UNITED STATES
DEPARTMENT OF THE INTERIOR
Geological Survey
Washington

GEOLOGY AND MINERAL DEPOSITS OF GLACIER BASIN AND VICINITY, WRANGELL DISTRICT, SOUTHEASTERN ALASKA

by

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INTRODUCTION

Glacier Basin is on the mainland of southeastern Alaska about 13 miles east of Wrangell (see fig. 1) and is about 10 miles by trail and by boat across Lake Virginia from tidewater (see fig. 2). A Forest Service trail starts from Eastern Passage a few hundred feet north of the mouth of Mill Creek and leads east to the west end of Lake Virginia, a distance of about 1 mile. It is about 2 miles across Lake Virginia to the start of a blazed trail, at the southeast end of the lake (see fig. 2), to Glacier Basin. The trail is about 6½ miles long and follows the valley of Glacier Creek. It rises from an altitude of 110 feet at Lake Virginia to an altitude of about 2,000 feet in Glacier Basin. The trail is in very poor condition and travel on it is difficult.

Glacier Basin is an impressive topographic feature. The floor of the basin is a flat area of muskeg, alluvium and glacial debris. The basin is about 1½ miles long and ¼ to ½ mile wide. A few low rock ridges extend out from the sides in the middle of the basin and others rise above the flat at each end. At the southwest end of the basin the flat gives way abruptly in a 400-foot drop to the floor of the next basin below Glacier Basin. The northeast end of the basin is bounded by an abrupt rise in slope. The Nelson Glacier flows southeasterly by the northeast end of Glacier Basin and is several hundred feet above the basin floor.

The south slope of Glacier Basin rises from the floor of the basin to an altitude of about 3,500 feet.

The north slope of the basin rises to the ridge (see fig. 2) which extends westerly from the Nelson Glacier toward Lake Virginia. The highest point on this ridge is at an altitude of 4,820 feet and is herein referred to as peak 4,820. Both the north and south slopes of Glacier Basin are furrowed by several long steep gullies. Five of these gullies on the north slope are designated herein for reference purposes from west to east as gullies 1, 2, 3, 4 and 5.

There is no large timber in the basin. Alders and small spruce trees grow between altitudes of 2,000 feet and 3,000 feet. Some of the slopes are partially covered with heather to an altitude of about 3,800 feet.

The deposits are reported to have been discovered about 1899 by Nelson and Smith. 1/ Since 1899 groups of claims have been located on both the north and south slopes of Glacier Basin 2/. The most recent claims are said to have been located in 1943 by several persons from Wrangell. The exploratory work in Glacier Basin consists of two small adits in gully 4 at altitudes of 2,253 feet and 2,285 feet and a short adit several hundred feet east of gully 4 at an altitude of about 2,100 feet (see fig. 3). The lower adit in gully 4 has about 42 feet of workings (see fig. 4) and the upper adit is 40 feet long.

Glacier Basin is briefly described by the Wrights 3/ and by Buddington 4/. This report summarizes the results of a Geological Survey field examination of Glacier Basin and the ridge extending northwest from peak 4,820 during July, August and September 1943. One of the purposes of the field investigation was to trace the ore deposits of Groundhog Basin, which were examined in 1942, 5/ southward into Glacier Basin. The generalized geology of Groundhog Basin is included in figure 3.

GENERAL GEOLOGY

The principal rock unit in Glacier Basin is a sequence of metamorphic rocks included between two masses of quartz diorite (see fig. 3). The metamorphic rocks are a part of a belt of rocks which extends for many miles along the western side of the Coast Range batholith in southeastern Alaska 6/. Quartz porphyry and basalt sills and dikes intrude the metamorphic rocks and the western quartz diorite. Sill and dike-like bodies of breccia cut the metamorphic rocks.

1/Buddington, A. F., Mineral deposits of the Wrangell district: U. S. Geol. Survey Bull. 739, p. 66, 1923.

2/Wright, F. E., and C. W., The Ketchikan and Wrangell mining districts: U. S. Geol. Survey Bull. 347, p. 189, 1908.

3/Wright, F. E. and C. W., op. cit., pp. 188-189.

4/Buddington, D. F., op. cit., pp. 66-67.

5/Gault, H. R., Zinc deposits of Groundhog Basin: U. S. Geol. Survey mimeographed report, March 1944.

6/Buddington, A. F., and Chapin, Theodore; Geology and mineral deposits of southeastern Alaska: U. S. Geol. Survey Bull. 800, plates 1 and 2, 1929.

The metamorphic rocks, which originally were sedimentary rocks, are principally gneiss and schist with interbedded amphibolite, marble, and pyroxene granulite. The different types of gneiss include biotite-quartz, pyroxene-feldspar, hornblende, hornblende-biotite, and garnet-kyanite varieties. The schist contain about the same minerals as the gneiss. Many beds of gneiss, schist and amphibolite contain small amounts of pyrite and pyrrhotite and their weathered surfaces are characteristically brown or rust-colored. The marble beds are light-colored almost-pure marble and dark-brown impure marble. Some of the pyroxene granulites are mineralized with sphalerite, galena, pyrrhotite and magnetite and constitute what are herein called "ore beds." 7/

The bedding and cleavage of the metamorphic rocks are nearly parallel. The regional strike of the metamorphic rocks is about N. 25° W. and the general dip is about 60° NE. (see fig. 3). Small drag folds occur within many of the beds and locally small areas are intensely folded. No large scale folding has been recognized in the sequence of metamorphic rocks extending from Glacier Basin to Groundhog Basin.

