UNITED STATES
DEPARTMENT OF THE INTERIOR
Geological Survey

LODE SCHEELITE DEPOSITS OF THE NOME AREA SEWARD PENINSULA, ALASKA

By

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INTRODUCTION

The area considered in this report comprises the Nome quadrangle and the southern part of the Grand Central quadrangle. The location is indicated on the index map (Fig. 1).

Nome is the principal distributing point for the Seward Peninsula, and is accessible by water from early June until late October. During the rest of the year the roadsted is icebound and passengers and mail enter and leave Nome by airplane. Most of the creeks in the vicinity on which mining has been done are accessible by automobile road or by the Seward Peninsula Tramway, a narrow-gauge railroad which is maintained by the Alaska Road Commission for public use.

The past production of scheelite from the Nome area has been in a direct relation to the price of tungsten and the activity in the gold-mining industry, because all of the scheelite produced has been a by-product of the gold placer-mining industry, and no deposit yet discovered is sufficiently rich in scheelite to permit mining for that mineral alone. Recovery of appreciable quantities of scheelite from residual and stream placers apparently began in 1916. In that year and during the succeeding two years a total of about 1,800 units of tungstic oxide was produced in the Nome area. Production since 1918 has been negligible.

The most detailed geologic work in this region was done by Moffit 1/ who mentioned the occurrence of scheelite in some of the placer deposits.

Mertie 2/ examined the principal lode deposit of scheelite in 1916, and described 3/ the localities where scheelite was being recovered in the course of placer-mining operations, Cathcart 4/ has recorded further observations on lode scheelite deposits near Nome.

The investigations resulting in this report were carried on during parts of July and August, 1943, by the writer, assisted by William N. Laval. The help

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1/ Moffit, F. H., Geology of the Nome and Grand Central quadrangles, Alaska: U. S. Geol. Survey, Bull. 533, pp. 1-136, 1913.

2/ Mertie, J. B., Jr., Lode mining and prospecting on Seward Peninsula: U. S. Geol. Survey, Bull. 662, pp. 436-437, 1918.

3/ Mertie, J. B., Jr., Placer mining on Seward Peninsula: U. S. Geol. Survey Bull. 662, pp. 456-457, 1918.

4/ Cathcart, S. H., Metalliferous lodes in southern Seward Peninsula: U. S. Geol. Survey Bull. 722, pp. 245-246, 1922.

received from the Alaska Road Commission and the U. S. Engineer Department, both of which made vehicles available for local transportation, is gratefully acknowledged. Numerous other residents of Nome and vicinity contributed to the work by freely sharing with the writer their knowledge of local conditions and mining history.

The purpose of the investigation was the examination of known lode deposits of scheelite in the Nome area, and the search for undiscovered lode deposits in the area in which scheelite is known to occur.

The quantity of scheelite in panned samples of stream gravels was used as an index to the probability of occurrence of lode deposits of scheelite in each drainage basin. Tests of this sort were made in almost every valley containing gravel in which scheelite had been reported. It was not deemed advisable, in the short time and with the meager facilities available, to attempt quantitative determination of the amount of scheelite in the placer deposits. The results of the observations are summarized in a later section of this report. The streams that were examined in the course of this investigation are indicated on Fig. 2. The areas of two larger-scale maps of the more important lode deposits are also outlined on Fig. 20.

The search for scheelite was greatly facilitated by the use of a portable lamp, capable of generating ultra-violet light, the maximum energy output from which has a wave-length of 2,536 A. U. Under this light pure scheelite fluoresces a brilliant bluish white. The color is pale blue in the presence of a small amount of molybdenum and ranges from white to deep yellow as the molybdenum content ranges from 0.5 percent to 5 percent. On the streams where panning showed a fair content of scheelite in the gravel, the lamp was used to examine fragments of quartz in the float, dumps of prospect workings, and the walls of the few accessible underground openings.

GEOLOGY

The host rock of the bedrock deposits of scheelite is a part of the Nome group, as described by Moffit 5/. It includes both limestone and chloritic and feldspathic schists. The scheelite deposits are confined to the schists.

