

# History of the Wilbert Mine, Butte County, Idaho

Victoria E. Mitchell

Staff Report 00-1  
March 2000

Idaho Geological Survey  
Morrill Hall, Third Floor  
University of Idaho  
Moscow, Idaho 83844-3014

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conform to the agency's standards.*

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## INTRODUCTORY NOTE

This report was prepared under a cooperative agreement with the U.S. Forest Service, Region IV, as part of a project to identify and describe inactive and abandoned mines in the state of Idaho. Work on this project included preparing detailed histories of mines in Region IV that had significant recorded production. The information in this report is taken from published and unpublished sources in the Idaho Geological Survey's mineral property files. Unless otherwise noted, most mine production data are drawn from the U.S. Geological Survey's (USGS) annual volumes on *Mineral Resources of the United States* (1882-1923) and the equivalent volumes produced by the U.S. Bureau of Mines (USBM) (*Mineral Resources of the United States*, 1924-1931, and *Minerals Yearbook*, 1932 to the present). Information on underground workings and mine equipment is generally from the annual reports of the Idaho Inspector of Mines (IMIR), published from 1899 to 1979. After 1974, the Mine Inspector's office was known as the Mine Safety Bureau, a section of the Idaho Department of Labor and Industrial Services. Detailed accounts of mine operations are mostly drawn from the annual reports prepared by the companies for the State Inspector of Mines; these reports were required by law, and the information contained in them formed the basis of the Mine Inspector's annual reports. Reports of recent developments are taken from the Idaho Geological Survey's (IGS) annual reports on mining and minerals in Idaho (from 1984 to present) or from similar reports produced by the Survey's predecessor, the Idaho Bureau of Mines and Geology (IBMG) from 1975 to 1984. Other published sources are referenced in the text. A complete bibliography is included at the end of the report. Where direct quotations are taken from source materials, the original spelling and grammar are preserved.

# History of the Wilbert Mine, Butte County, Idaho

Victoria E. Mitchell<sup>1</sup>

The Wilbert Mine is in the Dome mining district on the western flank of the Lemhi Range at elevations between 6,800 and 7,600 feet (Figure 1). The mine is just inside the northeastern boundary of Butte County, an area which at various times has also been included in Blaine and Fremont counties (Figure 2). Ore was discovered on the Daisy Black claim by Charles Blackburn in 1882. The claim was worked intermittently and with little production until 1891 (Ross, 1933). At that time, ore had to be hauled 75 miles to the smelter at Nicholia and only high-grade ores were shipped (Umpleby, 1917). The Daisy Black claim was patented in 1889 by the Wilbert Mining Company (Kuizon and Lipton, 1991). A second claim was patented by 1912 (Umpleby, 1917), and 145 acres were patented by 1928 (Kuizon and Lipton, 1991).

The mine is in the Summerhouse Formation in an area of complexly folded and faulted rocks (Figures 3 and 4) west of the Black Canyon thrust fault. Mineralization occurred as irregular replacement zones in quartzitic dolomite or altered dolomite, as fracture fillings along shear zones, in veins, and disseminated in the wall rocks (McHugh and others, 1991). Argentiferous galena was the dominant ore mineral, and in places it was altered to anglesite and cerussite (Kuizon and Lipton, 1991). In the upper part of the mine, the ore was localized by fracture and breccia zones along the crest of an overturned anticline; in the middle levels of the mine, the ore occurs as a vein along the plane of a curved thrust fault; and in the

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<sup>1</sup>Idaho Geological Survey, Main Office at Moscow, University of Idaho, Moscow.

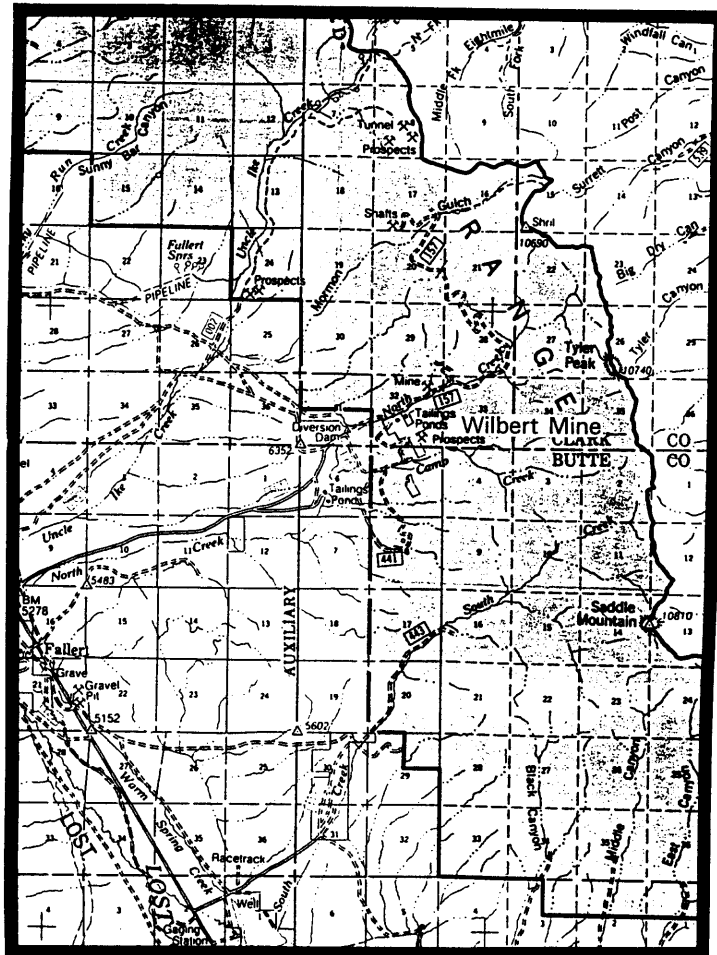


Figure 1. Location of the Wilbert Mine and vicinity, Butte County, Idaho (U.S. Forest Service Challis National Forest map, scale  $\frac{3}{8}$  inch = 1 mile).

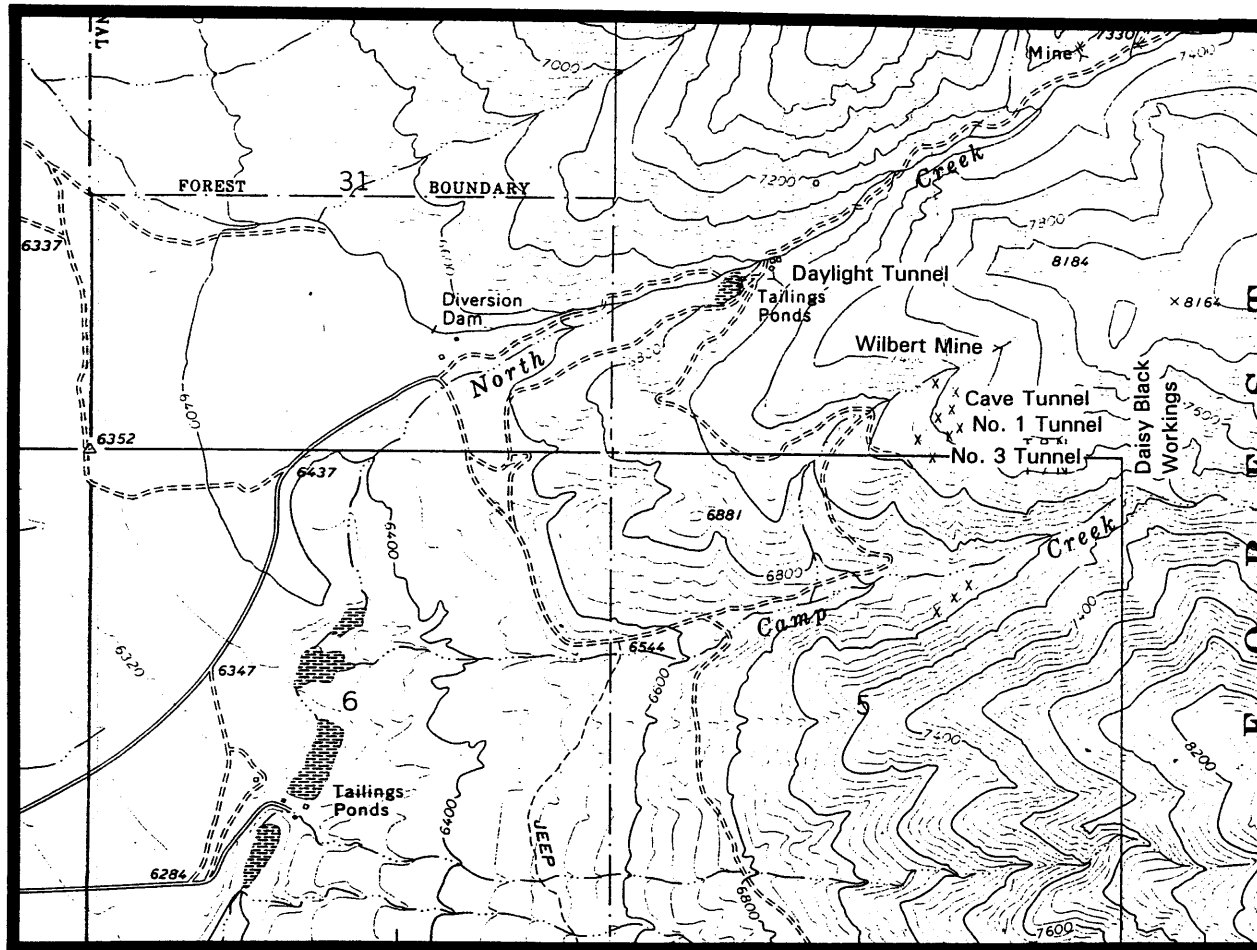


Figure 2. Topographic map of the Wilbert Mine and vicinity (U.S. Geological Survey Howe NE 7.5-minute topographic map).



Figure 3. Folded and fractured quartzite at the Wilbert Mine. One of the major ore zones at the mine occurred in this fold (Bell, Robert N., 1912, Thirteenth Annual Report of the Mining Industry of Idaho for the Year 1911, opposite p. 29).



