MI-114-02

SLOCUM ARM MOLYBDENITE PROSPECT

CHICHAGOF ISLAND, ALASKA

Sitka Quads B-6, C-6

Sitka, Alaska

Mar. 25, 1968

John D. Ballard, P.E.

June 26, 1968

Mr. John D. Ballard
Mining Engineer
Box 920
Sitka, Alaska 99835

Dear Mr. Ballard:

Thank you for your letter of May 31 including a copy of your report "Slocum Arm Molybdenite Prospect, Chicagof Island, Alaska". I have read the report with much interest and wish to commend you for its clarity, detail, and method of preparation.

I am forwarding the report to Jim Williams in Fairbanks and I am sure that you will be hearing from him in the near future with offers of any assistance that his Division may provide of local or regional geologic importance that might complement your report or in any way initiate exploration.

Yours very truly,

Thomas E. Kelly, Commissioner
Department of Natural Resources

TEK:ya
bcc: J. Williams, with report

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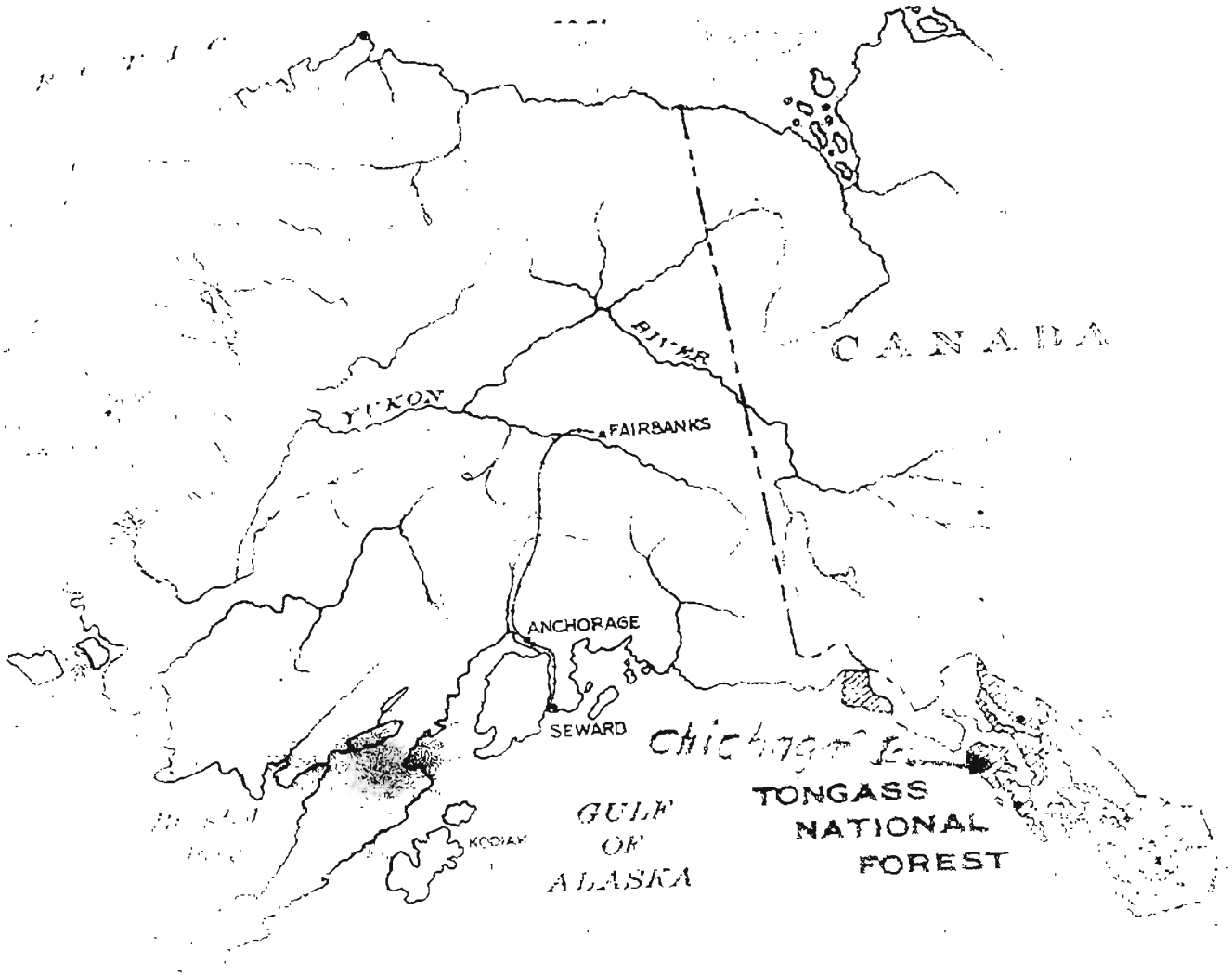
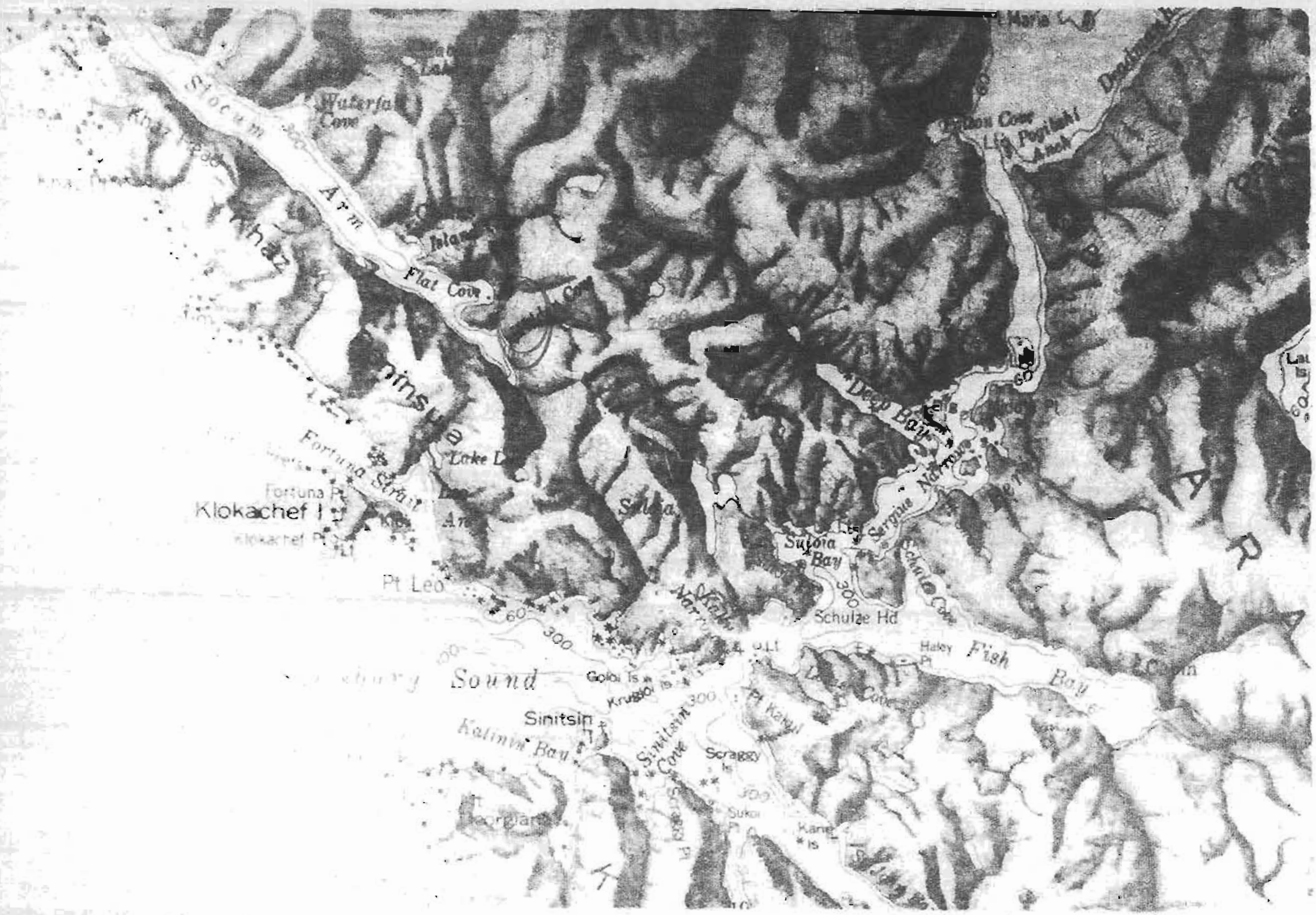