Veins

All of the scheelite that has been found in place is a constituent of, or is closely associated with, small quartz veins. The veins of this area have been studied in some detail by Cathcart 6/ who has classified the veins as older quartz veins, and calcite veins. The younger quartz veins were classified into quartz-veins, quartz-feldspar veins and quartz-albite veins.

5/ Moffit, F. H., op. cit. pp. 27-28.

6/ Cathcart, S. H., op. cit. pp. 173-174.

The small number of places in which scheelite was found in bedrock during the investigation does not permit far-reaching conclusions to be drawn. Scheelite is closely associated with quartz and sulfides including stibnite, pyrite, arsenopyrite, and sphalerite. Quartz and scheelite are later than feldspar, the feldspar in all the specimens examined being nearly pure albite. Albite and dolomite are nearly contemporaneous. The association of scheelite with albite is not uncommon, but apparently is fortuitous.

Lode occurrences of scheelite

Sophie gulch.—This deposit is the best-known lode deposit of scheelite in the Nome area. It is 8 miles north of Nome on the south slope of the Rock Creek valley, about 4,600 feet upstream from the road crossing, and 900 feet from Rock Creek.

The development at this property in 1916, the structure of the lode material and the distribution of the more important minerals were described by Mertie 7/. A further description was given by Cathcart 8/.

The workings are now included in claims held by the U. S. Smelting, Refining and Mining Co. The hydraulic pit mentioned in the earlier descriptions lay idle for many years; it is the long excavation shown at the bottom of Fig. 3. During the fall of 1942 and the early summer of 1943, three bulldozer cuts were made in the north side of the hydraulic pit, to disclose the distribution of the scheelite. Mineralized material from these cuts was sluiced to determine possible recovery of scheelite. It is understood that, although the amount of scheelite recovered would be regarded as considerable in a placer mining operation, it was far below the economic limits for a lode mining operation.

Numerous quartz veins which are indicated in Figure 3 are exposed by the bulldozer cuts. Scheelite grains were visible near and in some of the small quartz veinlets exposed in the second and third bulldozer cuts from the southwest. The bottom of the hydraulic pit is obscured by mud. Northwest of the hydraulic pit several small pits or shafts that are now inaccessible, have been opened on small quartz veins. No scheelite was found on the dumps of any of the shafts. However, just north of the east end of the hydraulic pit a small piece of albite float rock was found on the surface. This specimen contained a high percentage of scheelite; other fragments of albite rock found nearby appeared similar but were barren of scheelite.

The depth of softened and residually weathered rock at the Sophie Gulch prospect ranges from 3 or 4 feet up to 15 feet. It apparently is greater where the rock had a high content of sulfides, most of which are now oxidized to red hematitic material. The weathered rock was soft enough to be mined cheaply by hydraulic methods. The unweathered rock is too poor in scheelite to pay the costs of mining and milling. Only a very small amount of residual material, containing a few pounds of scheelite per cubic yard, is available here.

7/ Mertie, J. B., Jr., op. cit. (Lode mining) p. 436.

8/ Cathcart, S. H., op. cit., p. 246.

Rocky Mountain Creek

Rocky Mountain Creek is a small stream which is tributary to the Nome River from the east, about 19 miles north of Nome. Its location is shown by an insert on Figure E, which indicates the position of the area covered by Figure 4. About one half mile south of Rocky Mountain Creek is a smaller stream, sometimes referred to locally as Nelson Creek. Some desultory placer gold mining has been done on both creeks. It has been known locally for several years that considerable scheelite is present in the placer concentrates. The samples of creek gravel panned by the Geological Survey geologists had a scheelite content as great as that which was found in the gravels of any other creek examined in the Nome area.

Scheelite had been reported in a small adit, driven on a thick quartz vein that crops out on the south side of the north fork of Rocky Mountain Creek, about 100 feet from the creek, and at an elevation of approximately 850 feet but no scheelite was found in this vein.

However, scheelite was seen in place on the north fork of Rocky Mountain Creek, about 500 feet north of the principal forks of the creek, and at an elevation of about 550 feet. A vein of albite with later quartz and scheelite crops out in the west bank of the creek, just above water level. The vein ranges in thickness from 1½ inches to 2 inches, and is traceable for about 18 feet. Its total length is probably not much more. Similar veinlets may be present nearby, as coarse scheelite-bearing float is peintiful in the creek bed below this point.

