STATE OF OREGON
DEPARTMENT OF GEOLOGY & MINERAL INDUSTRIES

PORTLAND, OREGON

# THE ORE.-BIN

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## NEW EDITION OREGON MINING LAWS

Oregon mining regulations are printed in the revised edition Bulletin No. 1 of the State Department of Geology and Mineral Industries just published. New laws passed by the 1939 and 1941 legislatures have been included. Also added is a reprint of part of United States Bureau of Mines Technical Paper 591 which gives an outline of the Federal placer mining laws. Oregon mining regulations relating to location of mining claims are not specific as to placer claims and in all cases where State laws have not been passed to modify the Federal laws, the latter would apply.

This Bulletin, No. 1 revised, may be obtained at the Portland office of the Department, 702 Woodlark Building and at the field offices at Baker and Grants Pass. The price is 20¢ postpaid.

## STRATEGIC MINERAL PAPER

"Strategic and Critical Minerals, A Guide for Oregon Prospectors" by Dr. Lloyd W. Staples, assistant professor of geology at the University of Oregon, has just been published as G.M.I. Short Paper No. 8, by the State Department of Geology and Mineral Industries. This paper is issued to meet a demand for information created by the great need for finding and developing deposits of much needed minerals to supply war needs. The unprecedented demand for metals other than gold and silver finds prospectors and small mine operators with incomplete knowledge of various minerals and metals which have recently assumed prime importance.

The report contains 27 pages, is prepared particularly for the use of Oregon prospectors, and describes mineralogical and geological characteristics of minerals by which they may be identified, as well as occurrences and markets.

G.M.I. Short Paper No. 8 may be purchased at the Portland office of the State Department, 702 Woodlark Building, Portland, or from Department assay laboratories at Baker and Grants Pass. The price is 15¢ postpaid.

TO ALL EXCHANGE LIBRARIES

Copies of these publications were mailed from this office April 9th, 1942. If not received within ten days from the above date, advise this office immediately; otherwise replacement for copies lost in the mail or elsewhere cannot be made.

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## BOTTLENECK

This is a plea for simplification of Federal agencies written orders. From the standpoint of the mine operator, these orders are so numerous and complicated that a disproportionate part of the operators' efforts is consumed in obtaining interpretations of the orders and in filling out reports.

Getting interpretations of orders consumes time that might well be spent on the many problems of exploration, mining, milling, and marketing that are the well-known headaches of the mine operator. A great many of such interpretations have to be made in Washington, and it is not necessary to draw a diagram to show this time-consuming operation, to say nothing of the nervous exhaustion, such procedure entails.

Everybody agrees that maximum production of essential materials is absolutely necessary in order to win the war, and that obstacles preventing maximum production should be hurdled without delay. One of these obstacles is the time consumed in excessive governmental paper work required of mine operators.

Administrative orders should be issued only when absolutely necessary; they should be worded as simply as possible; reports and questionnaires should be required only when there is no other available method of obtaining information essential to actual war production.

Mine operators are earnestly patriotic. Because of the cosmopolitan nature of their calling, as a group they are probably better informed on world conditions than any other comparable group. They realize the jam we are in and are eager to do their utmost to increase mineral production. Despite their earnestness of purpose, they feel engulfed in a web of Government regulations which seem to frustrate their efforts to produce much-needed metals. Morale (a much-maligned word) is thereby reduced.

Mistakes in planning the organization for war production are to be expected, but it would seem to us far better to make the mistake of issuing too few orders than to issue so many that they form a decided obstacle to maximum production.

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## NOTES ON ANTIMONY ORE BUYERS

Harshaw Chemical Company, El Segundo, California:

This plant buys either oxide or sulphide antimony ore ranging in grade from around 30% to 67%. Sulphide ore carrying more than 60% is used for making antimony oxide direct and would command a higher price than lower grade ore or oxide ore.

Texas Mining and Smelting Company, Laredo, Texas:

Antimony ores of any grade are acceptable; lump ore, fines, or concentrates are purchased. Gold and silver are not recovered and ores containing lead are not purchased.

United States Smelting Company, Midvale, Utah:

Antimony ore is required in this company's refining process and antimony contents result in antimonial lead production. Gold, silver, and lead are recovered if contained in the ore.