Many faults cut the metamorphic rocks and a few cut the western quartz diorite. The observed displacements along the faults are small. Three sets of faults are common in the area; one set nearly parallels the bedding, another set strikes northeasterly and is almost vertical, and the third set strikes N. 45° W. to N. 75° W. and dips steeply northeast. At many places the bedding faults and the northeast-trending faults contain quartz-fluorite breccia veins.

At some places the contact of the western quartz diorite with the metamorphic rocks is parallel to bedding and at other places it cuts across the bedding (see fig. 3). At many places the western quartz diorite contains inclusions of the metamorphic rocks. It is composed principally of quartz, plagioclase and biotite. The contact of the eastern quartz diorite appears to parallel the bedding. The eastern quartz diorite consists chiefly of quartz, plagioclase and hornblende.

Pegmatites occur in a thick section of gneiss east of the sill zone and are associated with injection gneiss. The pegmatites are long flat lenses almost parallel to bedding. They are composed of quartz, feldspar and muscovite.

Most of the sills and dikes of Glacier Basin and vicinity are quartz porphyry. The sills, which far exceed the dikes in number range from 1/2 foot to 100 feet in thickness and average about 12 feet. Individual sills have been traced for over 4,000 feet. Most of the sills lie in a zone about 2,000 feet wide (see fig. 3). Within the sill zone are several sill groups made up of from three to ten individual sills. In some sill groups the sills are in contact with one another, in other groups they are separated by metamorphic rock 5 feet to 25 feet thick. Along much of their outcrop the sills are

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7/Gault, H. R., op. cit.

nearly parallel to bedding but at many places they cut across the bedding for short distances, generally in a northeast-southwest direction. Several large dikes of quartz porphyry cut the metamorphic rocks. Many of the sills are connected by short dikes.

The quartz porphyry rocks include several types which differ principally in grain size and color. The phenocrysts are quartz and feldspar; the groundmass is generally dense. The rocks are white, tan, light gray and light gray-green.

Basic sills and dikes occur throughout Glacier Basin and vicinity. They are fewer in size and number than the quartz porphyry sills and dikes. The basic sills and dikes range in thickness from 1/3 foot to 8 feet and average between 1 foot and 2 feet thick. The dikes strike northeasterly and at many places cut the quartz porphyry sills. The basic rocks are dark green to black and are probably basalts. Some rocks are porphyritic; the phenocrysts are feldspar and hornblende.

Sill-and dike-like bodies of breccia crop out southeast (see fig. 3) and northwest of Peak 4,820. The breccia is composed of slightly altered fragments of metamorphic rock and quartz porphyry in a matrix of very small fragments and comminuted material of the same rock types. The fragments range in size from slightly less than an inch in diameter to blocks 2 feet wide and 10 feet long. Veinlets containing quartz, orthoclase, and galena cut the breccia.

The geology and structure of many small areas in Glacier Basin and vicinity show, in detail, many of the characteristics of the geology and structure of the large area. The geology of part of gully 4 is typical of much of the geology of Glacier Basin (see fig. 4). Three sills are exposed in this part of the gully. The western sill terminates near the portal of the upper adit and crops out again south of the adit.

A quartz-fluorite breccia vein lies on the hanging wall of the middle sill north of the upper adit. Near the adit it cuts across the middle sill and becomes thicker. A short distance south of the lower adit the vein splits. The eastern split continues along the hanging wall of the middle sill. The western split cuts across the middle sill to the footwall, parallels the footwall for a short distance and then cuts across to the footwall of the western sill.

Much of the metamorphic rock near the upper adit is slightly metallized pyroxene granulite and at the portal there is about 4 feet of almost solid-sulfide ore. This material extends only a few feet into the adit.

The breccia vein and middle sill near the upper adit and in part of the lower adit are cut by a stockwork of quartz veinlets. Some of the quartz veinlets contain small amounts of galena and sphalerite.

ORE DEPOSITS

Ore beds

The term ore bed is used in this report to designate dark-green to gray-green, medium grained pyroxene granulite which is composed principally of pyroxene but locally also contains small amounts of feldspar, hornblende, garnet, epidote and quartz, and which is partially replaced by sphalerite, galena and pyrrhotite or by magnetite. The ore beds are similar to the disseminated-sulfide type ore in Groundhog Basin. Two types of ore are recognized in Groundhog Basin; a solid-sulfide type and a disseminated sulfide type. Where the ore beds are almost completely replaced by sulfide minerals, the ore is the solid type; in the disseminated type, the sulfide minerals are disseminated through or are in pods and bands in the pyroxene granulite. No solid ore has been recognized in the Glacier Basin. The weathered surfaces are brown and green and are pitted and ridged parallel to the bedding. In some exposures the weathered ore beds crumble into dull brown granules.

Sphalerite and galena are the most readily recognized sulfide minerals in the ore beds. At some places sphalerite is more prominent and at others galena is more prominent. Some of the sphalerite in the ore beds of Glacier Basin is slightly lighter brown than that in Groundhog Basin and probably contains less iron. The sphalerite in Groundhog Basin is identified as the iron-rich variety marmotite. Chemical analyses indicate that it contains 12 to 14 percent of iron. Where magnetite occurs, it is the only recognizable ore mineral.