The scheelite content of the vein where exposed was estimated to average about 3 per cent by volume.

The general trend of the vein is N. 20° E., and the dip is 47° W. The vein cuts both the schistosity of the bedrock and a milky quartz vein which lies in the plane of the schistosity.

South of Rocky Mountain Creek, at least as far as Nelson Creek, an abrupt scarp forms the boundary between the hills and the gently sloping bottom of the Nome River valley. Float of vein material containing scheelite is sparsely distributed in small fragments at numerous places along this scarp, but none was found above an elevation of 700 feet, or 100 to 200 feet above the base of the scarp.

Just west of the point where the two principal forks of Nelson Creek unite, at the base of the scarp, much quartz-vein material carrying scheelite may be traced southeastward up the slope to the top of a small knoll. The average scheelite content of the float material appears to be less than 1 percent by volume. The maximum thickness of the vein shown by the pieces of float is about one and one half feet. No scheelite was found in Nelson Creek above the point where this train of float reaches the creek, nor could similar float be found south of the top of the knoll. The general distribution of scheelite-bearing float is shown in Figure 4.

It is probable that a zone of scheelite-bearing veins follows the hill front at least from a point a few hundred feet south of Nelson Creek to the vein outcrop on Rocky Mountain Creek. Much more prospecting would be required to determine whether a minable vein of scheelite exists in this zone. No special search for gold was made in the scheelite vein material, and no gold was recognized.

Another locality where lode scheelite has been reported is the Boulder lode, which is opened by a short drift on the south bank of Boulder Creek, about a thousand feet west of the mouth of Twin Mountain Creek 9/. A search underground, during which the ultraviolet lamp was used, disclosed no scheelite.

Scheelite has been recovered by placer mining methods from the Lynx claims on Glacier Creek, from a bench claim on Twin Mountain Creek, and from a lode on the Glacier Creek-Rock Creek divide 10/. None of these occurrences were identified in the course of this investigation.

Scheelite has also been reported in a quartz vein at the head of Mountain Creek 11/. This occurrence was looked for in the course of this investigation but was not found.

Placer deposits of scheelite

Although the intensive study of placer deposits of scheelite was not undertaken as part of the investigations, some information regarding placer occurrences was obtained incidental to them. Samples were taken from the most convenient places, not all of which were near bedrock. The results should be considered as indicating only roughly the scheelite content of the gravel on the creeks investigated. No attempt was made to estimate the gold content of the gravel or the total volume of minable gravel remaining. Gold is even more widespread than scheelite in the stream gravels of this area, and in most places the value of the gold in the gravel is greater than the value of the scheelite. On many of the creeks mentioned little or no mineable ground remains.

Scheelite has been produced, according to Mertie, 12/ from Glacier Creek and Rock Creek. Some production of scheelite from Snow Gulch has also been reported.

9/ Mertie, J. B., Jr., op. cit. (Lode Mining), p. 428.

10/ Mertie, J. B. Jr., Placer Mining on Seward Peninsula: U. S. Geol. Survey, Bull. 662, p. 457, 1918.

11/ Mertie, J. B., Jr., Lode mining and prospecting on Seward Peninsula: U. S. Geol. Survey, Bull. 662, p. 435, 1918

12/ Mertie, J. B. Jr., op. cit. (Placer mining) p. 457.

In the following table the valleys of the area that were examined in the course of this investigation are listed according to the geologists' estimate of the scheelite content at the place where the examination was made. "No scheelite" indicates that none was found in the sample tested. "Negligible scheelite" indicates that the amount of scheelite is thought to be too small to make its recovery worthwhile from a commercial point of view, even in connection with a gold-mining operation. "Possibly important scheelite" indicates that the quantity of scheelite was sufficiently great to suggest that its recovery might be worthwhile in connection with a gold mining operation. The rate of recovery of scheelite would depend on the scale of the operation as well as on the scheelite content of the gravel. It is believed that the ultimate amount that may be recovered from the deposits on any creek is not likely to be more than a few tens of tons of scheelite.