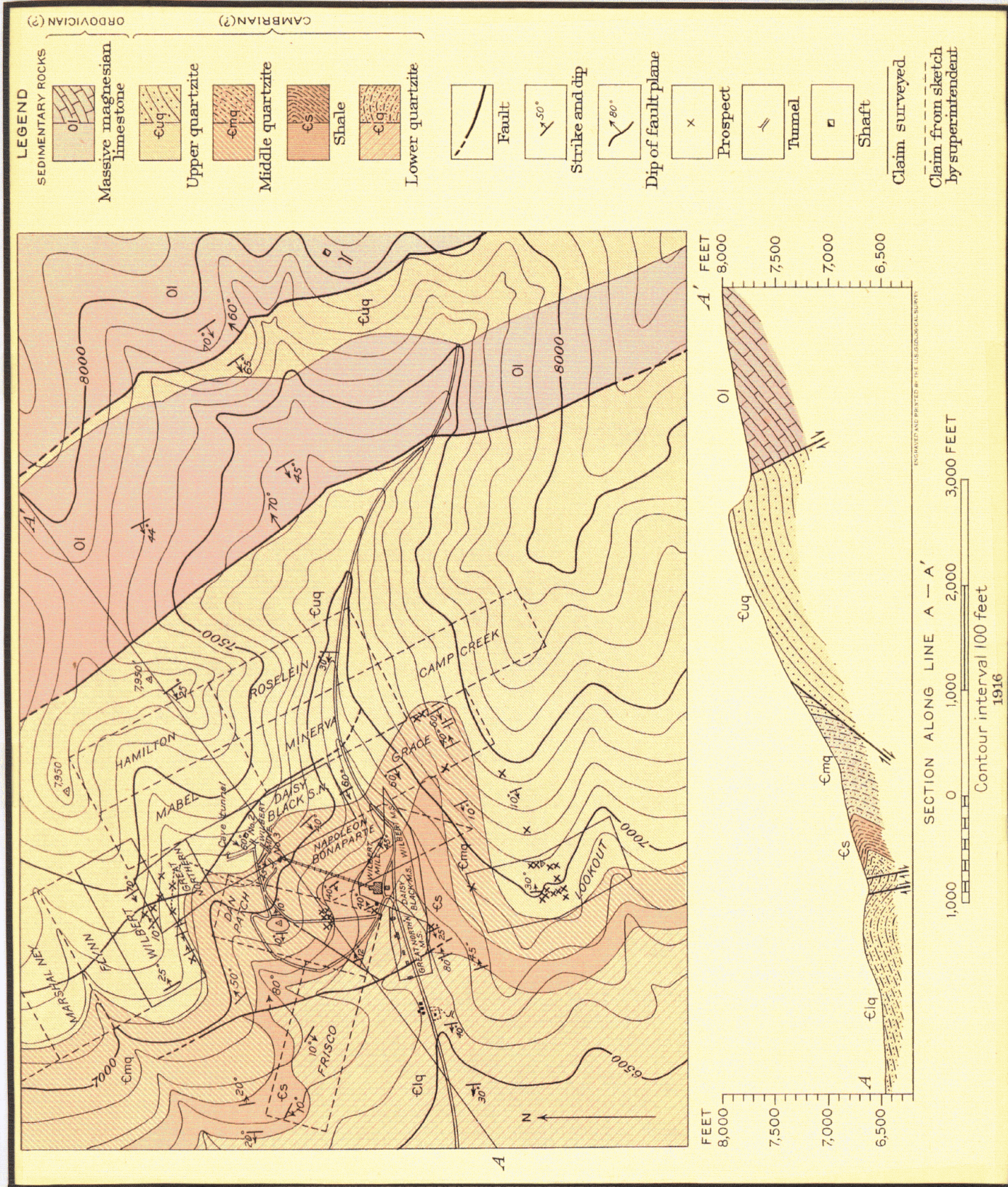


Figure 4. Geologic map and cross-section of a portion of the Dome mining district (Umpleby, 1917, Plate XVIII). Probable correlation of rocks units: lower quartzite is Swauger Formation; shale and middle quartzite are the formation of Tyler Peak, the upper quartzite includes both the Summerhouse and Kinnikinic Formations, and the magnesian limestone is the Saturday Mountain (after McCandless, 1982, and Ross, 1961). Note the faulted contact between the middle and upper quartzites in the cross section.



lower levels of the mine, the ore was along the contact between the Summerhouse Formation and the overlying Kinnikinic Quartzite. Mineralization is believed to be associated with the intrusion of altered silicic and basic dikes found at the northern end of the mine (Anderson, 1947). The ore zones have been traced laterally for about 2,000 feet and vertically to a depth of 750 feet.

In 1906, two hand jigs were installed on the property (Umpleby, 1917). The mine made small shipments annually for the next several years. It operated for eight months in 1908. A small number of men worked the property during 1909. The mine was idle for most of 1910, but shipped two carloads of lead-silver ore.

In the fall of 1911, H.S. Knight, A.S. Ross, and associates of Salt Lake City purchased the mine (Umpleby, 1917). (See Table 1 for companies and individuals operating at the mine.) The new owners, organized as the Wilbert Mining Co., Ltd., began constructing a gravity mill on Camp Creek that was variously reported as having a capacity of 100, 150, and 200 tons-per-day (tpd); company reports gave the capacity as 100 tpd. Equipment in the mill was to include a crusher, rolls, Hartz jigs, Wilfley tables, slimers, a Janny classifier, and a Hardinge mill (Figure 5).

The 1911 IMIR (p. 27-30) contained an extensive description of the Wilbert Mine:

Near the border of Blaine County in the Dome Mining District on Little Lost River, there is in process of construction at the present time a lead-silver concentrating mill of 200 tons daily capacity on the Wilbert Mine, which will be completed and in successful operation within the next ninety days, that should add an important item to the present large production of lead and silver ore from this State.

The Wilbert Mine carries a rich deposit of desirable high grade lead concentrating ore in a pronounced zone of folding and fissuring that traverses the steep slopes of Little Lost River Mountains in a quartzite formation [Figure 6]. The main development of this property is through a series of cross-cut tunnels which have opened the deposit at a total depth of 300 feet below its highest croppings, exposing an ore shoot 10 to 40 feet wide and several hundred feet in length that carries average values of 20 per cent lead. There are about 2,000 tons of this rich milling ore already on the dump and 20,000 tons of measurable ore of the same grade in sight in the mine, with probable ore indicated of much larger tonnage still.

The ore distribution on the strike of the vein extends fully one-third of a mile and while the bodies are generally low grade in silver the deposit carries some values that have given assay results of several hundred ounces per ton. In addition to this showing of richer concentrating ore, a crushed zone of sandy gangue carries lead values of three to four per cent through a width of nearly 100 feet in one of the crosscut tunnels that may become available for treatment by close milling, and the deposits present every appearance of a long life of important production.

This mine is situated about 40 miles from the nearest railway shipping point by way of Howe to Arco on the Salmon River Branch of the Oregon Short Line, over a good road and the concentrate products of the mill can be hauled at a cost of about \$6 per ton. A shorter route is available with a little improvement that would cut off ten miles of this distance, and with motor truck haulage the cost of this transportation feature is likely to be materially reduced.

Table 1. Companies and individuals operating at the Wilbert Mine.

Company Name	Officer	Date Incorporated	Charter Forfeited	Year(s) at Mine
Charles Blackburn	---	---	---	1882-? <sup>1</sup>
Wilbert Mining Co.	1	1	1	1
Wilbert Mining Co., Ltd.	A.S. Ross, President-Manager	April 10, 1907; reinstated June 1, 1961	Dec. 1, 1952; Nov. 30, 1963	1911-1952
Mac Settles (lessee)	---	---	---	1937-1950(?)
William H. Gibson (lessee)	---	---	---	1945-1946(?)
Willie-Ray Mining Co., Inc.	Reynold P. Miller, President and Manager	Jan. 18, 1965	sold to Bell Mtn. Mng. Jan. 6, 1967	1965
Bell Mountain Mining Co.	W.L. Baker, President	Dec. 6, 1965	date of forfeiture unknown	1966-1968

<sup>1</sup>Information not available in Idaho Geological Survey's files.

The ore is especially desirable for concentration, as it is clean, entirely free from other objectionable sulphides, and consists almost exclusively of finely disseminated lead sulphide in a light sandy gangue with the exception of an occasional stain of copper carbonate, which usually indicates richer silver values.

This mine has a previous hand sorted crude ore shipping record of 1,000 tons, carrying values of 40 to 60 per cent lead. It is in the hands of experienced Utah operators and should result in giving Blaine County a new and profitable mining enterprise in the very near future.

The mill was completed and made its first run in May 1912. By July 20, the mill had handled about 2,400 tons of ore and produced 300 tons of concentrate which contained 51-53 percent lead and 9 ounces of silver to the ton (Umpleby, 1914). The mill was saving less than 70 percent of the ore values, or about 10 percent less than it was supposed to recover. By the end of the year, the mill had produced concentrates yielding 1,500,000 pounds of lead and 10,000 ounces of silver (Umpleby, 1914). The 1912 IMIR (p. 73-74) contained the following information about the Wilbert:

This property has been operated with a new concentrating mill of 100 tons daily capacity [Figure 5], which was completed and gotten into commission last spring. Through faulty design or a misconception of the nature of the ore to be handled, the operation of this mill has not been very satisfactory, although a good many carloads of rich lead concentrates have been shipped from the property during the year, but a serious loss was made in the tailings, due to the extremely fine grained dissemination of the

Figure 5. Cross-section through Wilbert mill (c. 1912; Bell, Robert N., 1912, Thirteenth Annual Report of the Mining Industry of Idaho for the Year 1911, p. 28).

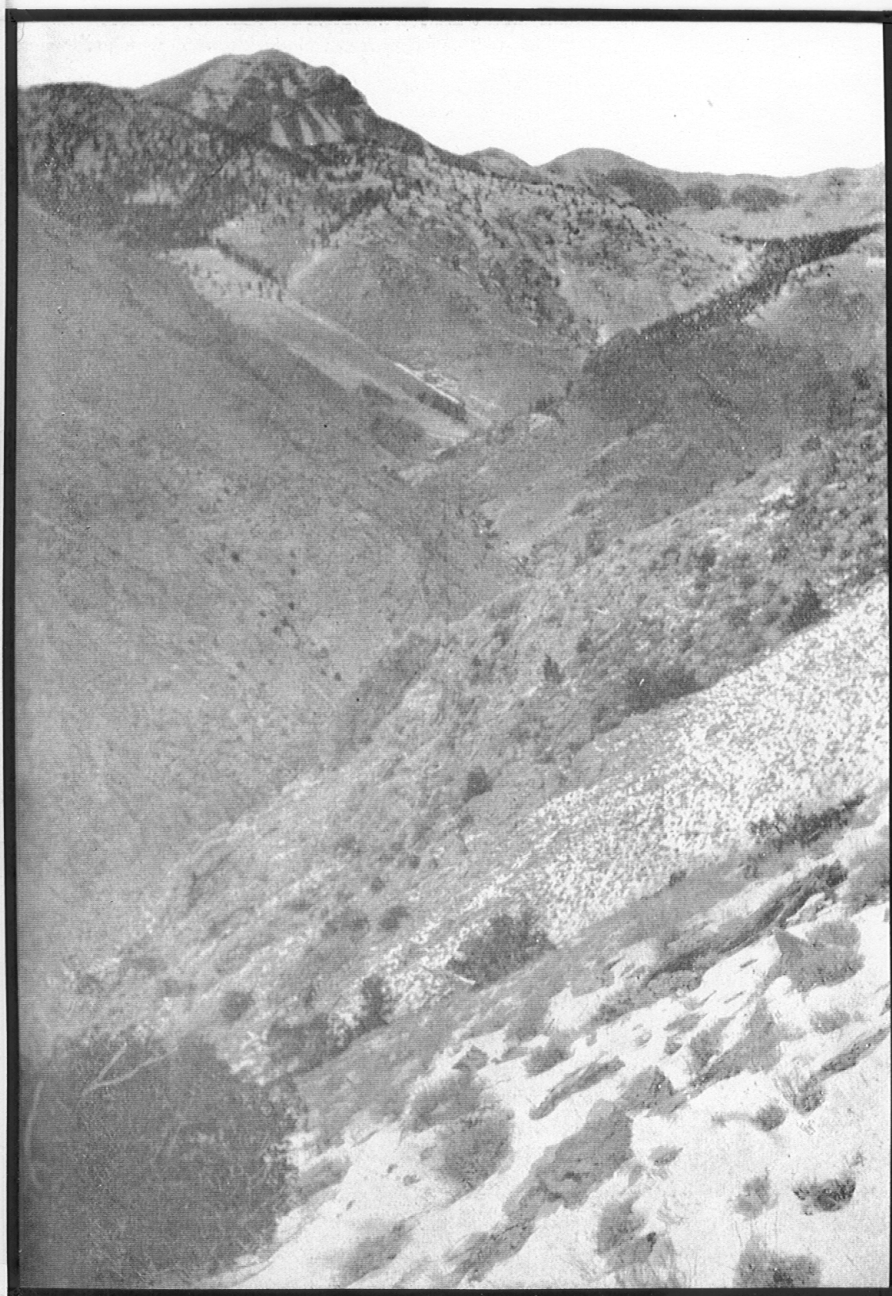


Figure 6. Rugged mountains above the Wilbert Mine (Bell, Robert N., 1912, Thirteenth Annual Report of the Mining Industry of Idaho for the Year 1911, opposite p. 28).

mineral, which consists of a quartzite gangue and a lead sulphide and carbonate mixture in which crystal forms have been largely destroyed by crushing movements of the deposit since it was formed.

