STATE DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
Head Office: 702 Woodlark Building, Portland 5, Oregon

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COMMENTS ON THE GEOLOGY AND MINERAL RESOURCES OF DOUGLAS COUNTY, OREGON*

General geology

Douglas County contains rocks of every geologic period from the Triassic to the Quaternary. These rocks furnish one of the most continuous and complete records in Oregon's geologic history and record geologic events over a 165-million-year period.

The oldest rocks are found in the southern lobe of the county in the area of the towns of Glendale, Riddle, Canyonville, Myrtle Creek, Days Creek, and Tiller. These are old volcanics and marine sediments into which granitics and basic rocks such as peridotite have been intruded. Gold, silver, copper, chromite, and other metallic minerals were introduced at the time of this great period of intrusion and are associated with these rocks. Intrusion was accompanied by uplift and after a long period of erosion, seas returned to this area; their record is left in the limestones and other sediments that are found east and southeast of Roseburg in a northeast-trending band extending from Dillard to the upper North Fork of Deer Creek.

The geology of the other parts of the county can probably be best outlined briefly by describing the rocks along a west-trending section extending from Mt. Thielsen to Roseburg to Reedsport.

Mt. Thielsen and the other volcanic peaks at the summit of the Cascades are the last products of severe vulcanism in the Cascades. These high peaks rest on a thick foundation of still older volcanics formed at a much earlier date. These are the dissected foothills of the Cascades. The western margin of this series of rocks would lie near a north-south line extending from Drew to Cottage Grove in Lane County.

Most of the rocks west of this line are sediments deposited in former seas. Around Roseburg and northward, volcanics interfinger with the sediments but west of this area, sandstones and shales make up the bulk of the rocks exposed. Tyee Mountain, most of the rocks of the Calapooya Mountains, and the rocks bordering the Umpqua River all the way to Reedsport were deposited in a sea that was present shortly after the one in which formed the sandstones, shales, and limestones of the Roseburg-Oakland-Yoncalla area. Among the sediments of the latter sea some coal was formed, indicating that this area was near the coastline.

At the present, the most spectacular geologic deposits that are forming are the sand dunes found near Reedsport.

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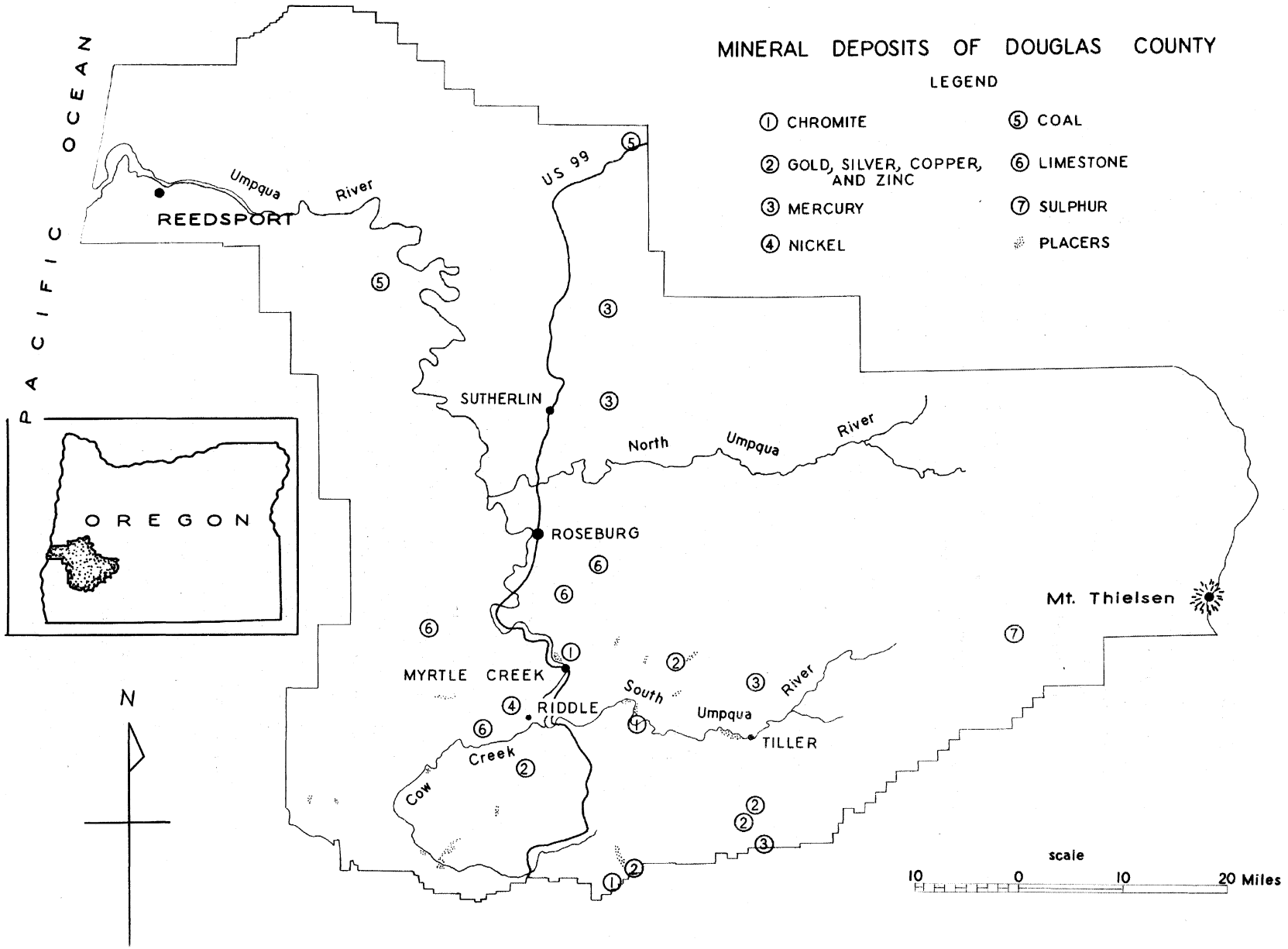
*Speech by F. W. Libbey, Director Oregon Department of Geology and Mineral Industries, at Roseburg Chamber of Commerce, February 5, 1951.


