Ruby Q

Heavy Metals Program
Situation Report
February 1967

GOLD PLACERS OF THE RUBY DISTRICT

Yukon River Region, Alaska

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Location

Ruby, a small village situated on the banks of the Yukon River and 125 miles south of the Arctic Circle, is no jewel. From May to September, it has dense clouds of enormous mosquitoes; a continuous oversupply of large, hungry, suspicious, and surly sled dogs who are ever alert to the possibilities of making a warm meal of most anything they can catch, including each other, uncautious strangers, or even cautious strangers; a congregation of log cabins and frame buildings casually connected by paths and narrow dirt streets; virtually no economy; no running water except in the streams; no plumbing; no summer; a short spring and fall; a long winter with temperatures of 60° below zero not uncommon; outdoor privies and indoor buckets. It is usually flooded and flushed in the spring by the Yukon River.

It has dwindled in population from about 1,000 in 1912 to its present 200 or less, but is the chief settlement, port of entry, and distribution point for the Ruby mining area which extends southward from the village about 20 miles wide and 50 miles long. Most of the placer mines start 25 miles south of Ruby and are on tributaries of the Nowitna River.

The Yukon River, airstrips suitable for small planes at Ruby and Long in the center, and Poorman on the south, and an unimproved dirt road extending some 30 miles southward from the village are the means of access to and through the mining area. Ruby is 125 air miles north of McGrath and 280 air miles west of Fairbanks. Large river barges bring supplies from Fairbanks and Nenana, both of which make connections with the Alaska Railroad, via the Tanana and Yukon Rivers. It is approximately 375 river miles from Fairbanks and 75 river miles from Nenana. Fairbanks is also on the Alaska Highway.

The area, actually the northeast end of the Kaiyuh Mountains, has a gently rolling topography; most of the ridges are about 1,000 feet in elevation and Yuki Mountain with an altitude of 2,149 feet is the highest point. The elevation of the Yukon River at Ruby is about 150 feet and the elevation of the streambeds at the southern end of the area is about 500 feet. The small streams are often of considerable length and singularly free from laterals.

The annual rainfall is between 10 and 20 inches. Despite this low precipitation, the small streams often have a considerable and even waterflow because of the thick moss which acts as a reservoir and the permafrost allows most of the rainfall to escape as surface water. Permafrost covers most of the area, but some of the more permeable gravels have been found to be thawed.

There is a scant growth of spruce and scattered tamarack and alder. Some trees along the streams are 1 to 2 feet in diameter. Thick moss makes foot travel difficult.

History

The placer gold discovered in 1907 on Ruby Creek near the site of the present village has more historical than economic importance, for only about 100 ounces of gold were produced from this prospect, and not until 1910 was the first discovery of economic importance made on Long Creek about 25 miles south of Ruby. This led to the settlement of the present village and in the next 10 years prospectors discovered gold on about 40 creeks in an area about 20 miles wide and 50 miles long. Probably 25 of these creeks were mined, but the greater percentage of gold produced came from Long, Greenstone, and Poorman Creeks or their tributaries. A dredge was installed on Greenstone Creek in the winter of 1915-16 and operated until the winter of 1917. It was dismantled in about 1920. Production from this dredge in 1917 was 15,000 ounces of gold and 2,000 ounces of silver from 715,000 square feet of bedrock. The average depth of cover was reported to be 10 feet.

Production figures for the area from 1912 to 1965 are given in table 1. These show over 391,000 ounces of gold mined during the period, but probably do not include the considerable nuggets and coarse gold suitable for jewelry. Complete silver records are not available until 1955, but partial records of various creeks indicate that about one ounce of silver was produced for every 7 ounces of gold.

At times, over 40 different mines were operating during the years 1913-17. Most were probably small operations worked by several men using hand methods. Present operations consist of two, one on Long Creek and one on Greenstone Creek. Both are small hydraulic operations using tractors and draglines.

It is undoubtedly true that many Alaskan mining camps in the early days of mining had their troubles with lawlessness, shootings, and individuals who may have been a little difficult to deal or reason with, but old stories and tales indicate that Ruby had at least its share of trouble and maybe a little more. This may have had an adverse influence on the prospecting and mining. It is known to the writer that at least one reputable mining company ceased drilling operations, which were showing promising results, because of difficulty in coming to an agreement with local owners.