LOCATION MAP



Slocum Arm
Flat Cove
Deep Bay
Fortuna Strait
Fortuna Pt
Klokachef I
Klokachef Pt
Pt Leo
Sound
Goloi Is
Krugloi Is
Sinitsin
Kalinin Bay
Sinitsin Cove
Scraggy Is
Pt Kakul
Schulze Hd
Haley Pt
Fish Bay
Sukoi Pt
Kane Is
Sukoia Bay
Sergius Narrows
Lake D
Pogibshi Anch
Deadman Reach

INTRODUCTION

This report has been written at the request of several interested partys and the Department of Economic Development of the State of Alaska.

The writer wishes to state in the beginning that though he has tried to the best of his abilities to write an objective and unbiased report and believes that he has done so, he is aware that when the owner, no matter how well qualified or well intentioned he may be, writes such a report it will be regarded with a degree of doubt. To the doubts that may enter the mind of the reader the only answer is for the reader to investigate and then form his own opinion.

SUMMARY

Molybdenite mineralization occurs in a strong fissure striking northeast and dipping southeast in a formation of andesitic volcanics forming the south side of an east-west trending mountain. The fissure intersects a major fault striking northwest and dipping steeply to the northeast which is occupied by a large dike in a strongly metamorphosed zone of altered shistose rock carrying traces of molybdenum mineralization.

CONCLUSION

It is the writers conclusion that taking into account the outcrop in the fissure, the strike and dip , its intersection with the major fault-dike complex to the northeast, the traces of molybdenum mineralization and the surface evidence of intense metamorphism, it is possible that the mineralization shown in the fissure migrated from the major fault-dike area along the fissure to a dilatant area where it was deposited and if so an economic mineral deposit may lie along this line.

LOCATION AND GENERAL CONDITIONS

the prospect is located approximately 35 miles northwest of Sitka, Alaska, on the southwestern part of Chichagof Island, with the original discovery about 1½ miles east of Hidden Cove in Sleeum Arm, latitude 57 degrees 27 minutes north, longitude 135 degrees 45 minutes west. The locality is shown on U. S. G. S. Quadrangles Sitka B-6 and C-6 and on U. S. C&G. S. Chart No. 8248, and lies in the Tongass National Forrest, Sitka Mining District.

The prospect consists of 10 unpatented claims in two groups. The original claim is known as the Mt. Rinehart Moly Lode and subsequently nos. 2 and 3 were added to this lode as well as an intersecting claim named the Hidden Moly. The second group of claims lie along a large dike occupying a major fault about ¾ of a mile northeast of the original claim and are known as the Mt. Rinehart Moly Lode No. 2 with nos. 2,3,4,5 and 6 extending to the northwest. The no. 3 claim of the Mt. Rinehart Moly Lode group intersects and overlaps the no. 2 claim of the Mt. Rinehart Moly Lode No. 2 group. All claims are recorded in the office of the Magistrate in Sitka

Access to the prospect is best gained from the City of Sitka which is a beautifully located small city, the capitol of Russian America and the first capitol of the Territory of Alaska. Sitka is served by the Alaska Ferry System, The Alaska Steamship Co., and a barge line by water and by air by Alaska Airlines daily jet service from Seattle to Sitka, Anchorage and Fairbanks and soon to interior points such as Juneau, Petersburg, Wrangell and Ketchikan by merging with Alaska Coastal Airlines.

Sitka is supported by a declining fishing industry, a thriving pulp mill owned by the Alaska Lumber and Pulp Company, a Japanese owned concern which shipps the high grade pulp to Japan direct on their own vessels, and by the Federal Government installations of the Public Health Service, The Bureau of Indian Affair, The Federal Aviation Administration and the Coast Guard all located on Mt. Edgcumbe Island (formerly Japonski Island).

Two air taxi operators maintain fleets of small float planes based at Sitka and a helicopter service is expected to be established there in the near future. From Sitka, access to the original claims is gained either by float plane to Hidden Cove and then by a rough and not well marked trail on foot which takes 3 to 4 hours, or by helicopter from Sitka which takes about 35 minutes.

For any extensive investigation it is necessary to bring supplies and a camping outfit to the vicinity of the prospect as since the closing of the Chichagof and Hirst Chichagof mines located about 20 miles north of the prospect and the general decline in mining and fishing in the district, the former resident population has been forced to move and at present there are no permanent residents on the west coast of Chichagof south of Lisianski Straits.