MINERAL DEPOSITS OF DOUGLAS COUNTY
LEGEND
① CHROMITE
② GOLD, SILVER, COPPER, AND ZINC
③ MERCURY
④ NICKEL
⑤ COAL
⑥ LIMESTONE
⑦ SULPHUR
PLACERS
PACIFIC OCEAN
OREGON
Umpqua River
REEDSPORT
US 99
SUTHERLIN
North Umpqua River
ROSEBURG
Mt. Thielsen
MYRTLE CREEK
RIDDLE
South Umpqua River
TILLER
Cow Creek
N
scale
10 0 10 20 Miles

Economic geology

There is a considerable diversity of mineral resources in the county. The most important with typical mines of the various districts are described below. Because of the strained and confused international situation, most attention is given here to war minerals.

(1) Quicksilver

Douglas County has been the leading quicksilver area of the State and one of the leading areas of the nation. The best known quicksilver mine in the State is the Bonanza located east of Sutherlin. History has it that the Bonanza and the adjoining Nonpareil mine were discovered in the 1860's. Nothing much in the way of their early history is known but very old workings have been found in the Bonanza property as well as the remains of an old Scott furnace. In 1935 H. C. Wilmot acquired the property from J. W. Wenzel and associates. In 1937 Wilmot put in a furnace plant and his underground work opened up high-grade ore. A little later the tension in Europe occasioned by fear of what Hitler would do, together with the demand for quicksilver for war purposes, caused the price to skyrocket to more than $200 a flask. The Bonanza got its plant in working order and discovered new ore at a time when there was a heavy demand at a price which allowed very profitable operation. In 1940 Bonanza was ranked second among domestic quicksilver producers. It continued to operate after the war even though the market price dropped to $70 with costs double prewar costs. It struggled to keep its head above water until 1949 when it finally closed down. The property still contains a substantial tonnage of low-grade ore and could very well resume operations if some assurance could be obtained which would guarantee a price over a sufficient period of time.

In the general locality of the Bonanza there is the Nonpareil, mentioned above, and farther north the Elkhead. Both of these properties had a small production in the early days but were inactive during World War II. In the eastern and southern parts of the county many prospects are known. Perhaps the best known are the Buena Vista, the Maud S, and the Red Cloud in the Tiller-Drew area.

