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

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EARTHQUAKES

The recent earthquake in the Pacific Northwest which was heaviest in the Puget Sound area was the incentive for the accompanying article.

In perspective, it may be stated authoritatively that this earth is a very unstable vehicle for our ride through space. Our span of life is but a brief instant in geologic time, but during that instant there are thousands of earth shudders. Some of them are rough and kill people; others are so slight that they are detected only by instruments. Some parts of the earth's surface appear to be relatively secure and others are certainly subject to recurring shakes, some of which are serious and will continue to be serious, but always they are unpredictable as to time.

According to the Seismological Society of America bulletins for the year from March 27, 1948, to March 27, 1949, there was a total of 253 recorded earthquakes. One hundred ninety-five of these were in the whole Pacific area, of which 78 were in the United States part of the area. Three were recorded in Alaska (with 8 off the coast or in the Aleutians). None was recorded in British Columbia (2 were off the coast). One was recorded in Oregon (1 was off the coast). Of the total, 74 were recorded in California. Nine were centered in other western states (Montana, Nevada, Utah).

These figures indicate that Oregon is a fairly tranquil place from the standpoint of earthquakes but it would be unsafe to predict that tomorrow we shall not have one.

To return to our original thought regarding the instability of the earth, we like to have an excuse to quote from a certain part of The Ancient Volcanoes of Oregon by Howel Williams. The part we especially like reads: "The landscape is changing endlessly, and the face of the earth is always in motion, pulsating like a living thing."

These pulsations are poetic in this text; in reality they are often disastrous, even though they occupy but a moment of our brief existence in the geologic scheme.

