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Item 23

Nightingale Range

Nightingale district

The Nightingale district is in the central portion of the north-trending Nightingale Range in T. 25 N., R. 24 and 25 E., southwestern Pershing County. The range is steepand rugged on the west side, where it is bordered by the down-dropped block occupied by Winnemucca dry lake. In contrast, the east side of the range and the crest are smooth, old age topographic surfaces. The principal tungsten deposits lie roughly in a line 5 miles long that trends northwesterly across the range. The Alpine, Nightingale, and Jaybird deposits near the crest of the range are accessible from the east by a graded road about 20 miles long that joins U. S. Highway 40 at Hot Springs, 43 miles southwest from Lovelock. The M. C. L. mine, at the west base of the range, is reached from Nixon on State Highway 34, at the south end of Pyramid Lake, by a 17-mile desert road that extends northward along the east side of Winnemucca Lake. In

1945, travel was also possible between the Nightingale and M. G. L. mines, in an indirect way, by a steep road south from the Nightingale mine and down Coyote Canyon to Winnemucca Lake.

The tungsten deposits were discovered in 1917, but were not worked to any extent at that time, although a little ore was shipped to the Toulon mill from the Nightingale mine. In 1929, the Nightingale mine was purchased by the Tungsten Production Co. of Boulder, Colorado, which in 1933 became Gold, Silver, & Tungsten, Inc. A mill was built and operated at intervals from 1930 to 1940, with a total recorded production of 3,515 units of WO_3. The mine was purchased by Rare Metals Corporation in 1944, and a little ore was shipped to Toulon.

The M. G. L. mine, then known as the Cowles property, was prospected during World War I, with output in 1918 of 80 tons of ore that yielded 1.28 percent of WO_3[1]. In 1941, the property was sold

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[1] Hess, F. L., and Larsen, E. S., Contact-metamorphic tungsten deposits of the United States: U. S. Geol. Survey Bull. 725-D, pp. 283-285, 1922.

to Arthur Letts, Jr. who operated as the M. C. L. Mining Corporation, built a 100-ton flotation concentrator at the mouth of Cowles Canyon, and in the period 1942-45 made an output of about 25,000 units before the mine was exhausted.

The Alpine mine was worked from 1943 to 1946 by the Rare Metals Corporation. Ore was trucked 40 miles to the corporation's concentrator at Toulon, 14 miles southwest of Lovelock. The total output is unknown, possibly 20,000 to 25,000 units.

Water for either domestic or industrial purposes is scarce in the region. Linton Well, a mile east of the Nightingale mine, provided water for the Nightingale camp, but supplied the mill for short periods only. For the M. C. L. mill, a well was sunk in the basin of Winnemucca Lake. An abundant supply was obtained, but the quality was poor.

The central part of the Nightinagle Range consists of argillaceous and calcareous sedimentary rocks, believed to be of Triassic age, in-

vaded by granodiorite and related intrusive rocks. South and west of the Nightingale mine these rocks are capped by tuff, breccia, and conglomerate of volcanic origin, and by basalt flows. No adequate geologic map has been made of the range, and the reconnaissance map of the central part (fig. 157) is only a rough portrayal of structure and distribution of rocks in the tungsten district. The sedimentary rocks consist largely of slaty shale and argillite with occasional beds of limestone and small amounts of quartzite. The slate and argillite grade into fine-grained schist and siliceous hornfels. The beds are steeply inclined and folded. The thickness of the series is unknown, although it appears to be at least several miles.

Fig. 157. Reconnaissance geologic map of the central part of the Nightingale Range, Nevada.

The contact between granodiorite on the northeast and the sedi-

mentary rocks on the southwest is very irregular in detail, although on a larger scale long stretches are roughly concordant to bedding. In the Cowles Canyon area, many small inclusions of sedimentary rocks are entirely surrounded by granodiorite at distances of several hundred feet from the main contact.

Tactite masses are found at various places along the contact where limestone and granodiorite are in juxtaposition. Even where the favorable limestone beds are present along the contact, tactite is in places lacking or very thin. Only part of the tactite contains scheelite. The ore treated from the M. G. L. and Alpine mines contained 0.5 to 1.0 percent of WO_3. The ore in the Nightingale mine contains less than 0.5 percent.