GEOGRAPHY

Southeastern Alaska is an archipelago composed of a chain of islands bordering the coast range from Dixon Entrance to Cross Sound and Chichagof is the most northwesterly of the chain. The west coast of the island is exposed to the open Pacific at the northern and sourthern ends while the more central part is protected by a fringe of small islands. Chichagof is

an anticline the central portion of which has been stripped to the granitic core of the batholith that uplifted it. It has been subjected to the forces of the continental ice sheet and as that withdrew, to valley glaciation apparently superimposed on preexisting drainage. The ice varied in thickness both from north to south and from the ocean to the coast range leaving only the high peaks unglaciated and rounding those from 2,000 to 2,500 feet. The effects of glaciation have been to round the hills, steepen the valleys, leaving much of the island mantled with a layer of till underlying numerous ponds and muskeg areas and making numerous lakes.

A mild climate and abundant rainfall has resulted in the land being generally heavily timbered to elevations of 1,500 to 2,000 feet with dense stands of sp ruce, hemlock and yellow cedar. Beneath the trees is a thick undergrowth of shrubs and small trees which in places form an impenetrable barrier to foot travel. The common shrubs and small trees are devil's club, willow, alder, and berry bushes such as salmon berry, currant and blueberry. The densly covered areas are a serious obstacle to foot travel, to prospecting and to geologic mapping.

The nearest weather station where records have been kept for a long period of time is Sitka. There the long term average is 96 inches of precipitation per year. While rain can be expected in varying quantities during any month, the heaviest precipitation is from september thru april with, at sea level, little of it in the form of snow. The driest months are usually june, july and august and the coldest month is normaly january with a mean temperature a little over 32 degrees and with extreme low temperatures seldom more than a few degrees below zero. Navigation is usually open thru the winter except for the heads of bays and inlets where a heavy admixture of fresh water

from streams causes freezing. Normally the higher elevations are almost completely clear of snow by the end of June, though depending on the depth of winter snow and the severity of the winter they may be clear from as early as late may to as late as the first part of august.

Chichagof Island is well populated with the Sitkan White Tailled Deer and large brown bear of the Kodiak variety abound, in fact the foot trail referred to previously from Hidden Cove to the prospect is largly a game trail used by the bear in their travels. Besides these large animals, mink and land otter are common along the beaches and watercourses, martin are found in the higher lands and red squirrels range from the beach to timber line. Occasional sea animals such as harbor seals and sealions are seen in the waters of Slocum Arm and whales and fur seals are seen in the adjacent ocean waters. Sea otter have been transplanted a few miles north of Slocum Arm by the Alaska Department of Fish and Game and appear to be thriving. The indtroduction of Martin has resulted in the grouse and ptarmigan becoming rare but in season migratory game birds are plentiful. The gravel beaches contain an abundance of clams and cockles and the outer rocks and reefs where the ocean swell breaks are populated with abalone. During the season from early spring to fall there is good sport fishing for salmon. Some lakes and streams offer trout fishing and the Department of Fish and Game is constantly planting other species such as arctic greyling where conditions warrant.

GEOLOGY AND TOPOGRAPHY

The investigations of the U. S. Geological Survey nearest the prospect area are recorded in, Bulletin 929, Geology and Ore Deposits of the Chichagof Mining District, by John C. Reed and Robert R Coats. The southern boundary of the area covered in this report is in Ford Arm some 6 miles north of the prospect. South of this, the region has only been investigated by observations of aerial photographs which for the most part form the basis of, Miscellaneous Geologic Investigations Map I-388, Reconnaissance Geologic Map of Chichagof Island and Northwestern Baranof Island, Alaska, By R. A. Loney, H. C. Berg, J. S. Pomeroy and D. A. Brew.

As the geology of the area of the prospect if similar to that of the Chichagof Mining District report, a very short and rough summary of that report is as follows

The western portion of Chichagof Island consists of a more or less centrally located core of diorite to granodiorite rock which is believed to be of comparable age to the coast range batholith. The batholith lies under and penetrates into a series of sedimentary, volcanics and intrusives which have been metamorphosed to varying degree by dynamic and igneous forces. As a result a considerable thickness of these beds have become a series of greenstone shists, separated from a later greenstone series, partly massive and partly shistose, by one of the major faults traversing this part of the island trending in a meandering course northwest-southeas. The greenstone series underlies and intefingers with a sedimentary greywacke series. The age of the rocks is uncertain because of the absence of suitable fossils for exact dating but they are attributed to some time from the permian or triassic for the lower series to the cretaceous of jurrasic for the greywacke. the individual strata vary considerably in thickness throughout the district

with the greywacke being thickest in the Klag Bay area where it is deeply embayed in the greenstones. The greenstone series being thickest in the northeast part of the district. The diorite and the sedimentarys are cut by numerous steeply dipping faults and dikes and by some gabbro sills. The faults are in two systems, one trending northwest and the other trending northeast and jointing is well developed in the massive rocks trending northeast and dipping northwest. The two major mines of the district, the Chichagof in Klag Bay and the First Chichagof in Kimshan Cove both occupy steeply dipping faults which strike northwest.

The area embraced in this report is typically glacial in topography and the principal water channel, Slocum Arm, is a typical glacial valley. From Hidden Cove, which for years has been the base of operations for foot trips into the interior, two glacial valleys open. One stretches to the north and the northeast for a total length of about 6½ miles from Flat Cove and is occupied by Flat Cove River. The other stretches for about 2½ miles to the east and intersects the head of another valley at a low pass. This valley stretches for some 5 miles to the southeast to Sulcia Bay on Peril Straits. From Hidden Cove the entrance to the eastern valley is framed on the north by the eastern ridge of the mountain the writer and his associates have named Mt. Rinehart. The ridge offers access to the top of the mountain up a rather steep slope to timber line and then by gentler slopes to the peak about 2 miles from Hidden Cove at an elevation of 2516 feet. The southern side of the entrance is formed by an unnamed mountain which slopes steeply upwards to a peak with an elevation of 2795 feet. The drainage of the eastern valley is by a stream flowing from a small lake at an elevation of 384 feet near the center of the valley, westward thru a narrow pass which is closed on

on the north side just west of the outlet by a cliff where it is necessary to cross the stream, at this point by an old log, and then recrossing a little to the west of the cliff by a ford which becomes impassable at times of heavy precipitation. The alternate route at this point is a difficult climb up the flank of the mountain to an elevation of about 1,000 feet to bypass the cliff, and a precipitousdescent on the other side. The south bank of the stream is almost impossible for foot travel. About ½ mile from Hidden Cove the stream turns southwest and enters Slocum Arm about ½ mile south of Hidden Cove.

In general,rock outcrops are limited to the beach areas, to above timberline and in the walls and beds of the numerous small watercourses descending the mountain slopes, most usually occupying a fault.

From field work over the past several years, study of the aerial photographs, study of Bulletin 929 and Map I388, the writer offers the following general summary of the geology of the area within which the prospect is located.

