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STATE OF ALASKA
DIVISION OF MINES AND MINERALS

REPORT ON

WHITE MOUNTAINS CINNABAR PROSPECT
OF
CORDERO MINING COMPANY

McGRATH QUADRANGLE, ALASKA

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March 1961

CONTENTS

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SUMMARY

The late 1957 cinnabar discovery and its staking the following year by Jack Egnaty, of Sleetmute, Alaska, has focused attention to a new district in the White Mountains, McGrath Quadrangle.

Exploration work since its discovery has resulted in expanding known cinnabar mineralization along the "A" Zone to a strike length in excess of 10,000 feet. The natural exposures and their width, plus cinnabar values exposed by trenching and expanded by augur sampling, make this an outstanding occurrence. It is believed that the widths and lengths of the individually limited areas so far tested on "A"Zone, plus the natural outcrops on the southwesterly section remaining to be checked and their limits to be determined, have a very large tonnage potential and a suggested ore grade far in excess of any presently known cinnabar deposit in the State.

From the brief study of the fewer outcrops on "B" Zone it does not appear this section has the surface "markers" comparable to the "A" Zone, as the cinnabar mineralization is weaker, and that observed was limited to scattered "blotchs" and small veinlets. However, it should be studied more carefully, and systemmatically trenched and sampled when time permits.

The White Mountains discovery and results obtained to date in that area, combined with recent but as yet unpublicized reports of two other cinnabar discoveries made at widely separated points to the southwest, emphasize that strong regional structures such as the Farewell Fault System are the most fertile areas to prospect, and are recognized to be the major controlling factors for all important mineral deposits and mining districts.

INTRODUCTION

The 1960 field trip to the White Mountains cinnabar prospect covered period of August 2nd to 4th, 1960. It was made at the invitation of Mr. Ed Hager, Mining Engineer, Cordero Mining Company, and Mr. Ray Maloney, Mining Engineer, in charge of the U. S. Bureau of Mines exploration program on the property. The area had been previously briefly examined August 30, 1958, at which time it was found that the numerous trenches excavated that first year of the property's location had exposed mineralization of especial interest. The work completed last season up to August 3rd expanded the previously known occurrences, and points to this area as being one of probable major importance.

LOCATION AND ACCESSIBILITY

This cinnabar area lies near south central limits of the McGrath quadrangle, about 60 miles southeasterly from McGrath, at approximate coordinates Longitude 154° - 52' and Latitude 62° - 11'. Situated at headwaters of the major northeasterly tributary of Swift River, the latter a tributary of the Kuskokwim River, the shortest (airline) distance to the latter navigable waterway is about 42 miles northwesterly.

With no roads into the district it is presently only readily accessible throughout the year by bush plane. Frequent landings have been made upon an unimproved landing strip on the well rounded ridge within a 100 yards of the original cinnabar discovery and claim location. Winter freighting overland with tractor equipment to the area from McGrath, Farewell, or closer points along the Kuskokwim River is considered practical.

The relatively low and isolated mountain mass is of limited areal extent. Unnamed on the USGS McGrath quadrangle map, it is locally called the White Mountains because of the extensive white limestone outcrops.

CLIMATE & WATER SUPPLY

The climate is typical of the Kuskokwim valley region, where winter temperatures drop to 30° and 40° below zero fairly frequently, and snow cover reaches an average depth of two to three feet. Dry summer periods of several weeks to a month are not uncommon, and low overcast with rainy periods of several weeks duration with poor flying weather are the general rule.

Below the junction of two streams 1 to 1½ miles southwest of the original discovery area, there is considered to be sufficient water supply to support a 200 ton or more per day operation. Although no stream measurements were taken in the area it was estimated the combined stream flow of the two creeks was 1200 to 1500 cubic feet per minute at time of visit. It is not known what volume of water is available during winter months, but it is possible that the numerous springs may supply sufficient water for cold weather operations.

One "mineral" spring was noted which gave off a strong SO_2 and H_2S odor; tracks and other sign indicates this spring to be used frequently by moose, caribou, and bear.

TIMBER & VEGETATION

Spruce timber, suitable for mining use, has a fairly dense growth in the narrow valleys of this area of interest. Only scattered spruce occurs on lower slopes of the valleys, with timberline within limits of 1000 to 1200 foot elevation above sea level. Birch growth in the area is of minor importance.

