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125°45'
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R E P O R T

on

GATAGA LAKE ZINC-GOSSAN DEPOSITS

SUMMARY AND CONCLUSIONS:

During 1957 unusually large and vividly coloured gossans were discovered in the Gataga Lake area of the Northern British Columbia Rockies. Low but persistent zinc assays and sparsely mineralized float prompted ground exploration during the first few weeks of the 1958 field season.

Packsack diamond drilling through the supposed surface encrustation was attempted on the more accessible gossans immediately northwest of Springiron Lake, and several large cuts were made. Drilling proved futile and the cuts failed to reach solid bedrock. Widespread carbonaceous and graphitic shales seriously effected interpretation of results of a self-potential survey.

Prospecting in the vicinity of the gossans turned up several small occurrences of sulvanite, a somewhat rare sulphide of copper and vanadium. Gneissic float containing copper-molybdenite mineralization was found, as was considerable quartzite float containing small disseminated "freckles" assaying in zinc. Tests made on spring water in the gossan zones showed it to be highly acid and to contain an unusually high concentration of metal. Of the several drill core recoveries large enough to permit assay, one showed a silver content of 1.5 oz. with zinc values ranging from 0.5% to 3%. Lead in more than minute amounts has not yet been found nor has the zinc mineral responsible for the assays been recog-

It is believed the gossans are surface representations of very extensive but low-grade, low-temperature mineralization controlled by regional and local faulting of certain shale and argillite horizons. They can only be tested with an adequate drilling machine. (see Maps in pocket).

LOCATION, ACCESS AND PHYSICAL FEATURES:

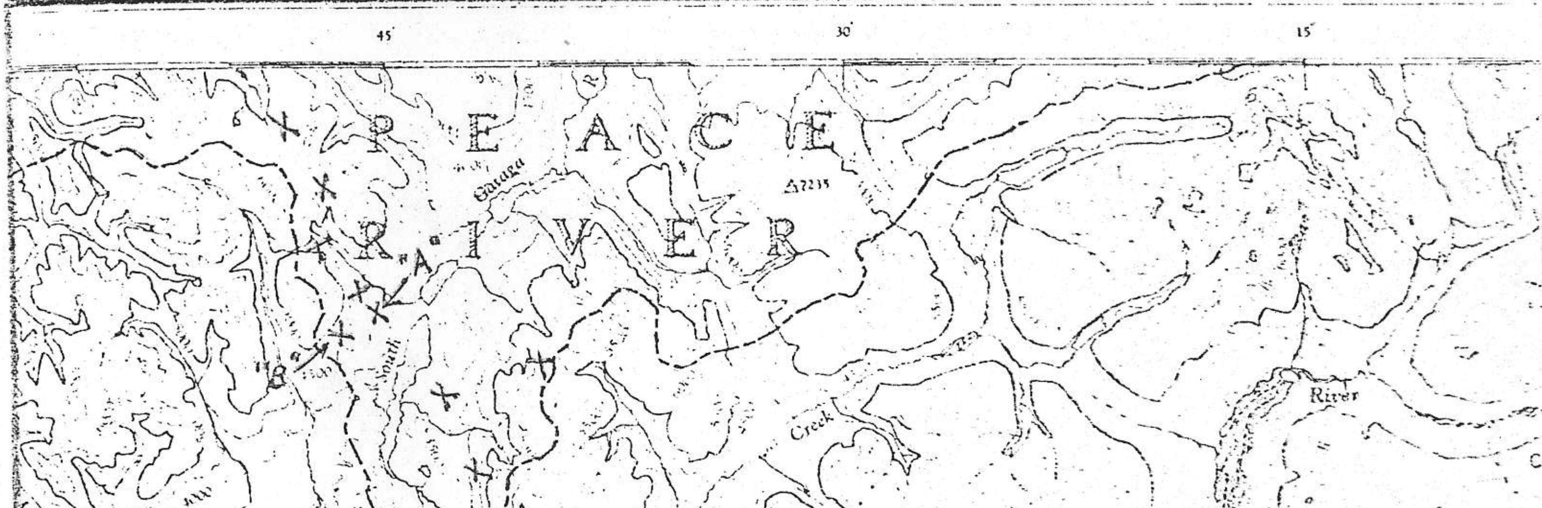
The two gossan zones described occur about 1-1/2 miles west of Springiron (our name) Lake, the central one of the three "Gataga Lakes" at the headwaters of the south fork of the Gataga River (Elev. 3200±). The deposits described are the central and more accessible ones of a dozen or more such gossan zones evident along a northwesterly trending belt.

The area is 56 miles south of the Alaska Highway from where it may be reached by following a pass constituting the headwaters of the main Toad River. This is one of the lower passes in the somewhat rugged (Mt. Churchill 10,500') northern Canadian Rockies with a divide elevation at Cub (our name) Lake of 5000'. Fort Ware, on the Finlay River, is the nearest settlement 50 miles to the south. The Rocky Mountain Trench (Wenner-Gren Land) is about 20 miles to the east and is paralleled by the South Gataga Valley. west.

Easiest access is by air from Muncho Lake, although pack trains could use the Toad Pass or Kechika routes, as well as that from Fort Ware. The latter Indian settlement is directly accessible by river boat from McLeod Lake on the John Hart Highway east of Prince George. During high water small barges could be used on this waterway providing help

Map GL 1

NAL TOPOGRAPHIC SERIES DEPARTMENT C



trenching purposes. Two trenches totaling 200' were put in on the lower showings, as were several smaller cuts.

A self-potential survey, using our newly acquired equipment, was carried out on both zones, as was a scintillometer survey.