Several important adjustments and improvements were made in the plant, which is now believed to be in such shape as to make a much higher recovery of the values than at first possible.

The property is located 40 miles from the nearest shipping point at Arco, on the Salmon River branch of the Oregon Short Line railroad, to which point the high grade lead concentrates and crude ores are hauled by wagon and auto truck.

The latter method it was believed would prove much more economical than horse flesh, but so far has not proven as satisfactory as anticipated by reason of the road in places being saturated with irrigation water and difficult for travel on that account.

Development on the Wilbert mine has continued with a good force throughout the year, a special feature of which has been the opening up of the great surface showing by quarries and the extension of the main drift from the lower tunnel on the property to the north, which is continued in ore for several hundred feet from the point of interception on the vein and to a considerable distance beyond the surface outcrops, showing a gratifying lineal extent of the ore deposits that is an agreeable surprise to the owners and fully insure the former estimate of tonnage that the property contains above this level.

Some concern was felt about the probable downward extent of this ore body by reason of the marked change in the formation which it was penetrating. It occurs in a zone of light colored vitreous Cambrian quartzite that is sharply folded. Just below the lower tunnel level, the light quartzite is succeeded by heavy beds of dark maroon colored rock, and some high geological authorities, who visited the property during the year, contend that the favorable ore bearing formation folds under the dark colored rock and that the ore will continue in the present matrix to an indefinite depth.

Recent reports from the development of this property indicate that the main surface showings of ore which are situated nearly 1000 feet apart may connect continuously in the underground development and with the favorable prospect of continued strength at further depth, these conditions greatly enhance the further value of the property as a source of high grade lead concentrating ore, with the prospect that it will continue an important producer for a long period and may ultimately warrant much larger milling facilities.

In 1913, the Wilbert Mining Co. operated the Daisy Black group most of the year. (See Table 2 for development work done at the mine.) The company shipped 300 to 900 tons of picked ore and concentrate per month. The USGS Minerals Resources Report for 1913 (p. 773-774) quoted the following information from a statement the company issued to its stockholders in May 1914:

During the period July 1, 1913, to January 15, 1914, 11,193 tons of ore were mined. Of this tonnage, 1,027 tons came from the surface quarry near the Caved Tunnel [Figures 7 and 8]. The balance of the tonnage came from the ore shoot opened up by the North Drift from the No. 3 tunnel during February and March, 1913, with the exception of about 1,500 tons which came from the old channel on the lower intermediate level and which joins the ore shoot just referred to about 70 feet above No. 3 level. . . . The principal development during this period has been the sinking of a 45-degree incline shaft below No. 3 tunnel level near the south end of stope No. 2. Cutting of station for hoist





Figure 7. Mining ore from the surface quarry at the Wilbert Mine (Bell, Robert N., 1914, Fifteenth Annual Report of the Mining Industry of Idaho for the Year 1913, p. 120).



Figure 8. Mining lead ore from surface workings at the Wilbert Mine (Bell, Robert N., 1916, Seventeenth Annual Report of the Mining Industry of Idaho for the Year 1915, p. 83).



Table 2. Development work, men employed, and companies operating at the Wilbert Mine, by year.

Year	No. of Men Employed	Tunnels (feet)	Sinking (feet)	Cross-cutting (feet)	Drifting (feet)	Raising (feet)	Operator
1913	45	1,220 <sup>1</sup>	280 <sup>2</sup>	940 <sup>3</sup>	---	---	Wilbert Mining Co., Ltd.
1914	45	1,500 <sup>1</sup>	300 <sup>2</sup>	1,200 <sup>2</sup>	---	---	Wilbert Mining Co., Ltd.
1916	60	1,495 <sup>1</sup>	200 <sup>2</sup>	1,275 <sup>3</sup>	---	---	Wilbert Mining Co., Ltd.
1917	35	---	152 <sup>2</sup>	1,045 <sup>3</sup>	---	---	Wilbert Mining Co., Ltd.
1919	15	300 <sup>1</sup>	200 <sup>2</sup>	100 <sup>3</sup>	---	---	Wilbert Mining Co., Ltd.
1921	6	200 <sup>1</sup>	---	200 <sup>3</sup>	---	---	Wilbert Mining Co., Ltd.
1923	12	1,700	---	---	---	---	Wilbert Mining Co., Ltd.
1924	12	---	---	---	400	400	Wilbert Mining Co., Ltd.
1925	15	450	---	---	---	---	Wilbert Mining Co., Ltd.
1926	15	---	86	---	---	345	Wilbert Mining Co., Ltd.
1928	23	---	40	---	---	700	Wilbert Mining Co., Ltd.
1930	35	---	---	---	---	1,200	Wilbert Mining Co., Ltd.
1931	20	---	240	360	---	---	Wilbert Mining Co., Ltd.
1946	10 <sup>4</sup>	210	138	235	68	---	Wilbert Mining Co., Ltd./ William H. Gibson, lessee
1947	12 <sup>4</sup>	265	80	180	350	---	Wilbert Mining Co., Ltd./ lessee
1948	10 <sup>4</sup>	---	---	---	60	---	Wilbert Mining Co., Ltd./ lessee
1949	10 <sup>4</sup>	---	---	---	20	---	Wilbert Mining Co., Ltd./ lessee

<sup>1</sup>Number given is for total development during the year.

<sup>2</sup>Combined number for sinking and raising.

<sup>3</sup>Combined number for drifting and crosscutting.

<sup>4</sup>All work on property was done by lessees.

and sinking of shaft was started in August and on May 1 the shaft was down 235 feet on the incline. At a point 150 feet down a station was cut and No. 4 level established. A crosscut was run from this station to the vein, which proved to be 50 feet to the west. Drifting on the vein has continued 45 feet toward the north and 25 feet to the south. . . . During the period of this report, the mill treated all the ore that was mined, viz, 11,193 tons, which had an average assay value of 30.5 per cent lead and 2.69 ounces silver. The mill was in operation just 200 days at an average of

17.14 working hours per day. There was produced 5,301.337 tons of concentrates and pickings having an average assay value of 52.3 per cent lead and 4.54 ounces silver per ton, thus yielding in metals 5,546,118 pounds of lead and 24,080 ounces of silver. From this it will be seen that for the period the mill made an average recovery of 81.23 per cent of the lead contents and 79.98 per cent of the silver contents.

The Wilbert set a record in 1913 by shipping crude ore and concentrate containing 8 million pounds of lead. The 1913 IMIR (p. 119-120) described the mine as follows:

The vein is a very pronounced and steep pitching fissure and its walls appear to have been subjected to very live motion and intense buckling action in places since the ore bodies were formed, which has resulted in crushing the mineral and, in fact, the wall rocks themselves in places through a width of 100 feet to a soft sandstone. The main ore shoot that has been developed is fully 500 feet long and varies from a few inches to forty feet in thickness, and a portion of this ore channel nearly 300 feet long is true and uniform as a board and has afforded a stope with a sixty degree dip that has varied from three to ten feet in thickness and has furnished a uniform feed value of 25 per cent lead to the 100-ton concentrating mill of the company. Another section of the vein is buckled and folded in short reverse angles and very badly disturbed and has been laid over a surface in such a manner as to afford quite an extensive area that could be quarried by the removal of quite a moderate covering of overburden, as shown in the accompanying cut [Figure 7].

Another conspicuous series of outcrops of similar ore in a more or less disturbed condition are exposed on the surface 1000 feet northwest of this showing, and are now being developed at depth from the bottom level of the mine by a long drift.

The mill is situated in a gulch at the foot of the mountain on which the ore body outcrops with a conformable dip and the situation affords splendid opportunity for further deep development by an additional crosscut tunnel of moderate length. With the object of undertaking this, the company has sunk a winze from the bottom crosscut level No. 3, which is now down 100 feet and has shown a continuance of the rich lead values. By reason of the later crushing action to which this fissure and its ore bodies have been subjected, the mineral, originally clean galena, has had its crystallization almost completely destroyed and reduced to a fine pulp. This makes a difficult ore to separate in spite of the fact that it carries practically nothing at all but lead mineral and quartzite gangue, and the heavy tailings loss is made at the fine end of the mill by reason of a deficiency in mechanical equipment in that department and a limited supply of water, which results in tailings carrying a 10 per cent lead values, but these tailings are being ponded for further treatment.

This deposit has many strong features and evidences of permanency. Its greatest drawback is the fact that it carries very low silver values and the product of the mill has to be hauled on wagons forty miles to the nearest railroad shipping point at Arco. In spite of those disadvantages the mine has made a good margin of profit over operating cost, which is being employed in the more extensive development and exploitation of its deposits.

Surface equipment at the mine included a blacksmith shop and 75-ton ore bin at the mouth of the working (No. 3) tunnel. (Figure 9 shows mine workings at this time.) A 1,000-foot aerial tramway connected the No. 3 tunnel to the mill (Figure 10).

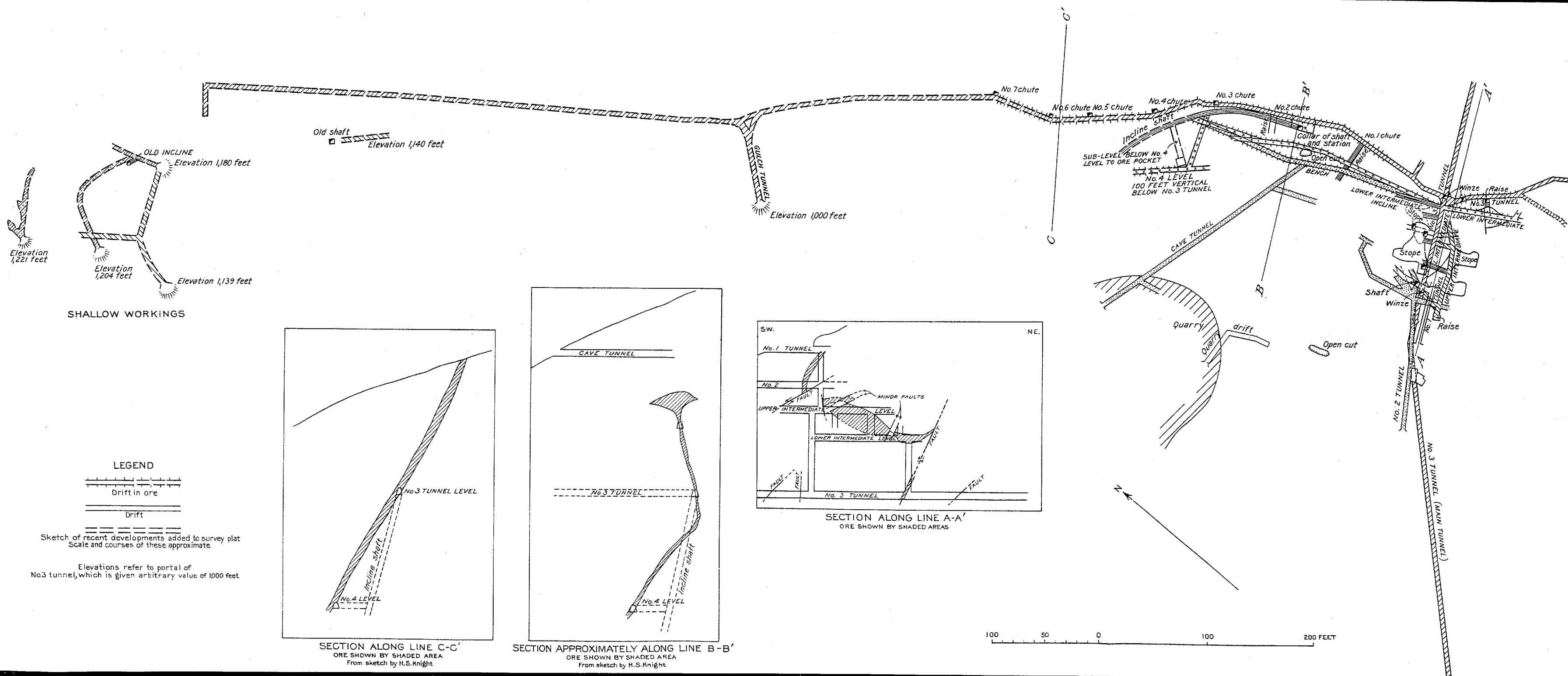


Figure 9. Plan and sections of part of the workings at the Wilbert Mine (c. 1913; Umpleby, 1917, Plate XXI).