The Nightingale mine contains the only large ore reserve in the district. The low content of WO_3 and the lack of water for milling are unfavorable factors that have delayed exploitation of the deposits. The ore bodies of the M. G. L. and Alpine mines appear to

be worked out, but it seems likely that other concealed ore bodies are present in the district, particularly between these 2 mines along the irregular contact where ore-bearing inclusions may be capped by granodiorite.

Alpine

The Alpine mine is in the SW¼ sec. 13, T. 25 N., R. 24 E., near the crest of the Nightingale Range and about 2 miles north-northwest from the Nightingale mine. An access road was built to the property in 1943 by the Federal Government.

The mine is at a sharp bend in the granodiorite contact where a salient of limestone and hornfels extends into the granodiorite (fig. 158). On the southeast side of this salient, the granodiorite con-

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Fig. 158. Geologic map and sections of the Alpine mine, Nightingale Range, Pershing County, Nevada.

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tact is vertical and cuts across vertical beds of limestone and hornfels. Scheelite-bearing tactite extends out along the limestone beds

from the contact for distances of 100 to 200 feet. At a vertical depth of a bout 100 feet, the beds are cut off by granodiorite.

The mine is opened by an adit which passes beneath a surface cut 120 feet long, 70 feet wide, and 50 feet deep. A vertical winze was sunk beneath the adit, a level about 185 feet long was turned at a depth of 47 feet, and the ore was stoped above this level. A drill hole showed granite 12 feet beneath the bottom of the winze. The deposit was reportedly exhausted when operations ceased early in 1946. The content of WO_3 in ore mined was about 0.6 percent. Perhaps half the tactite in the deposit contained less than 0.5 percent or was barren, and was not mined.

Nightingale

The Nightingale mine, described by Smith and Guild[1], is in

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[1] Smith, W. C., and Guild, P. W., Tungsten deposits of the Nightingale district, Pershing County, Nevada: U. S. Geol. Survey Bull. 936-B, pp. 39-58, 1942.

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the E½ sec. 25, T. 25 N., R. 2 4 E. The south part of the mine is

opened by the Ranson and Machine Shop adits, 2 glory holes, a vertical shaft 170 feet deep, and a level with about 500 feet of workings, turned from the shaft at a depth of 128 feet. The north workings consist of the Lidstone adit 500 feet north of the shaft and several glory holes. (Figs. 159 and 160.)

Fig. 159. Geologic map of the Nightingale mine area, Pershing County, Nevada.

Fig. 160. Geologic map and projection of the Nightingale mine, Pershing County, Nevada.

At the Nightingale mine, granodiorite cuts at a slight angle across nearly vertical beds of slate and argillite with interbedded limestone. The contact is nearly vertical to depths of at least 350 feet, where it was reached by diamond drill holes. Tactite in tabular bodies 10 to 50 feet thick is found along the contact where limestone is present. Scheelite, which is present in important quantities in only part of the tactite, occurs in the Machine Shop, Ranson, and Lidstone ore shoots, and in a fourth unexplored shoot 250 to 350 feet

north of the Lidstone workings. These shoots are respectively 210, 100, 230, and 100 feet long, and range in width from 7 to 50 feet. Five holes drilled for the U. S. Bureau of Mines in 1939 showed that the 3 shuthern shoots extend at least several hundred feet beneath the surface and appear to be vertical. The content of WO_3 is not accurately known, although available evidence suggests about 0.45 percent.

The tactite is a dark green and brown, medium-grained, heavy rock which owes its color to plentiful epidote and garnet, although quarts is its most abundant mineral. One tactite body consists mainly of hornblende. All the tactite contains much calcite and pyroxene, more or less scheelite, some tremolite, a little pyrrhotite, molybdenite, chalcopyrite, arsenopyrite, and pyrite, and microscopic grains of titanite and apatite. Both the epidote and the garnet are varieties low in iron.

The tactite is layered roughly parallel to bedding in the ori-

ginal limestone. The layers are alternately fine-grained and coarse-grained, and differ in mineral composition, including quantity of scheelite. The tactite layers are cut by many joints that strike east and dip gently south. The scheelite content of the tactite is greater near these joints than it is in the rest of the tactite, resulting in bands of ore that cut across the direction of bedding. Because of this dual control of mineralization by bedding and jointing, bulk sampling is required to give a realistic estimate of the average content of WO_3. The results from channel sampling are very erratic.

Jay Bird (Blue Jay, Garfield-Force) – Washoe County

The Jay Bird claim, formerly known as the Garfield-Force, is in the NW¼ sec. 31, T. 25 N., R. 25 E., about 1 mile south of the Nightingale mine (fig. 157). Some ore was mined in 1938 and again in 1943, when a lessee, E. B. Clemmons, hauled a few hundred tons to his small mill northwest of Wadsworth.