Beginning at the top of the geological column, represented by the greywacke exposed along the beach on the east side of Sloeum Arm at the southern border of the area described in Bulleting 929, and traversing southeasterly, the writer finds the following. The greywacke shows as a massive formation to a point about ½ mile northwest of Island Cove where a presumably older series of strata of greenstone and greywacke, still massive in character is exposed. This formation has been designated the Waterfall greenstone and the Cobol prospect located above Island Cove is in this

formation. The Waterfall Greenstone persists as far as the north end of Hidden Cove and includes the western part of the penninsula dividing that cove from Flat Cove. The eastern shore of Hidden Cove is a phyllite classified as the Pinnacle Peak Phyllite, traversing east from this shore towards the original claim of the prospect, the phyllite persists for about ½ mile and the division between it and the underlying greenstone is clearly shown on the aerial photographs. The greenstone formation continues for approximately 1½ miles from this point to where it is cut by a major fault showing in this area but which is not the same major fault spoken of in Bulletin 929 as the lower limit of the greenstone. The major fault referred to in this report is the one crossing the mountain about 2 miles east of Hidden Cove. To the east of this fault the greenstone and greenstone shist formations are much thinner than to the north in the area described in Bulletin 929 and are interfingered with diorite and granodiorite and are cut by numerous dikes and sills and with many small quartz stringers and lenses some of which show pyrite mineralization. This area has been highly metamorphosed and the top of the mountain the write and his associates have named Mt. Rinehart, is very highly metamorphosed and shows a dark area on the aerial photographs, oval in shape about ¾ of a mile on the major axis by ½ mile on the minor and consisting of a hornblend,chlorite,olivene mixture for the most part with numerous quartz stringers and lenses with in places a scanty showing of chalcopyrite. about 1½ miles southeast of the peak is a large diorite dike in the western wall of the valley leading to Sulcia Bay. The northeast side of the mountain is greenstone and greenstone shist metamorphosed in varying degree with many dikes,quartz stringers and lenses. The major fault is occupied on the eastern side by a dike which extends from 3/8 of a mile southeast of the crest to more than 1¼ miles northwest of the crest.

The west side of the fault is a highly metamorphosed greenstone, shistose and black in color, containing many small quartz veinlets, highly contorted, showing small amounts of pyrite mineralization and trace amounts of molybdenum. This contorted shist extends along the top of the mountain ridge to the west of the fault for a distance of about $\frac{1}{4}$ mile however at the northwest end of the claims staked along the fault, at an elevation of approximately 600 feet the metamorphosed zone in the west side of the fault is much thinner and variable in thickness. Diorite is exposed in a small creek about $\frac{1}{4}$ mile northeast of the northwest end of the claims. The vertical thickness of the contorted shist on the top of the mountain ridge to the west of the fault is not known due to scanty exposures of rock.

The original claim is located on a fissure exposed in the bed of a small stream decending the steep slope of the north side of the valley stretching east of Hidden Cove about $1\frac{1}{2}$ miles from the east side of the cove. The fissure has been excavated by the stream into a V-shaped canyon varying in depth from a few feet to 30 or 40 feet in depth. The general course of the stream is a little west of north as it climbs the dip and then follows the strike of the fissure. The walls are composed of greenstone, quite solid and massive where first exposed at an elevation of about 500 feet just above the valley floor. The fissure strikes about north 22 degrees east and dips 50 to 60 degrees southeast. The first outcrop of molybdenum mineralization occurs at an elevation of approximately 600 feet as a thin quartz stringer carrying molybenite. This widens into a quartz vein about 2 feet wide and coincedentally with the widening of the quartz the hanging wall or eastern side of the canyon becomes increasingly sheared reaching a maximum witdh of shear zone of about 60 feet perpendicular to the dip about at an elevation of 650 feet. This heavily sheared zone forms a wide place in the canyon. The zone is composed of dark green andesitic volcanics

intensly shattered and with numerous veins and veinlets carrying molybdenite. The shattered greenstone is metamorphosed and has been moderately chloritized and judging by expesures in mines and prospects in the district, well pyriticized, showing some evidence of hydrothermal alteration and carrying molybdenite in addition to that shewing in the quartz. The quartz is in general subparallel to the greenstone and is broken, discontinuous and lensey. The veins are displaced and badly cut up by numerous small shear planes in the main shear zone and are often characterized by extreme changes in strike and dip over short distances, as is characteristic of such veins in major fault zones. The mineralization observed in the heavily sheared zone includes besides molybdenite, pyrite, chalcopyrite, covelite and under U.V. illumination, powellite. The intensity of shearing and the mineralization decreases from this point upward untill at the north end of the original claim the creek is intercepted by a northwest trending fault and the fissure disappears under overburden. At the point where it disappears it shows quartz veins with pyrite mineralization. The west, or footwall side of the canyon is massive greenstone with some quartz veinlets and scanty pyrite but no molybdenite to an elevation well above the heavily sheard zone where it then becomes somewhat sheared to where the creek is intercepted by the northwest fault. The fissure has been traced on the aerial photographs to where it intersects the major fault just over the crest of the mountain on the north side. The nos. 2 and 3 claims are staked along the fissure from the upper limit of the original claim to the intersection with the major fault on pyrite mineralization and trace amounts of molybdenum. The Hidden Moly claim was likewise staked on a northwest trending fault which intersects the fissure on the no. 2 claim.

The rock exposures on the Hidden Moly and the no. 3 claim are highly metamorphosed contorted schist the lower limit of which is believed to lie in the no. 2 claim but is undetermined due to overburden concealing the area. The second group of claims embrace the area of sheared, metamorphosed shist bordering and including part of the dike lying in the major fault. These claims follow the dike striking north 30 degrees west to a stream beyond which the outcrop is covered.

At present such sampling and assaying as has been done is not considered by the writer as being either sufficient in numbers of samples or bulk. The manner of prospecting on foot has limited the numbers and amounts of weight of samples and most of those brought out have been rock type samples rather than grade samples. Therefore the writer feels that rather than publish the results of too few grab type samples it is prefferable for any investigator to be prepared to do his own sampling in such manner as he sees fit.