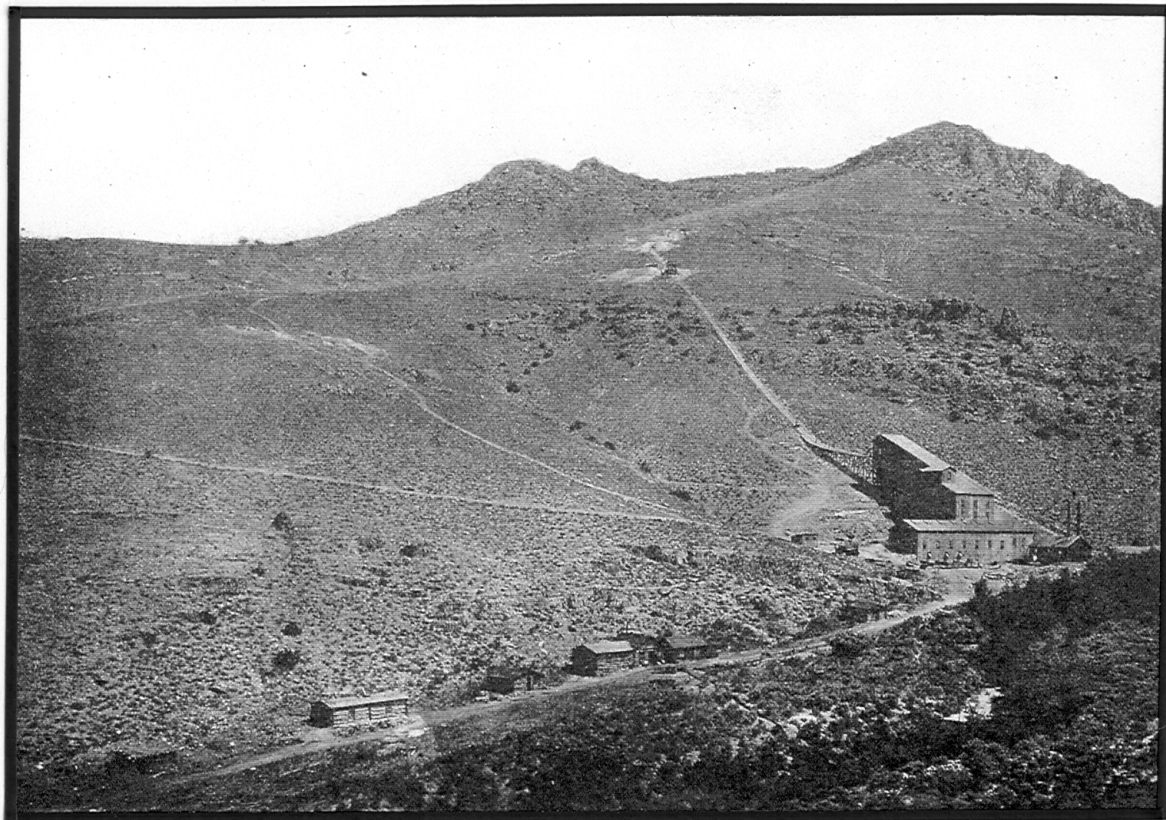


Figure 10. Wilbert Mine and mill (c. 1913; Umpleby, 1917, Plate III-B).

The mine and mill were each operated for about 6 months in 1914. In addition to lead concentrate, first-class ore was produced by hand picking the ore from the belt as it went through the mill. The average price per pound of lead declined from 4.4 cents in 1913 to 3.9 cents in 1914. As a result, the company shut down the mill in the fall, and the 1914 output from the Wilbert was less than half that of 1913. The company described its operations for the year ending May 1, 1915, as follows (quoted from USGS Mineral Resources of the United States, 1914, p. 620-621):

During the period mentioned 7,522 tons of ore were mined. Of this tonnage 6,685 tons were milled, 657 tons were shipped crude, and 180 tons of mill ore were stored on No. 3 dump, awaiting the resumption of mill operations. The mill ore averaged 30.3 per cent lead and 2.5 ounces silver per ton. The 657 tons of crude ore shipped averaged 55.81 per cent lead and 8.69 ounces silver. This tonnage came from the following stopes: No. 2 stope, 3,520 tons; No. 4 stope, 3,016 tons; No. 5 stope, 986 tons; making a total of 7,522 tons. The cost of extraction was \$21,617.11.

The main development during the past year has been the continuation of the inclined shaft to the No. 5 level, cutting out of ore and waste pockets, drifting on the vein on both No. 4 level and No. 5 level, and crosscutting in the Wilbert hill. A total of 844 feet has been driven at a cost of \$9,571.92. Most of the work, such as the sinking of the shaft and the drifting on No. 4 and No. 5 levels, which were timbered preparatory to stoping, has been of an expensive nature. Our main ore shoot on No. 4 level proved to be 190 feet long with an average width of 2 feet 6 inches. The ore on this level had an average grade of 35 per cent lead and 2.5 ounces silver, but in stoping above this level, the ore became somewhat lower in grade. On No. 5 level this same ore shoot was 110 feet long with an average width of 1 foot 3 inches. The grade of the ore, however, proved to be between 40 per cent and 45 per cent lead with about 8 ounces of silver. In stoping above this level the ore has maintained the same lead contents, but the silver values decreased somewhat. However, the ore in this stope has maintained a better width than it showed on the level. No sinking has been done below the No. 5 level.

The mill was in operation during the past 12 months a little less than five months, due principally to the prevailing low price of lead. The 6,685 tons of ore milled produced 3,035.73 tons of product assaying 53.79 per cent lead and 4.56 ounces of silver per ton; the ratio of concentration being 2.22 tons into 1. The lead recovery was 80.7 per cent and the silver recovery 83.0 per cent. The cost of milling was \$1.73 per ton. Operations at the mill will be resumed June 1, it being the intention to operate day shift only.

The higher silver values in the No. 5 bottom level, said to be double the average grade then being mined, were taken as an encouraging sign for the mine's future.

The Wilbert Mining Co. paid its first dividend, totalling \$10,000, in 1915. The company employed 70 men in the mine and mill, and underground development reached a depth of 400 feet. The mill (Figure 11) operated during the latter part of the year, shipping 500 tons of ore and concentrate per month. The company's annual report (quoted from USGS Mineral Resources of the United States, 1915, p. 544) stated:

The high price of lead allowed of a good deal of poor ore being extracted, also small streaks and shoots that would not pay otherwise. From No. 5 level to the surface



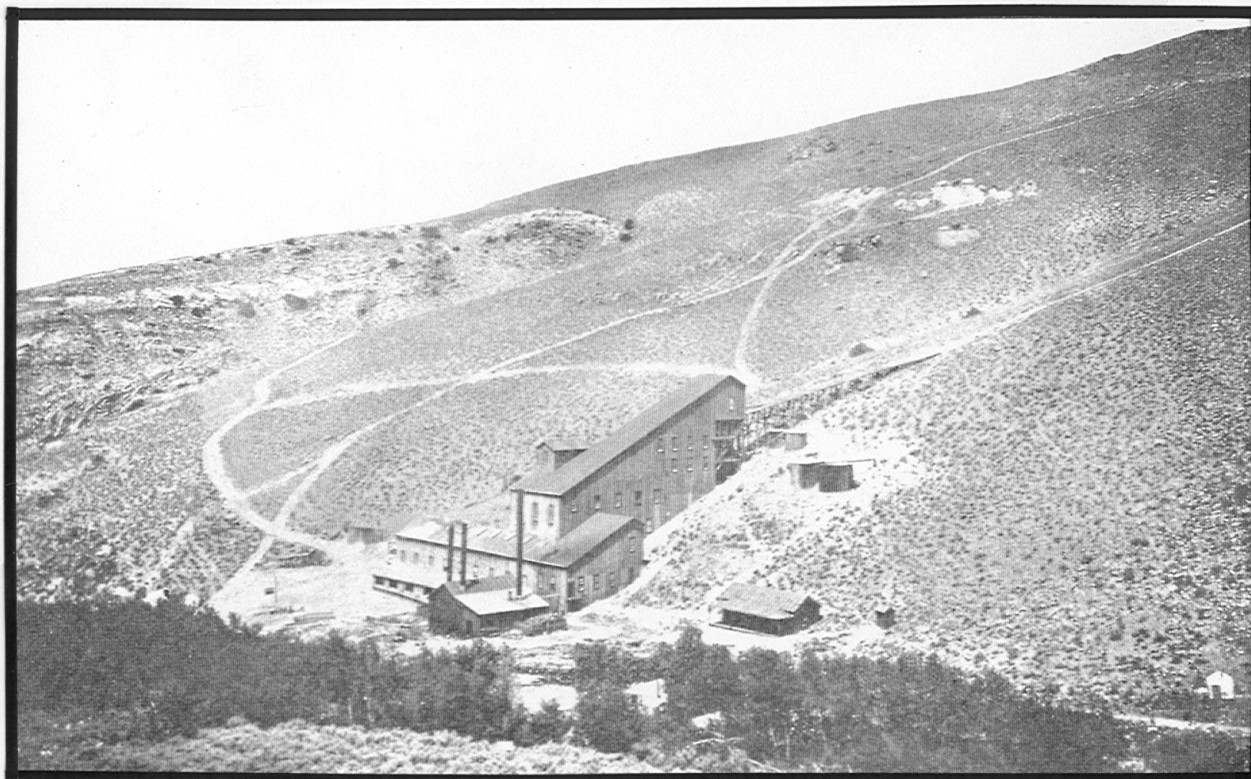


Figure 11. Wilbert Mine and mill (c. 1915; Bell, Robert N., 1916, Seventeenth Annual Report of the Mining Industry of Idaho for the Year 1915, p. 84).

the main shoot is nearly all stoped. The mill treated 15,204 tons assaying 25 per cent lead and 3.86 ounces silver. Concentrate produced was 5,787 tons, averaging 52.06 per cent and 8.02 ounces, equal to 6,025,600 pounds lead and 46,419 ounces silver. The cost was \$3.56 per ton.

In 1916, the company paid \$40,000 in dividends. Lead concentrate containing some silver was shipped to a Salt Lake smelter. The company's report for the year (quoted from USGS Mineral Resources of the United States, 1916, p. 585) stated:

Our main ore body has been getting continuously smaller as each new level in depth was attained and when in June, last year, the ore was reached on the No. 6 level it was of very small dimensions. In addition to this, water was encountered on the No. 6 level and also the vein had reversed its dip and was dipping very flatly to the northeast instead of to the southwest, as it had nearer the surface. To continue prospecting the ore meant a new shaft would have to be started from the No. 6 level with an inclination at about right angles to the old shaft and also that power would have to be installed for operating pumps as well as a hoist for the new shaft . . . .