Bunker Hill Smelter, Kellogg, Idaho:

This company has in the past produced antimonial lead from the small antimony content of Coeur d'Alene ore. Recently an electrolytic antimony plant has been built which takes antimony, copper, and silver concentrates produced in the district.

Sunshine Mining Company, Kellogg, Idaho:

This company is building an electrolytic reduction plant for treating antimony, copper, and silver concentrates. It is possible that this plant will have extra capacity.

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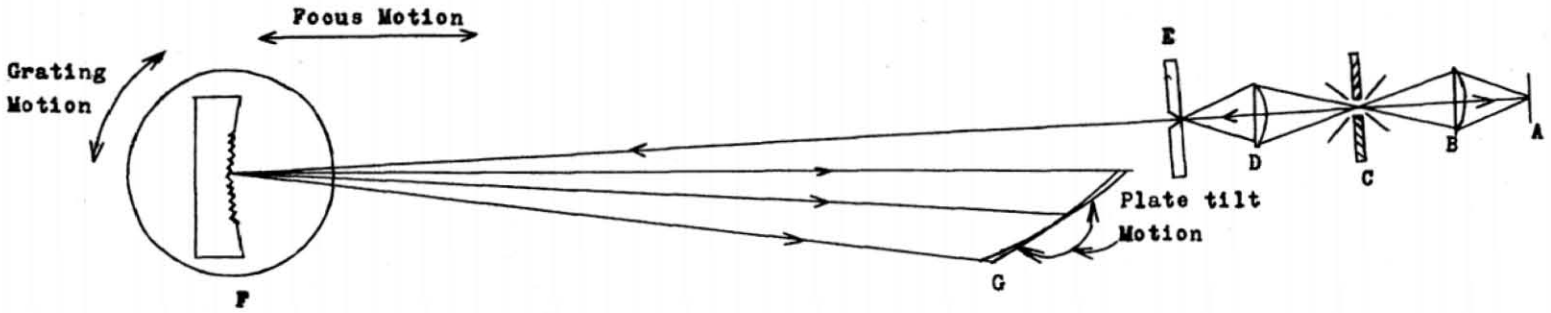


A. Test screen
B. Collimating lens (glass)
C. Light source (arc or spark to energize sample)
D. Focusing lens (quartz)
E. Slit
F. Concave reflection grating
G. Photographic plate

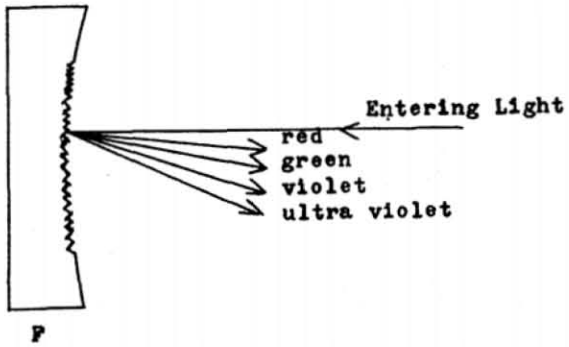


DIAGRAM OF LITTROW MODEL SPECTROGRAPH

## SPECTROGRAPHIC ANALYSIS

Although man has observed the rainbow since the beginning of time it was not until the seventeenth century that its origin was actually determined. In 1666 Sir Isaac Newton was carrying on experiments dealing with sunlight. During the course of his experiments he allowed sunlight to enter a darkened room through a pin hole in a window shade and passed this small beam of light through a glass prism. Much to his surprise he found that the beam of white light was broken up into a spectrum of seven colors similar to the rainbow. Further experimentation was carried out and Newton found that this spectrum when passed through another prism came out of the other side of the prism as white light. Thus, it was proven for the first time that white light was not basic but was composed of a mixture of colored light. If Newton had used a narrow slit instead of a circular hole in the window shade he would have made the first spectroscope. This was done many years later when the first crude spectroscope, as we know it today, was developed by Bunsen.

Except in refinements, the modern spectroscope differs very little from the one developed by Bunsen. All that is essential is a narrow slit, a means of separating a mixture of colored light into the individual colors present in the mixture, and a telescope for focusing the separated light so that it can be seen or photographed. The separation of the light into the individual colors depends upon the fact that light of different colors travel at different speeds and thus some colors are bent more than other colors when the mixture of colors is passed through a glass or quartz prism. The red rays are bent the least and the blue rays are bent the most, so these rays are separated when they emerge from the prism. This is shown in the accompanying figure. The grating (a mirror ruled with many fine lines close together) gives the same general result as the prism so that it can be used as a separating medium in a spectroscope.

