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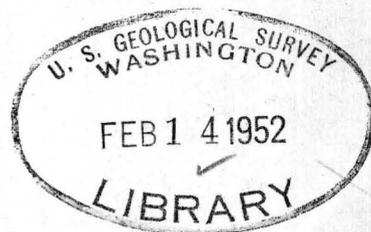
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**RECONNAISSANCE EXAMINATION FOR
URANIUM AT SIX MINES AND PROPERTIES
IN IDAHO AND MONTANA**

By ^{John Stewart}
J. S. Vhay, 1907 —

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METALLURGY AND CERAMICS

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RECONNAISSANCE EXAMINATION FOR URANIUM AT
SIX MINES AND PROPERTIES IN
IDAHO AND MONTANA

By J. S. Vhay

ABSTRACT

Six mining properties in Idaho and Montana at which radioactivity had been reported or suspected were briefly examined by J. S. Vhay and W. A. Roberts of the U. S. Geological Survey in October and November 1949.

The properties in Idaho are the Grunter mine, from which radioactive mill concentrates have been reported; the Kentuck mine; the Ulysses-Kittie Burton mill; and the Garm-Lemoreaux mine.

The properties in Montana are the Armeson-McKenny property in Beaverhead County and the Oro property in Lincoln County.

Moderate to high radioactivity was noted at the Garm-Lemoreaux mine and the Armeson-McKenny property. That most of this radioactivity is not caused by uranium is suggested by the low uranium content of the majority of the samples. One sample from a dump of the Garm-Lemoreaux mine assayed 0.11 percent uranium.

INTRODUCTION

Between October 25 and November 2, 1949, six mining properties in Idaho and Montana were briefly examined by J. S. Vhay and W. A. Roberts, of the U. S. Geological Survey. Radioactivity of the

presence of uranium in rocks on some of these properties had been reported by the public and by members of the Geological Survey.

The radioactivity of surface exposures, underground exposures, and of samples of mill products, was measured with an El-Tronics survey meter with a large probe consisting of six U. S. Geological Survey standard 1 by 12-inch Geiger-Mueller tubes connected in parallel. Twenty-four samples of radioactive material were collected and analyzed, and are listed in table 1.

No detailed geologic work has been done in any of the areas described in this report. The areas in Lemhi County, Idaho, and Beaverhead County, Mont., have been mapped and described by Umpleby (1913). The Oro property in Lincoln County, Mont., is a few miles north of the area included on the geologic map of the Libby quadrangle (Gibson, 1948)

This work was done as part of a program of exploration for uranium sponsored by the U. S. Atomic Energy Commission.

GRUNTER AND KENTUCK MINES

Location, ownership, and workings

The Grunter and Kentucky mines are in T. 24 N., R. 18 E., Boise meridian, Lemhi County, Idaho, on the north side of the Salmon River west of Shoup, Idaho. The mines are about 41 miles by road northwest of Salmon, Idaho. The mines were not in operation at the time of the examination.

The Grunter mine is owned by Gold Producers, Inc., of Spokane, Wash. The workings consist of open cuts and short tunnels.

The ownership of the Kentuck mine was not determined. The workings, described by Umpleby (1913), consist of tunnels on five levels.

Geology

The country rock at the mines is a porphyroblastic gneiss, interlayered with feldspathized quartzite and more rarely with schist. These rocks probably are highly metamorphosed sedimentary rocks of the Belt series. Mineral deposits occur either as definite veins, as at the Kentuck mine, or as broad zones of fracturing in which introduced minerals occur on small slips, on joints, and disseminated throughout the rock, as at the Grunter mine.

At the Grunter mine a broad mineralized zone strikes roughly east and contains many fractures striking N. 40° - 80° E., and dipping 35° - 60° S. Joints striking N. 20° E. and dipping 75° E. also are mineralized, and the remainder of the rock contains sufficient disseminated iron sulfide to be iron stained on outcrops and in the open pit. The ore, which carries relatively low values ($\$4.00$ - $\$8.00$) in gold, consists mostly of pyrrhotite and pyrite, with which is associated a little chalcopyrite, galena, and sphalerite. Scheelite occurs locally (Cooper, 1942).

