

STATE OF OREGON  
DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES  
PORTLAND, OREGON

# THE ORE.-BIN

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## WHAT WE ARE DOING

This issue of the Ore.-Bin is devoted primarily to a report of Departmental activities. Since production of strategic and critical minerals is all-important, the Department has tried to do everything possible to promote their production. From the very beginning of work of the Department in 1937 the importance of strategic minerals production was realized and investigations were made which in 1938 resulted in publication of the Department's bulletins on quicksilver and chromite. Widespread demand for these reports is good evidence of their usefulness; they have surely contributed to development of these essential minerals in Oregon.

In 1938, 1939, and 1940, the Department investigated tungsten and molybdenum in the Wallowa Mountains of northeastern Oregon, cinnabar deposits in the Ochoco Mountains of central Oregon and in the Tiller-Trail area of southwestern Oregon, and chromite in beach deposits. Results of some of these investigations have been published in the form of a bulletin on the Wallawas accompanied by geologic map, and in geologic maps of the Round Mountain and Butte Falls quadrangles.

Current investigations of the Department continue to be concerned primarily with the State's strategic and critical mineral resources. The national situation makes it essential that all actual and potential sources of these minerals be catalogued and evaluated. Some of the projects are on a cooperative basis with the U. S. Geological Survey and Oregon State College. Certain of the Departmental activities such as its summer geological survey are continuing projects, while others are special studies which will be contributions to the State's areal, historical, and economic geology.

This would seem to be an opportune time to express the Department's appreciation for the fine cooperative spirit of geologists of the United States Geological Survey, Oregon State College, and the University of Oregon. The Department wishes also to record the active assistance of the Chemical Engineering Department of Oregon State College in chromite beach sand research.

## STRATEGIC MINERALS HEARING

On July 15th and 16th, a hearing was held in Portland by United States Senator Rufus C. Holman, presiding for the Sub-committee of the Committee for Military Affairs of the United States Senate. Hearings of this sub-committee for the investigation of various matters concerned with production of strategic minerals had been held previously in Washington over a period of about two months. Senator Holman's opening statement in the Portland hearings indicated his desire to obtain information on the accessibility and availability of strategic ores and minerals in the Oregon country. He expressed a desire to bring out information on why the strategic minerals phase of the national defense program, including the accumulation of stock piles, had been far from successful. Mr. Earl K. Nixon, Director of the Department, was a witness and also assisted in bringing out evidence by questioning other witnesses. At the conclusion of the hearing he was asked to make a summary of his recommendations which would embody steps the Federal authorities should take in order to speed up production of strategic

and critical minerals necessary for national defense. Following is a list of such recommendations made by Mr. Nixon and forwarded to Senator Holman:

1. Ore prices:

A higher price must be paid for these strategic minerals or there will be an insufficient incentive to bring about adequate production by the multitude of small operators. (This applies primarily to chromite and manganese). For chromite, we would suggest that the following minimum base price for ore at the mine should start some ore coming out:- Seventy-five cents per long-ton unit for ore running 45% chromic oxide, and one cent per ton unit additional for each increase of one percent of chromic oxide. Thus 45% ore would bring \$33.75 at the mine, and a 50%  $\text{Cr}_2\text{O}_3$  ore would bring \$40.00.

2. Roads:

The prompt completion of a mine-to-market accessory road program by the Federal government will be essential in getting out a satisfactory tonnage of some of the strategic minerals. It is as important to provide roads to get mining machinery and even equipment for exploration in, as it is to get the product out of the many inaccessible localities.

3. Purchasing System:

The present Federal purchase system has been demonstrated as wrong. Individual producers are unprepared to go back to Washington, sit down with the Metals Reserve Corporation and try to work out contracts for relatively small tonnages of ore. In other words, Federal buyers, each with full authority to negotiate, must go into the field and deal directly with the producers, stock-piling the ores obtained in whatever quantities are supplied.