(2) Gold, Silver, Copper, and zinc

From quicksilver we turn to a group of properties containing sulphide deposits in which the commercial metals are gold, silver, copper, and zinc. The best known are on Silver Peak south of Riddle where two properties, the Silver Peak and the Umpqua Consolidated, adjoin and would probably need to be operated as a unit. These properties have a record of production of shipping ore to the Tacoma Smelter. The average assay value for 3,329 tons shipped in 1936 was about 0.1 ounce gold, 3.0 ounces silver, 5.6 percent copper, and 6.0 percent zinc. The ore shipped was massive sulphide containing copper, iron, and zinc sulphides. At today's prices gross value of this ore would be about $55 a ton. Much more development work needs to be done here before plans for a treatment plant could be intelligently drawn. Besides the solid sulphide ore, there is a substantial width of low-grade disseminated sulphides indicated. Whether this low-grade would be commercial is unknown at present, but the property warrants a thorough investigation including development work, especially because of the urgent need for development of strategic minerals.

In the southern part of the county worthy prospects are the Chieftain, the South Umpqua or Banfield, and the Rowley. These mines also require development work in order to be able to plan for the proper scale of operations and the proper treatment plants. However, they all have some very favorable characteristics.

(3) Nickel

The deposit on Nickel Mountain near Riddle resulted from a weathering and enriching process in the peridotite rock which caps the mountain. The unweathered rock contains small amounts of nickel and chrome. The occurrence is of especial interest at

the present time because it is probably the largest known nickel deposit in the United States and because of the extremely strategic nature of nickel metal. The deposit has drawbacks of being both low-grade and oxidized, but it contains a small percentage of chromite which should help out as a by-product.

Discovery of the deposit was made in 1864 by sheepherders. From 1880 to 1900 a large portion of the deposit was owned and managed by W. Q. Brown who carried on exploration and also experimented with concentration and treatment of the ore. Early in World War II, the Freeport Sulphur Company, then lessee of the property, developed a large tonnage of low-grade ore. Recently the M. A. Hanna Company leased the property.

World supplies of nickel in normal times come from three areas. The largest is the International Nickel Company property near Sudbury, Ontario, upon which the United States absolutely depends for its domestic supplies. The second is the Petsamo deposit in Finland now owned by the U.S.S.R. Both of these are sulphide deposits and the metallurgy or treatment of such deposits has been worked out over a long period of years. The third best known deposit is in New Caledonia owned by France. Here deposits are similar to the Nickel Mountain deposit but are very much higher grade, which allows France to use a relatively expensive method of treatment to convert the oxide into the sulphide. A large deposit of ore in Cuba very similar to the Nickel Mountain ore was put into production during World War II by Freeport Sulphur Company using government funds. It was closed down after the war because of high production costs. Recently it was reportedly reactivated by government order.

Two methods have been developed which are applicable to treatment of oxide deposits. One is a leaching process involving several reagents. The other, worked on by the U. S. Bureau of Mines, produces a stainless steel direct from the ore. Metallurgists of the Bureau are strongly in favor of this direct smelting process. The M. A. Hanna Company, present lessee of the Nickel Mountain deposit, has already done a large amount of metallurgical testing work. Further work including additional exploration of the deposit on the ground will be done this year.

(4) Chromite

Chromite is another very important war mineral. In normal times the United States has depended wholly upon foreign chromite. It is believed that over the past four or five years because of the great demand for chrome for ferro-alloys, no very large amount of chrome has been accumulated in our national stockpile. Therefore because of war tension, it behooves us to get busy and promote domestic production of chromite for national security reasons. We should have been doing this for the past four years. Oregon and California are about the only states which can produce a metallurgical grade chrome without chemical beneficiation.

In Douglas County several deposits are known and should be investigated by surface work and possibly diamond drilling. On Quartzmill Peak in the Starveout Creek area a deposit has been mined and the workings show that a considerable tonnage must have been shipped. It is believed that most of the ore would not rate as metallurgical grade according to present standards but the ore might be concentrated. It seems likely that more ore could be developed here if a market were available. Another chrome-bearing zone is on the South Umpqua River near Days Creek. Some samples obtained here have shown very good grade material. Other chrome deposits are known on Nickel Mountain and on Cow Creek south of Riddle. Because Douglas County contains large areas of serpentine, the source rock of chromite, chances for finding other chromite ore zones are favorable.

