has been steadily increasing since the depression year of 1933, when it was valued at just over \$9 million.

King County in 1961 had the highest mineral production value, followed by Pend Oreille, Stevens, Pierce, and Spokane Counties. Columbia was the only county that had no reported mineral production.

The State production decline to \$61.2 million in 1962 from \$64.5 million the previous year was the result of lower production values for gold, lead, and uranium ore. Nonferrous metals recorded an employment increase over the previous year, while ferrous metals employment dropped below the 1961 level. The number of workers in stone, clay, and glass products industries was unchanged. The following data are largely abstracted from a recent U.S. Bureau of Mines preliminary report on the mineral industry of Washington.

Barite.—Barite was mined by Triton Mining Co. and F. W. Bailor at operations in Stevens and Pend Oreille Counties, respectively. Production was lower than in 1961.

Cement.—Combined output of portland and masonry cement was estimated to have increased moderately both in quantity and value compared with 1961.

Six cement plants were operated by four companies in Washington.

The Ideal Cement Co. cement distribution terminal at Seattle, the company's largest terminal on the west coast, was put into operation in 1962. The 193,000-barrel storage facility consisted of 6 concrete silos (40 feet in diameter by 120 feet high), 2 interstice bins, and 8 loading bins. The terminal was to be filled with bulk and bagged cement from the company Grotto plant during the winter, in order to supply customers during the peak summer months.

Clays.—The quantity of clays sold or used by Washington producers declined an estimated 5 percent from 1961. Increased production of fire clay did not offset a decline in output of miscellaneous clay.

Diatomite.—Kenite Corp., Quincy, continued to be the only source of diatomite produced in the State. Output of prepared diatomite was estimated to have been 7 percent greater than in 1961.

Gypsum.—Agro Minerals, Inc., mined gypsite (a mixture of gypsum, quartz, and clay) from the Poison Lake deposit near Tonasket, Okanogan County. Output, used primarily for agricultural purposes, remained substantially the same as in 1961.

Imported crude gypsum was processed for use in making building products by Kaiser Gypsum Co., Seattle. Greenacres Gypsum Co., Spokane, marketed imported gypsum for agricultural use.

Lime.—Limestone was calcined to lime for use in sugar refining at two Utah-Idaho Sugar Co. plants in Grant and Yakima Counties. Lime output for this purpose was estimated to have increased sharply over 1961.

During the year, construction was nearly completed on a \$3 million lime plant at Tacoma by Pacific Lime Co., Ltd., a firm organized by Canadian interests. Startup of the lime plant was scheduled for early in 1963. Limestone for the plant was to be barged from a quarry on Texada Island, British Columbia.

Magnesite.—Washington leads the nation in production of magnesite. Northwest Magnesite Co. continued to supply the steel industry with dead-burned magnesite from an operation near Chewelah, Stevens County. Crude ore was mined at the company Red Marble quarry; output increased about 3 percent over 1961.

Olivine.—Olivine output, <sup>largely</sup> ~~entirely~~ from the Northwest Olivine Co. Twin Sisters quarry, Skagit County, increased an estimated 35 percent over 1961. Crude ore from the Twin Sisters quarry was hauled to a company plant at Hamilton for processing.

Pumice.—Pumice was mined at the Chelan County Standard mine by Westone Construction Products Co.; the material was used as concrete aggregate in making building blocks. Pumicite, mined at the Grimes Co. Sunnyside quarry, Yakima County, was prepared as pozzolan for use as a concrete admixture.

Sand, Gravel, and Stone.—There was no significant change in output of sand, gravel, and stone. Combined output of these commodities was estimated to be 30.4 million tons valued at \$30.5 million, a slight decrease from the 1961 production of 30.5 million tons valued at \$30.9 million. Increased requirements for these commodities by the State highway department apparently were offset by a lack of heavy construction projects in the State.

Talc and Soapstone.—Soapstone, mined at operations near Marblemount, Skagit County, was shipped to Seattle, Clear Lake, and Portland (Oreg.) grinding plants and processed for use as a paint filler, a carrier for insecticides, and a fertilizer mix.

