

GRANT COUNTY MINING

Mining in eastern Oregon began with gold operations at several widely scattered localities in 1862, the same year that Thomas Condon made his first collection of fossils in the John Day country. It can therefore be said that eastern Oregon geology received attention from the standpoints of both industry and pure science from the very beginning---a record that is not altogether common. Since then eastern Oregon geology and its related mining problems have been the object of continued study by both industrialists and scientists. Within Grant County this has resulted in the production of gold and silver from a great number of both lode and placer occurrences. Ores of chromium, copper and cobalt have also been mined and prospects containing mercury, tungsten and asbestos have been explored.

At the outset, the gold mining consisted of placer operations exclusively but a stamp mill was in operation on lode claims in the Prairie area east of Canyon City by 1868. This is described in a report published in 1870 by R. W. Raymond, covering mineral statistics west of the Rocky Mountains. Both the lode and placer mining has continued at one place or another ever since. No figures are currently available for the total production, but for the forty one year period between 1902 and 1943, the county is credited with a combined lode and placer production valued at nearly ten million dollars. For the year 1940, the U. S. Bureau of Mines Yearbook gives a production of 32,653 fine ounces of gold and 57,618 fine ounces of silver with a combined value of \$1,183,828.00. This originated from 17 lode and 24 placer operations. All gold mines were closed by law during World War II, however, and although attempts were made to reactivate some of the mines after the war, very few of the reactivated operations lasted very long due to the increased post-war mining costs and the fact that their product is still valued at the pre-war price of \$35.00 an ounce. As a result, gold mining is today at an all time low. In fact Grant County rates the distinction of having the only lode gold mine in Oregon to have maintained

production on a consistent payroll basis since reopening after the war.

This is the Buffalo Mine near Granite. Other gold-silver lode mines with noteworthy pre-war production records are the Red Boy, LaBelleview, Ben Harrison and Morning.

Chromite is a vitally needed industrial mineral normally imported during peacetime due to the availability of foreign ore at prices far lower than equivalent grade material can be produced from domestic occurrences. Because of this situation, domestic production of chromite has attained prominence only during periods of emergency when industrial needs were abnormally high and imports from foreign sources of supply were uncertain. Grant County's chromite has commanded attention during all such periods of emergency --- namely, during the first and second world wars and between 1952 and 1958 when the government maintained a purchasing depot at Grants Pass for the purchase of ores for a stockpile of defense minerals. Although production has always been comparatively small, the resource is nevertheless an asset. For example, during the existence of the stockpile program approximately 7,500 tons of lump ore and concentrates were shipped from the county for a value somewhat in excess of \$800,000.00--- a tidy shot in the arm to the economy of any area. Domestic chromite mining is again in a state of enforced inactivity, however, due to the termination of the stockpile program and the lack of any form of protection against cheap foreign imports. The county nevertheless does possess reserves of chromite which could support a modest but important local industry were this present policy of once again depending upon imports replaced with a constructive support program designed to encourage wholesome development of domestic occurrences. This has been demonstrated by a drilling program conducted on the Iron King and Chambers mine by the U. S. Bureau of Mines in the face of the industrial emergency of World War II and by the amount of chromite subsequently contributed to the stockpile from other nearby occurrences. Tests by the U. S. Bureau of Mines have shown these reserves to be suitable for the production of ferrochrome-silica and for refractory use. Since