According to Umpleby (1913, p. 143), the vein at the Kentuck mine strikes N. 70° E. and dips 40° SE. The vein is 2 to 6 feet wide, and is enclosed by gneiss. Granite porphyry dikes are younger than the vein. The gold ore is mostly pyrite in quartz, and in places

has arsenopyrite, galena, and a very little sphalerite.

Radioactivity

The response of the survey meter to normal background was determined at the north end of the Pine Creek Bridge over the Salmon River 1 mile west of Shoup, Idaho. Readings on highly potassic porphyroblastic gneiss and quartz monzonite were about twice those on a metamorphosed mafic dike and on quartzite. The average reading on quartzite was used as the background reading. A concentration of chloritic material gave a reading about 2 1/2 times those on the mafic dike and quartzite. The results of analyses of quartz monzonite, gneiss, and chloritic material, are given in table 1 (9-VS-1, 2, 3, and 4).

The Grunter mine.--On the lowest mine level, the readings were about 1 1/2 times background in feldspathized quartzite and 2 to 2 1/2 times background in gneiss. At the faces of the workings in gneiss, readings were about 3 times background, but a radiometric analysis of a sample from the face of the west drift showed only 0.01 percent equivalent uranium (table 1, 9-VS-5). In the small adit at the east end of the open pit and in the workings west of the pit, the readings were in about the same range, 2 to 3 times background. In the open pit and elsewhere on the property, no unusually high readings were obtained.

The Kentuck mine.--Most of the workings on the lowest level of the Kentuck mine were traversed. Readings were between 1 1/2 and

2 1/2 times background, and were somewhat higher in gneiss than in a granite prophyry dike that cuts the gneiss.

The Road from Kentuck mine to Boulder Creek.--A continuous traverse was made along the old wagon road between the Kentuck mine and the road up Boulder Creek, northwest of Shoup. No abnormal readings were obtained, although readings were higher (twice background) in areas of gneiss than in the bedded quartzite.

A sample of sulfide concentrate from the Grunter mill /contained

/ Collected by F. J. Anderson and J. S. Whay in July 1949.

0.071 percent equivalent uranium and 0.043 percent uranium. This indicates that the percentage of uranium in the ore must be extremely low as the ratio of concentration is rather high.

ULYSSES-KITTIE BURTON MILL

Location

The Ulysses-Kittie Burton mill is in sec. 31, T. 25 N., R. 20 E., Boise meridian, on Indian Creek, 4 miles from the main road on the Salmon River. It is about 37 miles by road northwest of Salmon, Idaho. Neither the mill nor the Ulysses and Kittie Burton mines has been operated for several years. The mines were inaccessible by car and were not visited. The present ownership of the properties was not determined.

Umpleby (1913) visited the Ulysses and Kittie Burton mines and

described briefly the geology of the district, but there is no record of previous examination of the area for radioactivity.

The area was examined briefly because it lies between the radioactive deposits of the Grunter and the Garm-Lemoreaux mines, and because the road to the property affords access to the area north of the Salmon River.

Geology

According to Umpleby (1913) the veins at the Ulysses and Kittie Burton mines cut quartzitic slates, strike west or northwest, and dip at low angles south or southwest. They consist of quartz and silicified country rock, some pyrite, and a little chalcopyrite and braunite. They were mined for their small gold content.

Radioactivity

Continuous readings, taken along the Indian Creek road, showed no abnormal radioactivity. Crude ore, ground ore, concentrates, and tailings in and around the mill, were tested carefully and none were abnormally radioactive. No samples were taken.

GARM-LEMOREAUX MINE

Location, ownership, and workings

The Garm-Lemoreaux mine is in sec. 31, T. 26 N., R. 31 E., Boise meridian, Lemhi County, Idaho. The mine is on Allan Creek, a small

tributary of Hughes Creek, which is a tributary of the North Fork of the Salmon River. It is about 30 miles by road north of Salmon, Idaho.