4. Ore Specifications:

Specifications for strategic minerals must be made more lenient in order that domestic producers can produce the types of domestic strategic ores that exist, rather than the types that consumers have been in the habit of receiving in the past mainly from foreign sources. The present specifications for screening, maximum sizes of chunks, and amount of fines could well be stricken out in the cases of chromite and manganese, at least. The specification for metallurgical grade of chromite ore might well be reduced to 44 or 45 percent  $\text{Cr}_2\text{O}_3$ .

5. Guarantees:

Insurance in some form--short term amortization of plant, relief from certain taxes, or otherwise, must be given to domestic producers in order to assure their interest in producing strategic minerals. Past experience involving cancellation of contracts is not a pleasant memory.

6. Import Tariffs:

Federal government must recognize that its import tariff policy may act as a strong incentive for, or deterrent against prospective strategic mineral production. The maintained tariff on quicksilver, for example, has been a factor in placing the domestic quicksilver industry in the strong position in which it is today. Import tariff cuts on manganese in recent years have had a disturbing effect on some who would

have been domestic manganese producers. To remove import tariffs on all strategic commodities at this time in order to save a few dollars to the government on their possible purchase of foreign ores would be false economy in the light of the effect that such a move would have upon domestic producers.

7. Priority Red Tape:

The Federal government, in allowing interminable delays through red tape in priorities, is handicapping especially the quicksilver producers who have great difficulty getting machinery and maintenance supplies. All strategic mineral producers should have the same priorities as consumers-A-1-A ratings.

8. Facts Lacking:

There is a lack of facts on the part of officials and consultants of the OPM and others in Washington in regard to the supply of zinc ores in the Pacific Northwest. Furthermore, it was brought out at this hearing that there seems reason to believe that the wishes of a handful of large eastern zinc smelter people have more weight with the OPM in regard to authorization of an electrolytic zinc smelter for the Pacific Northwest than do the real needs of this section, as well as the critical need for new zinc smelting capacity in the United States. We have been unable, so far, to break down the erroneous impression by OPM that we have any important quantity of zinc in the Pacific Northwest. Whereas, as a matter of fact--it was brought out at the hearing that at no point in the United States at this time does there appear to be a more favorable point than the Portland area for a zinc smelter, considering cheap power, transportation, and availability of zinc concentrates.

9. Power Needs:

It was brought out forcefully at this hearing by Dr. Raver, Bonneville Power Administrator, who gave facts and figures, that the power program at Bonneville and Grand Coulee must be stepped up to meet industrial demands within the next three years.

10. Stock-Piling Sub-grade:

It is our opinion that the government would be justified in stock-piling chromite ores at or near their points of production, that run as low as 25% chromic oxide. Private interests will not do this. However, the government could afford to, in order to anticipate the utilization of such ores by processes now completed or under study. We make the same recommendation for sub-grade manganese ores of oxide type, running as low as 25% elemental manganese.

We further recommend that serious consideration be given to the matter of stock-piling zinc concentrates. They would have to be stocked under shelter to protect them from wind loss. Zinc shipping ore of smelting grade could similarly be stock-piled, although sub-grade materials to be concentrated could not be stock-piled more than a year or two owing to their tendency to oxidize. A program of purchase and stock-piling by the government of zinc concentrates in the Pacific Northwest would offer a strong incentive for the development of many mines now idle, and at the same time the accumulation of such reserves would help justify the installation of an electrolytic zinc smelter on deep water in this area.

11. Pilot Plant:

The matter of processes for utilization of sub-grade domestic strategic

minerals must be given serious and prompt attention. We haven't needed processes because in the past we could obtain ample supplies of high-grade foreign ores. Now we must utilize lower grade domestic ores. Money should be appropriated for use not only by the federal agencies but also by the State or even private agencies that have already gone some distance in developing such processes. Appropriations for pilot plants and metallurgical process work should be promptly forthcoming to justify continued attention to the development of domestic sub-grade strategic minerals.