The ore beds range from 4 inches to about 20 feet in thickness. At many places the ore beds interfinger with, alternate with or grade into light gray to light green pyroxene-feldspar gneiss. Ore beds and bands of alternating ore beds and pyroxene gneiss made up lithologic units which have been traced from Glacier Basin to Groundhog Basin. Each unit below an altitude of 3,000 feet in Glacier Basin is composed principally of ore bed. At the higher altitudes, the ore beds are thinner, grade into pyroxene gneiss and occur as poorly defined lenses in pyroxene gneiss.

Four ore beds are recognized on the north slope of Glacier Basin (see fig. 3) and are designated as ore beds A, B, C and D. These beds are exposed in gullies 1, 2, 3 and 4 respectively. From their lowest exposures to altitudes of 2,900 feet to 3,300 feet in Glacier Basin the ore beds are continuous. Above these altitudes, the ore beds are discontinuous.

Ore bed A, exposed along the east wall of gully 1, (see fig. 3) is the most westerly and stratigraphically is the lowest ore bed. It has been traced up gully 1 from its lowest exposure at about 2,350 feet to an altitude of about 2,650 feet. North from that point it is covered by talus for a horizontal distance of 1,400 feet. North of this 1,400 foot covered area, ore bed A or its equivalent pyroxene gneiss is exposed almost continuously for 2,300 feet to near the crest of the north slope. The southern 1,600 feet of this 2,300 foot interval is light green pyroxene granulite and pyroxene gneiss 4 feet to 8 feet thick. Small amounts of galena and sphalerite are disseminated along or near bedding planes and fractures in the ore bed. The northern 700 feet is a light gray-green pyroxene gneiss containing several small zones of ore bed. For about 800 feet north from the crest of the north slope and on the west side of the ridge extending northwesterly from peak 4,820 there is practically no ore bed exposed. North of this 800-foot interval, ore bed A is exposed for 3,300 feet before it is again covered by talus and snow. Along this 3,300-foot extent the ore bed is 4 inches to 2 feet thick, thickening northward. In much of the northern half of this 3,300-foot interval ore bed A is recognized as two units each about 1 foot thick and several feet apart. The weathered outcrop is dark brown. In several places magnetite replaces the ore bed.

One of the magnetite-bearing portions of ore bed A is shown in figure 5. In the northern part of the area shown in figure 5, two beds of magnetite-bearing granulite are intercalated with light gray-green pyroxene gneiss. These two beds locally have been thickened by drag folding. They grade into barren pyroxene gneiss near the southern end of the area shown in figure 5. The southern continuation of ore bed A to Glacier Basin lies about 70 feet east of the magnetite-bearing granulite. At its northern end the eastern portion of ore bed A contains sphalerite but is magnetite-bearing about 700 feet south of the area shown in figure 5.

Two possible interpretations of this offset in ore bed A are (1) that ore bed A has been displaced along a fault zone represented by the two veins which join near the southern end of the area and lie between the two ore beds; or (2) that because of lithologic changes in the beds, the northern continuation pinches to the south and the southern continuation represents a stratigraphically higher bed.

There is a covered interval of about 3,000 feet between the northernmost exposure of ore bed A of Glacier Basin and the southernmost exposure of ore bed No. 1 of Groundhog Basin. Both ore bed A and ore bed No. 1 are stratigraphically the lowest ore beds and projection of either ore bed along its strike would connect one with the other. It is thought that ore bed A and ore bed No. 1 may represent parts of the same bed.

Ore bed B crops out discontinuously at lower altitudes in gully 2 and at higher altitudes in gully 3 for a horizontal distance of 3,500 feet to an altitude of about 3,700 feet. From the lowest exposure, at an altitude of 2,060 feet to about 2,900 feet the ore bed is about 6 feet thick. From an altitude of about 2,900 feet to 3,700 feet ore bed B thins from 5 feet thick to about 1½ feet thick and the amount of sulfide minerals is less than at lower altitudes. Ore bed B is not recognized north of its highest exposure on the north slope of Glacier Basin.

Ore bed C is exposed discontinuously in the cliff on the east side of gully 3 from an altitude of 2,170 feet to an altitude of 3,100 feet for a horizontal distance of about 2,200 feet (see fig. 3). In this 2,200 foot interval ore bed C is 10 feet to 20 feet thick and most of it contains disseminated galena and sphalerite. North of this 2,200 foot interval several exposures of ore bed between gullies 3 and 4 and one 850 feet westerly from peak 4,820 are thought to be the same bed as ore bed C.

The offset to the east of the continuation of ore bed C at the higher altitudes is believed to be due in part to thickening of the sequence of metamorphic rocks by intrusion of quartz porphyry and in part to local folding and faulting of the metamorphic rocks between gullies 3 and 4 at altitudes of 3,300 feet to 3,700 feet. The 600-foot exposure of ore bed whose southern limit is 2,100 feet north of peak 4,820 is thought to be the same bed as that in those exposures at the higher altitudes. Several exposures of ore bed (not shown in figure 3) are about 1 mile north of peak 4,820 near the westernmost margin of Nelson Glacier and are tentatively identified as the same bed as that in the 600-foot exposure 2,100 feet north of peak 4,820.