#### MINERAL FUELS

Carbon dioxide.—Recovery of carbon dioxide by Gas-Ice Corp. operations in Klickitat and Benton Counties increased an estimated 11 percent over 1961. The company recovered carbon dioxide from mineral waters in Klickitat County and from an ammonia-plant waste product at the company Finley plant in Benton County.

Coal.—Output of coal was estimated at 228,000 tons, compared with 191,000 tons in 1961.

A proposed coal-fired steam-electric plant, which would be supplied by coal from the Roslyn field, was being developed jointly by the Kittitas and Grant Counties Public Utility Districts. Construction of the proposed 500,000 kilowatt plant was expected to begin in early 1963, and power on the line was contemplated by January 1, 1966.

Peat.—Production of peat was estimated at 60,000 tons, an increase of 8 percent over 1961.

Petroleum and Natural Gas.—Exploration interest in Washington was focused primarily on offshore Grays Harbor County where Union Oil Co. drilled the 1-A State Tidelands, which was the Pacific Northwest's first offshore well. The stratigraphic test, drilled in 42 feet of water about 2 miles offshore from the Ocean City area, was abandoned in September at 1,176 feet. Onshore drilling was done in the Chehalis and Bellingham Basins during the summer.

## METALS

Aluminum.—Production of primary aluminum, the highest in the past 5 years, was 367,000 tons valued at \$176.2 million compared with 331,264 tons valued at \$168.9 million in 1961. This was an increase of 10.8 percent in tonnage and 4.3 percent in value.

The uptrend of market demand for aluminum caused the three primary producers to announce expansion plans which totaled over \$11 million. Two of the three producers also reactivated a potline.

Copper.—Lead-zinc mining in Pend Oreille County yielded, as a byproduct, most of the estimated 45 ~~tons~~ tons of copper output. A minor amount of copper was produced by Kromona Consolidated Mines, Inc., Kromona mine, Snohomish County, and Paymaster Mines, Inc., Paymaster mine, Okanogan County.

Ferroalloys.—At midyear Pacific Northwest Alloys, Inc., closed its ferrochrome and ferrosilicon plant at Mead near Spokane. The plant was sold at yearend to Kaiser Aluminum & Chemical Corporation, who announced plans to convert part of it to the production of electrode carbon.

Gold.—As in previous years years, Knob Hill Mines, Inc., Ferry County, and L-D Mines (formerly Lovitt Mining Co.), Chelan County, were the principal gold-producing companies in the State. Construction of the L-D Mines 300-ton concentrator near Wenatchee was completed, and it began operating early in the year.

Iron Ore.—The metallurgical feasibility of producing iron by electric-arc smelting of ores from Buckhorn Mountain, northwest of Spokane, and from the Potlatch, Idaho, area was investigated by Elektrokemish Co., Oslo, Norway. The two properties were acquired in 1961 by Zontelli Bros., Ironton, Minn.

Lead.—Lead output, the lowest in 12 years, was estimated at 6,033 tons and \$1.1 million in value. Output was principally from two mines in the northeastern part of the State—American Zinc, Lead & Smelting Co. Grandview <sup>mine</sup> and Pend Oreille Mines & Metals Co. Pend Oreille mine.

Small amounts of lead were produced by Lucky Joe Mining Co. from an operation near Newport, Clayloon Uranium, Inc., from the Lead King mine near Leadpoint, Stevens County, and Shamrock Mining Co., lessee of the Gladstone Mountain Mining Co. property in northern Stevens County.

Silver.—Silver output and value, the lowest in 15 years, decreased 52 and 45 percent, respectively, under 1961. Gold mining operations accounted for most of the State silver output with lead-zinc producers recovering the majority of the rest.

Tin.—Silver Hill Mines, Inc., shipped about 2 tons of tin concentrate from the Silver Hill mine near Spokane to Wah Chang Smelting & Refining Co. smelter at Texas City, Tex. The concentrate was valued at about \$3,000. This was the second recorded shipment of tin concentrate from the Pacific Northwest.

Uranium.—Dawn Mining Co. operated the Midnite mine and adjoining leases in Stevens County and a mill at Ford. Some of the  $U_3O_8$  was obtained from ore milled under a custom arrangement.

Zinc.—Zinc output, obtained entirely from lead-zinc ores mined in northeastern Washington, totaled 21,579 tons valued at \$5 million compared with 20,217 tons valued at \$4.7 million in 1961.