The map by Umpleby (1913) covers the area, although his report does not describe the Garm-Lemoreaux property. In 1933, D. C. Gilbert mapped the workings and made a brief private report on the property; his geologic maps at 40 feet to the inch, a composite map at 100 feet to the inch (fig. 2), and his report were made available to the writers through the courtesy of Mr. G. I. Hurley.

The property is owned by the estate of Ira Lemoreaux, for which Ralph E. Yates, 631 South Fourth Street, Springfield, Ill., is the agent. Mr. G. I. Hurley, of Salmon, Idaho, the local manager of the property, has sent the Geological Survey a dump specimen that contained a little uranium. Mr. Hurley gave the writers valuable assistance in reopening an adit and in attempting to get through a caved-in section of the adit. He operated the mine before World War II, and drove the lowest adit to and along the Lemoreaux vein.

There are four adits on the property (fig. 2); the portals of the three adits on the southeast side of the gulch, which reach the Lemoreaux vein, were caved at the time of the visit. The lowest portal was reopened, but another caved section about 300 feet from the portal prevented access to the vein.

Geology

The workings are in a small dry gulch near its junction with Allan Creek. The slopes are steep near the workings but more gentle above

them. The soil cover generally is thick, and outcrops are relatively scarce except on the steeper slopes. The country rock in the vicinity of the mine is fine-grained quartzite, in most places somewhat micaceous and slightly schistose, interbedded with layers of sandy phyllite or argillite.

In general, the beds strike about north-northeast. According to Gilbert's maps the dips underground are between 25° and 50° SE. On the northwest side of the gulch, the dips generally are 70° - 80° E. Several small faults that dip southeast are exposed in the underground workings. The ore is in a fracture zone striking west-northwest. The fracture probably is a fault, as several feet of gouge are reported along it in places. The ore apparently occurs as short, high-grade shoots on the fault.

The vein material on the dumps consists mostly of gray and reddish-gray fractured quartz; dark chlorite coats some of the fractures. The quartz contains some fine-grained pyrite, a little galena, and scattered green and yellow material, probably secondary uranium minerals. There is also a dark-colored mixture of fine-grained pyrite and one or more soft black minerals.

Radioactivity

Traverses were made across the probable trend of the vein above the mine. The vein is deeply covered, and no abnormal radioactivity was recorded. An arcuate traverse also was made, at an approximately

constant distance of a quarter of a mile from the mine, from a point southeast of the mine, through the northern quadrants, to a point southwest of the mine, but no abnormal radioactivity was found.

No abnormal readings were obtained on the highest of the three dumps on the southeast side of the gulch. On the middle dump, one pile of yellow-stained quartz (table 1, 9-VS-10) gave readings of slightly more than twice background, and radioactivity was slightly higher than background elsewhere on this dump. The lowest dump was somewhat radioactive over a considerable area; the northwest part averaged about 10 times background, and in places radioactivity 30 times background was noted.

ARMESON-McKENNEY PROPERTY

Location, ownership, and workings

The Armeson-McKenney property is in Beaverhead County, Mont., in the southern parts of secs. 19 and 20, T. 10 S., R. 15 W. The property is just east of the Continental Divide, along the upper part of the north fork of Frying Pan Creek, a tributary of Trail Creek, which flows eastward into the Beaverhead River at Armstead, Mont.

The property is about 2 1/2 miles from Lemhi Pass, and is reached by an unimproved wagon road and a newly cut trail.

The property at present is a raw prospect. No mine workings were seen except for the new discovery pits and a few old prospect pits. It is reported that there are some old shafts and adits a short distance to the south. According to Mr. Armeson, a bulldozer and diamond drill were brought in during the summer of 1950, to build a road and to

prospect by trenches and drill holes.

About eight claims have been staked in the area. All but two of the claims in the immediate area are owned by W. G. Armeson and the McKenney Logging Company of Wheeler, Oreg. It is believed that radioactivity in this area was discovered by Armeson, who, together with his backers, had an option on the Wonder Lode claims, which lie to the northwest across the Continental Divide. The ownership of the two claims not in Armeson's group has been in dispute between a Mr. Shoup and a Mr. Denny.