The shaft (which is at an inclination of only 23 degrees from the horizontal) was started down on the ore and at a depth of about 35 feet after the ore had almost pinched out, it began getting wider very rapidly, attaining in places a width of fully 8 feet. Furthermore, the grade of the ore has proven to be the best we have ever had, averaging about 40 per cent lead and 15 ounces silver, which we have sorted into two grades--the first averaging 52 per cent lead and 20 ounces silver has been shipped direct; the second class averaging approximately 20 per cent lead and 5 ounces silver has been sent to the mill for concentration before shipping. About 1,000 tons of this new ore was mined during the first four months of the present calendar year and this constituted practically all of our production for the period stated. The profit of this four months' period was \$21,969.71, thus showing a net profit of over \$20 per ton for this ore. . . .

During the past year a total of 7,337 tons of ore was mined at a cost of \$41,826.48, or \$5.70 per ton. . . .

A total of 1,045 feet of new work was performed in drifting and crosscutting on the various levels at a cost of \$10,050.79 or \$9.61 per foot. Also, the new shaft has been sunk 152 feet, which has cost, including the cutting of stations, etc., \$7,492.62.

During the year 6,981 tons of ore was milled, assaying 18.7 per cent lead and 4.9 ounces silver, producing 1,758 tons of concentrates assaying 54.2 per cent lead and 15.3 ounces silver, thus showing an average extraction of 72.9 per cent of the lead and 78.6 per cent of the silver. The cost of milling was \$13,202.22, or \$1.89 per ton.

The mine now had approximately 7,575 feet of development.

The company operated the mill intermittently in 1917 and shipped crude lead ore and concentrate of good grade. (See Table 3 for economic data on the mine's output.) However, major development work was undertaken to exploit the lower levels of the mine. The company's annual report (quoted in USGS Mineral Resources of the United States, 1917, p. 475) described the work in some detail:

It early became apparent to the present management that, in order to eliminate the increasing costs of handling the mine products by hoisting and transportation through

Table 3. Mine output and economic data for the Wilbert Mine for selected years, 1917-1928.

Year	Tons of Ore	Concentrates Shipped	Average Value (per ton)	Transport and Treatment Costs (per ton)	Silver Recovered (ounces)	Lead Recovered (pounds)	Gross Returns
1917	6,981	---	\$54 <sup>1</sup>	\$1.89 <sup>2</sup>	78.6% <sup>3</sup>	72.9% <sup>3</sup>	\$112,468.04 <sup>4</sup>
1919	100	---	\$60	\$22.00	6	52% <sup>3</sup>	\$5,222.16 <sup>4</sup>
1924	292.78	---	---	---	11,053.6	286,354	\$18,448.30 <sup>4</sup>
1925	3,163	878	---	---	7,990	988,628	\$68,163.67
1926	2,590	590	---	---	4,720	673,000	\$44,838.83 <sup>4</sup>
1928	9,100	2,500	---	---	27,300 <sup>5</sup>	2,730,000 <sup>5</sup>	\$1,600,000.00

<sup>1</sup>Value is net after deductions for freight and treatment.

<sup>2</sup>Cost for local treatment of ore.

<sup>3</sup>Total amount of metals recovered was not stated.

<sup>4</sup>Figure given was for "ore sales."

<sup>5</sup>Metals produced calculated from average grade of ore.

various levels until the surface bins were reached, it would be necessary to sink a new shaft from the surface which would connect directly with and form an upward extension of the 200-foot winze sunk from the 600 level during the previous and present (fiscal) years . . . At the present time the shaft is down 429 feet, at an angle of 21 degrees. An additional depth of 135 feet will connect it with an old stope below the 500 level and about 80 feet of this stope will have to be straightened to the angle of inclination above. The company will then have a straight incline shaft to a depth of 830 feet from which the ore body on the 800-foot level, and below, can be developed. . . .

To operate the drills necessary to sink this shaft a 50-horsepower Chicago pneumatic oil-driven compressor was installed together with a 6 by 8 inch hoisting engine, drills, etc. This installation was well suited for the purpose though after the flow of water was developed on the 800 level it became apparent that still additional machinery would be necessary to carry on the development at greater depth. This machinery . . . has been ordered, some of it being now on the ground and in process of installation. . . .

The immediate object in the erection of this plant and the driving of a new shaft is, of course, the further development of the ore shoot which has been productive from the surface. . . .

During the year 44 lots of ore were settled for. Of this, 1,021 tons were direct shipping ore, while 3,125 tons of mill ore produced 893 tons of concentrates. This ore returned the company \$69.77 per ton or a total of \$133,477.31.

With the present price of lead and with cheaper methods of ore extraction available by reason of the new shaft and hoisting machinery, the ore on the 800-foot level, which can readily be blocked out as soon as the new improvements are perfected,



should show a substantial profit. From present progress it is probable that shipping will be resumed by the middle or latter part of July.

Among the equipment at the mine, the company listed a 25-horsepower engine, a 12-horsepower hoist, and two motors (3- and 4-horsepower) for pumping.

Though ore shipments were less than in the previous year, the company still shipped over 2 million pounds of lead. Dividends of \$50,000 were paid during the year. According to the Mine Inspector, up to that time, total production from the Wilbert was worth over \$1 million, and the company had paid nearly \$100,000 in dividends. The 1917 IMIR (p. 39) described the work done during the year:

This ore channel has proven persistent down to the 800 foot level. It has been operated by adit tunnels to the 300 foot level; by means of a small underground gasoline hoist from the 300 to the 800-foot level. During the past year the property was equipped with a new electric hoist and compressor placed at the surface, and the straightening of the shaft from the 800-foot level to the surface on a 25 degree dip is well under way. The interesting feature of this development is the fact that the former average values in silver above the 600-foot level was about five ounces per ton, while between the 600 and 800-foot level an increase has been shown to 15 ounces silver per ton in shipping results. The product of the mine is about 50 per cent crude ore, carrying 50 per cent lead, and the balance of the product is 25 per cent lead mill feed, which is cleaned on the ground to concentrates carrying over 55 per cent lead and 12 to 20 ounces silver per ton. There is no perceptable iron, zinc or copper minerals in the ore.

The major work at the mine in 1918 consisted of sinking a shaft to the 800 level and installing a new hoist at the surface. The Mine Inspector noted that some of the best ore ever found at the Wilbert was located at the bottom levels of the mine. Fire destroyed the mill in October, resulting in reduced ore and concentrate shipments for the year. The mine was closed on December 3 and remained closed until May 15 the following year. The company announced that it intended to develop orebodies above the water level or on the 500 level before it rebuilt the mill.

The mine was idle in 1921, but lead concentrate was cleaned up from around the millsite and shipped. Work began on a new tunnel on North Creek that was intended to intersect the orebodies at greater depth than the current workings. In addition, a contract was let for constructing a power line from Arco to the mine. Equipment included a compressor powered by a 50-horsepower fuel oil engine and a second 50-horsepower engine to operate the pumps and the hoist.

In January 1922, the boarding house, bunk house, residences, mine office, and compressor building and equipment were moved to the portal of the new tunnel, and the old shaft was abandoned. The new tunnel on the 1100 level, known as the No. 4 or the Daylight, was extended to over 1,500 feet during the year. Total development on the property was about 10,000 feet, consisting of four tunnels, two shafts, twenty raises, three crosscuts, and six drifts. The mine had 1,300 feet of shafts, 2,000 feet of raises, 6,700 feet of tunnels, drifts, and crosscuts, and several open cuts. A 15-

horsepower compressed air hoist was powered by a 50-horsepower, 14-inch Chicago Pneumatic Tool Co. compressor.

The No. 4 tunnel was completed to a length of 2,300 during 1923, and it was connected by a raise to the old workings. This work exposed a large amount of ore, which the company planned to begin mining the following year. In addition, construction began on a new \$20,000, 60-tpd gravity mill. Equipment at the mine included a 50-horsepower electric plant to operate the pumps, in addition to the compressor and hoist (which were not being used). Haulage in the mine was by horse.

The 1924 output of Butte County, almost entirely from the Wilbert, was valued at \$55,325. The mine shipped several hundred tons of first-class lead ore. The new mill was completed in the fall and produced several tons of concentrate during the rest of the year. The mine had approximately 12,000 feet of development, consisting of 1,300 feet of vertical or inclined shafts, 2,000 feet of raises, 8,700 feet of tunnels, crosscuts, and drifts, and several open cuts.

The company did 1,000 feet of development in 1925. The mill ran on a part-time basis, and lead concentrate containing a little silver was shipped to Midvale, Utah. Increased shipments from the Wilbert were responsible for doubling the production from Butte County in 1925.

Production in 1926 was less than the previous year, although the company claimed that it maintained production and shipped a substantial tonnage of concentrate. Five hundred feet of new development work was completed. Total development on the property was about 15,000 feet. The mine had two tunnels, two inclined shafts which totaled 900 feet, and workings on eight levels.

The Wilbert was the fourth largest lead-silver producer in southern Idaho in 1927. Most of the ore came from a depth of 1,200 feet along the vein. The company also did a large amount of development work during the year, which exposed "an important showing of new ore" (1927 IMIR, p. 107). The mine had approximately 15,000 feet of workings. The longest was the 2,800-foot No. 4 tunnel. Two intermediate levels were reached through a 250-foot inclined shaft from the No. 4 tunnel.

The mine operated continuously in 1928 (Figure 12). The mill, equipped with jigs and tables, treated more than 11,000 tons of lead ore, which was reduced to 1,839 tons of lead concentrate containing more than 2 million pounds of lead. The output was shipped from Arco, a station on the Oregon Short Line Railroad, to the smelter at Midvale. The company did 800 feet of development, including extending the inclined shaft another 150 feet and starting work on a third level from it. This work was said to have located substantial quantities of new ore.

In 1929, the Wilbert ranked fourteenth as a producer of lead in the state, and it was the second largest producer of lead in Idaho outside the Coeur d'Alene district. The mine's output was nearly double that of 1928. The mill treated over 14,000 tons

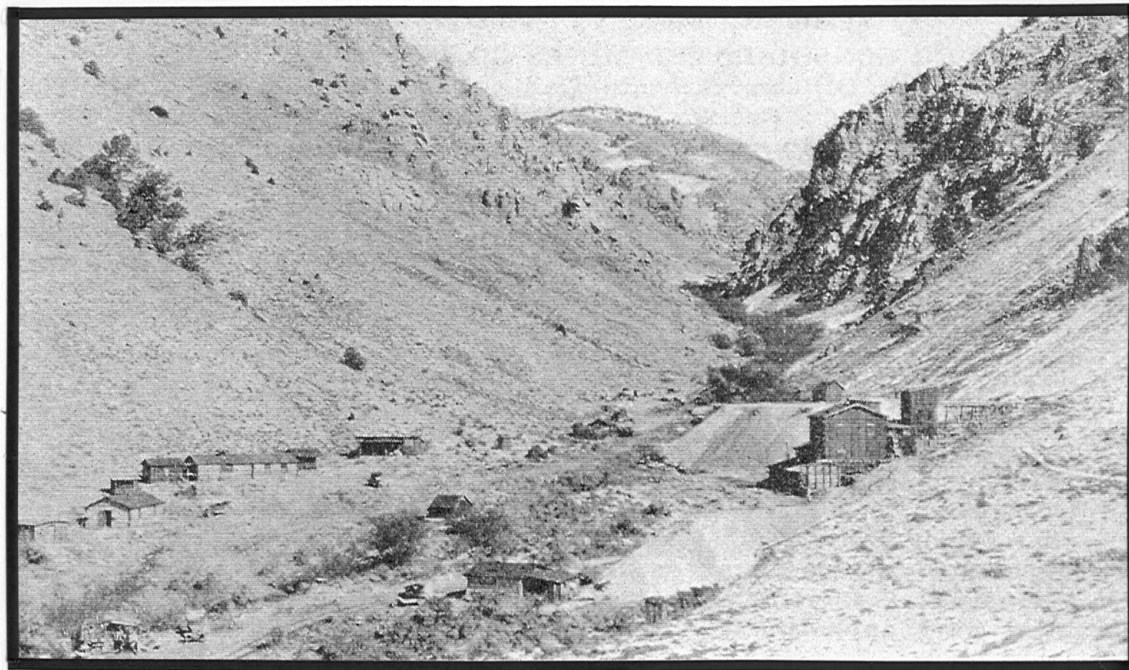


Figure 12. Mine camp and mill, Wilbert Mining Co., Ltd. (c. 1928; Campbell, Stewart, 1929, Thirtieth Annual Report of the Mining Industry of Idaho for the Year 1928, p. 101).

of lead ore, producing more than 3,000 tons of rich silver-lead concentrate. In April a 17-mile transmission line was constructed from Howe to the mine, and the mine and mill plants were converted from gas- to electrically-powered units. Seven hundred feet of development work was done, including extending the shaft 200 feet and starting a fourth intermediate level from it.