The Editor

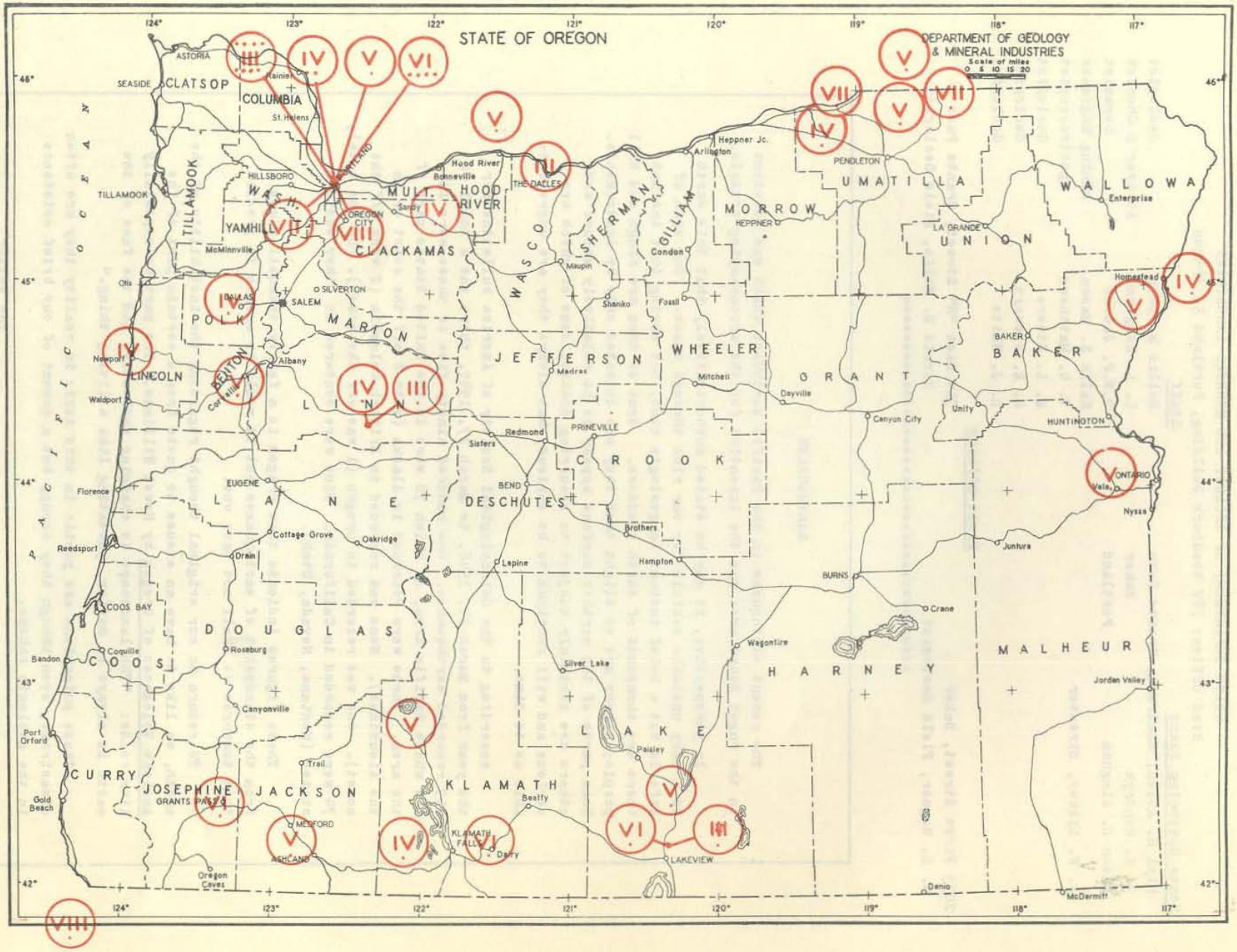

Fig. 1. Index map showing location of earthquakes in Oregon having an intensity of III or greater. Dots indicate number of shocks.

OREGON EARTHQUAKES

By
Ralph S. Mason*

Oregon has suffered but little damage from earthquake activity in the past century. The accompanying graph (fig. 2), which shows the occurrence in the State of all earthquakes with an intensity of III or greater (modified Mecalli intensity scale), shows that there has been only one earthquake having an intensity of VIII, and only three having an intensity of VII. On the Mecalli scale, an earthquake of intensity VIII is characterized by "slight damage to specially designed (brick) structures, with considerable damage to ordinary substantial buildings, accompanied by fall of chimneys, monuments, and walls." An earthquake of intensity VII does little damage to buildings of good design, although poorly built structures may suffer considerable damage. Earthquakes of intensity VI or less do little damage, and many people fail to even realize that an earthquake of an intensity III or IV has occurred.

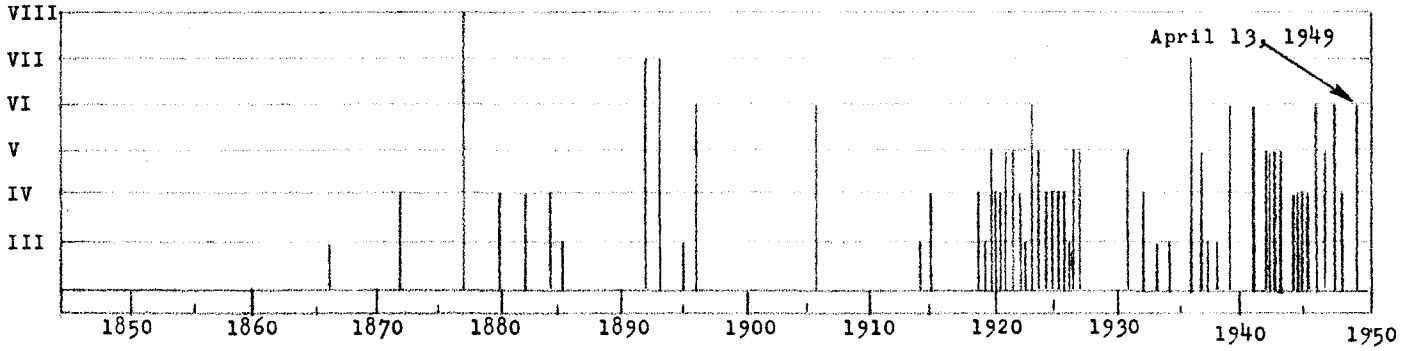

Fig. 2. Graph showing occurrence of earthquakes in Oregon having an intensity of III or greater from 1846 to 1949.

The greater number of earthquakes recorded since 1920, as shown on the graph, would seem to indicate at first glance that Oregon had experienced a great increase in seismic activity as compared to the 70-year record prior to that date. This would probably be an erroneous conclusion. During the early part of the period covered by the graph Oregon was sparsely settled and communication between settlements often long delayed. In sparsely settled areas the chances for a minor shock to go unobserved are relatively good, while in densely populated areas a shock of even low intensity is usually observed by enough people to verify its occurrence. The advent of the seismograph, a mechanical device which records even the faintest earth tremors, has resulted in a greater number of reported earthquakes in recent years.