(5) Limestone

Limestone lenses occur southeast and east of Roseburg and also in Camas Valley. The most important appear to be those near Roseburg. The Oregon Portland Cement Company operated one quarry in this locality in the early days but the attitude of the limestone forced them to go underground which made for expensive quarrying. They abandoned this quarry

when they opened their quarry in Baker County. Several other lenses are known and one has been quarried recently for agricultural limestone on the Landers farm about 12 miles east of Roseburg.

(6) Gold placers

For a great many years streams in Douglas County, especially those tributary to the South Umpqua, have been placered both by hand methods and by larger scale operations. In 1940 a dragline worked on the South Umpqua and on Cow Creek. Various placers have been worked on tributaries of Cow Creek.

(7) Coal and sulphur

Subbituminous coal deposits typical of Eocene sandstone beds are found at Comstock and near the Umpqua River about 17 miles west of Drain. Little is known of the Comstock coal except that a slope was driven on it many years ago. It is now caved. The Umpqua coal occurs in a flat-lying bed which crops out at several places around a hill. Analyses indicate a good grade of subbituminous coal quite similar to the Coos Bay coal.

Sulphur occurs in small lenses at the headwaters of Castle Rock Creek about 4 miles by trail from the Diamond Lake highway up Foster Creek. Very little in the way of development work has been done. Our Department looked them over in 1939. Because of the shortage of sulphur these deposits should receive much more attention and as soon as the snow is off, the Department intends to make a further examination. Both paper companies and chemical companies are looking rather intensively for Northwest supplies, preferably in the form of elemental sulphur, but sulphur from sulphides would be acceptable. Therefore very large deposits containing iron sulphide would be very interesting to paper and chemical companies.

(8) Sand, gravel, and crushed rock are important construction materials in Douglas County. Occurrences of clays, sandstone, and talc have potential importance.

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DR. FRANCIS A. THOMSON PASSES

Dr. Francis A. Thomson, one of the best known mining educators and mining engineers in the West, died in Spokane on January 11, 1951. Dr. Thomson had been in ill health for several months. He retired from the presidency of the Montana School of Mines on October 1, 1950, and moved to Spokane to take advantage of the lower altitude. He was a graduate of the Colorado School of Mines and also studied abroad. Among the important positions in the educational field held by Dr. Thomson were Dean of the School of Mines, Washington State College, and Dean of the School of Mines, University of Idaho. He became President of the Montana School of Mines in 1928 and remained in that position until 1950. He had been a member of the American Institute of Mining and Metallurgical Engineers for nearly fifty years and served one term as a Director. As Head of the Montana School of Mines, Dr. Thomson was also Director of the Montana Bureau of Mines and Geology. He took an active part in western activities of the American Mining Congress and was active also in the Montana Mining Association and the Northwest Mining Association. His students are in all parts of the world and probably no single educator in the mining field will be as long and affectionately remembered by students as will Francis A. Thomson.

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PERLITE PLASTER SAND RECORD

In 1950 Dant & Russell, Inc., Dantore Division, sold five hundred thousand 3-cubic-foot bags of Dantore. This quantity is estimated to be sufficient to cover 7,500,000 square yards of plastered surface if all were placed on rock lath.

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OREGON LEGISLATURE ISSUES MEMORIAL ON CHROME

House Joint Memorial No. 4

Introduced by Representative Dickson and read January 30, 1951

TO HIS EXCELLENCY, THE HONORABLE PRESIDENT OF THE UNITED STATES, AND TO THE HONORABLE SENATE AND HOUSE OF REPRESENTATIVES OF THE UNITED STATES OF AMERICA, IN CONGRESS ASSEMBLED:

We, your memorialists, the Forty-sixth Legislative Assembly of the State of Oregon, in legislative session assembled, most respectfully represent as follows:

Whereas chromite is an essential war mineral and without an adequate supply the United States would be dangerously handicapped in an all-out war; and