12. Cooperation:

There has been too little cooperation and exchange of ideas between the Federal technical agencies and the OPM in Washington, and the local State and private agencies in the strategic mineral producing areas. Whereas the local Portland officials of the Bonneville Administration cooperated excellently with the local and State agencies in the Pacific Northwest, there is a distinct lack of such cooperation between the Washington headquarters of other Federal agencies and the western groups. Local agencies are usually well informed and can furnish acceptable information and details which should receive serious attention in Washington.

13. Freight Services:

Rail freight rates in some of the western strategic mineral producing areas are among the highest in the United States. It was brought out at the hearing that a complete review and study of freight rates as they apply to the movement of raw materials should be made. Since the disparity in ton-mile freight between manufactured goods moving west and raw materials moving east has a bearing on the logical location of industry, this matter is an added reason for a review of freight structure.

14. Timing:

We had better get serious on the question of timing on the entire strategic minerals program. Some remedial measures must be taken now--not three months or six months from now. Conditions must be anticipated much farther in advance. In this connection the master minds in charge of the defense program are handicapped by lack of facts on the conditions in regions remote from Washington. Many of these facts could easily be obtained if the opinions of individual producers, engineers, and public agencies, located in the area, were sought. Throughout this hearing the question of giving better attention to the element of timing has been stressed by various witnesses. In the production of strategic minerals the time element is an especially important factor. We recommend that red tape be eliminated and short cuts taken at every possible point.

#### MANGANESE SURVEY

Since the study was made under the supervision of J.T.Pardee of the United States Geological Survey during the last World War, very little work has been done in the way of investigation of manganese deposits in Oregon. In 1937 the Department made a short reconnaissance survey of a few deposits in southwestern Oregon. Early this year it was recognized by the Department that the domestic



manganese situation would, in all probability, become acute and a survey was planned which would catalog and attempt to evaluate the known or reported deposits of manganese ore in the State. Geologists of the Department have visited and, in most cases, sampled all reported deposits upon which no previous reports have been made. Information has been assembled in manuscript form and will be published as a bulletin in the near future. In addition to descriptions of properties, there will be chapters in the report descriptive of the economics of manganese and also of the problems involved in prospecting and developing manganese orebodies. The probabilities are that bodies of manganese ore in Oregon may not be mined so that metallurgical grade manganese may be produced directly in any large amounts. In some cases small tonnages of acceptable grade may be made available by hand-sorting methods, but, in general, beneficiation will be necessary to produce any large tonnages of commercial grade material.

#### INVESTIGATION OF SOURCES OF ZINC

For many months the Department has been bending every effort to encourage and promote the establishment of an electrolytic zinc smelter in the lower Columbia River area, believing that such a location is extremely attractive because of the combination of especially favorable factors, namely: deep water transportation, low-cost electric power, and sources of supply of zinc concentrates immediately available for such a plant. Various difficulties have arisen to retard carrying out the plan. Most of these difficulties have been caused by lack of definite information which OPM representatives have had concerning zinc resources in the Pacific Northwest. Although much evidence has been presented, there continues to be an unwillingness on the part of OPM experts to believe that adequate sources of supply of zinc concentrates would be available in this part of the country. While such a plant in this area would, at the start, be mainly dependent on zinc concentrates from the Pend Oreille district of northeastern Washington, a material tonnage could be supplied from Western Oregon. Development of new zinc deposits in Oregon would undoubtedly be stimulated.

The situation in domestic zinc supplies is such that increase in zinc smelting capacity is essential. In order to assemble more definite information on Oregon's zinc resources, during the past two months the Department has made a survey of the best-known zinc deposits of the State. The complex sulphide ores of the Cascade Range are well-known, but in only a few properties has development progressed far enough so that zinc ore reserves could be estimated. These properties have been examined and, in addition, engineers' reports have been obtained. The information is being assembled and will be published as a GMI Short Paper in the near future.

#### GEOPHYSICAL WORK.

In cooperation with the United States Geological Survey the Department has started a geophysical survey in a section of the Ochoco Mountains east of Prineville. A geophysicist and equipment are being furnished by the United States

Geological Survey. The Department is furnishing an assistant as well as funds to be matched by the U.S.G.S.