Willow and alder brush was not noted to occur in dense growth, and foot travel is relatively easy. The brushline is generally around the 1300 foot elevations, with exceptions being in limited swampy depressions at several points near the "rolling" ridge crests, where scattered growth of three foot willows is usually present.

The soil cover is generally shallow above the brushline, and weathering of limestone and dolomite supports only a thin moss, short grass, low-bush cranberry and blueberry growth. (1)

TOPOGRAPHY

The White Mountains region is one of mature topography and low relief. Fault movements have developed 30 to 50 foot escarpments at number of points in the area.

The USGS topographic Map (McGrath Quadrangle) shows highest elevation in immediate vicinity of the cinnabar showings to be 3200 feet two miles to northwest, and 3600 feet at point 12 miles S10W of the discovery showings. (1)

HISTORY AND OWNERSHIP

So far as presently known, fine cinnabar "float" was first noted on surface slopes and in the narrow valley creek bed on south side of the ridge during trapping season of 1938 by Jack Egnaty, a native "leader" of the Sleitmute area. No effort is reported to have been made by him to trace the "fine" float to its source at that time or during the next 19 years.

This occurrence was reported to Robt. F. Lyman and Ed Hager in fall of 1957, and Mr. Hager encouraged Mr. Egnaty to return to the area and trace the "float" to its source. This was readily accomplished, and as a result of the promising samples brought back by him it was arranged to have Nick Mellick, Jr., of Sleetmute to fly into the district in May 1958. Landing about 10 miles to the south, Mr. Mellick hiked to the area and staked-out the landing strip. Mr. Egnaty staked 4 claims along strike of the zone - the WMM and WMM 1, 2, and 3 lode claims-for total length of 6000 ft. (2)

In June and early July, 1958, Mr. Hager did extensive trenching, with aid of two natives, across the mineralized zone. This work was largely concentrated on the WMM, WMM No. 1, and WMM No. 3 mineral claims. (3) Results of this program were very encouraging. During that first season limited reconnaissance work to southwest of original discovery revealed presence of cinnabar mineralization at a number of points, indicating an additional mile length to the zone of economic interest. Limited efforts made to trace the mineralized zone to the northeast have not been successful to date.

(1) Refer to views of area attached.
(2) Refer to attached map 1.
(3) Refer to attached maps 1, 2, & 3.

During 1959 and 1960 Mr. Egnaty continued prospecting the area. His work resulted in staking an additional 3 claims, beginning at southwest endline of the WMM mineral claim and continuing southwesterly, giving a total length along this zone of over 10,000 feet. (2) The natural outcrops on the most southwesterly claim are considered the most interesting found to date.

Mr. Egnaty discovered a second zone on southeast side of the original discovery (for purposes of reference in this report the first zone is called the "A" Zone, and the second "B" Zone). This new discovery appears to be at tangent to "A" Zone, and lies on south side of the small creek in narrow valley below original claim group. (2) Cinnabar mineralization in this new area was observed at numerous points in the low limestone (or dolomite?) bluffs and in large talus slabs at their base. Four claims were located along the "B" Zone. The brief investigation made of this area ("B") with Mr. Hager in August 1960 indicates the "A" Zone is the most promising. (1)

All claims located by Mr. Egnaty are held by the Cordero Mining Company, Palo Alto, California, under option agreement.

From mid-June to mid-September, 1960, an U. S. Bureau of Mines exploration program on the property was under way, with Ray Maloney, Mining Engineer, in charge of the project with a two man crew and with Mr. Hager assisting. Their work during that period was limited to "A" Zone and confined to power driven augur sampling on a closely spaced pattern, and to some trenching to check augur hole results. Their program for the 1961 season is planned to be enlarged and dozer equipment employed for stripping, with the work largely confined to the "A" Zone.

GEOLOGY

There is no published U. S. Geological Survey coverage of the White Mountains area to date. However, in 1958 two geologists of the USGS visited the property for a short period, and they were followed by A. S. Sainsbury in 1959. Mr. Sainsbury is said to have spent considerable time on geological mapping of the district, and is reported to have determined the cinnabar occurrences were along and associated with the highly shattered zone developed by the regional Farewell Fault system. It is also stated Mr. Sainsbury's work determined the "A" Zone, in which the cinnabar mineralization occurs, is largely confined to a dolomite formation rather than limestone - at least so far as surface and trenched exposures are concerned (Hager and Jasper had previously considered limestone to be the host rock).