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Geologic phenomena in Grant County include veins carrying gold, silver, copper and cobalt, occurrences of refractory grade chromite, asbestos and cinnabar prospects, springs giving off carbon dioxide gas and fossil beds of international fame. The bedrocks with which these phenomena are associated bear imprints which show involvement in two major phases of geologic history. For instance, those containing the noted graveyard of prehistoric vertebrate remains are part of an interbedded sequence of fresh water sediments and volcanics which have experienced very little post-depositional alteration and disruption. This group of rocks was formed in the Tertiary period during which time the land surface of eastern Oregon remained continuously above sea level and subject to the normal processes of erosion. Lakes existed in many places and life flourished as is shown by the abundance of plant and animal remains preserved in the soils and sediments that were formed. The landscape was nevertheless a changing one due to volcanic activity which took place from the beginning to the end of Tertiary time, filling the lakes, upsetting drainage and blanketing large areas of the land with layers of ash and lava. From a composition standpoint the rocks thus formed consist of bedded shales and sands and gravels, occasional interbeds of diatomite and lignite, tuffs, agglomerates, rhyolites, andesites and basalts. These formations blanket most of eastern Oregon but in places the underlying rocks of pre-Tertiary age are exposed. This is particularly so in Grant, Baker and Wallowa Counties where the younger Tertiary formations have been eroded away over large areas. In general, this erosion has constituted the principle geologic process at work since the end of Tertiary time. Folding and faulting, while present, have at no time been intensive enough to do more than gently warp and displace the formations. For this reason, the Tertiary sediments are only moderately well consolidated and breakdown of some of the tuffs to clay represents the chief extent to which post depositional alteration has occurred.

The geologic events which transpired during the formation of the older, pre-

Tertiary series of rocks were considerably more diversified than those which occurred during Tertiary time. For one thing, marine conditions of deposition prevailed throughout eastern Oregon on several occasions during pre-Tertiary times. These occasions alternated with periods of emergence above sea level so that the accumulated sediments reflect both deep and near-shore depositional environments. Another difference is that the area underwent a series of crustal disturbances of mountain-building proportions accompanied by widespread intrusion of several kinds of magmas at several different times. The result is that the pre-Tertiary rocks were everywhere folded and faulted to a profound extent, and in places metamorphosed to the point where they underwent appreciable changes in character. Particularly so in the areas most heavily invaded by intrusive magmas. Still another difference is that these events took place over a space of time three or more times greater in duration than the Tertiary --- a factor which also contributes to the degree of alteration imposed on the rocks that were formed. The list of pre-Tertiary rock types therefore includes diorites, gabbros, peridotites, serpentine and other related ultrabasic intrusives along with a wide range of shales, sandstones, conglomerate, limestone and some associated volcanics, all of which show varying degrees of both regional and contact metamorphism. From the standpoint of age, these formations were formed throughout all of the Mesozoic era and part of the Paleozoic. They underlie the Tertiary formations in all Grant County areas where the Tertiary formations occur and they are separated from the Tertiary by an unconformity of a magnitude that indicates a long period of erosion. Above all, the pre-Tertiary formations constitute the host rocks in which most of the known metalliferous prospects in Grant County are found.

Figure _____. Quadrangles covered by published geologic maps are indicated by the map name followed by its date of issuance. Quadrangles in which mapping is in progress are named but not dated. Maps for these areas are scheduled for issuance between 7-1-59 and 6-30-60. The available maps may be secured from the Geologic Survey, Federal Center Bldg., Denver, Colorado at a cost of 30¢ each.

Areas in which geologic mapping has been done are indicated by both the dashed line pattern and the solid gray background. The line pattern covers areas for which maps have been published for public sale. These are indicated by an asterick in the bibleography below. The gray background represents geologic mapping contained in professional journals and theses. This material is generally available for reference only at scientific libraries but the area covered by such mapping is depicted here for the purpose of illustrating the extent to which geologic study has been made in the county as a whole. Data of this type is shown only in instances where it occurs in areas not covered by the available published material.

Selected list of publications dealing with geology and mineral resources.