No Scheelite	Negligible Scheelite	Possibly Important Scheelite
Nellie Gulch	Mountain Creek	Snow Gulch
Alpha Creek	Mary Gulch	Glacier Creek
Sledge Creek	Lindblom	Rock Creek
Boulder Creek, above Twin Mt. Cr.	Balto Creek	Seattle Creek
Divining Creek	Boulder Creek, below Twin Mt. Creek	Nelson Creek
Bangor Creek, above Butterfield Canyon		Rocky Mountain Creek
Jorosa Creek	Twin Mt. Creek	
Dewey Creek	Bangor Creek, below Butterfield Canyon	
Christian Creek	Butterfield Canyon	
	Basin Creek	
	Hazel Gulch	
	Last Chance Creek	
	Dorothy Creek	

The streams are listed in order from south to north.

CONCLUSIONS

The reserves of placer scheelite in the Nome area are small. The known lode deposits are too small and too low-grade for profitable development, and do not appear likely to contribute significantly to the national tungsten supply.

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WAR MINERALS INVESTIGATIONS
PRELIMINARY MAP

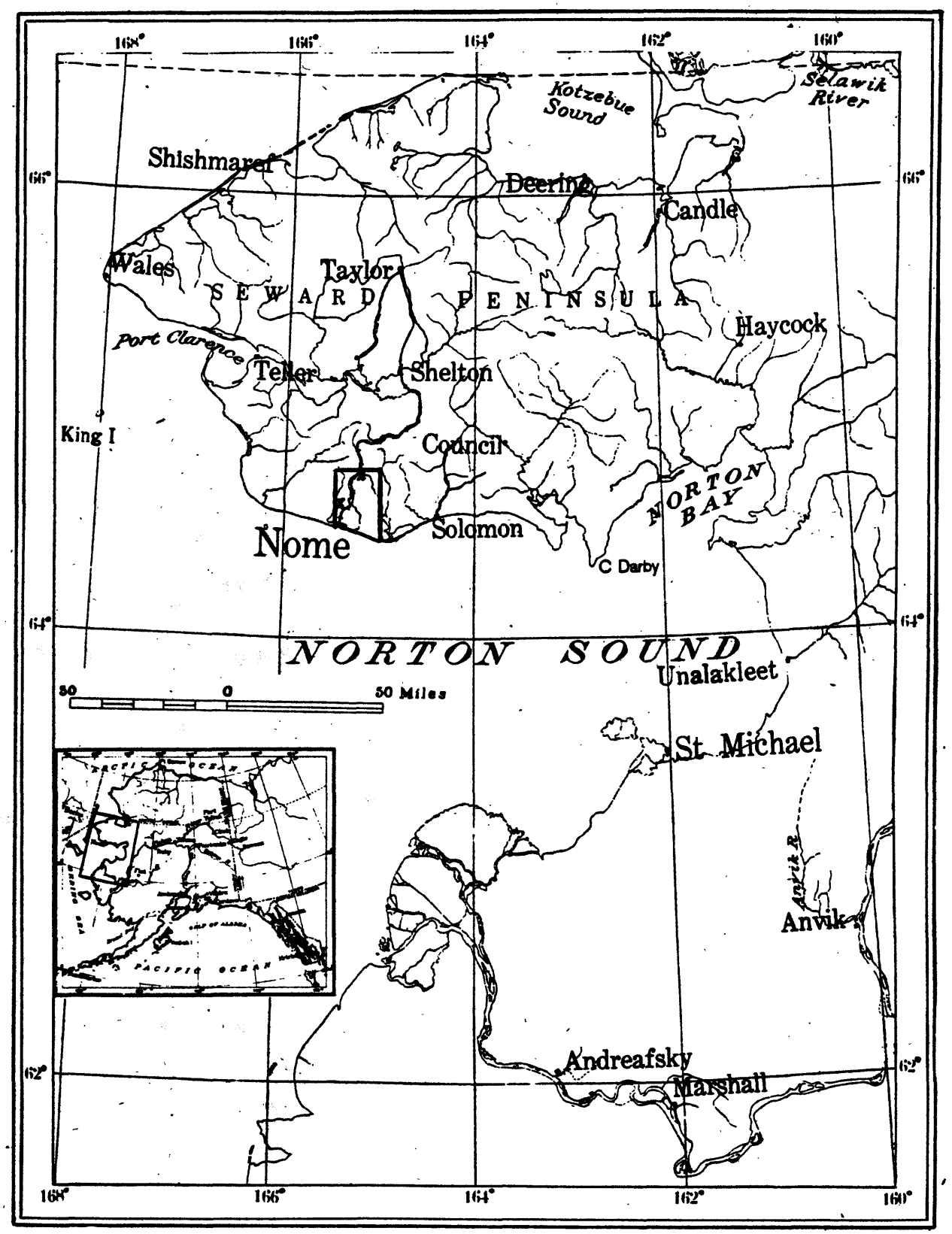

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Figure 1

Index map, showing location of Nome area and principal lode scheelite deposits.