The extensive limestone (and dolomite) formation in this area is suggested by Jasper to be of Paleozoic age, and probably (?) a southern limb of the Paleozoic limestone mapped by the USGS in the Mespelt-Medfra region 70 to 80 miles to the north.

(1) Refer to attached views of area.
(2) Refer to attached Map 1.

In vicinity of original discovery ("A" Zone) at common endline (on south side) of the WMM and WMM No. 1 mineral claims there is a limited surface cropping of thin bedded shale of as yet undetermined thickness. In Trenches No.s 1, 2, 3, and 4 of this area the shale has an apparent 45° NW dip, and northeasterly strike. (3)

In trenching to locate source of the fine cinnabar "float" on surface of the 20 to 30 foot wide shale outcrop a fault "gouge" was encountered within a foot of the gently sloping surface. This gouge material - several feet in thickness - followed the surface slope for distance of 10 to 80 feet in Trenches No.s. 1, 2, 3, and 4, and then started to "plunge", reaching a near vertical attitude in the two deeper Trenches No.s 1 and 2.(3) It is believed that with additional depth it will be found that the fault dips steeply to the southeast. With no mineralization noted in the shale under the gouge in the "flat" section, being confined entirely to the dolomitic formation so far as known to date, the cinnabar occurrences are presently considered to be "post-faulting" in age. With fault gouge acting as an effective barrier to upward migrating mineral bearing solutions, and the cinnabar deposition being found limited (to date) to north side of fault gouge, it seems a reasonable expectation greater depth will reveal the fault dip is to southeast.

A probable (?) explanation for the flat lying gouge at southeast end of the trenches is believed due to gradual "creep" down the steeper slope, which latter begins a short distance south of the trenches. This movement is thought to be largely activated in the erosional cycle of the district by the "heaving" action of freezing and thawing; the highly shattered dolomite on north side of the gouge filled fault zone shows ice veinlets present to depths of the trenches. (3) Total depth of frozen bedrock in this fractured zone, it is suggested, may exceed 100 feet.

A similar condition appears to exist in vicinity of Trench No.s 1 and 2 on WMM No. 3 claim. In Trench No. 1, 90 feet in length, the bottom followed a similar flat lying gouge for about 60 feet - as was also the case in Trench No. 2 for shorter distance. At time of the 1958 visit the banks of both trenches had sluffed-in and covered the bottoms. Mr. Hager reported that the ore occurrences were all above the gouge in "crushed" and weathered dolomite as noted on attached map. (4) With steeper surface slopes in this area and the gouge extending further down the hillside it seems likely that the main fracturing along "A" zone lies further up the slope to the west.

With discovery of the "B" Zone made last year there had not been sufficient time to prospect the various showings with open-cuts or trenches. From the brief investigation of that area, however, observations made of natural outcrops and the large talus slabs suggests that fracturing along "B" Zone was not as intense as that along "A" Zone. Mineralization noted was limited to more scattered "plates" and fine seams of cinnabar along joints and/or fractures, and does not appear to justify the prospector's opinion of its being more promising than "A" Zone. Nevertheless, it justifies exploration and will be given attention at an early date.

(3) Refer to Attached Map 2.
(4) Refer to Map 3, attached.

The "B" Zone lies at a 15 to 30 degree tangent to "A" Zone. Discoveries along its strike suggests its intersection with the "A" Zone on the WMM No. 3 claim, and the 90 foot length of Trench No. 1 on the latter claim may be near its northern end. (4)

Mineralization

The numerous trenches and samples from them show the mineralization is limited to cinnabar; no stibnite, realgar, orpiment, pyrite, or arsenopyrite was noted at any point examined.

In the yellow, crushed, dolomite adjacent to and on north side of the gray fault gouge there are good HgS values in places and very little at other points. Some brecciated sections have good HgS "cementation" and are high-grade; these were usually a few feet beyond the "crushed yellow" dolomite. (3)

In Trenches No.s 1 to 4, near common endline of the WMM and WMM No. 1 claims, the cinnabar occurs as very thin small to large plates and short veinlets along fractures, and small pods of highgrade for distances of 10 to 40 feet north of the fault gouge. (3) The material removed from several of these long trenches was said to be of much higher grade than the cinnabar deposits being mined in the western states.