For a considerable period the Department has wished to try out geophysical methods in tracing shallow geologic structures which are known to bear a close relation to ore deposition. The area selected for the initial experiment is the so-called Johnson Creek fault zone in the northern part of the Round Mountain quadrangle. Along or near this zone are the cinnabar deposits of the Mother Lode, Blue Ridge, Independent Quicksilver, and Number One properties. The first instrument work has been with the magnetometer. A grid of cross-sections at right angles to the zone is being made. By means of the anomalies shown by the magnetometer, an attempt will be made to trace the zone under areas covered by overburden and also to outline relationships between structure and orebodies in the zone. Resistivity methods will probably supplement magnetometer work. Certain other areas of the State can probably be tested by similar methods. It is hoped that some concrete facts will be obtained which will be helpful in prospecting and development work. It is too early, however, now to state whether or not definite evidence will result. A report by the Geophysical Branch of the United States Geological Survey, in cooperation with the Department, will be made as soon as results are available.

#### BEACH SAND INVESTIGATION

For the past two and one-half years the Department has been active in studying the commercial possibilities of producing chromite from the back beach deposits of the southern Oregon coast. Two major problems are involved: first, that of treatment in order to make a commercial separation and, second, to determine whether or not chromite occurs in economic deposits. In 1939 and 1940 considerable sampling was done by the Department and samples were sent to a laboratory in the East for electrolytic separation tests. Results of these tests, together with results from much more extensive research work by Professor George W. Gleeson of Oregon State College, indicated that a commercial separation was feasible, at least for a chemical grade of chromite.

In 1940 the Department made application for a small W.P.A. grant to be used for drilling and test-pitting in selected areas principally north of Bandon. The application was approved and work was actually started in June of this year. The project provided for a joint supervision by the United States Geological Survey and the Department. As sponsor, the Department contributes equipment as well as providing for analytical work on samples. Coos County has very materially assisted by furnishing transportation for workmen.

Various delays have occurred from time to time to slow up the work, and probably the amount of ground which will be prospected will be less than the amount it was hoped would be covered. However, it is felt that the work of this project would compare favorably with most other W.P.A. projects, and a material quantity of commercial chromite sand has been proved in two localities. About 40 test pits, 25 Empire drill holes, 3 churn drill holes, and several small pipe drill holes, have been put down, so far. It would appear that enough chromite has already been indicated to provide sufficient incentive for private operators to do more detailed development work. The present project will end about the middle of August.

## STATE GEOLOGICAL SURVEY

As in 1939 and 1940, the State geologic survey is in charge of Dr. W. D. Wilkinson of Oregon State College. Mapping is being done this summer in the St. Helens quadrangle. This area was selected because it contains the limonite deposits located, generally, west of Scappoose. As soon as the necessary areal geology is completed, Department geologists will cover the area and study the economic geology, paying particular attention to the iron ore deposits. Because these deposits are very favorably situated as regards transportation, they would be especially important to a steel plant on the lower Columbia River.

The Department feels that because of the present emergency all information pertaining to the economic geology of the deposits should be assembled and made available as soon as possible, even though development work is insufficient for making definite estimates of total ore reserves.

## SPECTROGRAPHIC LABORATORY

Spectrographic equipment has been ordered for the laboratory authorized by the 1941 Oregon Legislature. Because of national defense needs deliveries of equipment will be somewhat delayed, but it is believed now that installation can be completed some time in October. Dr. H. C. Harrison, formerly in charge of the spectrographic laboratory of the New York State College of Ceramics, has been employed as spectro-analyst for the Department laboratory. Dr. Harrison has arrived from the East and is now at Oregon State College engaged partly in the work of designing some accessory equipment necessary for the spectrographic laboratory and partly in a laboratory investigation of the reported occurrence of tin in the Juniper Ridge area west of Burns.