Whereas in time of war, foreign sources may be cut off in whole or in part; and

Whereas Oregon and California contain the most important domestic deposits of chromite and these deposits could be made available to the national stockpile if a price would be paid sufficient to make it profitable to develop the available chromite deposits; and

Whereas the chrome miners of southern Oregon and northern California have organized in order to negotiate with government officials to secure an adequate price for chromite to cover development, mining, transportation and profit, as well as to secure assistance in building access roads; now, therefore,

BE IT RESOLVED BY THE HOUSE OF REPRESENTATIVES OF THE STATE OF OREGON, THE SENATE JOINTLY CONCURRING THEREIN:

That the President and the Congress of the United States hereby are memorialized, and this forty-sixth Legislative Assembly of the State of Oregon hereby does petition that the Defense Minerals Administration be directed to purchase chromite without further delay from Oregon and California producers at a price that will allow delivery to a government ore purchasing depot at a fair profit for the producer; and be it further

Resolved, That the Secretary of State of the State of Oregon be and the same hereby is directed to transmit copies of this memorial to the President of the United States and every member of Congress.

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CHROME MEETINGS IN WASHINGTON, D.C.

According to the Grants Pass Courier, issue of February 1, Fay Bristol, President of the Oregon Mining Association, and William Robertson, Chairman of the Association's Chrome Committee, were called to Washington, D.C., on January 31 to confer with S. H. Williston, Director of the Supply Division of the Defense Minerals Administration. The conference is designed to set up a program for government purchase of chrome from southwestern Oregon and northern California mines. Mr. Niel R. Allen of Grants Pass, Chairman of the Board of the State Department of Geology and Mineral Industries, also attended meetings held to set up the program, and Senator Guy Cordon of Oregon participated in the conference.

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INDUSTRIAL MINERALS CONFERENCE

The Oregon Section of the American Institute of Mining and Metallurgical Engineers is again playing host to the Northwest Industrial Minerals Conference. The all-day meeting will be held at the Congress Hotel on Friday, April 27. The Saturday following will be devoted to tours to industrial mineral plants in the area and to manufacturers of earthmoving equipment. This will be the first Northwest conference to be sponsored by the Industrial Minerals Division of the A.I.M.E.

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SYMPOSIUM ON POSSIBLE FUTURE OIL PROVINCES OF THE PACIFIC COAST REGION

Part III - Oregon (Abstract)*

By
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Oregon's prospective oil territory is considered to be limited to two areas where thick sections of unmetamorphosed marine sediments occur, namely, the Coast Range province of northwestern Oregon, and a part of the Ochoco Mountains region in central Oregon.

The former, with an area of 14,000 square miles, contains more than 15,000 feet of clastic sediments mostly of marine origin, together with several thousand feet in interbedded volcanics. These rocks range in age from middle Eocene to Pliocene.

In central Oregon more than 35,000 feet of Mesozoic and Paleozoic predominantly marine sediments, with no interbedded lavas, are exposed in windows in the regional cover of Tertiary and younger volcanics. Their extent below the volcanic cover is unknown.

The detailed structure and geologic history of neither region has been adequately deciphered. The Coast Range area seems to be essentially a broad, undulating northerly plunging geanticline, but it is modified and complicated by many lesser structural features. Dips are generally gentle and folds symmetrical. The central Oregon area is closely and complexly folded and numerous unconformities are present.

No oil seepages or oil sands are known in Oregon although oil and asphalt have been found in basalt vesicles, fossil cavities, and drusy cavities in quartz veins.

Ninety-five to 100 wildcat wells have been drilled in Oregon: 45-50 in the Coast Range Province; 3 in central Oregon; 25-30 in the Harney Basin and Vale areas of southeastern Oregon, with the remainder at scattered locations. Noncommercial amounts of gas were encountered in some of these wells, but no authenticated oil indications are known. Wildcatters have been attracted to the southeastern Oregon areas apparently by the occurrence of natural gas in the lacustrine and other continental sediments which occupy structural basins in this area.

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*Reproduced by courtesy of the American Association of Petroleum Geologists, from the Bulletin, vol. 34, no. 12, p. 2382, December 1950.