Ore bed D, at some places interbedded with gray coarse-grained siliceous marble, crops out in gully 4 between altitudes of 2,125 feet and 2,900 feet for a horizontal distance of about 2,100 feet. Ore bed D has not been found between the northern end of this 2,100-foot interval and the exposure of ore bed 350 feet westerly from peak 4,820. This exposure 350 feet westerly from peak 4,820 and the exposures of ore bed north from it are thought to be the same bed as ore bed D. In this bed is a zone about 50 feet long and 1 foot thick of solid type ore composed principally of galena. This solid ore is north of the basin proper. Another ore bed crops out about 1,900 feet north of peak 4,820 (see fig. 3) and is thought to lie stratigraphically above ore bed D. The stratigraphic position of ore beds B, C, and D with respect to the ore beds in Groundhog Basin is uncertain. Projection of the beds B, C, and D, along their strike would place them stratigraphically above the ore beds in Groundhog Basin. The stratigraphic thickness between beds A and D is much greater than that between beds Nos. 1 and 4 of Groundhog Basin, and this greater thickness is not proportional to the amount of quartz porphyry added to the section. None of the ore beds of Glacier Basin are continuous into Groundhog Basin. Although the ore beds can be traced with little difficulty at lower altitudes the beds equivalent to the ore beds at high altitudes have not been traced because it is difficult to distinguish them from other rocks in the section and because they are interrupted by the many quartz porphyry sills.

No ore beds have been recognized on the south slope of Glacier Basin. The geology and topography of the south slope in general are mirror images of the geology and topography of the north slope. However beds of marble crop out on the south slope at the stratigraphic positions approximately corresponding to the ore beds on the north slope. Four marble beds are recognized on the south slope west from the gully opposite gully 4. Furthermore if the ore bed exposed near the west margin of Nelson Glacier about 1,900 feet north of peak 4,820 is projected south along its strike it would about coincide with a marble bed in gully 5. A corresponding marble bed is exposed on the south slope in the gully opposite gully 5.

In view of the similarity of the geology of the north and south slopes and the similar stratigraphic positions of the ore beds and certain marble beds, it is thought that the ore beds probably grade southward into marble beds and that the ore beds may represent matamorphosed and mineralized marble beds.

Veins

The veins in Glacier Basin and vicinity are mineralized shear and breccia zones. They are of a type similar to the veins in Groundhog Basin. The sulfide minerals in the veins are galena, sphalerite, pyrrhotite, pyrite and chalcopyrite which commonly are finely disseminated in altered and silicified fragments of country rock and in the fine grained quartz which cements the brecciated material. At a few places veinlets of sulfide minerals are present. Locally masses of galena ranging in weight from 5 pounds to 50 pounds occur as fissure and cavity fillings. Some light colored, altered bands of sheared metamorphic rock in the veins are partially replaced by pyrite and quartz.

The gangue consists of quartz, fluorite and the silicate minerals of the metamorphic rocks. Quartz occurs as fine grained material replacing the breccia fragments, as vein filling, and as drusy coatings in fissures and vugs. The fluorite is coarsely crystalline and is intimately associated with quartz.

Some veins consist of breccia blocks cemented with quartz whereas other veins consist of only moderately fractured rock cut by a network of quartz veins. Most of the breccia fragments consist of metamorphic rock but quartz porphyry fragments are in those veins which lie along or cut across porphyry sills and dikes. Nearly all of the metamorphic rock and quartz porphyry fragments are altered and silicified. The veins in general parallel the sills and the metamorphic rocks and their contacts are well defined.

The maximum range of thickness of the veins is from a few inches to 30 feet but most of the veins range from $1\frac{1}{2}$ feet to 10 feet thick. They pinch and swell but nearly all veins maintain a uniform thickness for at least 100 feet along their strike. Most of the veins 2 feet or more thick probably extend for distances of several thousand feet. At many places the veins cut across the bedding and the quartz porphyry sills. These cross-cutting veins trend northeasterly and most of them extend only short distances but a few extend for at least 500 feet.

The characteristics of the veins in Glacier Basin and vicinity are about the same regardless of their locations. Most of the veins occur in the zone of quartz porphyry sills but several veins are known east of the sill zone on both the north and south slopes of Glacier Basin.

RESERVES

Grade

The Geological Survey collected 15 chip samples in Glacier Basin. Eight samples (for locations see fig. 3) are from veins and seven are from ore beds.

Sample	Rock type	Length of cut in feet	Percent of Zn a/	Percent of Pb a/	Ounces of Ag a/	Ounces of Au b/	Location and Elevation	Remarks
GB-1	pyroxene granulite	12.0	1.71	2.05	none		gully 3 2180	Ore bed C; lowest exposure; slightly weathered.
GB-7	"	4.0	1.55	2.00			gully 3 2940	Ore bed C; GB-7 is stratigraphically lowest; GB-8 continues from GB-7; GB-9 continues from GB-8 and is stratigraphically highest; aggregate of lengths represents 11 feet of ore bed at least 12 feet thick.
GB-8	"	2.0	0.48	0.52			"	
GB-9	"	5.0	0.64	0.44			"	
			0.77	0.90				Weighted average of GB 7, 8, 9.
GB-2	"	5.0	5.34	0.31	none		gully 2 2060	Ore bed B; lowest exposure
GB-11	"	2.5	0.17	0.03			gully 1 3650	Ore bed A; near upper limit of metallized portion.
GB-12	"	6.0	0.42	0.41			North of peak 4820 4360	Ore bed north of peak 4820
GB-3	vein	5.0	0.20	0.05			gully 3 2140	Same vein; GB-3 is breccia type vein GB-4 is moderately sheared and altered metamorphic rock.
GB-4	"	3.0	0.10	0.12	none	none	"	
GB-5	"	2.0	0.05	0.17	none	none	gully 4 2130	Same vein; GB-5 is fractured metamorphic rock with fluorite-bearing quartz veinlets. GB-6 is moderately sheared metamorphic rock.
GB-6	"	4.8	0.24	0.04			gully 4 2140	
GB-14	"	2.2	0.26	none			southslope 2650	Sheared and altered, dark colored metamorphic rock.