The index map (fig. 1 opposite this page) of the State showing the location of earthquakes having intensity of III or greater bears out the fact that areas of reported earthquake activity coincide with the areas having the greatest density of population. It is extremely doubtful that the Portland area has had any more shocks than other areas in the State. The map shows, however, that there have been seventeen earth tremors in the Portland area as compared to a total of one or two for any other area in the State. It should be noted in connection with the plotting of the earthquakes shown on the index map that only those quakes which apparently originated within the boundaries of the State, or closely adjacent to it, were shown. Probably every part of the State has felt earth tremors, at one time or another, which originated at a considerable distance, perhaps many miles beyond the boundaries of the State.

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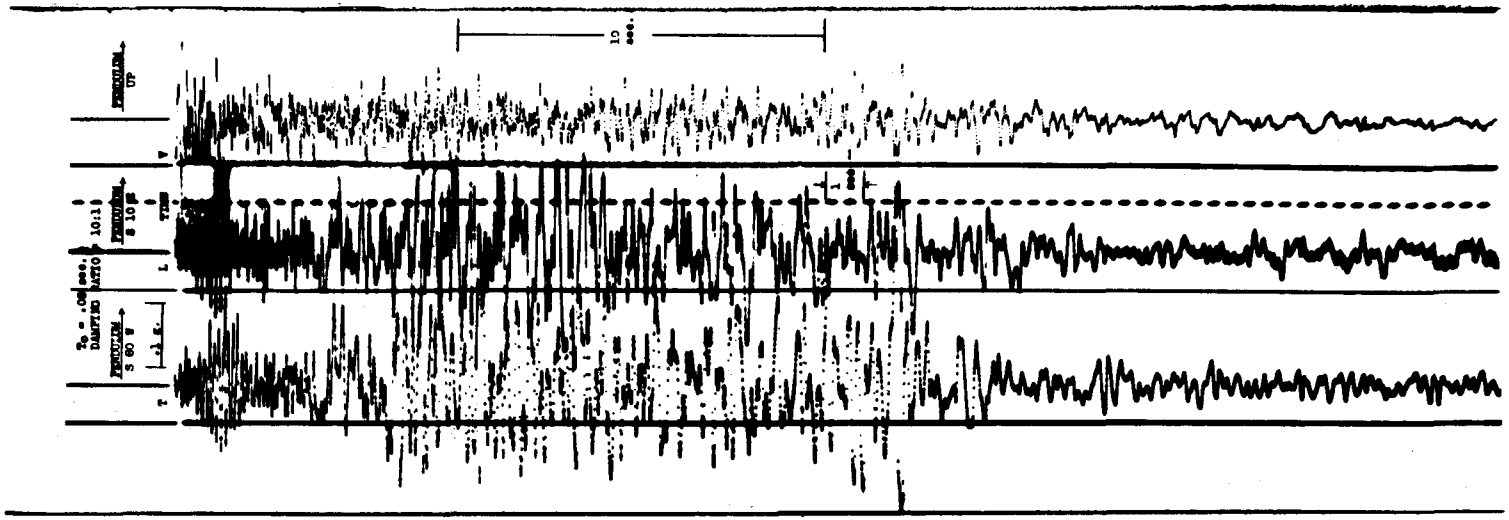
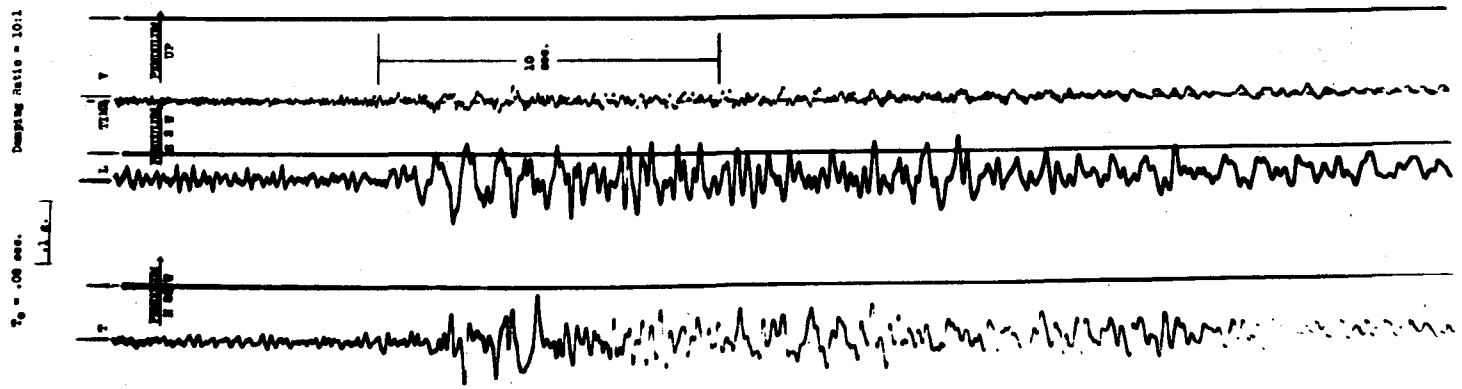
* Mining Engineer, Oregon Department of Geology and Mineral Industries.