The mine was active throughout 1930, but at a lower level than the previous year. The mill treated about 8,400 tons of lead ore; lead production was over 2 million pounds less than the previous year. The company did 1,000 feet of development, including opening the 1,450-foot level from the inclined shaft below the No. 4 tunnel (Figures 13, 14, and 15). When Ross (1933) visited the mine in June 1930, he noted that many of the older workings were inaccessible.

The Wilbert maintained production through January 1931. Development continued for the next three months before declining metal prices forced the mine to close. Lead prices continued to decline for the next year, reaching an all-time low of 2.9 cents per pound in 1932. Prices remained low for the rest of the decade, and the mine remained idle.

In 1937, Mac Settles acquired the dump and mill tailings at the Wilbert. New equipment was installed in the mill, increasing its capacity to 75 tpd. Lessees (presumably Settles) sampled and tested the tailings dumps during 1938. In 1941, 2,500 tons of lead ore from the mine dump was treated by gravity concentration.

The mine was under lease, and considerable work was done during 1944. The mine buildings, compressor, and shop equipment were reconditioned, and the mine was dewatered. A mill for treating tailings was built on the dump at the intersection of North Creek and Camp Creek. Equipment in the mill included a feeder, an elevator, an agitator, a classifier, six #24 43"x43" Denver Sub A flotation cells, and 75-ton gravity-load concentrate bins. Also listed were a complete assay office and a dragline loader with a capacity of 180 tons, which was used for transporting tailings. Approximately 450 tons of old tailings was treated during the year.

William H. Gibson operated the mine and tailings dump under lease in 1945. He shipped 555 tons of crude lead ore to a smelter and treated 930 tons of old tailings by flotation.

Gibson worked the mine continuously in 1946. He shipped 1,750 tons of zinc-lead ore to the custom flotation mill at Bauer, Utah. In addition, 2,313 tons of old tailings, containing mostly silver and lead, was treated in the mill by M.C. Settles. Development work in the mine included 210 feet of tunneling, 138 feet of sinking, 235 feet of crosscutting, and 68 feet of drifting (Figures 16, 17, and 18). Twelve hundred feet of 12-pound rail and 470 feet of 16-pound rail were placed in the mine, as well as transformers and transmission cable. The lessee added a 30-horsepower Joshua Hendry electric hoist during the year. Horses were used for haulage in the mine.

Lessees continued to operate the mine in 1947. The mine produced 1,020 tons of zinc-lead ore, which was shipped to a custom flotation mill at Bauer. Most of this

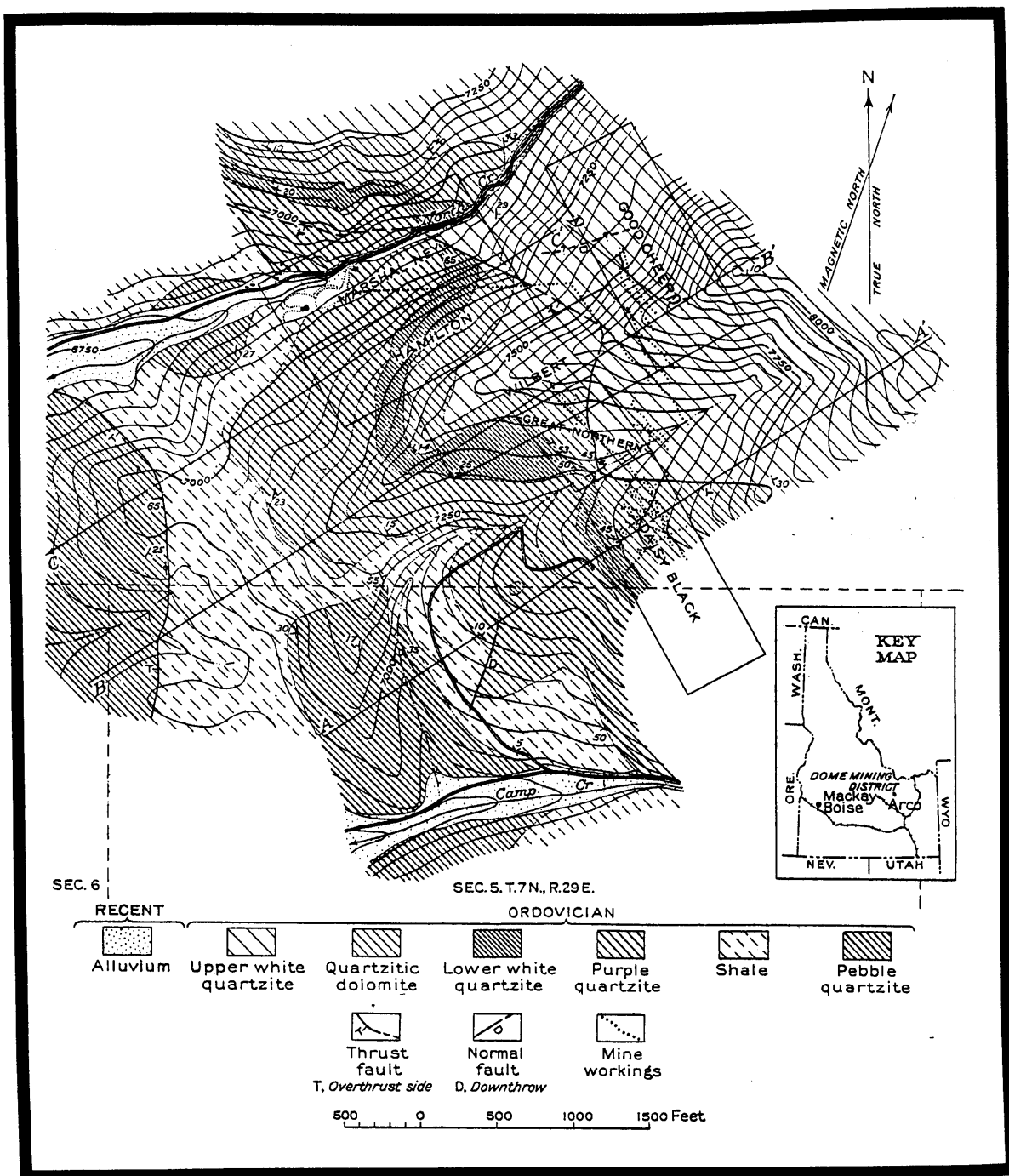


Figure 13. Geologic map of the vicinity of the Wilbert Mine, showing claim boundaries (Ross, 1933, Plate 1). Probable correlations of the rock units are: pebble quartzite is Swauger Formation, the shale and purple quartzite units are the formation of Tyler Peak, the lower white quartzite and quartzitic dolomite are Summerhouse Formation, and the upper white quartzite is Kinnikinic Formation (correlations after McCandless, 1982, and Ross, 1961).

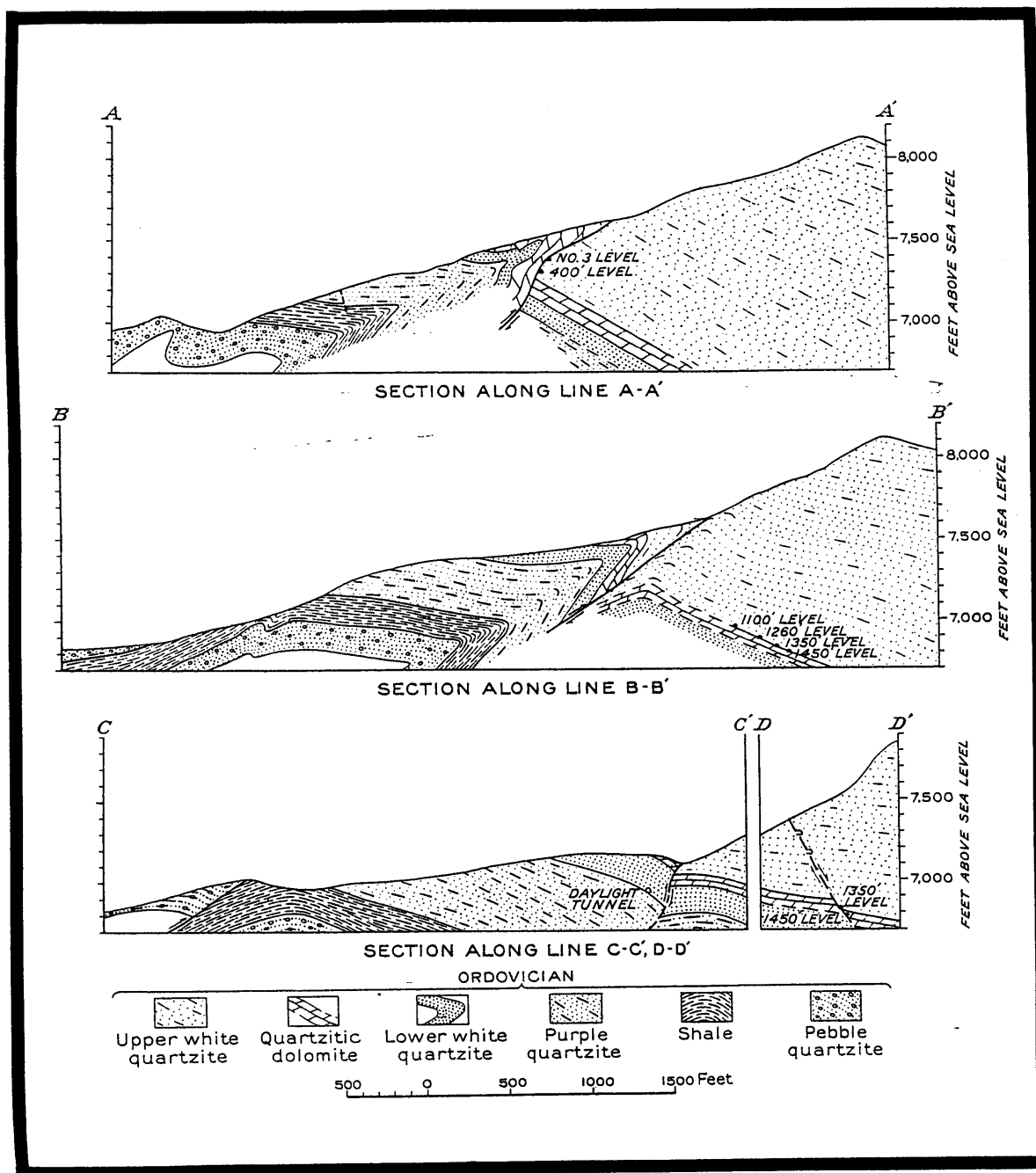


Figure 14. Structure sections the vicinity of the Wilbert Mine. Section lines are shown on Figure 13 (Ross, 1933, Plate 2). Correlation of rock units is the same as for Figure 13.