## UNITED STATES GEOLOGICAL SURVEY

As in previous years, a United States Geological Survey party is doing geologic mapping in southwestern Oregon, under the supervision of Dr. Francis G. Wells. Work is in the Kerby quadrangle which adjoins the Grants Pass quadrangle on the west. The Kerby quadrangle contains some of the most inaccessible and difficult terrain yet mapped in southwestern Oregon by United States Geological Survey geologists. Use of pack trains is necessary since a great deal of the country surveyed is many miles away from passable roads. This work is being under a cooperative arrangement between the U.S.G.S. and the Department. When completed the map will be published by the Department.

## SPECIAL GEOLOGIC STUDIES

During June, Dr. Ira S. Allison of Oregon State College was employed by this Department to complete geologic mapping of the Salem, Stayton, Albany, and Lebanon (15-minute) quadrangles. Most of the total area included in these quadrangles had been mapped previously. The work done by Dr. Allison will make it possible for the Department to publish these maps which in the aggregate cover an area of about 900 square miles.

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The Oregon State College geological summer survey under the supervision of Dr. W. D. Wilkinson, assisted by Mr. Herbert Harper, was in the Molalla quadrangle. Work was completed in June. The map will be prepared by Mr. Harper for his Master of Science thesis and will be published by the Department.

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The Ironside Mountain (30-minute) quadrangle, which adjoins the Sumpter quadrangle on the south, is being mapped this summer by Wallace Lowry, who is a graduate of Oregon State College and has a fellowship for graduate work at the University of Rochester. Mr. Lowry is doing the areal geology of the Ironside Mountain quadrangle toward his Ph.D. degree. Part of the expenses of his field work is being paid by the Department, and the geologic map of the quadrangle will be published by the Department when completed.

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Wayne Lowell, formerly with the Department and now doing graduate work at the University of Chicago, is making a study of the paragenesis of southwestern Oregon gold and copper ores. When completed, the study will be the subject of a thesis leading to his Ph.D. degree. Many samples were taken in the field during June and part of July. These samples have been sent to Chicago where a large number of thin and polished sections will be made for detailed microscopic study. The Department has paid part of the field expense for this work and the thesis will be available for Departmental publication.

#### GEOLOGIC STUDIES IN OREGON BY OUT-OF-STATE GEOLOGISTS

Dr. Conrad Krauskopf of Stanford University is studying contact relationships of the granite batholith of the Wallowa Mountains. The work is of a much more detailed nature than ever before done in the Wallowa Mountains.

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During June, Mr. Beverly Wilder of Berkeley, California, collected and studied fossil plants in the Molalla quadrangle as a part of his doctorate work at the University of California.

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For the past several months Dr. Ralph W. Chaney of the University of California has been directing the work in Eastern Oregon of a party of paleontologists, headed by Dr. Robert LaMotte. Studies have been made especially of fossil plants in the John Day beds. An extensive collection of leaves has been made and this work will be an important contribution to the paleobotany of the State.

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#### TOPOGRAPHIC MAPPING

Topographic mapping in Oregon by the United States Geological Survey is being done this summer in the Euchre Mountain quadrangle located near the coast and extending on the west from a point a little north of Devil's Lake south to a point about 3 miles east of Otter Rock. The east boundary of the quadrangle extends south from Saddle Mountain.

The whole current program of topographic mapping in Oregon by the U.S.G.S. includes five 15-minute quadrangles named Euchre Mountain, Toledo, Tidewater, Roman Nose, and Panther. The first three adjoin in a line north and south with Euchre Mountain the most northerly and with the Toledo quadrangle adjoining it on the south. The last two adjoin east and west and are located west and south of Eugene in an area approximately half-way between the Pacific Highway and the Coast. The aggregate area of the five quadrangles is something in excess of 1,000 square miles. It is not now known when the program will be completed.

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#### 2000 WILLOWS DOING FINE, DREDGED LAND

##### Forest Reports Porter Ground Rehabilitated.

A project aiming at the rehabilitation of land over which gold dredges have passed was begun this year on tailings of the Porter and Company operating near Granite, a report from the Whitman National Forest headquarters indicates.