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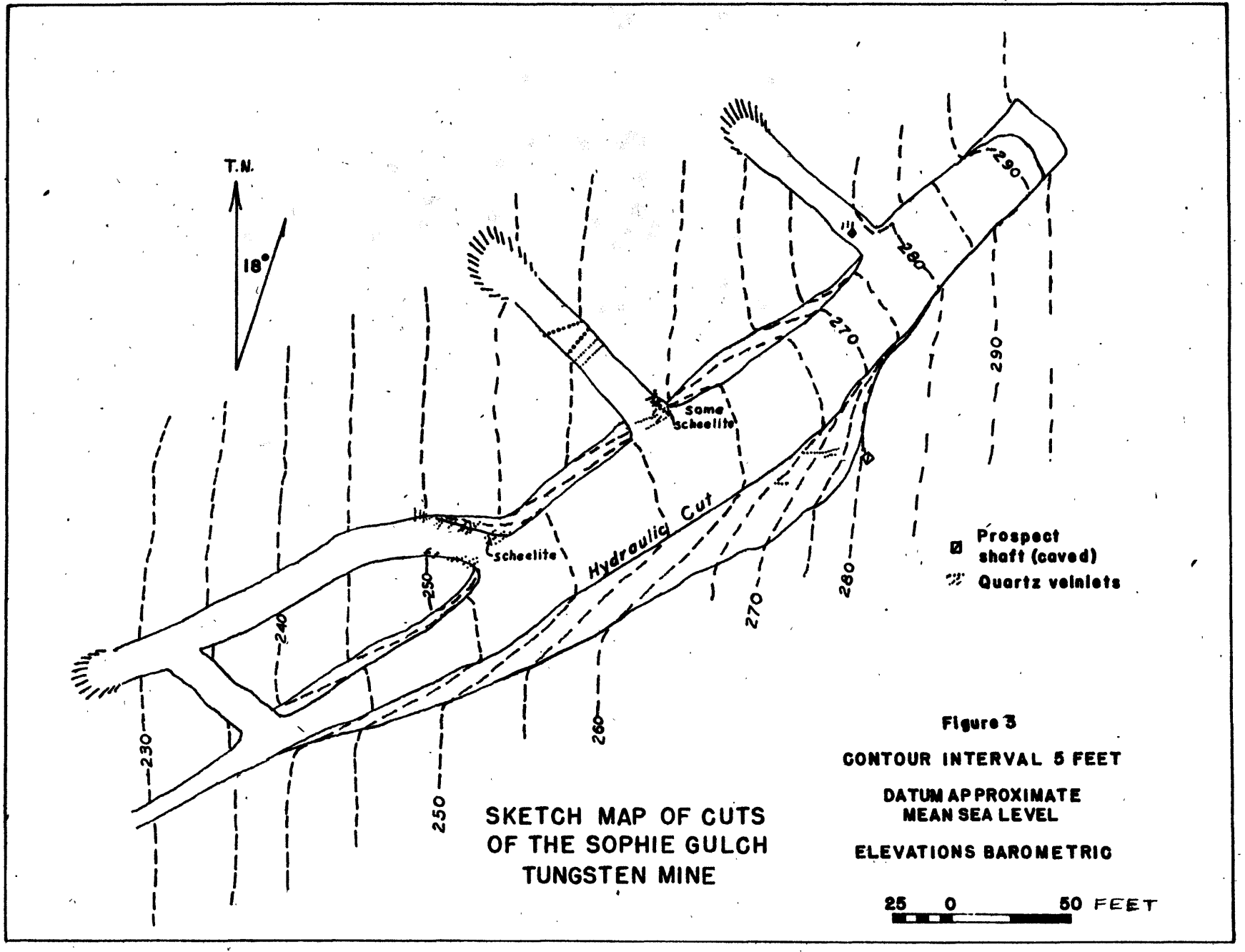
WAR MINERALS INVESTIGATIONS
PRELIMINARY MAP