Sample	Rock type	Length of cut in feet	Percent of ZN	Percent of Pb	Ounces of Ag	Ounces of Au	Location and Elevation	Remarks
GB-15	Vein	3.0	0.07	0.17	none	none	southslope 2980	Same vein; GB-15 is light colored, pyrite-bearing, altered metamorphic rock. GB-16 is from 12 feet of dark breccia type vein containing fluorite.
GB-16	"	3.2	0.08	none	none	none	southslope 2950	
GB-17	"	5.0	0.07	0.19	none		gully 5 4150	Brecciated county rock in matrix of quartz cut by quartz veinlets.

a/Analyst, Norman Davidson, Chemical Laboratory, Geological Survey

b/Analyst, Samuel H. Cress, Chemical Laboratory, Geological Survey.

The analytical results on the material collected are given in the following table. All sample cuts are approximately perpendicular to the bedding or to the walls of the veins.

The weighted average of the grade of the samples taken from the mineralized pyroxene granulite in Glacier Basin is zinc, 1.66 percent; and lead, 1.09 percent; and of the samples taken from the veins is: zinc, 0.14 percent; and lead 0.09 percent. Obviously the few samples collected do not represent precisely the grade of the ore beds or the veins, but it is thought that they do represent the order of magnitude of the grade of the material.

Tonnage

There has been no production from Glacier Basin and exploration work has been confined to the two adits in gully 4 and the adit east of gully 4. Many hundreds of thousands of tons of mineralized pyroxene granulite are inferred, but considering the low grade of the material, it is doubtful if the mineralized granulites in Glacier Basin can be regarded as ore at this time.

There are at least 12 veins in Glacier Basin with a minimum thickness of 3 feet and a minimum horizontal extent of 600 feet. Of these 12 veins, six are 5 feet or more thick and extend at least 1,000 feet horizontally. These 12 veins contain, at a minimum, several million tons of material but the grade is too low for the veins to be considered ore.

RECOMMENDATIONS

The low grade and the relative inaccessibility of the mineral deposits of Glacier Basin are unfavorable to any extensive exploration program. In view of the similarity of the geology and mineral deposits of Glacier Basin and Groundhog Basin, any data obtained from further exploration of the Groundhog Basin deposits may make future exploration of the Glacier Basin deposits desirable. If further exploration of the Glacier Basin deposits is considered it would be desirable to know more accurately the grade, widths, and lengths of the sulfide-bearing parts of the pyroxene-granulites, particularly of ore beds B and C at their lower altitudes.

As has previously been stated the solid-sulfide type of ore crops out in Groundhog Basin from altitudes of 1,600 feet to 3,500 feet 8/. Between altitudes of 2,500 feet and 3,500 in that basin the ore beds contain disseminated-sulfide type ore. On the other hand the lowest exposures of ore beds in Glacier Basin are of the dissiminated-sulfide type ore. With increasing altitude (and northward) the ore beds in Glacier Basin grade into less metallized material which in turn grades into relatively barren pyroxene gneiss. Therefore it appears that in both Glacier Basin and Groundhog Basin the ore beds contain, in general, less sulfide minerals at higher elevations than at lower elevations. Broadly speaking, it also appears that the best metallized material in both basins (see fig. 3) occurs in those parts of the ore beds that are nearest the western quartz diorite.

8/Gault, H. R., op. cit. p. 5.

Whether the facts outlined above are of genetic significance has not been determined. However the implied relationship between ore, altitude and distance from the western quartz diorite and the fact that sulfide-bearing granulites are traced for 3 miles should be borne in mind in any future operations that may be undertaken in Groundhog Basin.

SUMMARY

Glacier Basin is on the mainland of southeastern Alaska about 13 miles east of Wrangell. Zinc-lead deposits occur in a section of metamorphic rocks between two masses of quartz diorite and are of two types sphalerite-and galena-bearing pyroxene granulites interbedded with gneisses and schists and veins containing small amounts of sphalerite and galena. The metamorphic rocks are cut by sills and dikes of quartz porphyry and basalt and by breccia zones.

There are several beds of pyroxene granulite called ore beds and where metallized with sphalerite and galena are similar to the disseminated ore of Groundhog Basin. The total known extent of zinc metallization in the pyroxene granulites is slightly more than 3 miles. The grade of the granulite deposits in Glacier Basin and vicinity is about 1.66 percent of zinc and 1 percent of lead. There are at least several hundred thousand tons of this type of material.

The vein deposits are in general, nearly parallel to bedding and are known to crop out over a distance of 4 miles. The grade of the vein material is about 0.14 percent of zinc and 0.09 percent of lead. It is estimated there are several million tons of this type of material.

