WYOMING STATE GEOLOGICAL SURVEY

JADE, JASPER, AND RUBIES IN THE TIN CUP DISTRICT, WESTERN GRANITE MOUNTAINS, CENTRAL WYOMING

by

W. Dan Hausel
Senior Economic Geologist
Wyoming State Geological Survey
Box 3008, University Station
Laramie, Wyoming 82071

MINERAL REPORT MR96-2

Laramie, Wyoming
1996

WYOMING STATE GEOLOGICAL SURVEY
MINERAL REPORT MR96-2

Jade, Jasper, and Rubies in the Tin Cup district, western Granite Mountains, central Wyoming

by

W. Dan Hausel
Senior Economic Geologist
Wyoming State Geological Survey
Box 3008, University Station
Laramie, WY 82071
(307/766-2286)

The Tin Cup district forms a small historical mining district along the western end of the Granite Mountains in central Wyoming. The nearest town is Jeffrey City located about eight miles to the southeast of the district along highway 287. Jeffrey City was established as a company town by Western Nuclear during the height of the uranium boom a few decades ago, and lies immediately north of the Crooks Gap-Green Mountain uranium district. After the uranium market crashed in the early 1980s, Jeffrey City nearly became a ghost town. But in the past year, the town has seen some resurgence due to reclamation projects in the area, and to the recent interest in the district's uranium reserves by Kennecott. Last summer, the city's two gas stations, two bars, two cafes, and motel reopened after a several year hiatus.

From Jeffrey City, the Tin Cup district is accessible by driving west along 287 to the Graham Ranch road, or by driving north from Jeffrey City and taking an unimproved road west near the old Western Nuclear mill. Either direction requires four wheel drive or a good pickup to get into the district.

The district is underlain by amphibolite-grade metamorphosed Archean (>2.5 billion years old) gneiss, schist and amphibolite that has been intruded by granite. In fact some age dates in the Granite Mountains indicate some of the gneiss in the region is very old and date as old as 3.2 billion years.

In the northern portion of the district, I mapped three prominent faults (see map), with a total strike length of nearly 7 miles while I was searching for gold and copper. All three faults have several prospect pits along their length, and the southernmost structure also has a couple of historical mines known as the Red Boy mine located at site 15, and Sutherland mine to the southwest. The remains of a mill foundation were found near the Sutherland shaft.

In 1994, the Wyoming State Geological Survey began field investigations in the Tin Cup district. Prior to 1994, no detailed study on the district was available, although some previous work had been completed by Love (1970) who provided an excellent

overview on the mineralization and geology of the area, and by Beeler (1907) who described some of the mines and mineralization in the district.

Henry Beeler wrote a glowing report on the district's potential for gold and copper. According to Beeler, mineralized samples were found in the district that assayed from 0.08 ounce per ton gold to greater than 5.0 ounces per ton gold. It was also reported that some banded jaspers (jasperoids) assayed 0.14 ounce per ton gold, and some prospects yielded samples with as much as 15% copper. Additionally, the Prospectus of the Emigrant Mining Company, published on June 12, 1938, supported Beeler's work and reported ore from the Sutherland mine south of Tin Cup Mountain assayed 0.04 to 0.46 ounce per ton gold. The prospectus also claimed that samples taken at the bottom of the shaft assayed 0.4 ounce per ton gold and 23 ounces per ton silver.

After reviewing the available literature, I was under the impression I was in for some interesting discoveries, as the district had remained relatively unexplored for gold for the past 50 years. However, when I received the laboratory reports on the samples I had collected in the district, they did not support Beeler's earlier reports (see Table 1). Instead, the gold content of the all of the samples collected was essentially nonexistent and ranged from <5 parts per billion to a high of only 10 parts per billion. Based on other work I had done in similar districts in the past several years (see Hausel, 1989), these gold values were below crustal abundance. The copper values from some of the samples were a little more interesting ranging from 146 parts per million to more than 2.0%, although the available copper in the district is very restricted. Overall, based on my samples, the district does not have any potential for commercial metal deposits. This was quite a surprise, as some of the samples I sent to the laboratory included brecciated jasperoids, massive sulfides, banded jasperoids, and copper-stained schists and looked like good candidates for precious metals.

But instead of containing valuable metals, the district is a rock-hound's paradise. Numerous samples of massive jasper, banded agate, jade, rubies, lapidary materials and some massive pyrite were found during my investigation of the Tin Cup region.

Sutherland-Red Boy mines: The Sutherland shaft was sunk in a gossan and intersected massive pyrite at a shallow depth. Samples of the massive pyrite and banded gneiss with stratiform pyrite were collected from the mine dump (samples 9, 10, 31, Figure 1). Another sample (sample 17) of jasperized breccia was collected from an adit driven on the same structure to the northeast of the shaft. These samples (see Table 1) contained no detectable gold. Only one sample along this structure (sample 19) contained trace amounts silver (0.1 ounce per ton) and 1.71% copper. The sample was a copper-stained jasper with minor amounts of malachite, azurite, tenorite with a trace of chalcocite.