In the 90 foot trench on the WMM No. 3 claim numerous small "pods" with lower grade material along fractures was found along the first 60 feet across a 1 foot average width making good ore for this section. (4) In the four trenches to southwest of Trench No. 1 the first two have minor cinnabar and the other two no cinnabar "in place". Of the two trenches to northeast of No.s 1 and 2, the first one shows minor cinnabar along "flat partings" in blocky dolomite, and no mineralization "in place" in the second one. (4)

The natural outcrop on "A" Zone, within an estimated 1500 feet of the presently located southwesterly end of this claim group, is the most interesting and highest grade of any exposure found to date in the area. This exposure, about 500 feet to southwest and 150 to 200 feet above and to west of the sulfur spring, has a 20 to 25 foot width. The cinnabar occurs as irregular small "gobs" or pods, "blebs" along fractures, and irregular short veinlets up to a quarter inch or more in width. It is guestimated the full width of this showing will run over 2 flasks per ton.

The cinnabar occurrences along the "B" Zone, in the few exposures seen, is confined to more scattered "plates" and fine seams or short veinlets along joints and fractures. This zone does not show the strong fracturing which prevails along "A" Zone.

(3) Refer to Map 2
(4) Refer to Map 3

Sampling

No channel samples were taken during the 1958 or 1960 visits to the area. However, Mr. Hager had sampled the various trenches, with a few of the results obtained shown on his sketch maps, copy of which is attached. (Maps 1, 2, & 3)

Results of the rather extensive augur sampling plus samples of trenches put down by the USBM were not available. However, the mud cuttings from the augured holes looked very good in many cases, and a number of short trenches exposed high grade sections. The location of the augur sampling program was largely confined to area in vicinity of common endline of the WMM No. 1 and WMM No. 2 claims. The pattern followed was across strike of the "A" Zone on lines 6 feet apart with the holes spotted along the lines at 6 foot intervals, and placed on each line midway between the holes of the lines on each side. This pattern was expanded in each case for short distances along the lines beyond limits of appreciable mineralization . The augur bit was 2 inches in diameter. Depth of holes varied from 3 to 6 or 7 feet, the limit determined by depth to solid and/or frozen bedrock. Powered by a small aircooled engine the equipment required 2 men to operate it.

The number of auger holes put down by end of the 1960 season was probably within limits of 250 to 300. Total area covered (width and length) by season's end is not known.

CONCLUSIONS

Directly associated with the regional Farewell Fault system, and the resultant highly fractured and brecciated dolomite-limestone formation providing an ideal structure for mineral deposition, this cinnabar occurrence has been traced at intervals and staked for a length of over 10,000 feet along the "A" Zone. Its width, grade, recurrence at number of widely spaced natural outcrops, the mineralization exposed in the 1958 trenches, plus results obtained during test work completed in 1960, suggest that this deposit should prove to be an outstanding one.

Information gained to date points to a large tonnage potential, and to be a deposit having a higher average grade than has been found anywhere in the Kuskokwim Valley Region cinnabar "Province".

The apparent absence of appreciable antimony or arsenic sulfides adds to the potential value of this deposit.

The 90 foot width of thin bedded shale revealed in the 1958 trenching on the WMM and WMM No. 1 claims shows a 45° northwesterly dip, and that it possibly (?) underlies the dolomite-limestone formation. The total shale thickness has not been determined.

Present information indicates that the Farewell Fault intersects the shale formation at a 45° angle to the latter's dip, in which event it may be found that width of the cinnabar mineralization is confined to narrower widths, as shale is generally found to be a poor "host rock" for mineral deposition, generally acting as a barrier to mineral bearing migrating solutions.

However, it can be reasonably expected that, due to the probable magnitude of regional movement accompanying the Farewell Fault system it resulted in major horizontal-vertical displacement of the formations, and that on northwest side of the fault the shale member may be either absent or at considerable depths below present surface. Strength of the cinnabar mineralization is considered as evidence that it is absent. (?)