Geology

The geology is summarized from the Geological Survey bulletins listed in the bibliography. Outcrop exposures in the Ruby area are rare, but bedrock is mostly comprised of metamorphic rocks, probably of Paleozoic age and older, mostly of sedimentary origin, but including some igneous members. Schists, slates, limestones, cherts, and greenstones are the usual rocks. Numerous quartz veins cut the bedrock and considerable folding and faulting is evident. Unaltered shale, sandstone, and conglomerate, probably of Cretaceous age, occur north of the Yukon River opposite Ruby.

The igneous rocks are usually old, altered basics, and some unaltered coarse granular Cretaceous granite. Quartz veins are common in the metamorphic rocks, and some have been found over 15 feet wide and are the source of the gold. Hematite and arsenopyrite also occur and are reported to contain gold.

Mines

The gold placers in the Ruby area were probably formed by ancient streams and not by the streams that now occupy these valleys. In this they differ from the gold placers at Flat, Cripple Creek Mountain, and Ophir, other well-known mining areas in this general region. The gold-bearing gravels, lying on bedrock and covered by silt, are to one side or the other of the present stream channels and usually in irregular, deep, discontinuous bodies of gravel rather than in continuous pay streaks. They are not true bench placers because the bedrock surface below the placers is often lower than the bedrock surface below the present streams. At Poorman, for example, it was 35 feet from the bedrock below the pay gravels to the present streambed that drained the area. This lack of bedrock drain and the consequent expense of lifting of material to the present streambed contributed materially to the cost of this operation and was one factor in its failure to operate on an economical basis; the gold was there. In varying degrees, this drainage problem is probably true over a large part of this area. It may have influenced the abandonment of some prospects and discouraged further prospecting on some streams.

Overburden is generally great, often 50 to 100 feet, and probably as much as 200 feet, though some mines had good gold values with less than 10 feet of overburden. Old reports mention one prospect hole sunk over 350 feet without reaching bedrock, but which did disclose an unknown thickness of white quartz gravel. Local and unverified reports indicate that other prospect holes have had to go 200 feet to bedrock with gold present but too deep to mine economically.

Much of the early mining was by underground drifts. Placer cuts have exposed old log cribbed shafts to bedrock and up which the gold-bearing gravels were hoisted to the surface and then washed for their gold content. Permafrost, where present, simplified underground timbering and probably, as revealed by recent placer cuts, often made it unnecessary in both shafts and drifts. Where permafrost was not present or when the permeable gravels were thawed, water and the necessity of timbering must have severely curtailed mining operations as much of this work was done by hand with the minimum of equipment. The depth of overburden, often the lack of a bedrock drain, and the lack of equipment prevented or discouraged stripping or open cut methods. These conditions and factors may have resulted in negative reports by some prospectors even though gold was present. Years ago, Birch Creek was drilled by a mining company interested in the area; the results were apparently encouraging enough that the company wanted

N.E. of Long

to continue and extend the drilling program. Exorbitant demands by the owners decided the company to suspend operations and leave the area.

At Poorman, mentioned earlier, open pit operations over an area that had been previously mined by underground drifting failed, despite the operator's statement that, while previous underground drifting was more extensive than they suspected, the gold values remaining were as good or better than expected. The reasons given for the failure were: (1) lack of financing, and (2) lack of proper equipment. Financing was such that at times fuel oil was being flown in by small planes in 100-gallon lots from McGrath at a cost of about $1 a gallon. This was in comparison to about 25 cents via river barge. Three large tractors, 5 water pumps, and 3 vehicles were all being used at the time. A season's stripping and thawing could not be financed; in other words, the ground had to be cleared, the overburden (about 50 feet) removed, and the gravel washed all in the same season. This required the extensive use of rippers mounted on tractors to remove the frozen overburden and gravels. If the ground could have been cleared and weather and water used to help thaw for a season before mining, it would have meant a substantial reduction in costs. The rippers were front end rippers and mounted on tractors too small for this type of work. One larger size tractor with a rear end ripper would have done the same work as these three at a much lower cost. The operators realized this too late. Twenty miles of water ditch supplied the water for this operation. Over 10,000 ounces of gold were produced in four years.