May, 1944.

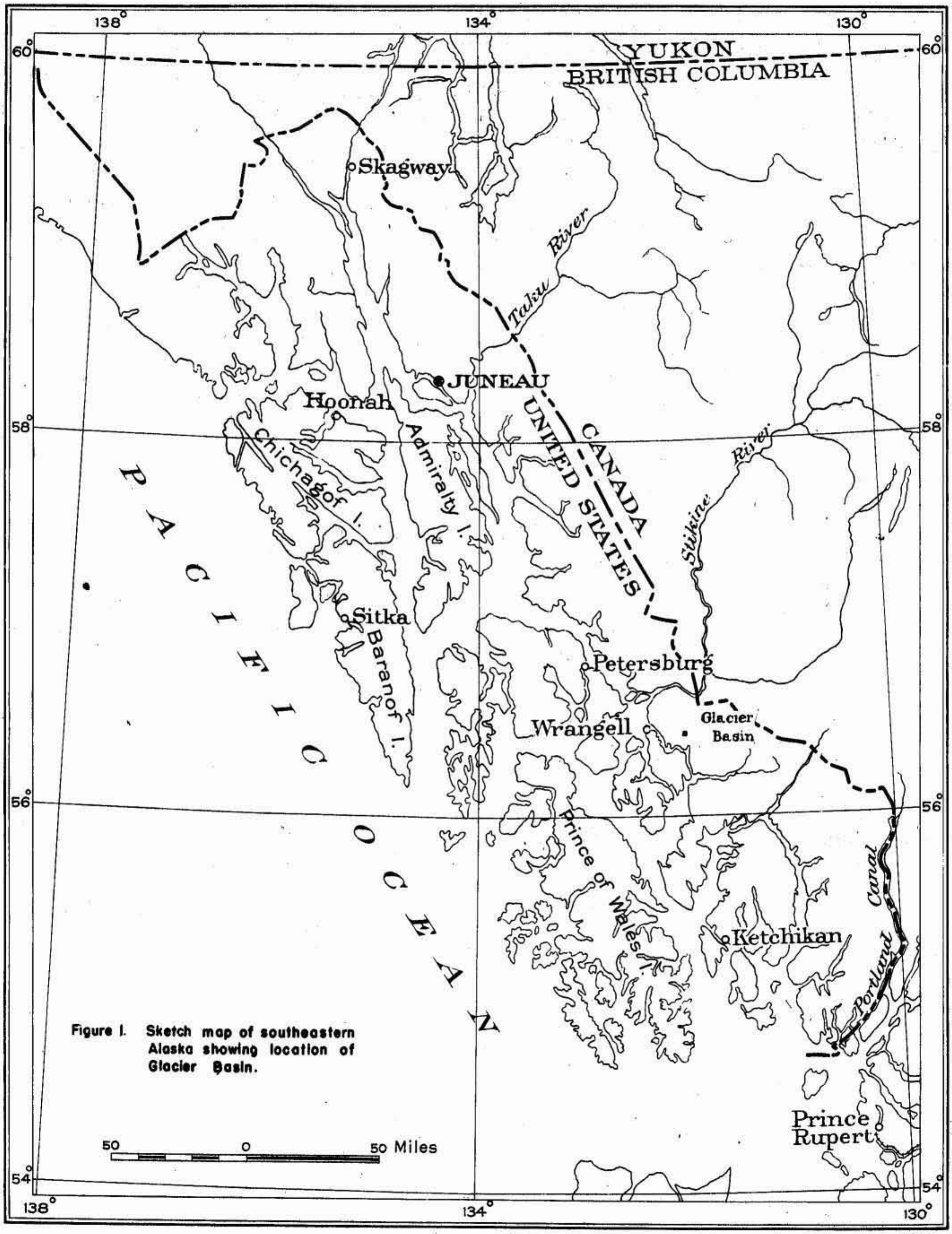

Figure 1. Sketch map of southeastern Alaska showing location of Glacier Basin.