A 1958 reported finding of cinnabar-stibnite "float" on west side of the Tatlawiksuk River, 24 miles S75-78W of the above White Mountains deposit (at approximate Long. 155° - 36' and Lat. 62° - 36') on the east slope of a low, isolated, well rounded hill, suggests another area worth investigation. On "projection" this location is within 10 to 15 miles northwest of the Farewell Fault.

Anchorage, Alaska
March 1961

By- Martin Jasper

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Mining Engineer
State Division of Mines & Minerals

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Sulfur spring at mouth of gulch

Aug. 3, 1960

White Mts. Mercury Prospect. Views looking NE along "A" Zones general strike, taken from point ± 100 ft. above higrade HgS outcrop about 1500 from SW end of property. "B" Zone on right side of valley with outcrops in low bluffs and strike at 15° to 30° tangent to "A" Zone.

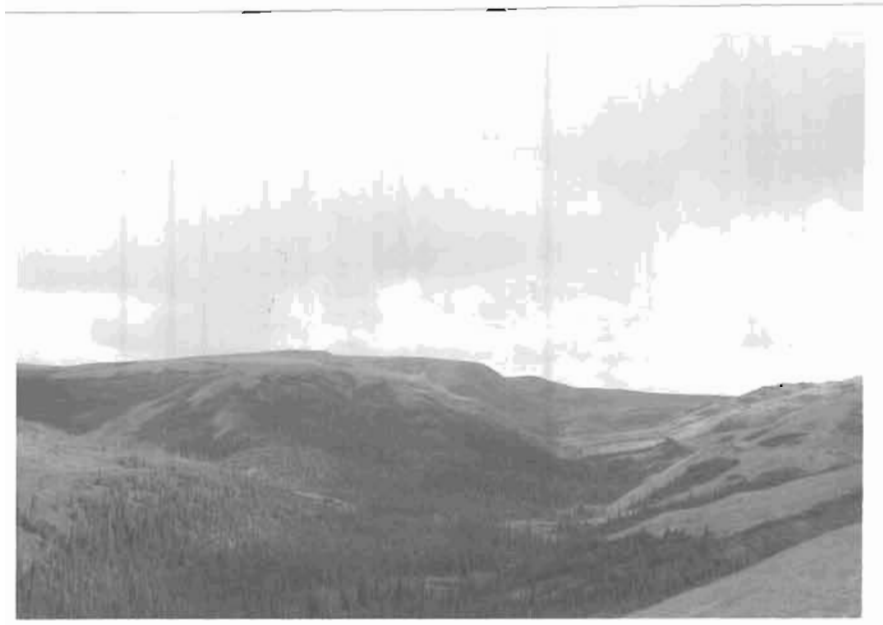


PLATE 1

Aug. 3, 1960
White Mts. Mercury Prospect. U. S. B. M. Campsite

July 1958
Looking NW along Trench No. 2 with
Ed Hager on bank.

PLATE 2

July 1958
View of trenches near common endline of WMM & WMM No. 1
Trench No. 1 @ extreme left and Trench No. 2 in center.
Shale outcrop in foreground. (Refer to Map 2) looking
northwesterly across "A" Zone.

White Mountains Mercury Property
McGrath Quad.

July 1958
View looking northerly showing trenches across "A" Zone
Mr. Hager at lower end of Trench No. 1, WMM claim.

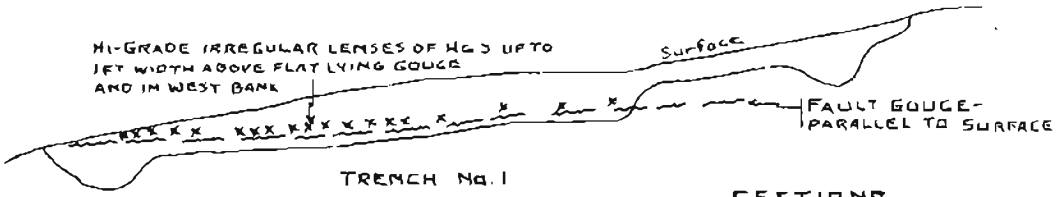
White Mountains Mercury Property
McGrath Quad.

July 1958
View looking southwesterly along "A" zone's general strike. Trench No. 1 started at "Discovery" on WMM # 3 has northerly strike and is presently the north end of "B" Zone. The two gulches to right of Mr. Hager are considered post mineral "Blockfaulting" planes.