Tactite is present in most of the openings along a contact be-

tween granodiorite and limestone. Exposures are poor, and the contact zone can be seen only in the workings, which consist of 2 adits 30 and 200 feet long, several open cuts, and 3 shallow shafts, distributed over a distance of 1,200 feet. The contact is nearly vertical, and is approximately concordant with the limestone. In the main adit, a tactite layer 4 feet thick appears to contain about 0.25 percent of WO_3. A cut at the north end of the property exposes material of higher grade, possibly 0.5 percent to 1.0 percent.

M. G. L. (Cowles)

The M. G. L. mine, on the north side of Cowles Canyon, is in the SE¼ sec. 15, T. 25 N., R. 24 E. The mill was 2 miles northwest, at the mouth of the canyon (fig. 157).

The mine lies in a contact zone several hundred feet wide and about 750 feet long (fig. 161). The contact is broadly conformable

Fig. 161. Geologic map and sections of the M. G. L. mine area, Nightingale Range, Pershing County, Nevada.

but the contact zone is intricately injected by granodiorite, partially lit-par-lit, resulting in mixed rocks. The central portion of the contact zone consists of a band of limestone about 80 feet wide, partially altered to tactite. The rocks on either side are hornfels or schist, mixed with granodiorite. At depths of a few hundred feet, the granodiorite cuts across the sedimentary rocks and eliminates the favorable limestone beds. In most of the contact zone, bedding, where it is visible, is parallel to bedding in the main mass of sedimentary rocks to the southwest. However, at the south end of the mine, an irregular block of the limestone 120 feet by 80 feet in plan, entirely surrounded by granodiorite at the surface, has been rotated 45°. The block apparently floated as an inclusion in the granodiorite, and not only rotated, but also moved perhaps 100 feet southwesterly.

The M. G. L. mine is opened on 3 levels by adits with combined

lengths of 3,250 feet (fig. 162). The South ore body was mined

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Fig. 162. Geologic and composite maps of underground workings of the M. G. L. mine, Nightingale Range, Pershing County, Nevada.

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through a glory hole 45 feet wide, 120 feet long, and 150 feet deep. The North ore bodies, separated by the Timoshenko fault zone, were mined in part through a small glory hole, in part through underground stopes.

The largest ore body in the mine occupied the south, rotated block. At the surface, this block was surrounded by highly quartzose tactite 5 to 20 feet thick containing 70 to 90 percent of quartz and 10 to 30 percent of epidote, pyroxene, hornblende, and garnet, and small amounts of sulfides. Between this quartzose layer and a central core of marble was a band of scheelite-bearing tactite on the south, west, and north sides of the block. In depth, the scheelite-bearing tactite thickened at the expense of the marble, and on level B, 100 feet beneath the outcrop, the marble was replaced by ore across

the full width. The ore extended about 50 feet deeper where it was cut off by granodiorite. The content of WO_3 in the mineralized tactite was 0.75 to 1.0 percent, although the material milled contained only 0.5 percent because of dilution in mining.

The outcrop of the North ore bodies resembled that of the South ore bodies, and consisted of a rim of tactite 5 feet wide around a block of marble. The area between the North and South ore bodies was covered at the surface, but was shown by underground work to consist of a tongue of granodiorite 200 feet wide. Northwest of the Timoshenko fault, ore was stoped irregularly above and below level B, and from level C to the surface. On levels B and C, tungsten mineralization was also found southeast of the stoped ore body, east of the Timoshenko fault, in a mass of tactite that did not extend to the surface. This tactite, 60 by 120 feet in plan, appears to be in beds formerly continuous with those on the west side of the fault. Scheelite is sparsely disseminated in the mass, but not in sufficient quantity to make ore.

Before the mine was abandoned, an exhaustive search for more ore was made by diamond drilling. This exploration demonstrated the absence of ore bodies that could be mined profitably in 1945.

At several places 0.5 to 1.0 mile east of the M. G. L. mine, on the same group of claims, scheelite is found in small tactite inclusions in granodiorite within a few hundred feet of the main mass of sedimentary rocks. Diamond drilling by the M. G. L. Mining Corporation showed that these inclusions were all shallow and contained only a few hundred tons apiece of commercial ore.

(WESTERN SOLDIER ?)