Geology

Outcrops are scarce in the area, and almost the only rocks seen in natural outcrop were masses of silicified and mineralized rock. At Lemhi Pass a conglomerate which dips gently southward probably is the base of the Cambrian section. According to Umpleby's map (Umpleby, 1913) the rocks in this area are in the lower part of the Paleozoic section.

Little information is available on the structure of this area. An outcrop just to the east of the Trapper No. 4 discovery pit consisted of rather poorly bedded fine-grained impure sandstone which strikes N. 70° W. and dips about 10° NE. At the Trapper No. 4 discovery pit the fault, which apparently controls the position of the mineralized rock, strikes N. 52° W. and dips 80° NE. About 300 feet to the northwest the radioactive zone, which probably follows this fault, changes in trend from N. 50° - 55° W. to N. 20° W. The

silicified zone on the east side of the Trapper No. 1 claim strikes about N. 40° W., and the large sheared silicified zone at the discovery pit of the Trapper No. 1 claim strikes roughly N. 20° W. and dips 70° - 80° E. In general, the radioactive silicified zones appear to be controlled by faults or shear zones that strike in a northwesterly direction, although the long direction of an oval area of similar rock on a claim at the west edge of the group trends westerly.

The minerals visible in the mineralized rock are quartz, specular hematite, and a yellowish-brown porous limonitic material which may have come from the oxidation of one or more sulfide minerals. The reddish-gray to dark-gray quartz probably was formed by replacement of the country rock along faults or shear zones. The quartz is cut by many small veinlets of specular hematite, which locally constitutes as much as 50 percent of the rock. The brown porous material in the Trapper No. 4 discovery pit is 6 to 18 inches thick and occurs along the fault. Only secondary iron minerals were identified in the porous material. It has been reported that the vein in the Trapper No. 4 pit contains considerable amounts of rare earths.

Radioactivity

Every outcrop of silicified rock in the area showed moderate or high radioactivity. Within 5 or 10 feet of the Trapper No. 4 discovery pit, at the Trapper No. 1 discovery pit, at another outcrop on the Trapper No. 1 claim, and at several other outcrops, the needle of the survey meter went off scale when the machine was being set to

operate on the 20 scale. In addition, much of the hillside elsewhere showed some radioactivity, probably because of float from outcrops higher up. The radioactive zone at the Trapper No. 4 discovery pit was traced, through cover, for about 300 feet N. 50° W. and thence 200 feet N. 20° W. using cross-traverses about 50 feet long. On each traverse a zone 10 to 15 feet long gave readings of 3 to 12 times background. About nine pits or outcrops showing radioactivity were visited.

The results of chemical and radiometric analyses of samples taken at the property are shown in table 1.

ORO MINE

Location, ownership, and workings

The Oro property is on Ruby Creek, southwest of Troy, Lincoln County, Mont., in the northwest part of T. 59 N., R. 34 W. The property can be reached by an unimproved logging road along Ruby Creek. The deposit was discovered recently and has been explored by a few bulldozer cuts and two short adits.

The owners of the property are R. & H. Obermeyer, E. Phillips, and T. McIntyre, of Troy, Mont.

Geology

Very few outcrops are present on the property as there is a cover of deep soil and vegetation. Most of the rock in this region is quartzite, probably part of the Belt series, but the country rock at the property is a medium-grained dark intrusive rock, probably

diorite. The diorite is cut by small faults in which veins occur. A bulldozer cut at the portal of the lower adit exposes a vein that strikes N. 46° W. and dips 85° NE.; 55 feet to the southwest another vein strikes N. 50° W. and dips 80° NE. About 200 feet northwest, and at a higher altitude, a second small adit is on a vein that strikes N. 50° W. and dips steeply. The exposed veins range in width from 6 inches to 5 feet.

The ore where exposed is strongly oxidized and consists of quartz, pyromorphite, cerussite, possibly mimetite, limonitic material, a soft black manganese oxide, and a little relict galena. The primary ore probably is mostly galena in quartz, and some manganiferous ankerite (?). It is reported to carry high values in silver and lead.

Radioactivity

Readings on the vein in the lower adit averaged about 10 times background, and on the ore in a box outside the portal, 3 to 4 times background. The upper adit showed readings of 2 to 3 times background. Analyzed samples are listed in table 1.