ECONOMIC FACTORS AFFECTING MINING DEVELOPMENT IN THE AREA

The chief factor affecting mining development as well as all other development in Alaska is transportation. In Southeastern Alaska the basic means of transportation of materials is by water. The methods are, by steamship which is limited to large cargos especially of a bulk nature or such as can be handled in large containers such as the loads of baled pulp handled by the specially designed ships of the Japanese moving that product from the pulp mill at Sitka. By barge, a method also used by the pulp mill for moving supplies from the lower 48 States, their barge being a railroad car barge. The third method is by truck trailer via the Alaska State Ferry System either thru British Columbia in Canada or direct from Seattle as the Ferry System is now operating that far. For personell, mail and light freight the most used transportation is by air via Alaska Air Lines, Alaska Coastal(now in

the process of merging with Alaska Air Lines) and the air taxi services. The situation of the prospect area for water transportation is excellent. However as the access to Slocum Arm is from the open ocean and requires a 15 to 20 mile trip thru the open ocean from the inside passage it is a dangerous route for small boats in the fall and winter and tugs are reluctant to tow barges over the open water during the same period. Suloia Bay is located on the inside waters of Peril Straits which is the regular route of the ships of the Alaska Steamship Company when and if they send such ships to Sitka as well as the Ferry System and the barge service to Sitka. To base any development on Suloia Bay would require a longer access road to the prospect area but it offers compensation in costs of transportation and in the abundant water supply in Suloia Lake adjacent to the bay. Because the main difficulty in road building in Southeast Alaska is the scanty supply of gravel availabe,as the only deposits are found in the deltas and beds of the larger streams and rivers, any road from the prospect area would have to start from Flat Cove as it is the nearest supply of gravel available at tidewater with which to start building. Once the road had been extended past the small lake in the valley the prospect is located in, then there is an adequate supply of stream gravel to continue on to Suloia Bay.

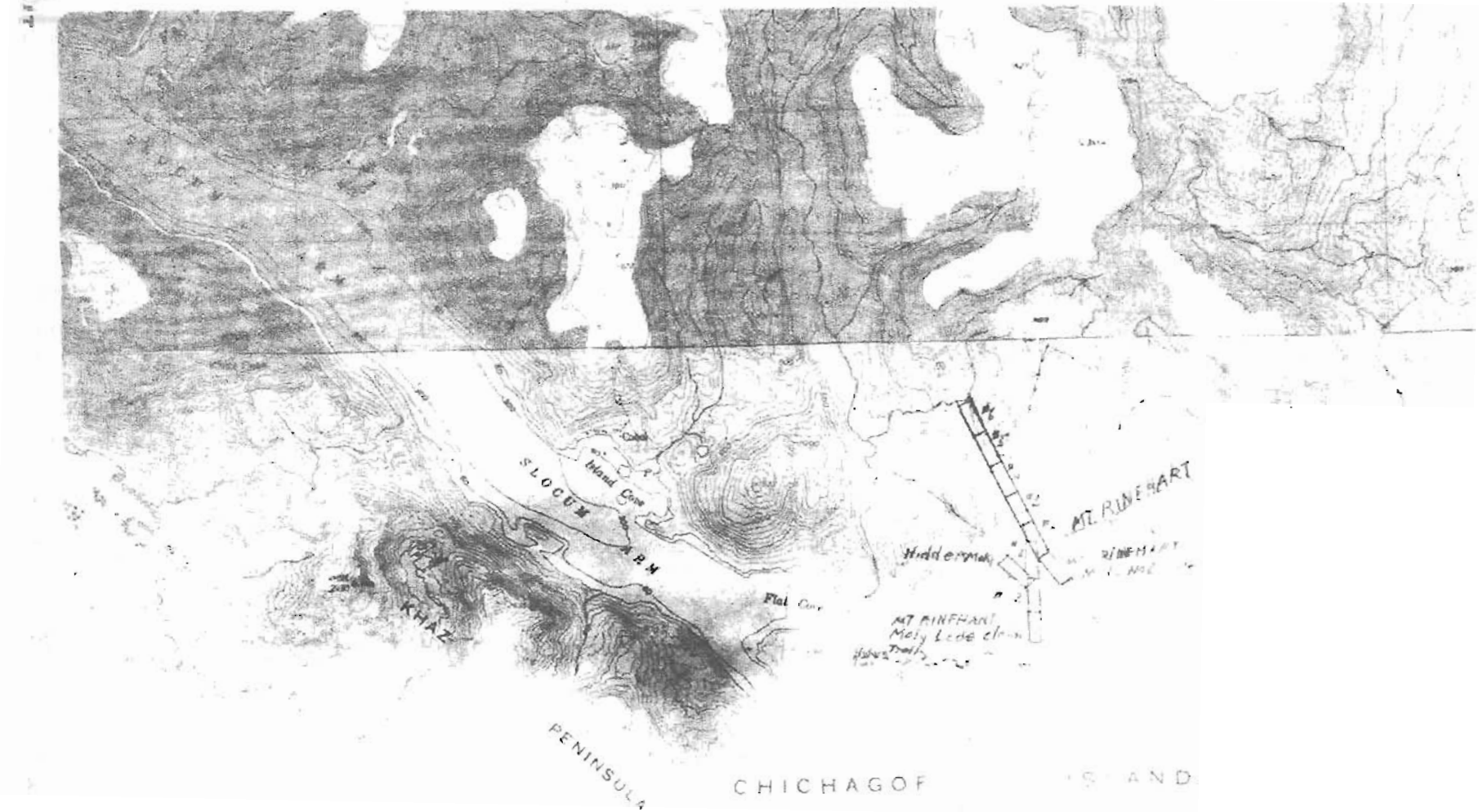
Another factor to consider is that of taxes, both local and State. The State has established a policy of tax incentive to encourage mining developments which is established under the certification of the Division of Mines in the Department of Natural Resources. The local tax authority is the Greater Sitka Bourough with offices situated in Sitka. Thus far the Bourough has formulated no policy concerning any tax incentive program but action on such a policy is expected in the near future.

Water pollution regulations at the State level are presently being formulated

and though the original demand of the Department of the Interior concerining the acceptable level of pollution was such as to seriously mitigate against any possible development, it appears at this time that though pollution control will be strict it will be based on the minimum pollution obtainable with the use of the best technology available. The writer feels strongly that in the matter of water pollution especially that it must be prevented and not allowed in the beginning otherwise Alaska will be damaging an important resource represented by the abundance of pure water. Water for domestic use in a mine camp or for a large mill is easily obtained in the vicinity of the prospect but there appear to be only two potential sources for hydroelectric power. One is a lake lying at an elevation of 888 feet north of Mt. Rinehart and the other is Lake Suloia.

Judging from the experience of the Alaska Lumber and Pulp Company and the various logging camps, any operation in Southeast Alaska can expect a high labor turnover. Alaska wages are higher than in the lower 49 States and in the pulp mill and in the construction industry the union are devoted to maintaining the high level. Even the Federal Civil Service gives a 25% bonus to its employes working in Alaska to cover the increased cost of living.