According to the information on the project, the work is done under an agreement as to dredging federal forest land and involved the planting of 2000 willow trees on the leveled tailings piles. In addition, the dredging company is said to have planted crested wheat grass directly in the rock and that a stand was obtained. The company has done similar planting in Montana, it is said.

The willows, native to the district, were cuttings from 18 to 24 inches in length and were set out during the spring under the supervision of Mel Burke, forest service staff member. Ninety percent of the trees were growing, he indicated Tuesday. Plantings were made along the winding creek channel reconstructed by the company over the ground mined.

The official indicated that while the willows are apparently doing fine, they may not grow tall enough to affect the whole area. He suggested that cottonwood trees may prove an ideal planting for dredged-over ground in eastern Oregon.

- Baker Record Courier, July 24, 1941.

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#### EXCESS PROFITS TAX ON STRATEGIC MINERAL PRODUCTION

The House Ways and Means Committee in Washington recently eliminated from the 1941 Federal tax measure the excess profits tax exemption for producers of the strategic minerals. The bill, we understand, is now in the United States Senate for consideration.

If this knocking out of the excess profits tax exemption for strategic mineral producers in the United States sticks and the law passes without the exemption, it will be a slap in the face for every mining group in this country producing strategic minerals or even considering opening up strategic mineral properties. It would remove one of the most important incentives that mining people have for producing strategic minerals in this national emergency. It would mean that strategic mineral producers, who have been and are continuing to be urged by the Federal government for patriotic reasons to extend themselves to the utmost to produce the mineral products of which the government is sorely in need, will be apt to lose their shirts unless they happen, in their mining development, to strike orebodies of bonanza size.

The elimination of the profits tax exemption would gain for the government in taxes about one-half million dollars in the quicksilver industry and another half-million dollars in the tungsten industry. If the domestic strategic minerals production is adversely affected, as it doubtless will be by this removal of the incentive to develop new mines, the government itself may have to get into strategic minerals production and produce the materials urgently needed in this emergency. In the latter event, it would probably cost the government twenty-five times as much as the million dollars a year they would save by eliminating the excess profits tax exemption.

To remove one of the principal inducements for the production of sorely needed strategic minerals in the United States would be a very stupid move indeed, therefore we urge that a Senate amendment be incorporated in the bill that would provide an exemption from excess profit taxes for all domestic strategic mineral producers.

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#### THE HOPPER

We welcome to our small group of monthly news publications "The Hopper", of the Oklahoma Geological Survey. Dr. Dott writes that the name and idea of our own Ore.-Bin may have helped in starting The Hopper. Thanks for the compliment. Our very best wishes to The Hopper for its future growth and success.

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#### DOMESTIC PRODUCTION OF GEM STONES

From the 1909 peak output of gem stones valued at \$534,280, the domestic industry dwindled to only \$3000 in 1934. Since then the production has increased markedly and in 1940 was valued at \$340,000 to \$750,000; the first figure is a rough estimate of the amount used in jewelry and the second an estimate of the total, including that treasured by collectors or sold to tourists, collectors, and rock gardeners. The rise is due largely to the growth of lapidary work as a hobby (particularly in the Pacific Northwest and notably in Oregon and Washington). Stones of the agate family comprise about 87 percent of the amount used in jewelry. Gems are produced largely by individuals or partnerships, and as there are no official returns exact figures are not available.

The war has shut off, at least in part, the country's normal sources of supply of colored gems; their place, to some extent, has been taken by gems of American origin.

- Preprint of Chapter on Gem Stones  
from U.S.B.M. Minerals Yearbook for 1940.

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#### SUMPTER GEOLOGIC MAP

A colored geologic map of the Sumpter quadrangle covering a part of western Baker County and including the extreme northeastern part of Grant County, will be issued by the State Department in the very near future. Mapping was done by geologists of the U.S. Geological Survey. The cost of reproduction is to be paid by the State Department.

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