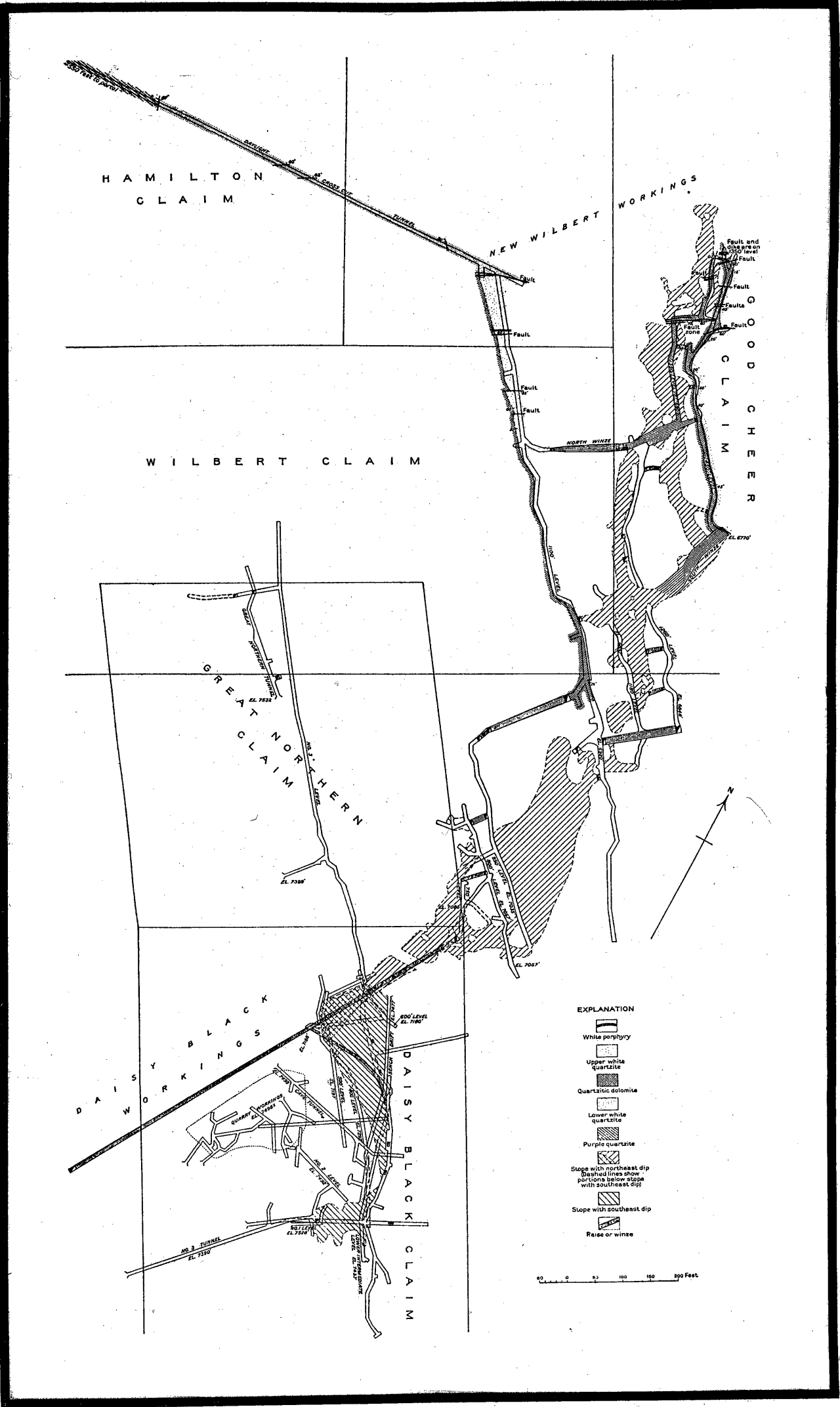


Figure 15. Geologic map of the Wilbert Mine workings (Ross, 1933, Plate 3).

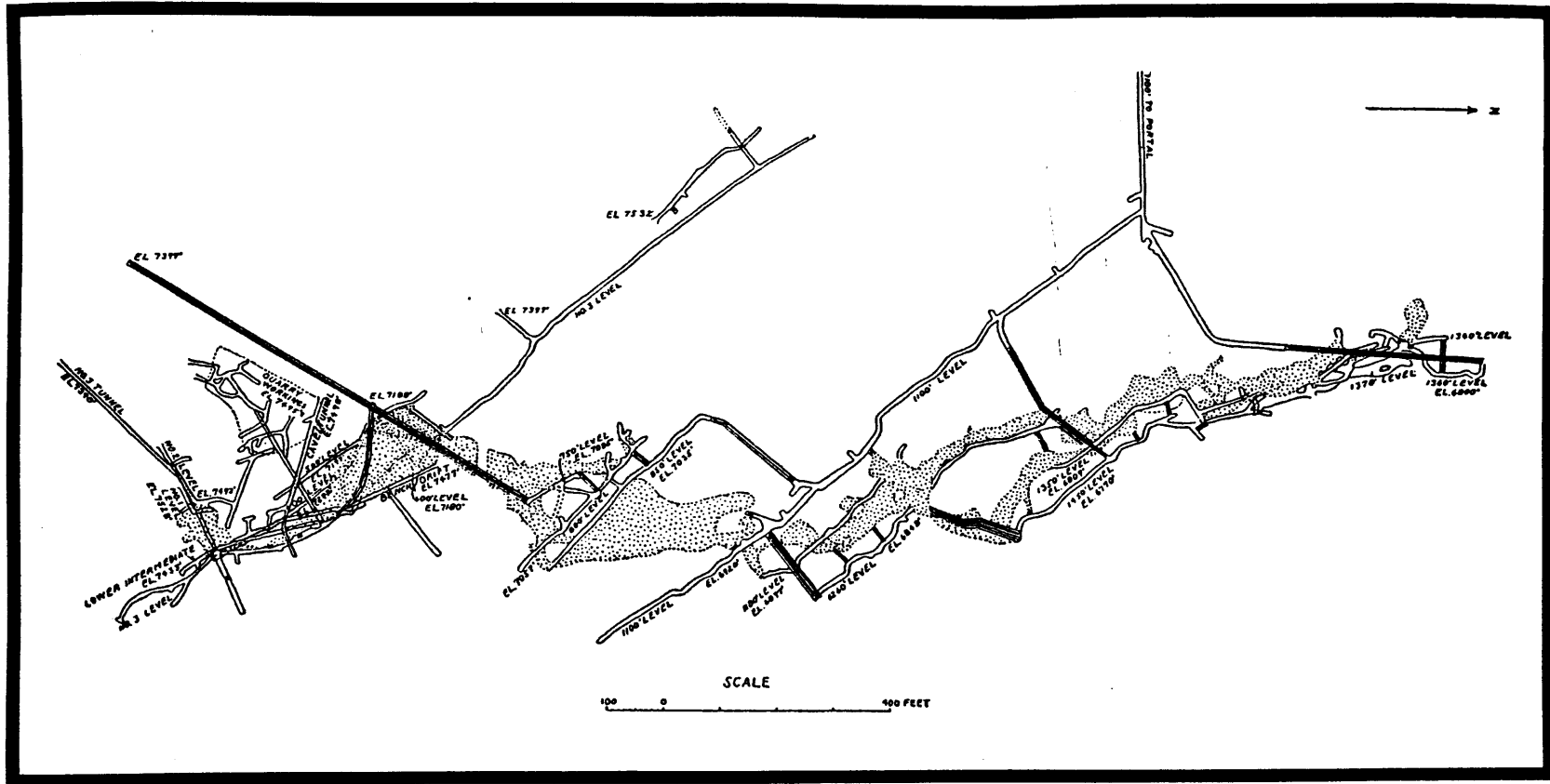


Figure 16. Plan of underground workings at the Wilbert Mine, showing stope ground (stippled areas). The major difference from Figure 15 is the northward extension of the 1100 level at the right of the map (Anderson, 1947, Figure 2).



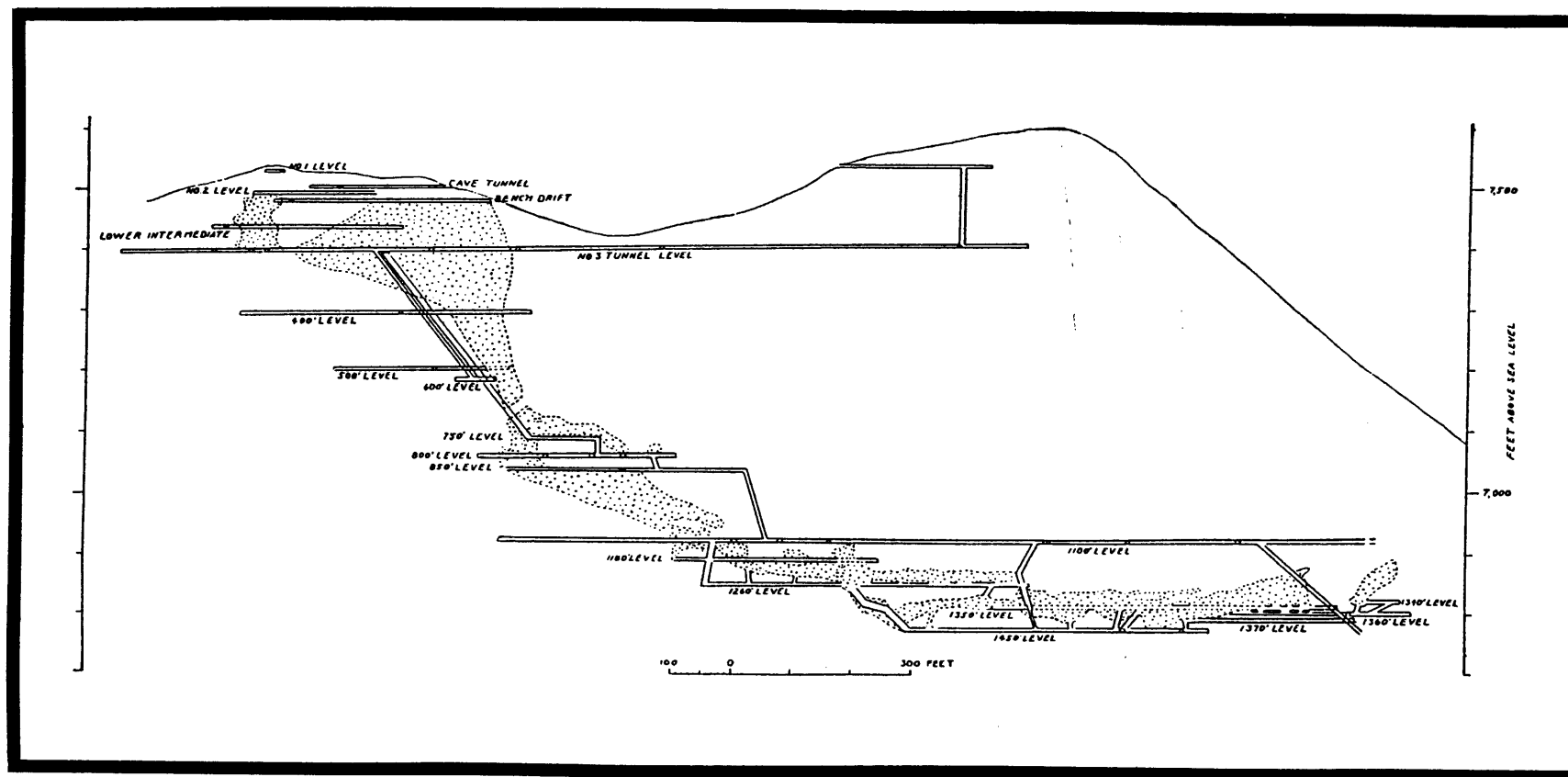


Figure 17. Longitudinal section through the Wilbert Mine, showing the position of the ore shoots. The line of the section is N. 40° W. (Anderson, 1947, Figure 3).