- Allen, Rhesa A., 1948, Geology and mineralization of the Morning Mine and adjacent region, Grant County: Oregon State Dept. Geology and Mineral Indus., Bull. 39*.
- Batty, J. V., and others, 1947, Beneficiation of chromite ores from western United States: U. S. Bureau Mines, Report of Investigation, 4079.
- Gilluly, James, and others, 1933, Some mining districts of eastern Oregon: U S Geological Survey Bulletin 846-A, (out of print).
- Hundhausen, R. J., and others, 1956, Exploration and utilization studies, John Day chromites, Oregon: U. S. Bureau of Mines, Report of Investigations 5238.
- Kelly, H. J. and others, 1952, Refractory properties of Pacific northwest chromites: U. S. Bureau of Mines, Report of Investigations, 4929.
- Lindgren, Waldemar, 1901, The gold belt of the Blue Mountains of Oregon: U. S. Geological Survey, 22nd Annual Report, pt. 2, (out of print).

- Lorain, S. H., 1938, Gold mining and milling in northeastern Oregon: U. S. Bureau of Mines, Information Circular 7015.
- Oregon State Department Geology and Mineral Industries, 1941, Oregon Metal Mines Handbook, Grant, Morrow and Umatilla Counties: Bulletin 14-B (out of print).
- Pardee, Joseph T., and others, 1914, Geology and mineral resources of the Sumpter quadrangle: Oregon Bureau of Mines and Geology, Mineral Resources of Oregon, Vol 1, No. 6, (out of print).
- Steere, M. L., 1954, Geology of the John Day country, Oregon: Oregon State Department of Geology and Mineral Industries, Ore-Bin Vol. 16, No. 7.*
- Thayer, T. P., 1956, Preliminary geologic maps of (1) Aldrich Mountain (2) Mount Vernon (3) John Day Quadrangles: U. S. Geological Survey, Mineral Investigations, Field Studies maps, MF 49, 50, 51.*
- Wagner, N. S., 1954, Preliminary report of the geology of the southern half of Umatilla County, Oregon: Oregon State Department of Geology and Mineral Industries. Ore-Bin, Vol. 16, No. 3.*
- Wallace, R. E., and Calkins, J. A., 1956, Reconnaissance geology of the Izee and Logsdell quadrangles: U. S. Geological Survey, Mineral Investigations, Field Studies map, MF 82.*

Note: Most "out of print" publications can be obtained from the State Library, Salem.

new occurrences can be found only by means of vigorous underground exploration once the obvious surface occurrences have been depleted, it is to be hoped that a worthwhile plan can be established to render continued domestic development possible. That such a program is basically important from a national standpoint is clearly indicated by the record of interruption that has occurred with respect to importation in times of crucial need in the past.

The Standard mine in the Quartzburg district is the leading representative of the copper occurrences in the county. This property was worked extensively between 1902 and 1908 and some encouraging shipments of newly discovered ore have been made during recent years. The ore contains associated values in the form of cobalt bearing minerals and gold which constitute a milling problem. However, this is a matter that can be overcome if continued exploratory development serves to demonstrate sufficient reserves of new ore. As a matter of historic record, it should be mentioned that shipments of cobalt ore from the Standard were made to Germany and to Thomas A. Edison during the course of the early operation when the use of cobalt was in its infancy.

Exploration of cinnabar prospects in the Murderers Creek headwater has resulted in the production of twelve flasks of quicksilver from the retorting of development ore for test purposes but no ore has yet been found of sufficient grade or in sufficient tonnage to permit sustained commercial production. The scheelite prospects which have been explored have fared no better. Neither has any mineable occurrence of asbestos yet been discovered, although two of the most active and experienced companies in the asbestos field have seen fit to conduct extensive exploration projects on two of the county's better known asbestos prospects. Future development of these resources cannot therefore be considered promising in terms of productive mining on the basis of the available data.

The foregoing paragraphs summarize the county's mineral resource story all too briefly, but they do focus attention on the all-important fact that the commercial status of the two leading resources, gold and chromite, is governed

by decreed price and import policies. Any future improvement in the mining picture of these minerals is thus dependent to a large extent upon a change of regulatory policies along lines that will provide domestic operators with at least a fighting chance. Till such changes do occur in a truly workable form, no resumption of mining on a substantial scale can be anticipated even though the county does have an impressive record of past production and reserves that remain to be developed.