The spectroscope is an instrument for separating light into its component colors and focusing these different colors so that they can be seen. Unfortunately the human eye is sensitive to only a very small portion of the spectrum and thus the spectroscope is limited in its use; however if we replace the eye with a photographic plate we are able to record those colors not detected by the eye, and thus the range of the spectroscope is greatly increased. Whenever a spectroscope is so constructed that a photographic plate can be used in place of the eye it becomes known as a spectrograph. When looking into a spectroscope the eye sees the individual colors in the mixture of light as bright colored lines ranging from violet at one end of the spectrum to red at the other end with different shades of the colors blue, green, and yellow between these two ends. When these colors are recorded on a photographic emulsion they appear merely as black lines on a clear background, but their position on the photographic plate is a measure of the color of the light forming these lines. Not only does the spectrographic plate extend the range of usefulness beyond the visible spectrum but this method of observing the spectrum has many additional advantages. When the colors are photographed as lines on a photographic emulsion they are permanently recorded and may then be studied by anyone. Often the colors appear only as flashes of light and it is very difficult for the eye to detect and classify these numerous flashes; the photographic emulsion automatically records these flashes of light and thus they are not lost. Frequently the visible spectrum contains a great number of colored lines and it is extremely difficult to determine definitely the actual position of these lines; however when the lines are photographed it is possible to measure accurately the position of these lines by means of a high powered microscope.

Experiments have shown that every different chemical element will emit light when excited by heat or electricity. The spectroscope and the spectrograph have proven that the light emitted from each element is as different from the light emitted by any other element as the finger prints of one person are distinctly different from the finger prints of any other person. The difference in appearance in mercury vapor lights and neon signs are common examples of the different colors of light emitted from different elements. Thus, we see that if we have a method of causing a sample of substance to emit light and a means of identifying the emitted light we will be able to identify positively the elements present in the sample.

Although there are a number of methods used to make a substance emit light, the electric arc is probably the most generally useful method now in use. This method of excitation can be used with samples which are not electrically conductive (ores, slags, minerals, etc.), as well as those samples which are electrically conductive (metals, alloys, etc). For all practical purposes the electric arc acts as a small furnace and a sample placed in the arc will vaporize under intense heat and emit light. Graphite rods are usually used as the electrodes in the arc and the sample to be analyzed is placed in the form of a powder in a hole in one of the electrodes. The arc is struck and the light from the arc is made to pass through the spectrograph where the light is broken up into its different colors and photographed on the photographic plate. After the plate is developed the recorded lines are classified and the elements present in the sample which emitted the light can be identified. In addition to the information regarding the elements present in the sample the lines on the photographic plate can be used to determine the amount of each element present in the sample. This is accomplished by measuring the blackness of the lines produced by the element and assuming that the blackness of the line is dependent upon the concentration of the element producing the line.

Spectrographic methods are finding varied and many uses, and during the present time when analytical results must be obtained rapidly and with reduced personnel. Practical uses of spectrographic analysis in chemistry, metallurgy, medicine, geology, mining, crime detection, sabotage detection, and prospecting are numerous.

Some of the advantages of spectrographic analysis over chemical analysis may be summarized as follows:

1. Small traces of most elements can be detected as readily as large amounts. This means that small samples may be used whenever it is difficult to obtain a sample, or when the material being analyzed is of great value, as is the case with alloys of the platinum group of metals.

2. Once the sample has been obtained, the analysis can usually be made in a small fraction of the time required for a chemical analysis.

3. Identification is positive. Methods of increasing the sensitivity of spectrum analysis have been so developed that this method is usually more sensitive for small amounts of elements than chemical analysis. It is possible to differentiate between elements of similar chemical behavior such as the rare earths, which would be almost impossible to identify by chemical methods. There is very little danger of mistaking one element from another.

4. Spectrographic analysis often shows the presence of elements not looked for by chemical analysis of the sample. Not only does it record the lines of the element

being sought but also the lines of the other metallic elements in the sample, and also the lines of some of the non-metallic elements. It is not uncommon to analyze an ore for a certain element and find commercial amounts of another unsuspected element present in the sample.