Data on gold values on various creeks is scarce and usually incomplete; however, in 1922 the Annual Report of the Alaska Mine Inspector gives average values of $0.75 to $1.25 per square foot of bedrock for about five creeks. Unconfirmed reports and verbal statements from miners and prospectors indicate that considerable ground carried $1 to $3 per square foot and $5 to $15 per cubic yard in the gold-bearing gravels. Data available on 11 creeks mined in 1917 give gold values varying from $1.50 to $16.70 per square foot of bedrock, with most between $2.50 and $3.00. The average cover was not given, but it was probably at least 40 feet. The thickness of the gold-bearing gravels was about 4 feet. These creeks were scattered from Long Creek to Poorman Creek, a distance of about 25 miles. One, Greenstone Creek, had a dredge operation which averaged $0.73 per square foot of bedrock. A small operation, probably an underground drift, on the same creek that year averaged $3.00 per square foot of bedrock. The reported thickness of gold-bearing gravels in the dredge operation was 10 feet, in the small operation, 2.5 feet.

Placer cassiterite has been found in many of the gold mines, but not all, and small shipments have been made. One such shipment of approximately 1,000 pounds assayed slightly over 50 percent tin; however, not enough has been found to pay to mine except as a byproduct of the gold operations. Previous investigations made of the tin in the Ruby area have not located a bedrock source, but the angular shape and sharp edges of the cassiterite nuggets indicates the mineral has not traveled far. Most of the cassiterite nuggets are seldom over 3/4-inch in size but a few nuggets estimated to

weigh approximately 10-15 pounds have been reported. Data is not available for an accurate estimate of the amount of cassiterite; however, from field observance and reports from miners, it probably will average, when present, not over 0.02 pounds cassiterite per square foot of bedrock.

Small amounts of placer cinnabar have been found in some of the gold-bearing gravels. It is not of economic importance.

Lead-silver-bearing gossans at Beaver Creek, about 14 miles south of Ruby, have been examined by the Bureau and the Geological Survey; they are not of economic importance at present. Similar lead-silver prospects are near Calena about 40 miles away.

Conclusions

Placer gold has been found on many streams over an area 50 miles long and 20 miles wide. Deep overburden, unfavorable climate, permafrost, and high costs in general were some of the factors which have discouraged many miners and prospectors in this area and may have decided many to abandon or not even mention some gold-bearing prospects. The writer feels it has a potential as a major gold producer and past production is a minor portion of what is left. It is thought that there is still a large amount of placer gravel left that will average over $0.50 per square foot of bedrock. If mined, modern equipment, financing, and reasonable royalties would be necessary. Under such conditions, small operators might compete to an advantage over much larger scale operations. Before anything develops, an exploration program to evaluate the area should be done. Such a program, which the Bureau might do, could follow along these steps:

1. A contour of the bedrock, including the depth of overburden.

2. Location of gravels and their depth.

3. Determination of gold values in these gravels.

4. Study of mining methods and equipment best suited for the environmental and physical conditions present in Alaska with the thought of adapting equipment and methods to these conditions and not vice versa.

Geophysical or other methods might have to be devised to determine the extent and size of the gravel beds and a quicker and cheaper method of drilling to determine the gold values might have to be developed. Most of this is beyond the reach of many mining companies and certainly the individual prospector and miner. It is a situation where the Bureau might be able to help.

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TABLE 1. - Gold production, Ruby, Alaska

Year	Ounces gold	Ounces silver
1912	8,224	-
1913	37,973	-
1914	48,379	-
1915	33,865	-
1916	31,122	-
1917	42,816	-
1918	19,352	-
1919	7,933	-
1920	8,224	-
1921	8,224	-
1922	5,951	-
1923	3,483	-
1924	4,093	-
1925	1,930	-
1926	1,742	-
1927	2,526	-
1928	135	-
1929	1,742	-
1930	1,363	-
1931	3,693	-
1932	4,529	-
1933	441	-
1934	2,385	-
1935	2,561	-
1936	1,495	-
1937	7,400	-
1938	8,253	-
1939	6,957	-
1940	8,108	-
1941	9,785	-
1942	5,852	-
1943	234	-
1944	240	-
1945	117	-
1946	2,181	-
1947	3,535	-
1948	2,776	-
1949	3,758	-
1950	3,765	-
1951	2,236	-
1952	2,634	-
1953	1,735	-
1954	1,783	-
1955	4,046	794
1956	4,761	753
1957	3,306	561
1958	3,709	638
1959	2,909	439
1960	2,038	337
1961	1,489	218
1962	958	137
1963	679	103
1964	664	102
1965	634	93
TOTALS	392,483	4,175