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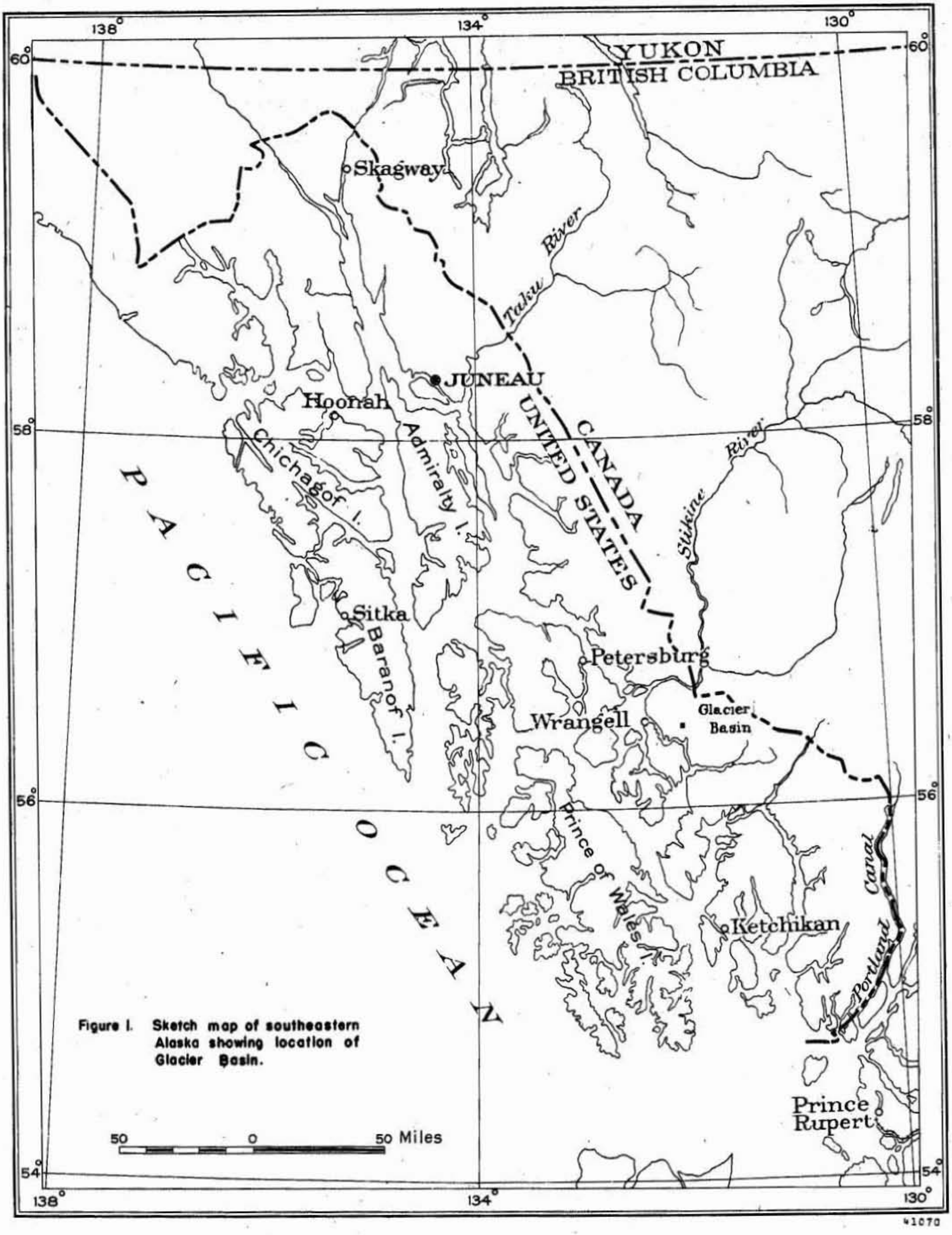


Figure I. Sketch map of southeastern Alaska showing location of Glacier Basin.

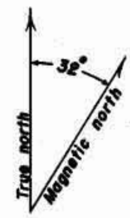
UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

WAR MINERALS INVESTIGATIONS
PRELIMINARY MAP

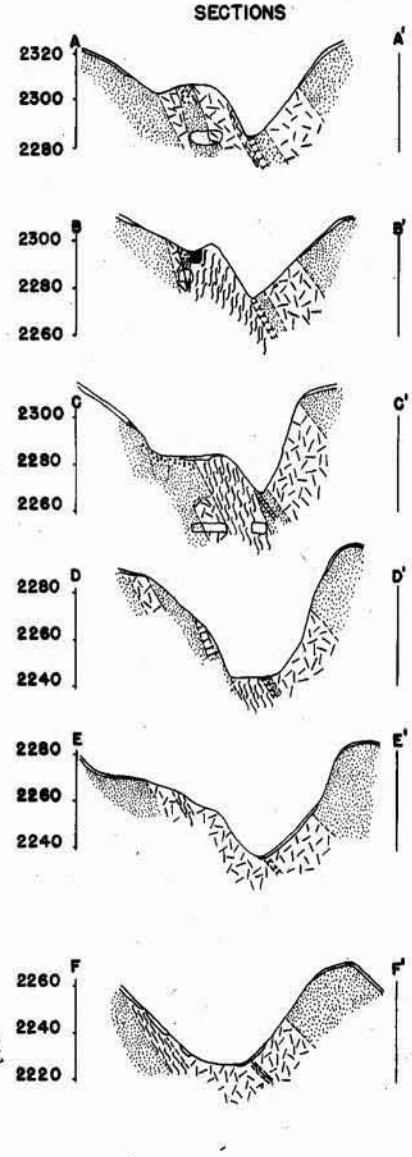
FIGURE 4
GEOLOGIC MAP AND SECTIONS OF A PART OF
GULLY 4
GLACIER BASIN
SOUTHEASTERN ALASKA