Jasperoids: To the north of the Red Boy-Sutherland structure, jasperoids were also found in the two parallel faults. Red jaspers with jasperoid breccias and grey, banded, isoclinally folded jasperoids were found along these two structures. A sample of massive jasper with jasperoid breccia (sample 29) contained no detectable gold or silver. But beautiful specimens of red jasper and grey and white banded jasperoid were found in several of the prospects along the three faults (Figure 1) which produce exquisite pieces of polished rock. In particular, beautiful specimens of folded jasperoid and red to butterscotch jasper were collected at sites 41 and 43.

Gemstones: Gemstones and lapidary materials offer the greatest potential in the district. A ruby gneiss was traced along strike for 4,000 feet with widths of 20 to 50 feet in the southern portion of the district (locality 45). This gneiss contains common ruby

porphyroblasts (metamorphic crystals) and fuchsite pseudomorphs (replacement crystals) after ruby. The rubies have a slight purple coloration possibly due to the presence of trace chromium. The stones range from 2 inches across to millimeter size. And although the great majority of the stones collected were of poor quality, some stones of gem character were found. In particular, my son, Eric J. Hausel, found a beautiful, gem quality ruby.

The ruby gneiss is a grey quartzofeldspathic gneiss. It continues south where the metamorphic grade decreases and the gneiss grades into chloritic schist. The schist also contains ruby porphyroblasts.

Several jade prospects also occur in the area. At locality 34, some bleached leucogranite with slight purple coloration was found in a worked-out jade prospect. The rock has a pleasing color and produces an attractive lapidary stone. X-ray diffraction analysis of the aphanitic (very fine grained) purple material in the rock resulted in a match with lepidolite, a lithium-bearing mica. At locality 46, jade was uncommon, however, some samples of nephrite jade were recovered that contained nephrite pseudomorphs after hexagonal quartz. In other words, the jade replaced the former quartz crystals. Some of the other jade prospects in the area contain common narrow veins and veinlets of nephrite jade, that are known as slicks.

In addition to jade and rubies, some small white sapphires have recently been found in the area by Robert Odell, a geologist from Casper. Near locality 23 and 45 (Figure 1), samples of serpentinite and tremolite schist are found.

In summary, this area of the Granite Mountains contains some very interesting geology, rocks, and minerals. There are reports of rubies and sapphires being found elsewhere in the region, and some spectacular specimens of jade have been found in the past. Much of the land is public land, but access requires entry through some local ranches. If you decide to prospect in the area, please be considerate to the ranchers, as they were there first, and please close any gates you open. If you find any interesting specimens you would like to have identified, feel free to contact me at the Wyoming Geological Survey address. I am also available to speak to various rock hound club groups and business meetings.

References

Beeler, H.C., 1907, Prospecting in the Black Rock-Long Creek vicinity near the Sweetwater River, Fremont County, Wyoming: Office of the State Geologist miscellaneous printed report, Cheyenne, Wyoming, 12 p.

Hausel, W.D., 1989, The geology of Wyoming's precious metal lode and placer deposits: Wyoming Geological Survey Bulletin 68, 287 p.