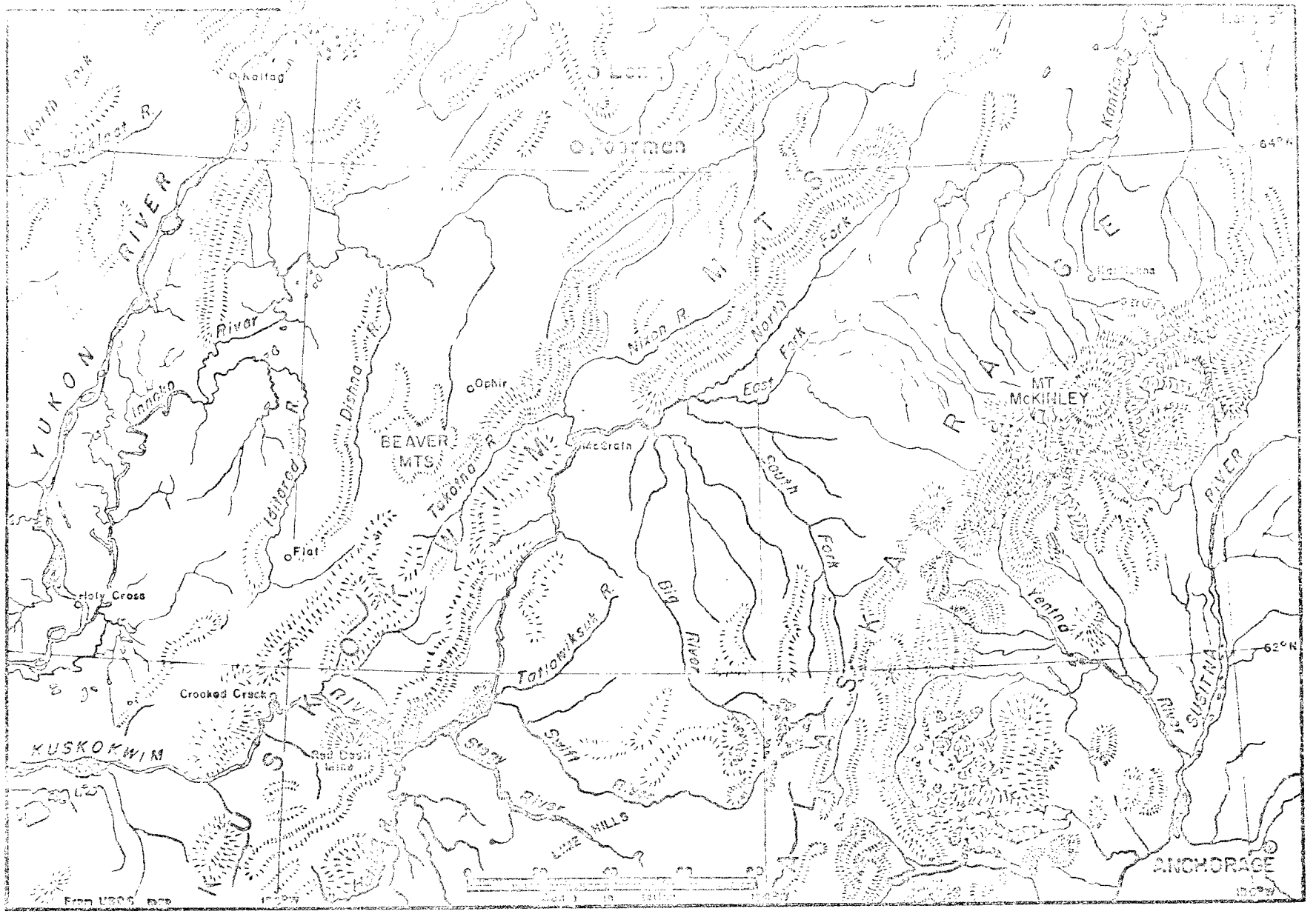

FIGURE 1. - Index Map, Ruby, Alaska.