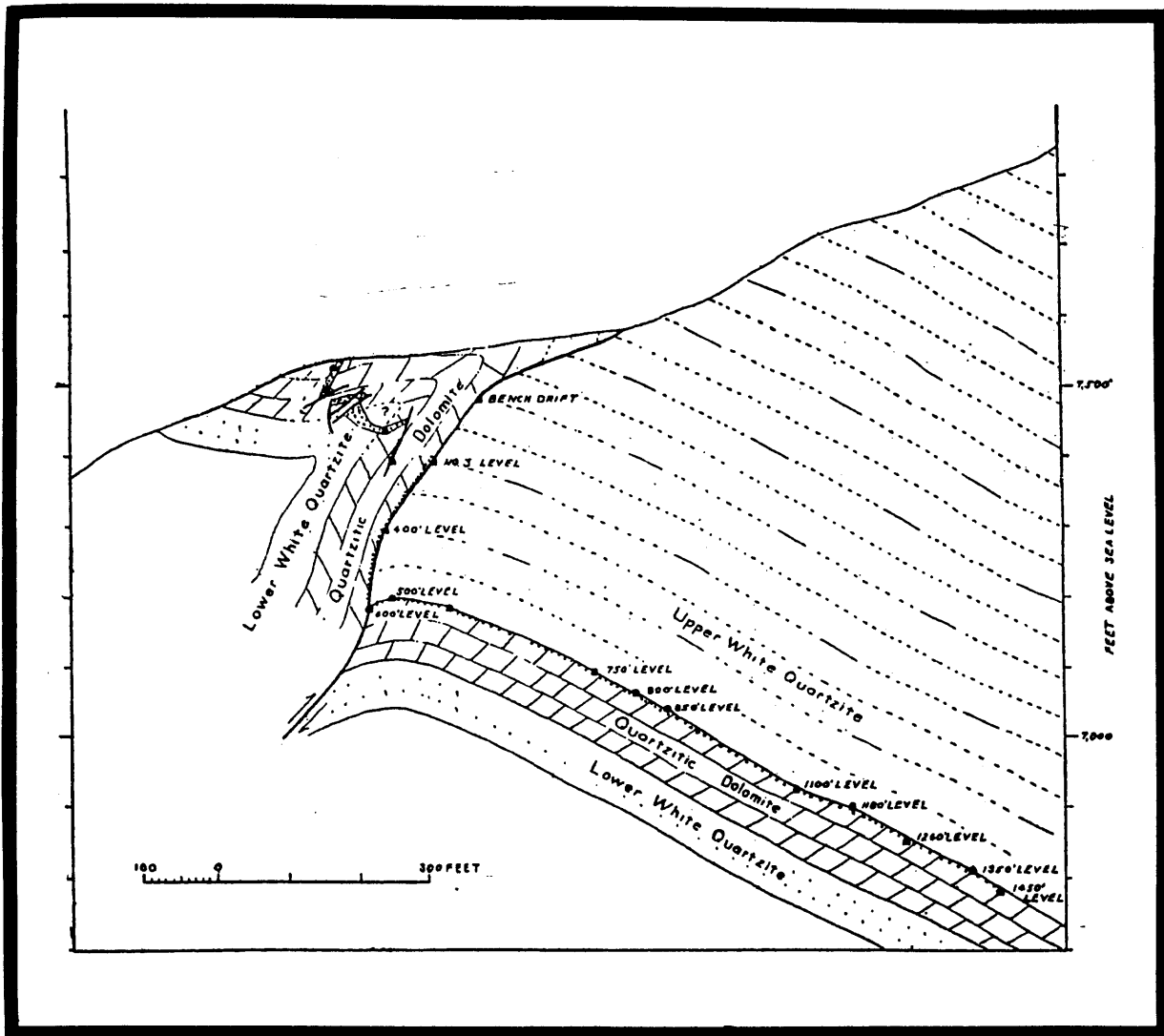


Figure 18. Somewhat idealized cross section of the Wilbert Mine, showing structural relationships and localization of the orebodies (dotted areas; Anderson, 1947, Figure 4). Rock units are the same as in Figure 13.

ore came from the 1365 level of the mine. It was hoisted to the 1100 level and then trammed to the surface. The company noted that all levels above the 1100 were mined out. The mine had about 18,500 feet of workings.

In 1948, lessees produced 773 tons of ore which yielded 3 ounces of gold, 776 ounces of silver, 876 pounds of copper, 243,886 pounds of lead, and 21,762 pounds of zinc. The mine was idle in 1949.

M.C. Settles worked at the Wilbert for a few months in 1950 and shipped 13 tons of lead ore to a smelter in Utah. According to the company, this material was tailings from the dump. The Wilbert Mining Co., Ltd., forfeited its charter in 1952.

Willie-Ray Mining Co., Inc., began work to reopen the mine in 1965. In 1966, the property was leased to Bell Mountain Mining Co., who constructed a mill to process material from the tailings pond. Between then and 1968, Bell Mountain produced over 1.5 million pounds of lead and 14,000 ounces of silver from the tailings (Kuizon and Lipton, 1991).

The orebodies on the Wilbert property are developed by more than 18,000 feet of workings that extend over a horizontal distance of about 2,500 feet and a vertical distance of 750 feet. When visited by USBM field crews in 1986 and 1987, the Daylight tunnel contained two feet of water for about 200 feet, the winzes were flooded, and most of the raises and stopes were caved and inaccessible (Figure 19). In 1945, it was estimated that about 1,000 tons of ore remained in the mine in pillars and old stope faces. Another 3,000 to 7,000 tons of inferred resources averaging 13 percent lead and 2.1 ounces per ton silver are believed to extend northward from the main part of the mine (Kuizon and Lipton, 1991). Figures 20, 21, and 22 show the mine as it appeared in 1994 when it was visited by an Idaho Geological Survey geologist as part of a program to evaluate environmental hazards on inactive and abandoned mines in southern Idaho.

Total recorded production from the Wilbert Mine between 1906 and 1982 was 183,329 tons of ore and 29,989 tons of reprocessed tailings. This material yielded 42 ounces of gold, 376,857 ounces of silver, 43,089 pounds of lead, 40,718,436 pounds of lead, and 146,450 pounds of zinc.

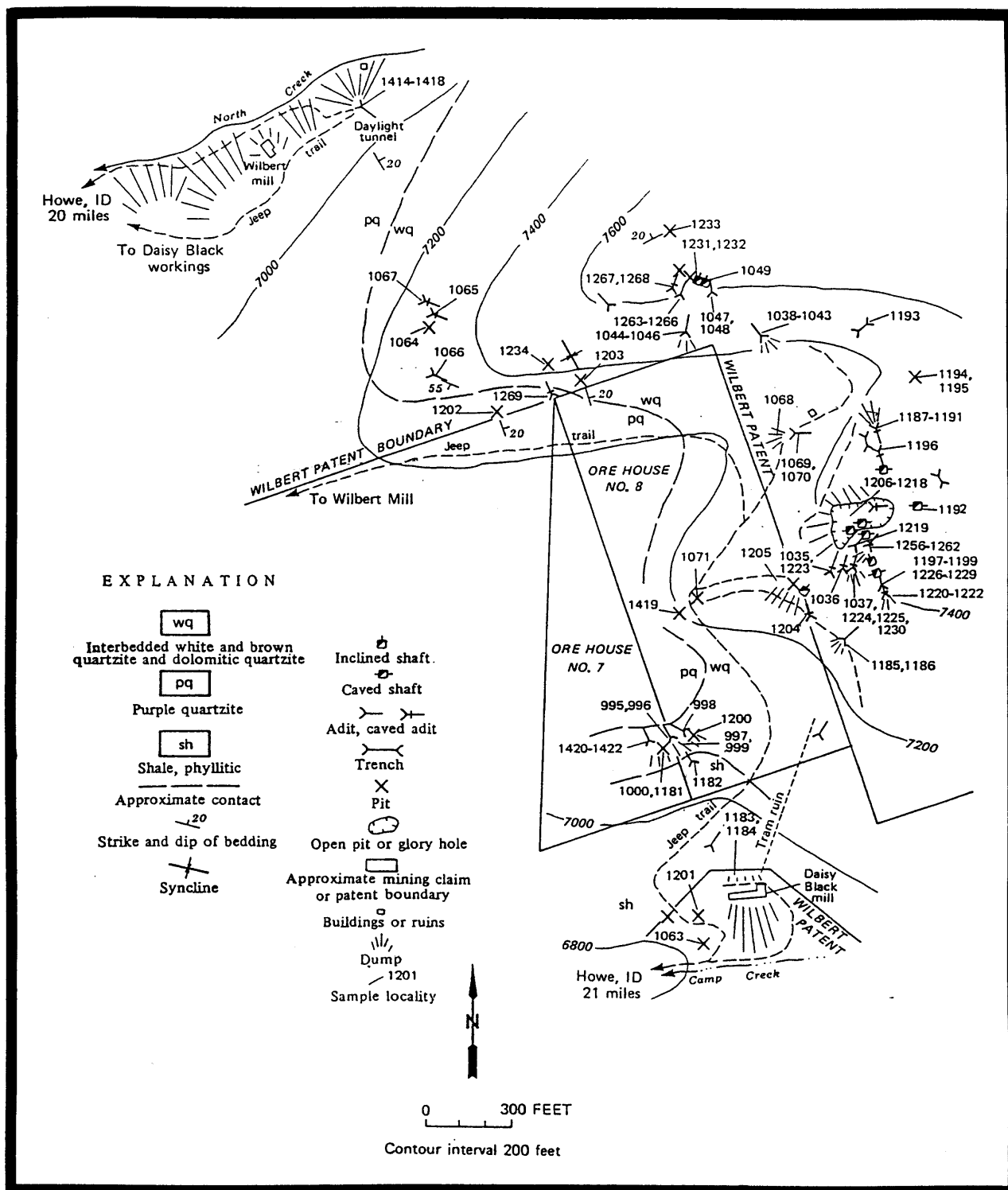


Figure 19. Surface workings at the Wilbert Mine and on the adjacent Ore House claims (c. 1987; Kuizon and Lipton, 1991, Figure B-11).





Figure 20. Foundation of the original Wilbert mill in 1994. The view is looking south toward Camp Creek. This is the mill that is shown in Figures 10 and 11 (photograph by Falma J. Moye, Idaho Geological Survey).





Figure 21. Wilbert millsite and tailings piles on North Creek in 1994. Compare this photograph with Figure 12 (photograph by Falma J. Moye, Idaho Geological Survey).





Figure 22. Daisy Black workings on the hill between North and Camp Creeks in 1994. The Cave, No. 1, and No. 3 tunnels of the Daisy Black (Wilbert) Mine were all in this area (photograph by Falma J. Moye, Idaho Geological Survey).

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