CONCLUSIONS

Moderate to high radioactivity was noted at the Garm-Lemoreaux mine, Lemhi County, Idaho, and at the Trapper No. 1 and No. 4 claims of the Armeson-McKenney property, Beaverhead County, Mont. That most of this radioactivity is not caused by uranium is suggested by the low uranium content of the majority of the samples. One sample from a dump of the Garm-Lemoreaux mine assayed 0.11 percent uranium.

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Table 1--Equivalent uranium and uranium determinations
of samples from Idaho and Montana

<u>Sample Number</u>	<u>Location</u>	<u>Description</u>	<u>Percent equivalent uranium</u>	<u>Percent uranium</u>
9-VS-1	Road cut, north end of Pine Creek Bridge, Shoup, Idaho	Medium-grained quartz monzonite prophyry	* 0.01	
9-VS-2	"	Gneiss, high in orthoclase	* 0.01	
9-VS-3	"	Fracture surface with chlorite (?)	* 0.01	
9-VS-4	"	Mass of chloritic material in fracture	0.004	0.001
9-VS-5	Face of west drift, Grunter mine, Shoup, Idaho	Gneiss with south-dipping fractures containing sulfides and quartz	* 0.01	
9-VS-6	Workings west of open pit, Grunter mine	6-inch vein of gouge, quartz and sulfides	0.002	0.001
9-VS-7	Main chute from open pit, Grunter mine	Composite sample of ore	0.004	0.001
-----	Grunter mill	Mill concentrate	**0.071	0.043
9-VS-8	Northwest part of lowest dump, Garm-Lemoreaux mine, Lemhi County, Idaho	Random sample across dump face	0.027	0.018

* Determination made in Spokane Regional Office of the U. S. Geological Survey.

** Determination on a sample collected by J. S. Vhay and F. J. Anderson made by the U. S. Geological Survey Laboratory in Washington, D. C.

Table 1--Equivalent uranium and uranium determinations
of samples from Idaho and Montana--Continued

<u>Sample Number</u>	<u>Location</u>	<u>Description</u>	<u>Percent equivalent uranium</u>	<u>Percent uranium</u>
9-VS-9	Northwest part of lowest dump, Garm-Lemoreaux mine, Lemhi County, Idaho	Selected material from dump	0.024	0.008
9-VS-10	Middle dump, Garm-Lemoreaux mine	Yellow-stained quartz and gossan	0.015	0.005
9-VL-24	Northwest part of lowest dump Garm-Lemoreaux mine	Sample made up of specimens of fractured quartz, chlor- ite, pyrite, and secondary minerals, taken for study	0.13	0.11
9-VA-11	Trapper No. 4 discovery pit, Armeson-McKenney property, Beaverhead County, Mont.	NE. side; silicified rock with specularite veinlets	0.06	0.004
9-VA-12	"	NE. side; brown porous material	0.35	0.010
9-VA-13	"	Fault gouge	*0.01	
9-VA-14	"	SW. side; soft altered rock, iron-stained	0.008	0.001
9-VA-15	"	SW. side; white to yellow soft altered rock	0.004	0.001
9-VA-16	Trapper No. 1 discovery pit, Armeson-McKenney property	Across 6 feet of fractured reddish-gray quartz	0.077	0.004

* Determination made in Spokane Regional Office of the U. S. Geological Survey

Table 1--Equivalent uranium and uranium determinations
of samples from Idaho and Montana--Continued

<u>Sample Number</u>	<u>Location</u>	<u>Description</u>	<u>Percent equivalent uranium</u>	<u>Percent uranium</u>
9-VA-17	Trapper No. 1, claim, 200 feet N. 45° W. of discovery pit	Chip sample across 50-foot outcrop of silicified rock	0.023	0.002
9-VO-18	Lower adit, Oro mine, Lincoln County, Montana	Sample across 2-foot vein	* 0.01	
9-VO-19	Upper dump, Oro mine	Sample of iron-stained ore	0.007	0.005
9-VO-21	"	Random specimens rich in galena	*0.01	
9-VO-22	Lower dump, ore box. Oro mine	Material showing highest radioactivity in ore box	0.014	0.012
9-VO-23	"	Grab sample	* 0.009	

* Determinations made in Spokane Regional Office of the U. S. Geological Survey.