OLYMPIA, WASHINGTON, ACCELEROGRAPH
EARTHQUAKE APRIL 13, 1949, 11:56 A.M., P.S.T.



SEATTLE, WASHINGTON, ACCELEROGRAPH
EARTHQUAKE APRIL 13, 1949, 11:56 A.M., P.S.T.



U.S.C. & G.S. SS-23
Seis. Field Survey

Fig. 3. Graphs of the April 13, 1949 earthquake recorded by U. S. Coast and Geodetic Survey accelerographs at Seattle and Olympia, Washington.

There has been little scientific interest taken in earthquakes in Oregon until quite recently. This has been doubtless due to the fact that the State has experienced such little earthquake disturbance. At the present time there is but one seismic recording station in the State, although a second station is currently being prepared. A description of the seismograph installed at Oregon State College appeared in the July 1948 Ore.-Bin. This instrument is to be replaced by one of improved design which will be housed in a more suitable structure located a short distance outside of Corvallis. The instrument currently at Corvallis is to be transferred to the Eastern Oregon College of Education at La Grande.

The recent quake which occurred April 13, 1949, although causing little damage in the Portland area, created considerable interest and concern among individuals, public agencies, engineering firms, power companies, and insurance firms. The State of Washington has inaugurated a special study of the earthquake, the epicenter of which was located by the U.S. Coast and Geodetic Survey between Olympia and Tacoma. Olympia suffered the greatest damage of the cities of the Puget Sound area. Minor damage to several of its substations in southern Washington was reported by Bonneville Power Administration. The Oregon Section, American Society of Civil Engineers, has undertaken a comprehensive study of earthquake resistant construction in buildings in Oregon. The study will include both the public safety and economic aspects of the problem.

As would be expected, local insurance firms were besieged by requests for earthquake insurance coverage immediately following the recent disturbance. One large international insurance firm made a comprehensive study of the earthquake activity in the State, together with a study of the subsurface conditions existing in the areas occupied by the principal cities in the State.

The graphs (fig. 3), representing the record made by the accelerographs operated by the U.S. Coast and Geodetic Survey at Seattle and Olympia, Washington, show the movements of the earth in three directions; the upper trace is a record of the vertical motion, the second and third show horizontal movement, the one trace being a record of motion at right angles to the other. In addition, of course, the graphs show the relative extent of greatest shock as well as a comparison of the intensity of movement between the Olympia and Seattle records.

Similar records recorded by other instruments in cities scattered throughout the world enable seismologists to locate accurately not only the geographical location of the origin of the quake but its depth below the surface as well. Further information regarding the two graphs reproduced herewith may be obtained from the U.S. Coast and Geodetic Survey, Seismological Field Survey, 214 Old Mint Building, San Francisco 3, California.

Oregon has been spared from destructive earthquakes, such as those which have been experienced in California, principally because the San Andreas rift which can be traced from the Mexican boundary northwards through San Francisco to a point just south of Eureka, California, passes out to sea, probably parallel to the Oregon coast some little distance from the shore line.

Undoubtedly Oregon experienced numerous severe earthquakes in the geologic past when fault scarps such as those now visible at Winter and Abert rims and Steens Mountain were formed. It is, of course, impossible to predict what the future holds for Oregon with respect to earthquake activity, but it is interesting to note that in California, seismologists estimate that four great shocks may be expected per century. These shocks will be generated by movement along either the San Andreas rift or the Owens Valley trough.* Just when the next slip will occur along the San Andreas fault line or at what point the movement will take place can not be determined. If the movement should occur along the portion of the fault which passes to the west of the State of Oregon, the resulting damage might be substantial. Careful measurements are being made along the California coast to determine the motion of the earth's surface on both sides of the San Andreas fault. The rate of movement at the present time continues at about the same rate that preceded the San Francisco quake in 1906.