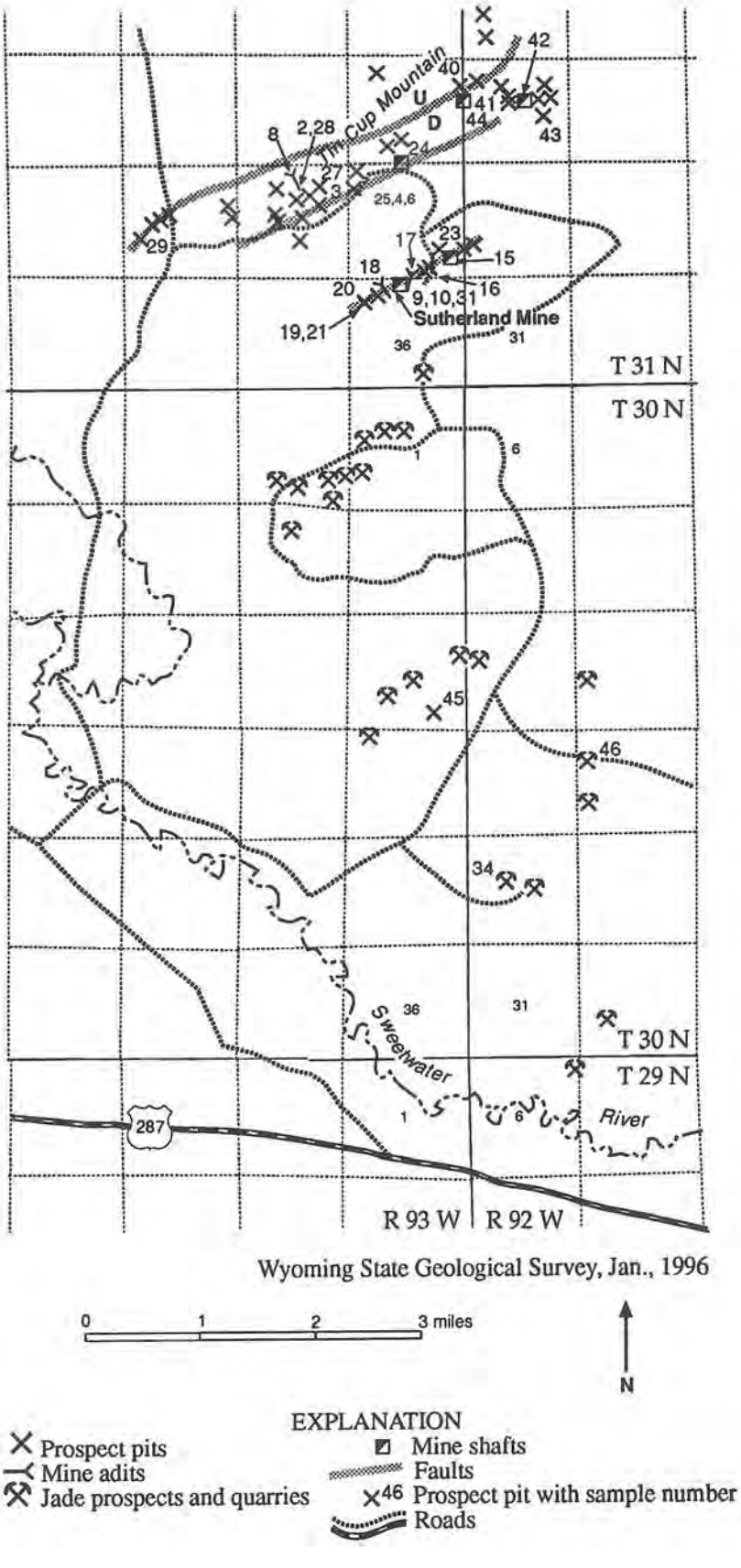
Love, J.D., 1970, Cenozoic geology of the Granite Mountains area, central Wyoming: U.S. Geological Survey Professional Paper 495C, 154 p.

Figure 1. Schematic sample location map of the Tin Cup district, western Granite Mountains.

Table 1. Samples collected in the Tin Cup district (see map for location)(*ppb=parts per billion; **ppm=parts per million).

No.	Au (ppb*)	Ag (ppm**)	Cu (ppm)	Pb (ppm)	Zn (ppm)	Mo (ppm)	As (ppm)	Sb (ppm)	Hg (ppm)
1	<5	0.9	1128	4	20	14	108	1.0	<0.010
2	<5	<0.2	>20000	87	57	7	78.0	0.6	<0.010
3	10	<0.2	2116	7	198	6	103.0	3.5	0.027
4	<5	<0.2	392	<2	27	5	20.0	1.6	<0.010
6	<5	<0.2	188	551	253	6	342.0	14.0	0.351
8	9	<0.2	-	-	-	-	-	-	-
9	<5	<0.2	258	13	27	13	496	<5	0.048
10	<5	<0.2	276	13	15	17	165	<5	0.016
16	<5	<0.2	-	-	-	-	-	-	-
17	<5	<0.2	-	-	-	-	-	-	-
18	<5	<0.2	-	-	-	-	-	-	-
19	7	3.6	17121	10	74	-	-	-	-
21	<5	<0.2	-	-	-	-	-	-	-
24	<5	<0.2	146	6	3	-	-	-	-
25	<5	<0.2	-	-	-	-	-	-	-
27	<5	0.5	4781	18	57	-	-	-	-
28	<5	<0.2	2889	23	35	-	-	-	-
29	<5	<0.2	-	-	-	-	-	-	-
31	<5	<0.2	461	23	25	116	190	<5	0.033
40	<5	<0.2	-	-	-	-	-	-	-
41	<5	<0.2	1258	43	694	11	86	<5	<0.010
42	<5	<0.2	2246	26	336	38	65	9	0.016
43	10	<0.2	577	28	154	16	69	<5	<0.010
44	<5	<0.2	-	-	-	-	-	-	-

No.	Au (ppb)	Ag (ppm)	Pt (ppb)	Pd (ppb)	Ni (ppm)	Cr (ppm)
15	2	<0.1	<5	<1	39	220
20	4	0.3	<5	2	417	704
23	-	-	-	-	411	1463


Tim Cup Mountain
U
D
42
40
41
44
43
8
2,28
24
27
3
25,4,6
29
17
23
15
18
16
20
9,10,31
Sutherland Mine
19,21
36
31
T 31 N
T 30 N
1
6
45
46
34
36
31
T 30 N
T 29 N
Sweetwater
River
1
6
287
R 93 W
R 92 W
Wyoming State Geological Survey, Jan., 1996
0
1
2
3 miles
N
EXPLANATION
Prospect pits
Mine adits
Jade prospects and quarries
Mine shafts
Faults
46 Prospect pit with sample number
Roads