5. Any element that can be detected qualitatively can also be determined quantitatively. It reveals the presence of metals at concentrations so low that they would escape chemical detection and in many industries it has been found that these trace elements are an important factor which must be taken into account. Quantitative analysis with the spectrograph is most satisfactory when concentrations of the element being determined are not over 5-8 percent. Above these values chemical analysis is better. Below 1 percent spectrographic analyses are better than chemical analyses.

6. It is extremely useful in examining substances difficult to attack chemically such as glasses, slag, tin ore, refractories, certain organic materials. It is possible to determine the nature of inclusions in minerals and alloys, and to analyze without destroying or mechanically removing material from the sample.

The spectrograph installed in the laboratory of the State Department of Geology and Mineral Industries is a complex research instrument about twelve feet long, weighing nearly a ton. This machine allows a wide spread of colors with ample detail and complete coverage of the spectrum from the ultra-violet region to that of the infra-red. The optical system is quite simple and is kept down to the smallest number of optical parts. The 4-inch diffraction grating is a piece of aluminum-coated glass which has been ruled in a precision lathe so that it has 15,000 lines per lineal inch.

Further information regarding the work of the Spectrographic laboratory and the State law regulating its functions will be sent on request.

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## MINING NOTES

Crescent-Pacific Gold Mining Company: This dredging company has discontinued operations on the Applegate River and has moved the floating washing plant to the W. L. Greenleaf Ranch on Kane Creek southeast of Gold Hill. At present, the company's dragline is being used at Camp White on construction work. Following the construction of the camp, the dragline will be moved to Kane Creek where the company plans to dredge the Greenleaf ground and other holdings.

Jackson Mining Company with a dryland plant about a mile east of Jacksonville has discontinued operations. The dragline equipment is being used on the construction of Camp White. It is reported that the company does not intend to resume dredging operations.

Christine & Dobbins have a small dragline in operation within the northwest city limits of the town of Jacksonville. They are digging ground which has been dredged several times, but it is reported that they are making good recoveries. The operation started shortly before Christmas.

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NOTES FROM INFORMATION SERVICE
OF AMERICAN MINING CONGRESS
Washington, D.C.

## Change Scheduled in Applying Blanket Priorities Ratings

According to an announcement made by J. S. Knowlson, Director of Industry Operation of the War Production Board, a new plan called the Production Requirements Plan to replace use of blanket priorities ratings allowed under existing "P" orders may be put into effect in the near future.

Under the new P.R.P. plan a company would make application to cover its estimated needs of material requiring priorities rating for a three months period in advance.

Quoting from the American Mining Congress release of March 27, "Heavy increases in demands for war materials have made it impracticable to continue the use of preference ratings which have been assigned under existing 'P' orders to whole industries, without any exact check of the amount of materials which such ratings may be used to obtain. Under the PRP (Production Requirements Plan) ratings will continue to be assigned to deliveries of materials for essential uses, but the rating in each case may be used only to secure a predetermined quantity of materials or products.....

"The existing preference rating order P-56-a, applying to the manufacture of mining machinery, is of a very different nature from the general 'P' orders referred to in Mr. Knowlson's announcement. Under P-56-a, as under the PRP, manufacturers submit their needs of critical materials for one or more quarters in advance, and the ratings assigned apply only to such quantities. The general condemnation of existing 'P' orders, therefore, does not apply in principle to the mining machinery order. Meanwhile, continued efforts are being made through the Mining Branch of the WPB to insure delivery of those raw materials which are now available only in limited quantities or under very high ratings, but which are essential to the production of mining machinery and repair parts."

## Funds Requested for Mineral Exploration

Congress has been asked by the President to make a special appropriation of $366,370 to be used for exploration and development of strategic and critical minerals.

## Quotas Under Priorities Order P-56

Dr. Wilbur A. Nelson, head of the Mining Branch, W.P.B. has written mines operating under P-56 as follows:

"Any operator who has not yet submitted to the Mining Branch an estimate of his repair part requirements for the second quarter of 1942 and the related figures for 1941, as previously requested, should do so without further delay. This is necessary in order that the Mining Branch may approve and assign the second quarter quota of repair parts under Schedule A to which an A-1-c preference rating may be applied.