The valley in which the original claim is located has a small supply of saw timber and the valley of Flat Cover River contains a stand of timber estimated at 16 to 18 million board feet. The Forrest Service does not anticipate logging for pulp on the west side of Chichagof for some time due to the difficulties in moving the logs to the pulp mill over the open water from Kahz Bay to Salisbury Sound.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Flat Cove
MT. RINEHART
Hidden Creek
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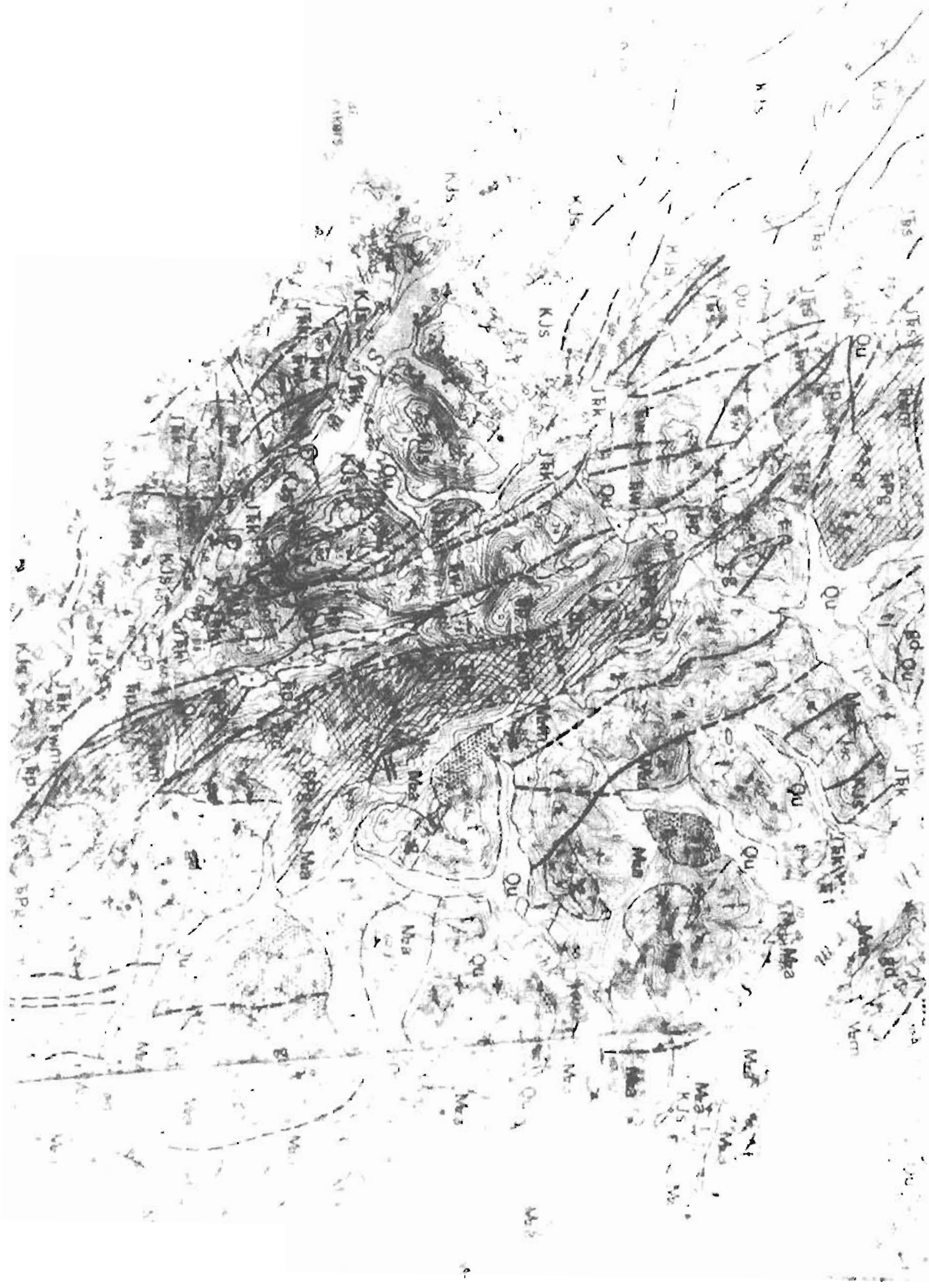
Moly Lode claim
KHAZ
PENINSULA
CHICHAGOF