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NO INCENTIVE FOR VENTURE CAPITAL*

One of the matters that causes headaches in business and financial circles is the decline in the net returns which investors, taking them by and large, receive on the money they have placed in the securities of industry. A number of commentators are of the opinion that the investor has become the real "forgotten man" in the era of enormous material progress which he financed.

A typical comment was recently written by W. Alton Jones, president of the Cities Service Company. He observed that in the petroleum industry someone must provide $34,000 worth of "tools" for each worker employed. He said, "A worker so dependent upon tools should cultivate the good will of the man - and not overlook the woman - who makes the job possible. . . .The American custom is to induce someone who has saved to join in an enterprise by investing his savings in tools and facilities so that management can assemble workers and get on with the task of producing something people want."

The drop in the return paid for the use of the "tools" has been very sharp. At one time it averaged around 8 cents - now in many instances it is down to 2 or 3 cents. The factor is of extreme importance here. The investor, whether rightly or wrongly, must pay a double tax. First, the profits earned by corporations are heavily taxed on a graduated scale. Second, whatever is paid out to investors in the form of dividends or interest, is hit hard by the

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*From Pay Dirt, January 1951, reprinted in Wallace Miner, February 1, 1951.

individual income tax. The result is to dry up sources of "tool" money.

This is not a problem of moment only to the large business. In fact, it is felt most severely by the new and smaller business. The big going corporations, which have been in operation for many years, are already financed. Generally, they have large reserves earned in the past. They are best able to adapt themselves to changes in the economic climate or government policy. The smaller business, on the other hand, doesn't have these advantages. It may need money for expansion, or to start in the first place. The investor who puts up that money is running a risk of losing it all. So, knowing that even if the concern does succeed his net returns after taxes will be small, he is chary of the risk.

In view of the above, one can readily see why there is mightly little venture money going into new mining enterprises at the present time. Those who invest and take the added risks must be assured of more than normal profit if they strike the kind of ore bodies that they hope for. However, with the government taking the bulk of the profits when you win and not sharing any part of the losses if you lose, there is certainly but little inducement for those who do have money available. A tax-incentive program for new mines would bring about renewed exploration of our natural resources.

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CANADA DOES ALL RIGHT

Apropos the above discussion of incentives for mining investments, we have recently noted with a great deal of interest a couple of news releases with a Nelson, British Columbia, dateline which were headlined approximately as follows:

"Woodbury Issue Oversubscribed" and "Van Roi Finance Plan Completed."

There followed brief descriptions of the new mining development projects being undertaken by the companies and the purposes for which the newly invested private capital would be expended.

These cases are by no means isolated. Similar new items from north of the international border have been fairly common, particularly during the past year or so. Hon. R. C. MacDonald, British Columbia minister of Mines, told a meeting of Northwest Mining Association members at their convention in Spokane last December that in recent months some 30 new mining companies were organized in the province.

To what can be attributed this healthy expanding condition in Canadian mining? The answer to that one is not difficult. Briefly, it is favorable tax laws.

In Canada a new mining venture is entirely exempt from taxation during the first three years of production, and, in addition, is allowed a six-months period of tax-free operation for "tune-up." Their laws permit deduction of exploration and development costs from taxable income as operating expenses. They have no capital gains tax, and they grant a depletion allowance to stockholders amounting to 10 to 20 percent of the dividend, in addition to the depletion allowance which corporations receive. Finally, they recognize losses from unsuccessful mining ventures as losses and permit their deduction from taxable income in the year of loss.

This type of tax climate gives the investor a run for his money. The man taking a big risk has a chance for a big pay-off. There's some real incentive for taking the risk.

So mining flourishes in Canada while the domestic industry withers. "Responsible" officials in the administration view with alarm the critical shortage of many metals, while others, including the president, continue their unsettling references to "excessive depletion allowances." In the present urgent situation, good money is poured after bad in marginal holes in the ground in the hope of gleaning a few additional pounds of badly needed metal.

. . .The National Minerals Advisory Council to the Department of Interior has long recommended a six-point tax program which includes in large part our northern neighbor's favorable features. Passage of legislation incorporating this six-point program would, more than any other single action, reawaken the languishing interest in mining ventures in this country. . . .

** (<u>Wallace Miner</u>, Feb. 1, 1951)