"Pending receipt from the Mining Branch of official assignment of his second quarter quota, an operator may proceed to endorse an A-1-c rating on purchase orders for repair parts or equipment on Schedule A, provided that the aggregate total dollar value so endorsed, for delivery during the month of April, shall not exceed the March quota figure which the operator computed on his own account in accordance with the provisions of the March 2 revision of the P-56 order."

## Explosive Licenses

Director R. R. Sayers of the United States Bureau of Mines has issued a warning that licenses for distributing, storing, selling, issuing, transporting, or using explosives were necessary as of March 16 and that operating without a license makes companies liable to imprisonment and heavy fine.

Recently amended regulations of the Federal explosives act require that associations, corporations or others shall furnish the Bureau with pertinent information concerning control of their organizations. The purpose of the amended regulation is to prevent explosives falling into the hands of enemy controlled organizations or individuals.

## Coal Allocations May Be Made

According to a statement by Acting Solid Fuels Coordinator, Howard A. Gray, allocation of coal supplies may be necessary in order to protect war industry fuel supply. The bituminous coal division statistics show failure of consumers to store coal in advance of immediate needs and are depending upon uninterrupted transportation schedules to continue to supply them.

## Industrial Salvage

More than thirty field offices to handle industrial salvage throughout the nation will be each set up by W.P.B. which has named J. W. Bertch to supervise this work.

In describing the program, Mr. Bertch said "it is our function to expedite the movement of large accumulations of scrap materials where special obstacles exist such as uncertain ownership, clouded titles, high cost of demolition, remote location or some other familiar complication. In this category are many obsolete or abandoned railroad or streetcar rails, mines, oil wells, bridges, etc."

## Assessment Work

A bill, S.2395, has been introduced in the Senate and referred to the Committee on Mines and Mining. This bill would suspend assessment work on mining claims until such time as the President issues a proclamation declaring wars in which the United States is now engaged have been terminated. No reports have been received concerning action on this bill.

## Gold Mines May Operate Under P-100

Those precious metal mines whose serial numbers were cancelled because dollar value of their gold and silver production ran over 30 percent of their total production value may operate under P-100. This order allows a blanket rating of A-10 for repairs, maintenance and operating supplies. No serial numbers nor specific authorization are required. Each purchase order for material which may be obtained with an A-10 rating should be endorsed as follows:

"Materials for maintenance, repair, or operating supplies - rating A-10 under Preference Rating Order P-100 with the terms of which I am familiar."

"_____"
Name of Producer or Supplier"

"_____"
Signature of Designated Official

In order to obtain new equipment, operators must fill out Form PD-1A and submit it to Dr. Wilbur A. Nelson, Administrator, Mining Branch, War Production Board.

Many of the gold mines whose serial numbers were cancelled produce, in addition to gold and silver, a material amount of lead, zinc, copper and other strategic minerals. This fact has been taken into consideration by the Mining Branch of the War Production Board and up to April 3, about one hundred serial numbers had been re-instated. In considering application for re-instatement of serial number, the W.P.B. will consider each individual application on its merits as to amount of metals being produced which are needed for war materials and the amount and quality of fluxing ores desired by lead and copper smelters.

## OREGON NICKEL DEPOSIT

The nickel deposit near Riddle, Oregon, is described in a new bulletin issued by the United States Geological Survey. The bulletin is designated as 931-I and gives the results of an investigation made by Messrs. William T. Pecora and S. Warren Hobbs, geologists of the Survey in 1940.

Because an adequate supply of nickel for our war needs is essential and because the large deposits at Sudbury, Ontario, cannot supply an amount sufficient for all allied needs, the Riddle deposit, which may be the largest in the United States, assumes national importance. The abstract of the report is reproduced herewith:

### Abstract

"The Riddle nickel deposit, on the slopes of Nickel Mountain about 5 miles northwest of Riddle, Douglas County, Oregon, was discovered in 1864. Since then much prospecting and preliminary development work has been done, but no ore has been shipped except small lots used for metallurgical tests.