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*From the bulletin of the Seismological Society of America: Vol. 34, No. 4, October 1944, "Frequency of earthquakes in California" by B. Gutenberg and C. F. Richter.

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ASSESSMENT EXEMPTED

Congressman Harris Ellsworth has wired the Department that on June 17 the President signed HR 1754 which extends the mining claim moratorium to cover the current assessment year ending July 1, 1949. Provision is made in the bill for crediting any labor performed or improvements made on any mining claim during the current assessment year against the labor or improvements required to be performed or made for the year ending on July 1, 1950.

In order to obtain the benefits of this act every claimant must file or cause to be filed in the office where the location notice or certificate is recorded, on or before 12 o'clock noon of August 1, 1949, a notice of his desire to hold his mining claim or claims under the act. Claimants on O&C Lands must file also with the Bureau of Land Management, Swan Island, Portland. **********

NEW URANIUM GUIDE

The U.S. Atomic Energy Commission and the U.S. Geological Survey have collaborated in publishing a pocket size handbook of 123 pages entitled "Prospecting for Uranium." The text contains descriptions of types of deposits, uranium minerals, various tests for radioactivity, methods of using the Geiger counter, and the laws and regulations governing the location of uranium claims and production of uranium ore. The handbook is available through the Superintendent of Documents, Washington 25, D.C. Price is 30 cents per copy.

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URANIUM SCHOOL

The Nevada State Uranium School has been established with Don C. Cameron, Director. The address of the school is State Capitol Building, Carson City, Nevada. Anyone interested in obtaining further information could write Mr. Marty Hess, care of the school.

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OREGON MINING NOTES

Mr. Bert Lowry, Medford, Oregon, has leased his antimony property to the Fasel and Scott Mines, also of Medford. The property is located in the Upper Applegate area, on Kanaka Gulch in southern Josephine County. Messrs. Fasel and Scott have recently cleared out some of the underground openings and are mining and sorting stibnite ore. Three men are employed.

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The Buffalo Gold Dredging Company, 582 Market Street, San Francisco, has purchased the dredge and placer ground formerly owned by the Western Gold Dredging Company of San Francisco and John Day, Oregon. The dredge is a connected bucket type with buckets of about 6-cubic feet capacity. The present set-up is at Mount Vernon in the John Day Valley. The Western Gold Dredging Company operated the dredge until it was shut down by War Production Board Order L-208. Operations were resumed by the Buffalo Gold Dredging Company April 25, 1949, under the direction of Paul Clemmons, Superintendent. Thirteen men are employed.

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The Calhoun and Howell dragline dredge located near Dale, Oregon, on the North Fork of the John Day River was obliged to suspend operations during May because of high water. Operations were conducted on the location during 1948 and were resumed after the winter shutdown in February 1949. It is planned to start up again in June.

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A. L. Schneider and associates have begun open-pit exploration work on a gold lode property near Gold Hill, Oregon. The excavation work is by Stearns and Owens, Medford, Oregon. An estimated 100,000 cubic yards has been excavated in the operation which is also to include considerable diamond drilling and some underground development work.

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The Opp gold mine in Josephine County, Oregon, has sold 2000 yards of dump rock at 15 cents a yard for road metal, and about 1000 tons of mill tailings at 50 cents a ton for paving and manufacture of hollow tile.

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Baker County high grade stibnite ore from the Gray Eagle Mine was used in the initial run of the Morris P. Kirk & Son, Inc., smelter at Portland which started up June 1.

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According to the Spokane Spokesman Review of June 17, 1949, Cornucopia Gold Mines has filed qualifications with the Federal Security and Exchange Commission under a plan to market 191,500 shares of stock without underwriter and at a price to be determined about June 20, when the offering is made. Carl Stoll, Spokane, is president of the company, Dale I. Hayes is vice-president, and John M. Baker is secretary-treasurer. The property is situated in the southern Wallowa Mountains in Baker County, and is located about 70 miles northeast of Baker. It has had a long history of development and production. The district was discovered in the late 1870's. Several mills were built down through the years. The greatest production was in the late 1930's. Although the record of early production of the Cornucopia veins is somewhat obscure, the value of their total production is believed to be about $15,000,000.

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CHANGES IN MINING LAWS ARE ASKED BY HOOVER COMMISSION

The Hoover Commission task force, after a 16-month study of the government's handling of natural resources, has proposed several changes in the United States mining and leasing laws. The commission's report states that the mining laws, which date back to 1872, and the mineral leasing law of 1920, while generally satisfactory and workable, need revision.