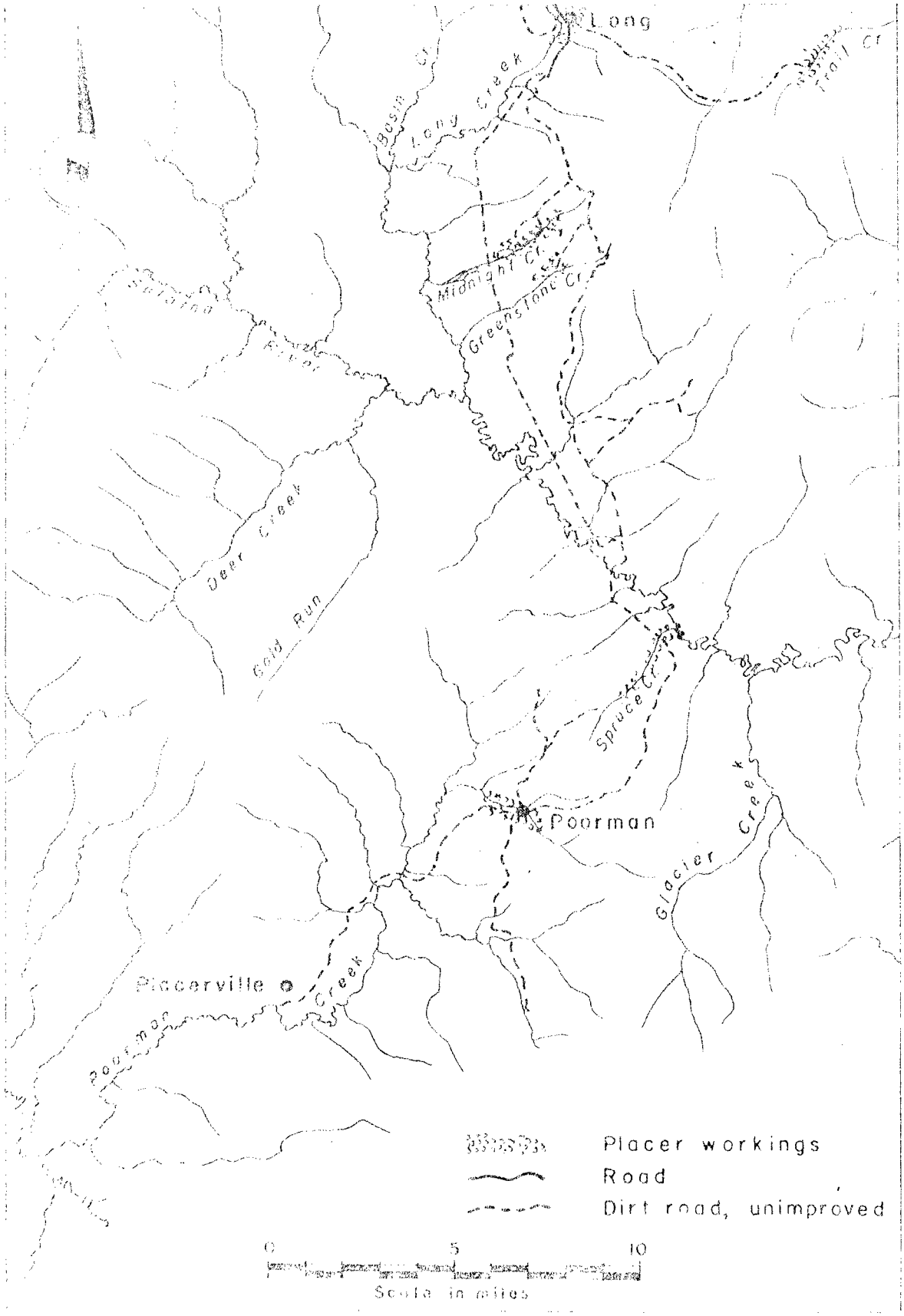

FIGURE 3. - Ruby Placer Area.