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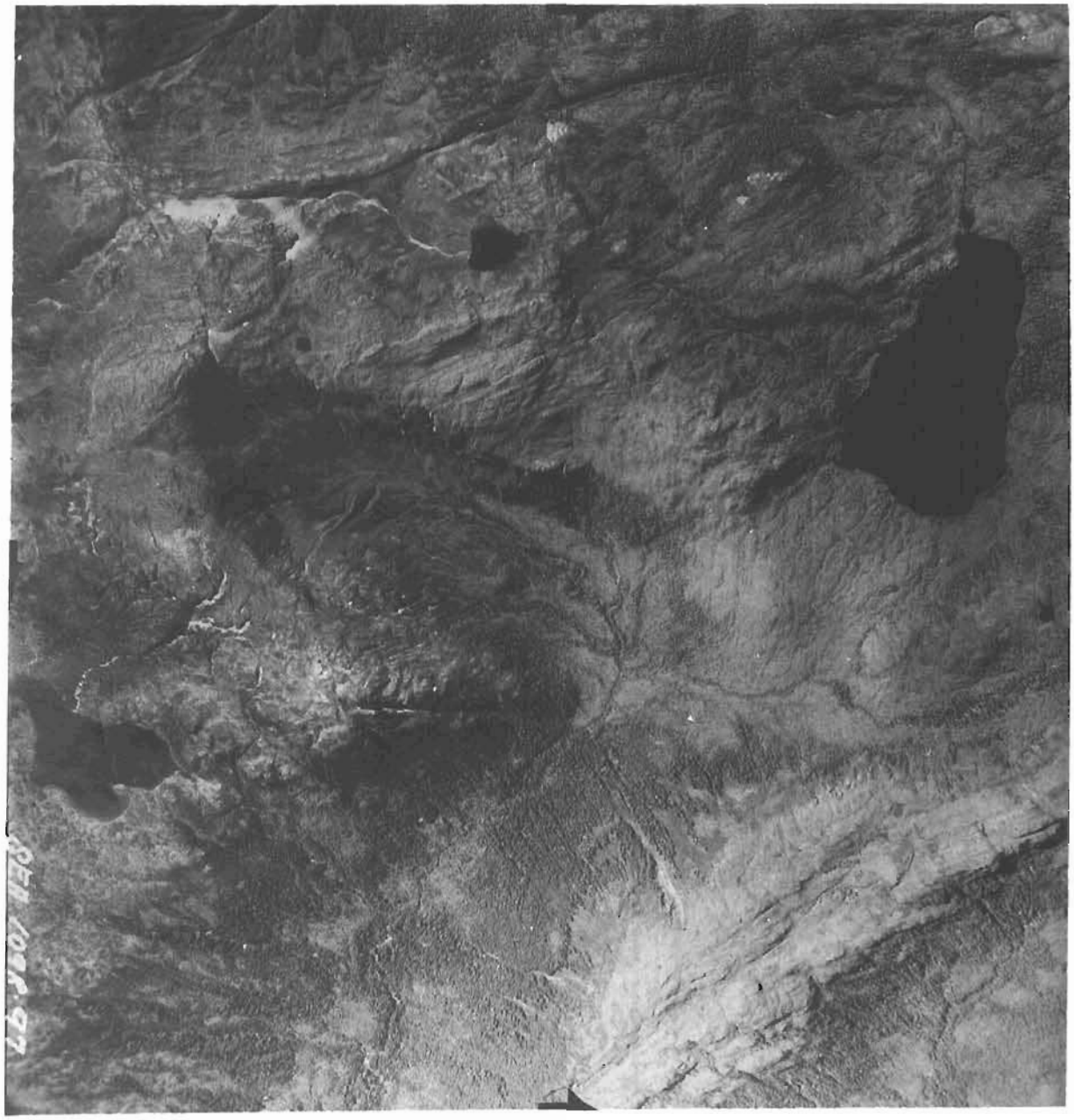
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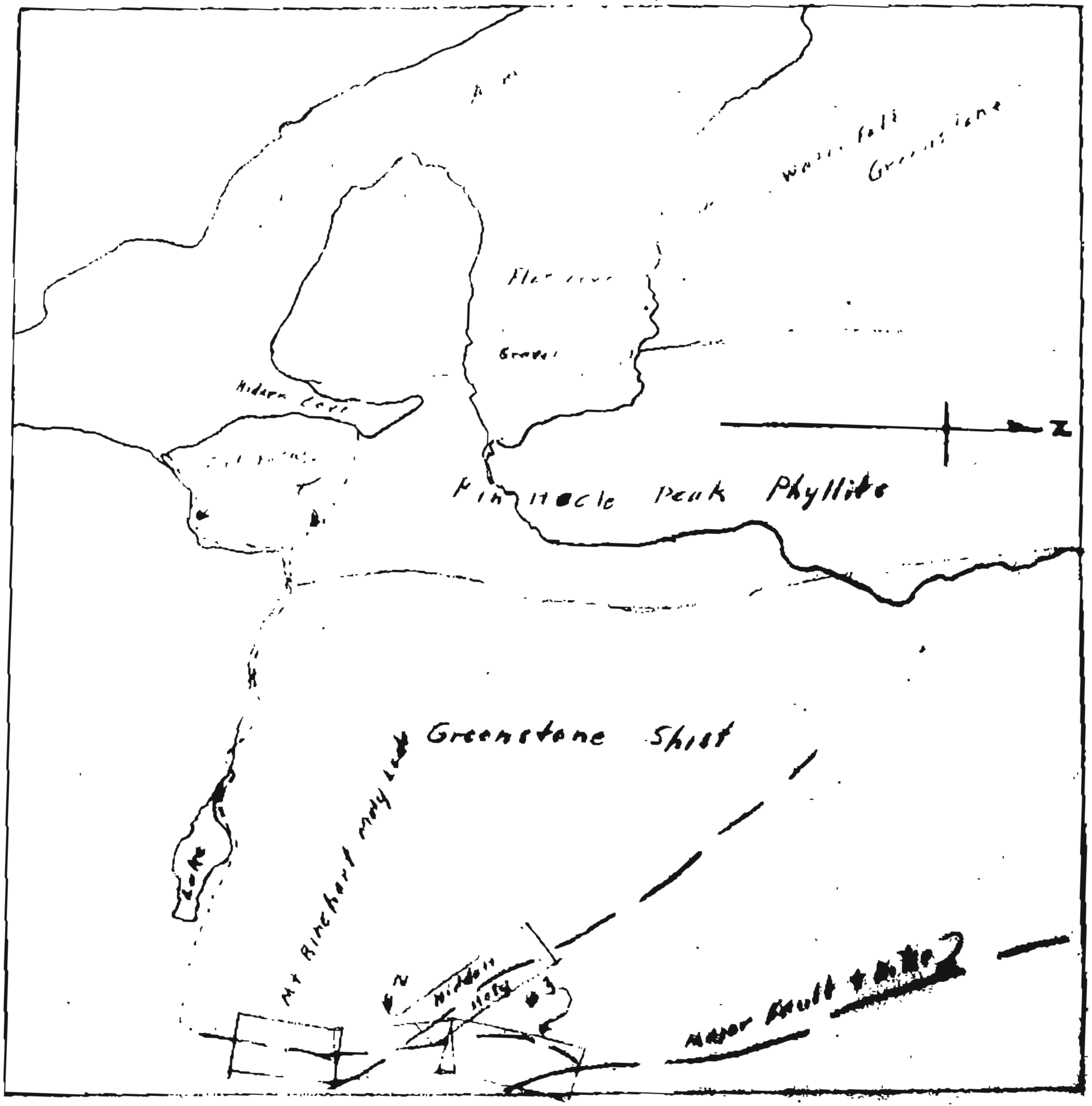
Waterfall
Greenstone
Graves
Pinnacle Peak Phyllite
Greenstone Shist
Lake
Mt Rinehart moly lode