SKETCH MAP OF CUTS
OF THE SOPHIE GULCH
TUNGSTEN MINE

Figure 3

CONTOUR INTERVAL 5 FEET

DATUM APPROXIMATE
MEAN SEA LEVEL

ELEVATIONS BAROMETRIC

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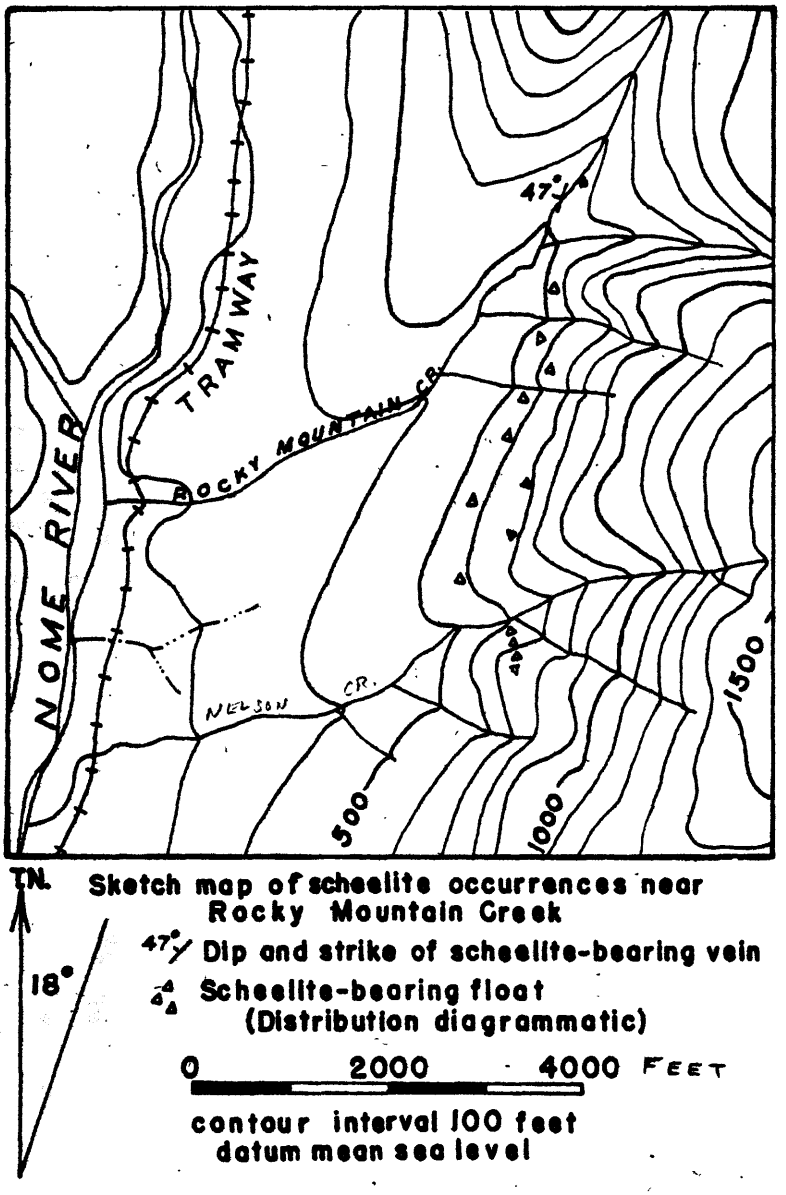
WAR MINERALS INVESTIGATIONS
PRELIMINARY MAP

Figure 4



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WAR MINERALS INVESTIGATIONS
PRELIMINARY MAP

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Figure 2

MAP OF THE NOME AREA,
SHOWING LOCATION OF STREAMS FROM PLACERS OF WHICH SCHEELITE HAS BEEN REPORTED
AND AREAS OF KNOWN LODE SCHEELITE DEPOSITS

MILES

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