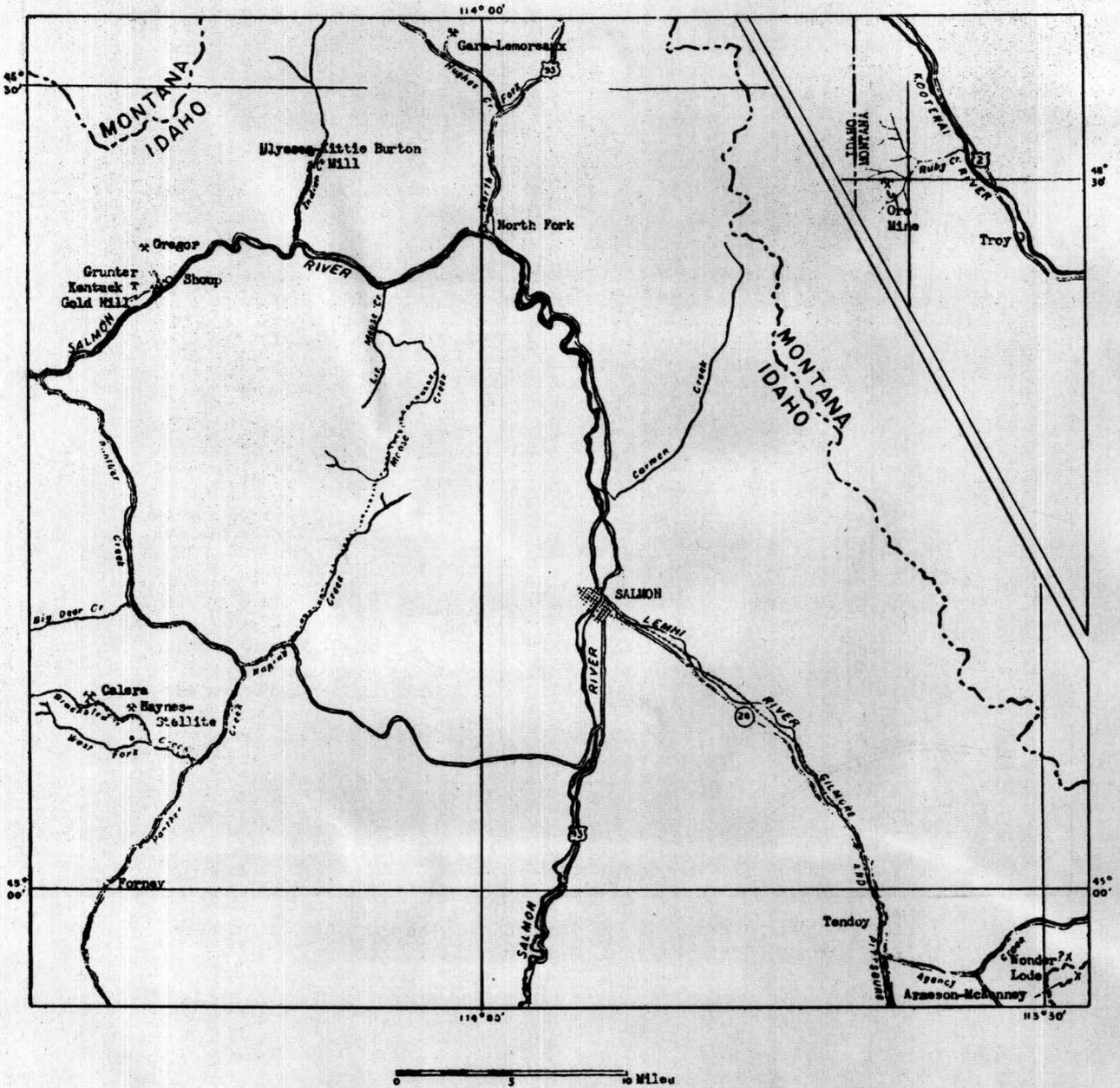


Fig. 1--Areas visited in reconnaissance in Idaho and Montana - Oct. 1949.