A special point was made of the fact that the present law does not cover concealed deposits because of its requirement of exposure of valuable minerals in order to establish a valid claim. It also noted the fact that there has been a steady decline in the number of mineral claims patented on public lands, the number dropping from 2,500 in 1905 to less than 100 in recent years.

The following changes in the laws pertaining to mining locations and patents were suggested:

1. Permit the staking of mineral claims on all vacant, unreserved and reserved public land, with certain exceptions such as the national parks and monuments, and other obvious reservations.

2. Recognize the validity of claims without the requirement of "discovery" of valuable minerals, so that ground without surface exposure or other positive evidence of ore or valuable mineral deposits may be held for sufficient time to complete exploration or to secure evidence indicative of its prospective value.

3. Eliminate reference to alleged structural forms of an ore body, such as are implied by the words "lode," "vein," "apex," or other geologic terms, and locate claims in rectangular areas conforming wherever possible to lines and corners of the public land surveys, and not to the assumed course of some geologic body.

4. Restrict underground rights to vertical planes through the boundary lines of the claim, thus eliminating the present provision of extralateral rights as far as new claims and patents based on them are concerned.

5. Cancel the rights of new unpatented mineral claims at the end of three years if evidence of potential value of ore for valuable mineral deposits that is acceptable for patenting, as subsequently defined, has not been obtained. At the same time, there should be the privilege of renewal of the rights, without patenting, for subsequent periods if work is in progress that is approved by the Geological Survey as suitable for testing the ground.

6. Give the Geological Survey the right to cancel new unpatented claims at any time, if it is requested to examine the ground by the agency administering the land, and if it finds prospective value of the ground too slight to warrant further expenditure of money or effort on its exploration.

7. Require that all claims be located with reference to fixed points and that they be surveyed prior to application for renewal; or that they be located by legal subdivisions wherever section corners and boundaries have been established.

8. Record a duplicate of location notice at the appropriate land office.

9. Grant patents upon establishment of the potential value of the ground for ore or mineral deposits, with the acceptance for this purpose of such evidence as proximity to known deposits of value, projection of ore bearing loci, extension of fracture or sheer zones with indications of mineralization, presence of gangue minerals or of rock alteration known elsewhere to be associated with ore, and of other evidence that meets with the approval of the Geological Survey.

10. Drop the requirement of assessment work for existing unpatented claims if the owner will accept the new rules and regulations governing claims that may be adopted in accordance with the recommendations in this report.

11. Recognize the presumptive right of the holder of a mineral claim to the surface but restrict surface uses, prior to patenting, to those necessary in connection with exploration activities. Grazing and cutting of timber should be in accordance with regulations of the Forest and Range Service and be limited to the needs of the proposed operation.

Changes in laws pertaining to leasing, as proposed by the task group, are

1. Provide for a prospecting period with liberal terms for exploration in leases covering areas where available data are not sufficient to reveal the extent, quality, minability and methods of processing essential to the determination of feasibility of established or new types of commercial operations.

2. Grant prospecting rights on areas of sufficient size and under provisions formulated by the Geological Survey that will encourage thorough and complete search for mineral deposits and that will justify the required expenditures.

3. Permit exploration for all minerals within the area covered by leases and provide for their orderly development, with exclusive rights granted to the prospector on a fractional part of the total area (or otherwise a minimum area), and a preference right for the remainder of the area or so much as may be in keeping with sound public policy and feasible of development with the financial resources available.

4. Remove all limits or restrictions on overriding royalties on oil or other leases on public lands and Indian lands.

Reprinted from Pay Dirt, the official publication of the Arizona Small Mine Operators Association, Phoenix, Arizona, May 20, 1949.

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OIL TEST DRILLERS ATTENTION

House Bill 427 passed by the 1949 Oregon Legislature requires that certain features of oil well test drilling in the State be supervised by the State Department of Geology and Mineral Industries. The law becomes effective July 16, 1949, and work in progress as well as new tests come under the law. Information concerning procedures may be obtained from the Department, 702 Woodlark Building, Portland.

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GENEVA STEEL COMPANY NEEDS MANGANESE ORE

Manganese ore is in demand by all steel companies, and the Geneva Steel Company, Geneva, Utah, is looking for a source of manganese ore in the Northwest. Any owner of manganese ore may obtain specifications and price quotations by writing Mr. S. G. Sargis, Supervisor Raw Materials, Geneva Steel Company, P.O. Box 269, Salt Lake City 8, Utah.

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