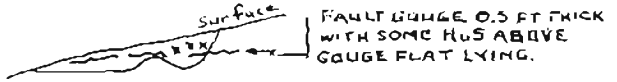
July 1958
View looking southwesterly along ridge crest. Plane in center background at mid-section of unimproved natural airstrip.

White Mountains Mercury Property
McGrath Quad

July 1958
Nick Mellick Jr.s Piper Super Cub on unimproved ridge crest landing strip. Numerous landings and take-offs with 2 passengers (or freight) made without mishaps. Original discovery 100 yards to left of plane.

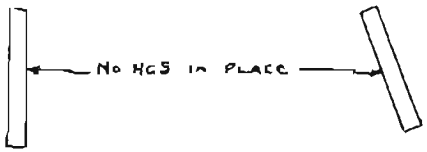


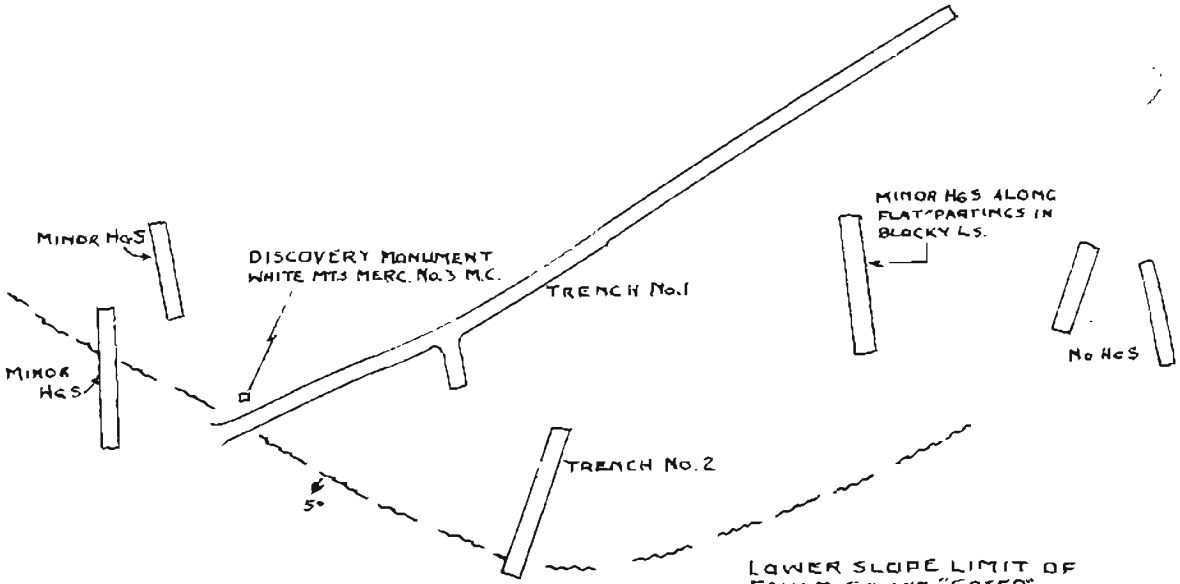
TRENCH No. 1



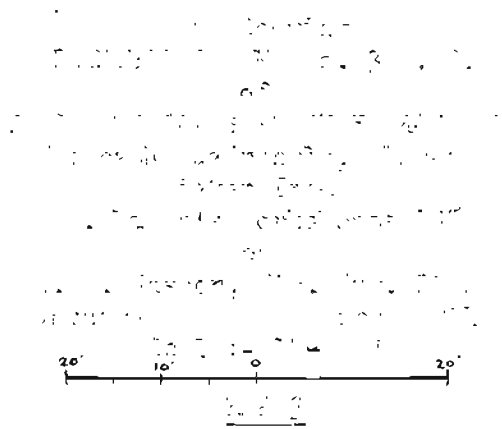
TRENCH No. 2

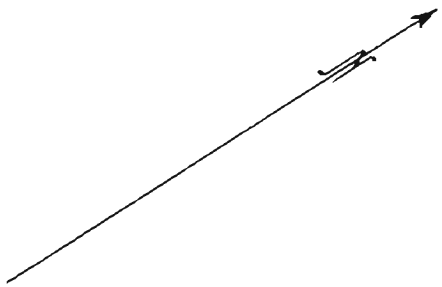
SECTIONS

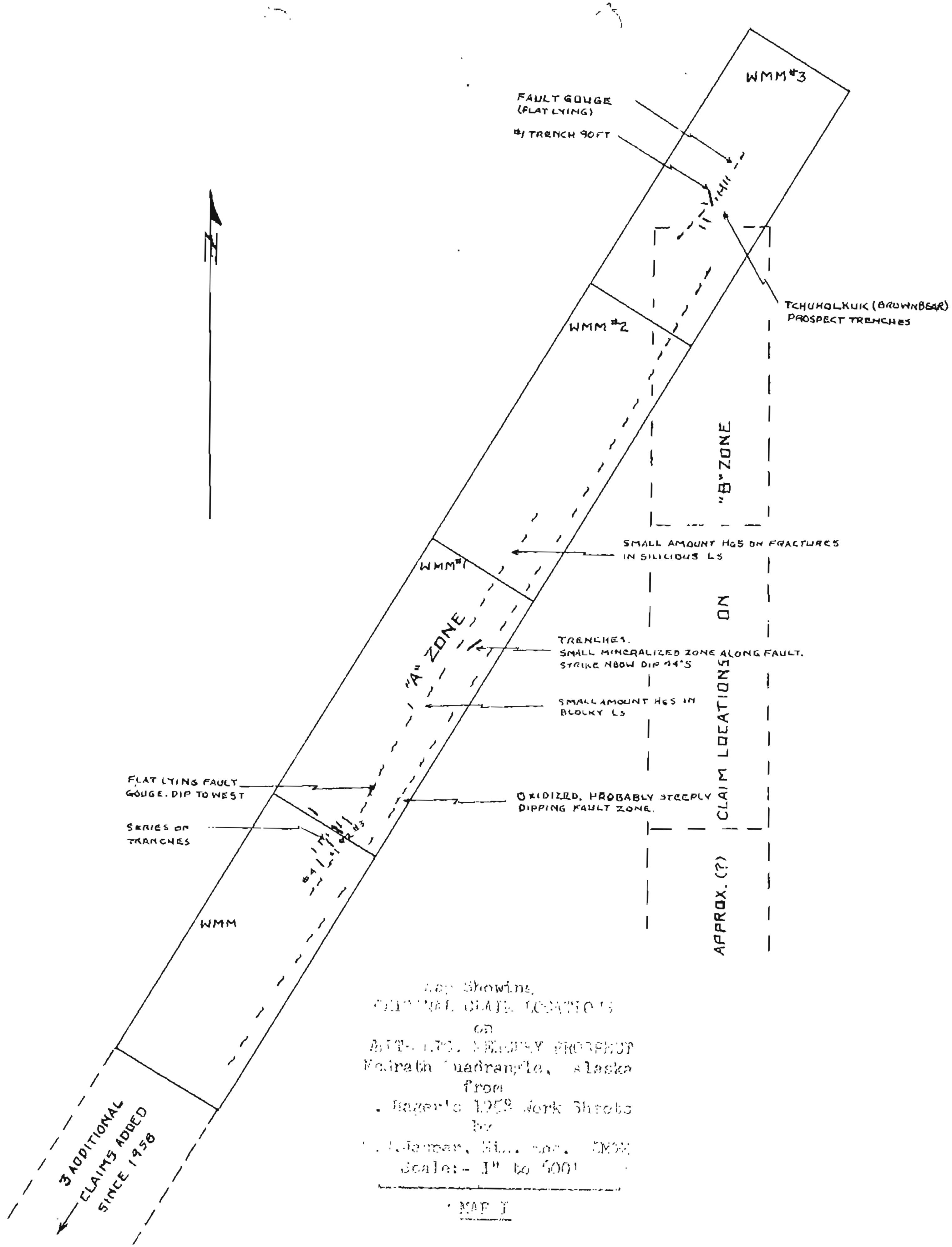




PLAN







Map Showing
[illegible] CLAIM LOCATIONS
on
[illegible] MERCURY PROSPECT
McGrath Quadrangle, Alaska
from
[illegible] 1959 Work Sheets
by
[illegible]
Scale:- 1" to 500'

MAP I