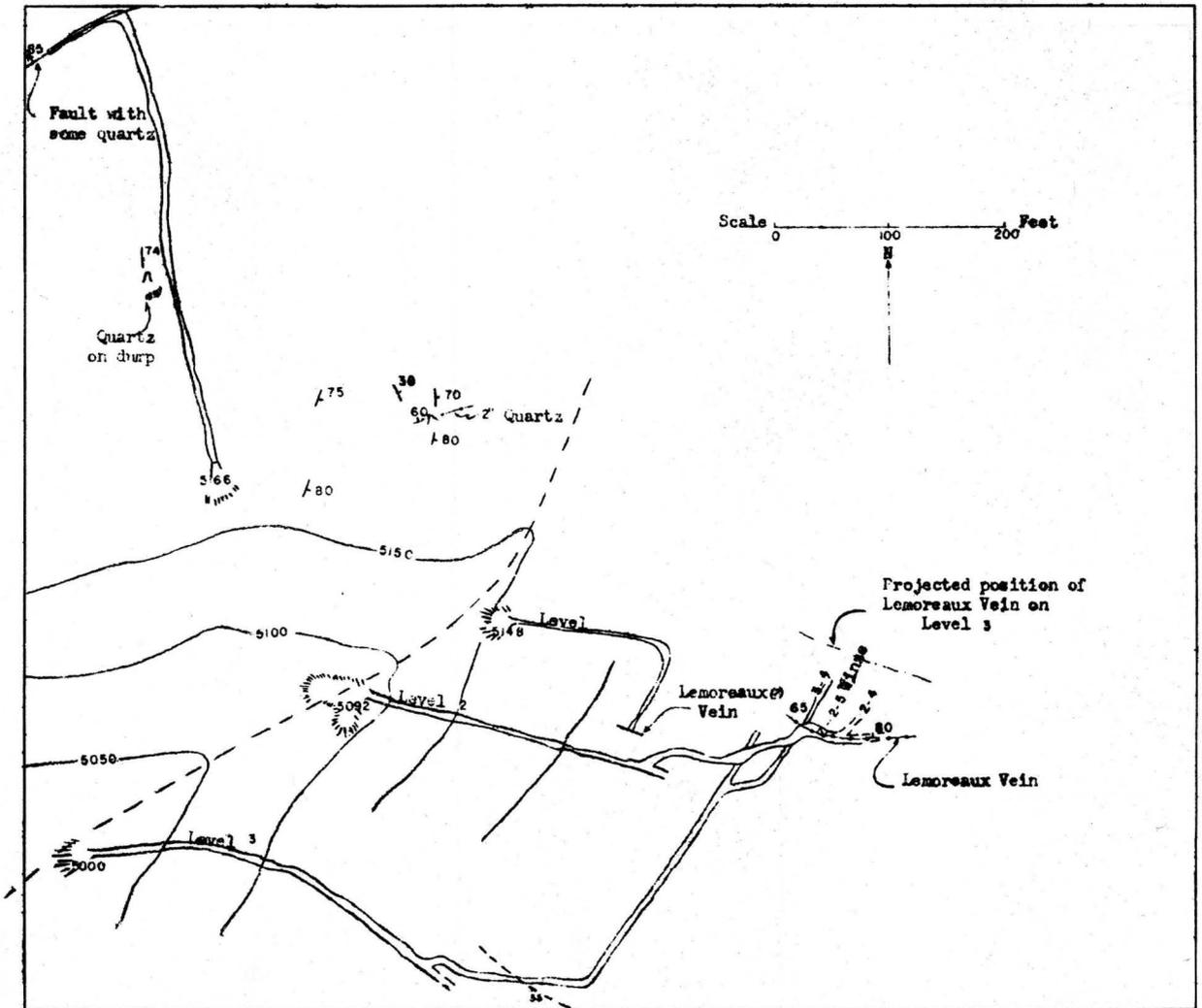


Fig. 2--Composite map of the workings of the Garm-Lemoreaux mine Lemhi County, Idaho by D. C. Gilbert, 1933.

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