Scale
50 25 0 50 100
in feet

Contour interval 20 feet
Datum is mean sea level as determined by aneroid

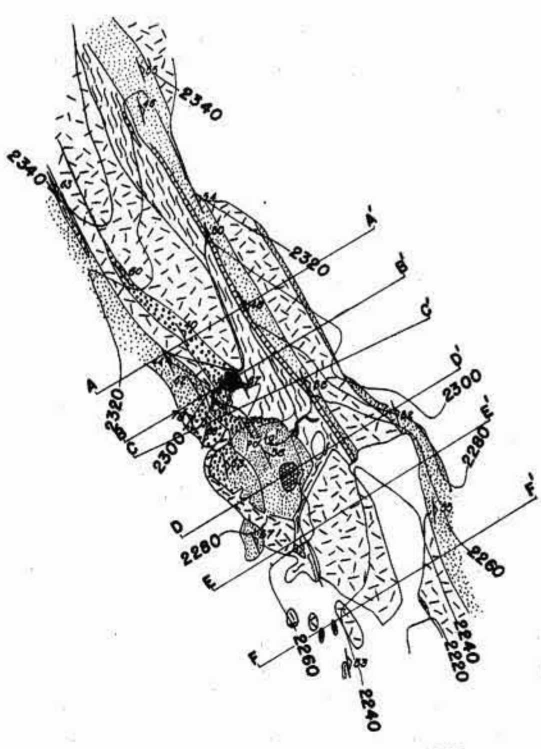


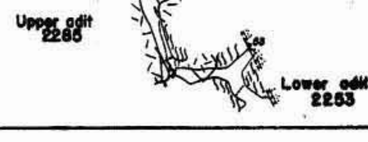
SECTIONS



EXPLANATION

- Covered and unmapped areas
- Vein
- Quartz porphyry
- Ore: 1. Almost solid sulfide; 2. Disseminated sulfide
- Metamorphic rocks (a. siliceous limestone bed)





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WAR MINERALS INVESTIGATIONS

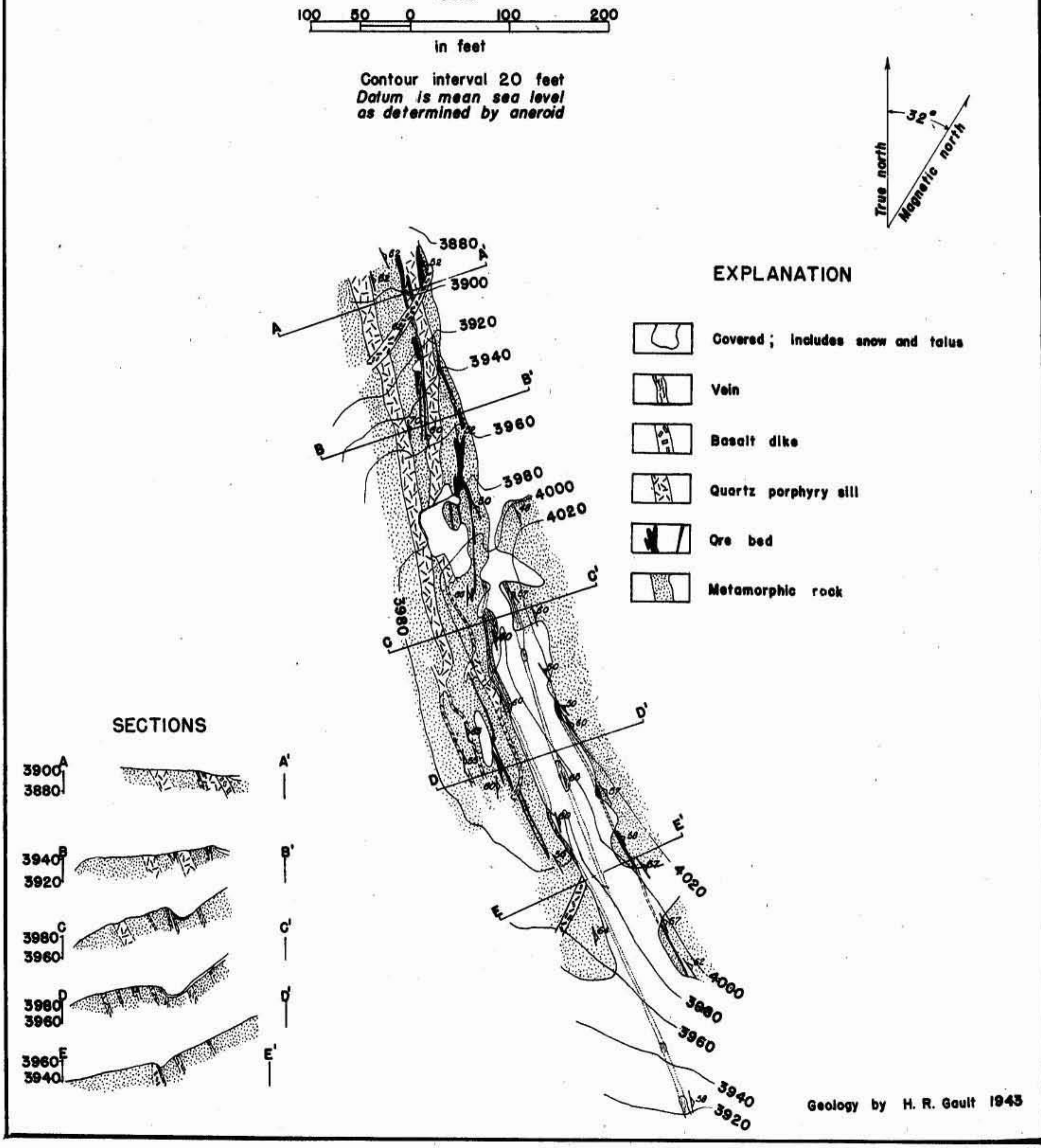
PRELIMINARY MAP

FIGURE 5

GEOLOGIC MAP AND SECTIONS OF AN AREA

NORTHWEST OF PEAK 4820

GLACIER BASIN AND VICINITY SOUTHEASTERN ALASKA



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