"The deposit is a layered blanket, containing the nickel silicate garnierite, which rests upon unserpentinized peridotite. This blanket ranges in thickness from a few feet to a maximum of 60 or 70, but with an average of about 20 feet. It is best developed on terraces, flats, and gentle mountain slopes above an elevation of 2,000 feet. It consists of three layers, a top brick-red soil layer, an intermediate thick yellow limonitic layer with some quartz-garnierite boxwork, and a root layer composed of quartz-garnierite boxwork in nearly fresh bedrock that is a transitional phase between weathered material and fresh peridotite. The disposition of the boxwork veins was controlled by original blocky jointing in the peridotite. Nickel occurs in all three layers of the blanket but is most abundant in the boxwork veins carrying garnierite. The darker green varieties of the garnierite contain the highest percentage of nickel.

"The nickel is believed to have been derived from olivine in the peridotite by decomposition during lateritic weathering, which probably took place during late Tertiary time, before the present regional surface at an elevation of 2,000 feet was dissected. This process formed limonite and nickel-poor garnierite. Under present climatic conditions the original laterite has undergone a change resulting chiefly in a boxwork of quartz and nickel-rich garnierite.

"About 162 acres of ground are underlain by a blanket containing over 6,000,000 tons of material, 1 to 2 percent of which is probably nickel. Eighty thousand tons have been proved to contain 2 to 3 percent of nickel, and 75,000 tons have been proved to contain 1 to 2 percent of nickel. A new method of treating low-grade silicate material would have to be devised before this large deposit could be utilized."

Bulletin 931-I may be obtained from the Superintendent of Documents, Washington, D.C. The price is 20¢.

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## QUICKSILVER BULLETINS

Two bulletins describing quicksilver deposits in Oregon have recently been published by the United States Geological Survey. Both are by Clyde P. Ross and give results of his field work during the summer of 1940. The bulletins are numbered 931-B and 931-J respectively.

Bulletin 931-B, "Some Quicksilver Prospects in Adjacent Parts of Nevada, California, and Oregon", describes the Glass Buttes Quicksilver Mine in northeastern Lake County and also the Currier Mine near Paisley, Oregon. Maps of both these Oregon quicksilver properties are given. Other prospects described in this bulletin are in the northwestern corner of Nevada and northeastern corner of California.

Bulletin 931-J, "Quicksilver Deposits in the Steens and Pueblo Mountains, Southern Oregon", gives the results of a reconnaissance geologic survey and describes various quicksilver prospects of the region. The abstract of this bulletin is reproduced below:

"The Steens and Pueblo mountain ranges together form a shallow crescent of northerly trend in the eastern part of Harney County, Oreg. They contain more than 15 quicksilver prospects and a few that were opened for gold and copper. Most of the area is underlain by flexed and faulted Tertiary lava, but pre-Tertiary metamorphic and igneous rocks are exposed in the southern part. Part of the eastern flank of the mountains consists of somewhat deformed alluvial deposits, which are younger than the lava but older than the lacustrine and alluvial deposits on the valley floors.

"The lavas along the east side of the mountains have undergone rather extensive hydrothermal alteration. At intervals for a distance of about 30 miles they contain mineralized fracture zones, in most of which mercurial tetrahedrite and cinnabar are the principal valuable minerals. The pre-Tertiary rocks in the southern part of the mountains also contain lodes. These were first explored for gold and copper, but locally they contain quicksilver as well.

"Although the presence of quicksilver deposits in the Steens and Pueblo Mountains has been known for 40 years, they have been very little explored and probably less than 10 flasks of quicksilver has been produced from them. The lodes on the whole are of low grade, although they contain rich pockets, some of which may have formed in the zone of weathering. The low average tenor, coupled with the large size of some of the lodes and the metallurgical problems introduced by the unusual mineralogy, suggest that the area may be better adapted to exploration by large, well-equipped organizations than to working by individual operators. If keen demand for quicksilver continues, this region should be considered as a possible source of supply."

These bulletins may be obtained from the Superintendent of Documents, Washington, D. C. and are priced at 25¢ and 40¢ respectively.

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## CLEARING HOUSE COLUMN

61-CH W.W. Blackwell, Baker, Oregon, desires to sell or lease copper property on the Imnaha River about 7 miles north of Imnaha, Wallowa County, Oregon. The owner states that 9% copper ore shows in surface workings.

62-CH E. G. Kingwell, with Abrams & Ellis Incorp., 409 Masonic Bldg. Salem, Oregon, is a mine broker and is interested in all metals produced in Northwest. He desires to get in touch with anyone having a good mine prospect requiring development or a property for sale.

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