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Moly
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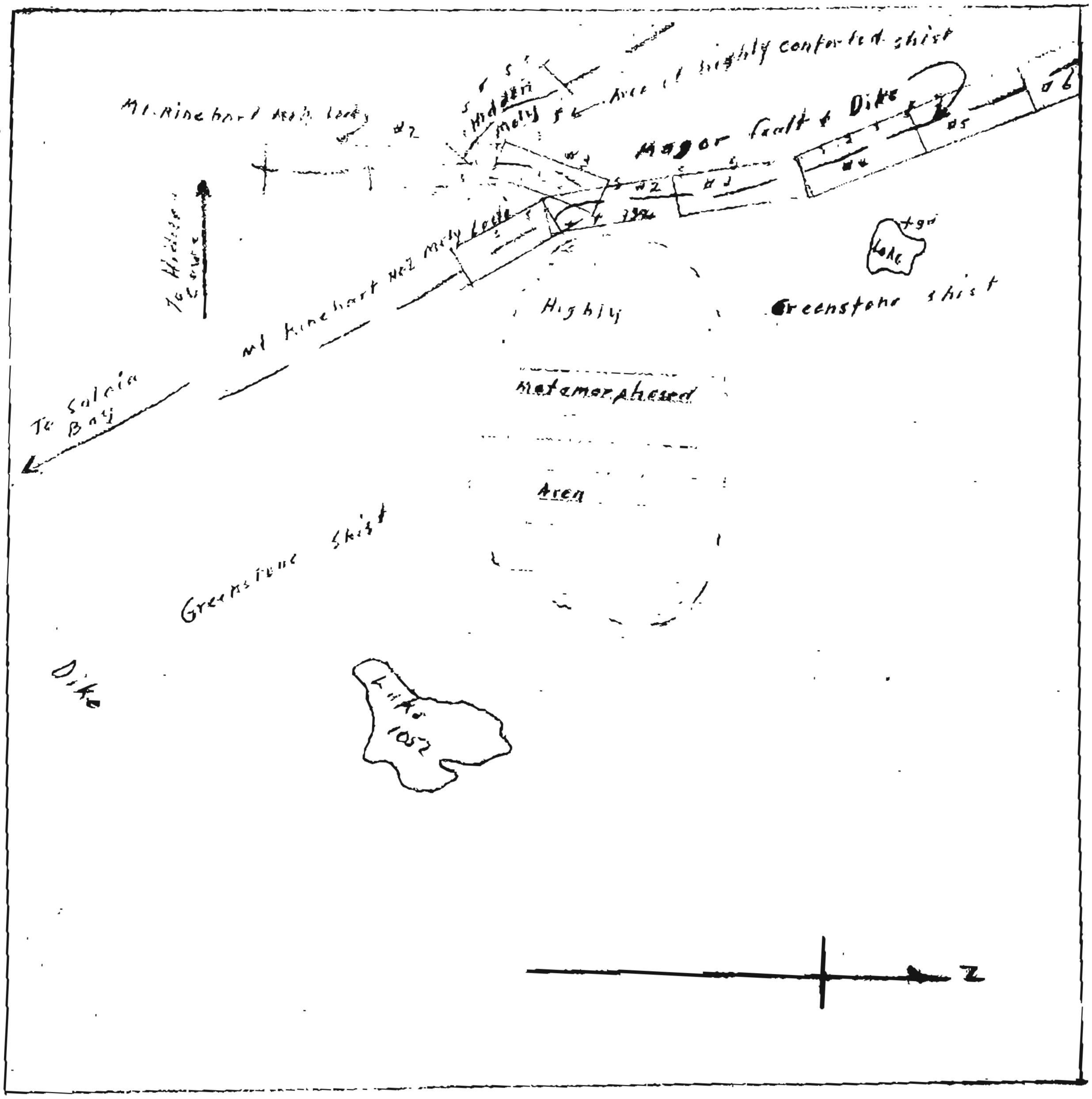
Major Fault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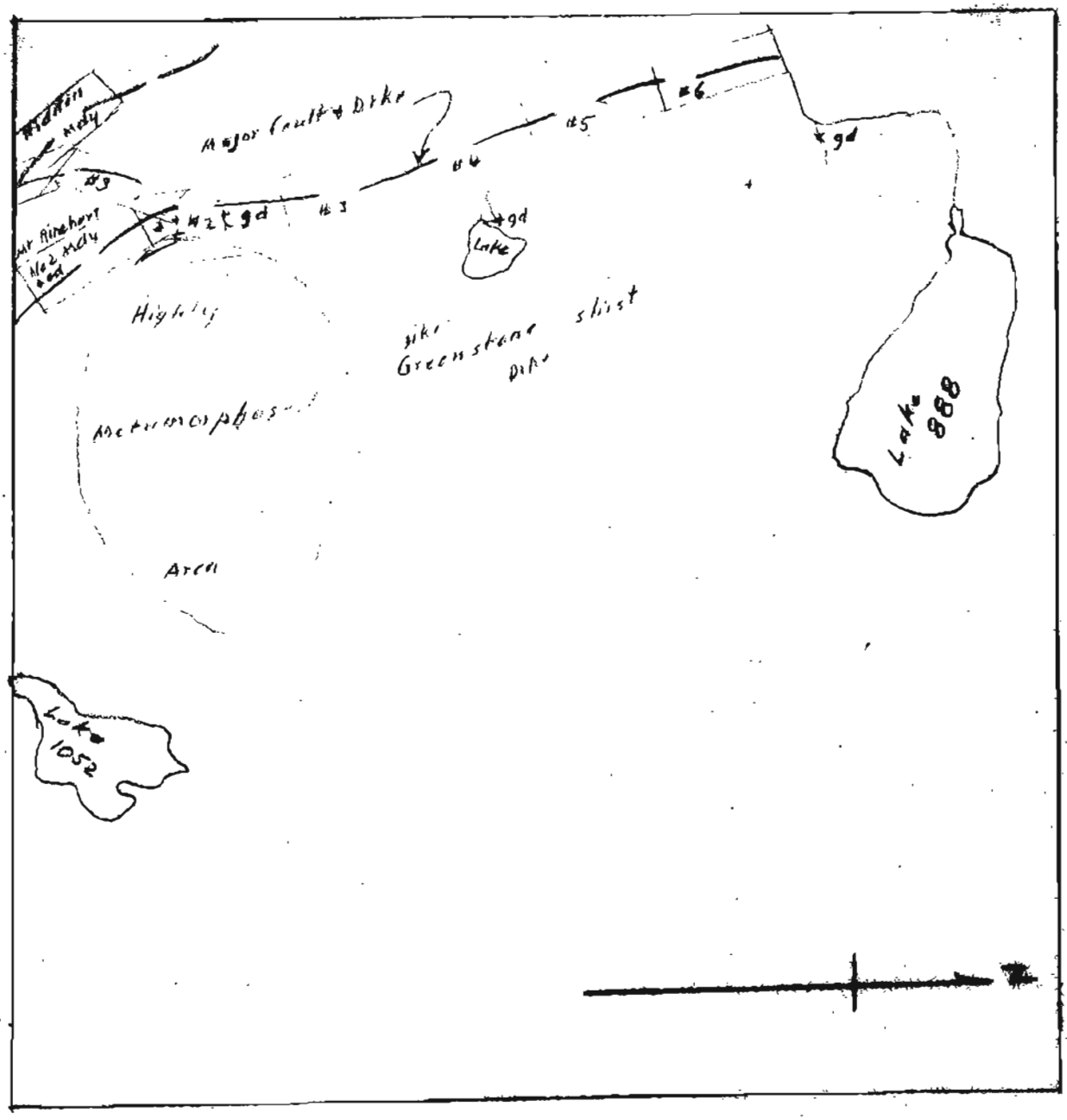
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