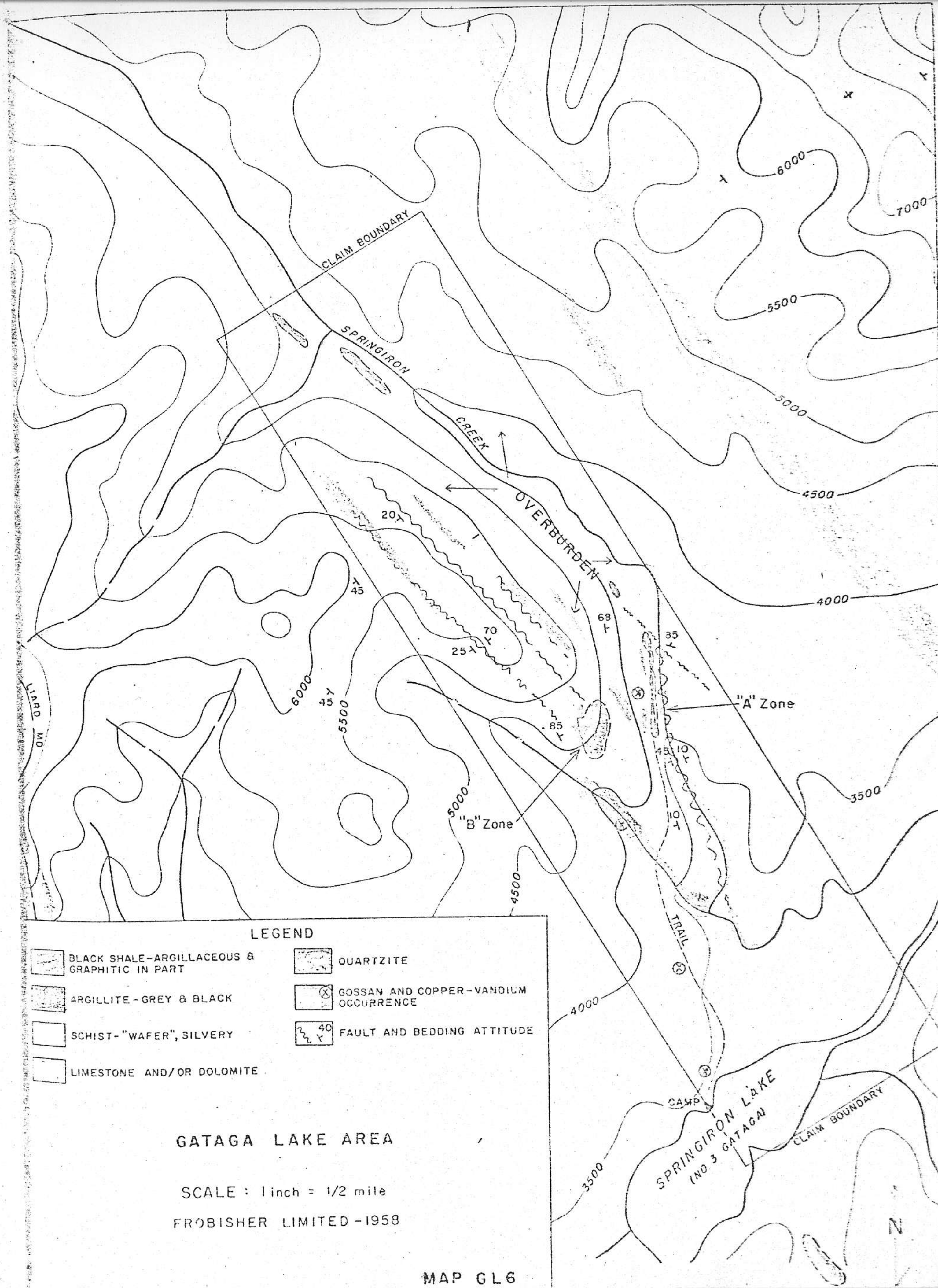
A limited amount of ground prospecting and airborne scintillometer checking was carried out elsewhere in the gossan belt.

Several miles of trail were cut from the camp on Springiron Lake.

DESCRIPTION AND GEOLOGY:

The Gataga Gossans occur in shales and argillites comprising the westerly limb of a large, considerably 'ruptured' northwesterly striking anticline, the crest of which is exposed on the mountain-tops north and east of Springiron Lake (see Map GL6). The shales appear to overlie massive dolomitic(?) limestones and quartzites of inferred early Paleozoic Age. The area has not been mapped geologically and fossils have not been found. Copper deposits are known in similar rocks near Toad River to the north and the Akie River to the south.

Recognizable structural features include well-defined scarps representative of a system of northerly-trending strike faults associated with sudden dip reversals (see photo #G-1 and Map #GL6.) As a whole these are suggestive of faulted anticlinoriums. There is considerable evidence that the limonite gossan deposits are related to these breaks. Some of the rock fragments cemented by limonite may



CLAIM BOUNDARY
SPRINGIRON CREEK
OVERBURDEN
6000
7000
5500
5000
4500
4000
3500
20
45
68
70
25
85
35
10
45
10
"A" Zone
"B" Zone
6000
45
5500
5000
4500
4000
3500
LIARD MD
TRAIL
CAMP
SPRINGIRON LAKE
(NO 3 GATAGA)
CLAIM BOUNDARY
N
LEGEND
BLACK SHALE-ARGILLACEOUS & GRAPHITIC IN PART
ARGILLITE-GREY & BLACK
SCHIST-"WAFER", SILVERY
LIMESTONE AND/OR DOLOMITE
QUARTZITE
GOSSAN AND COPPER-VANDIUM OCCURRENCE
40
FAULT AND BEDDING ATTITUDE
GATAGA LAKE AREA
SCALE : 1 inch = 1/2 mile
FROBISHER LIMITED-1958
MAP GL6

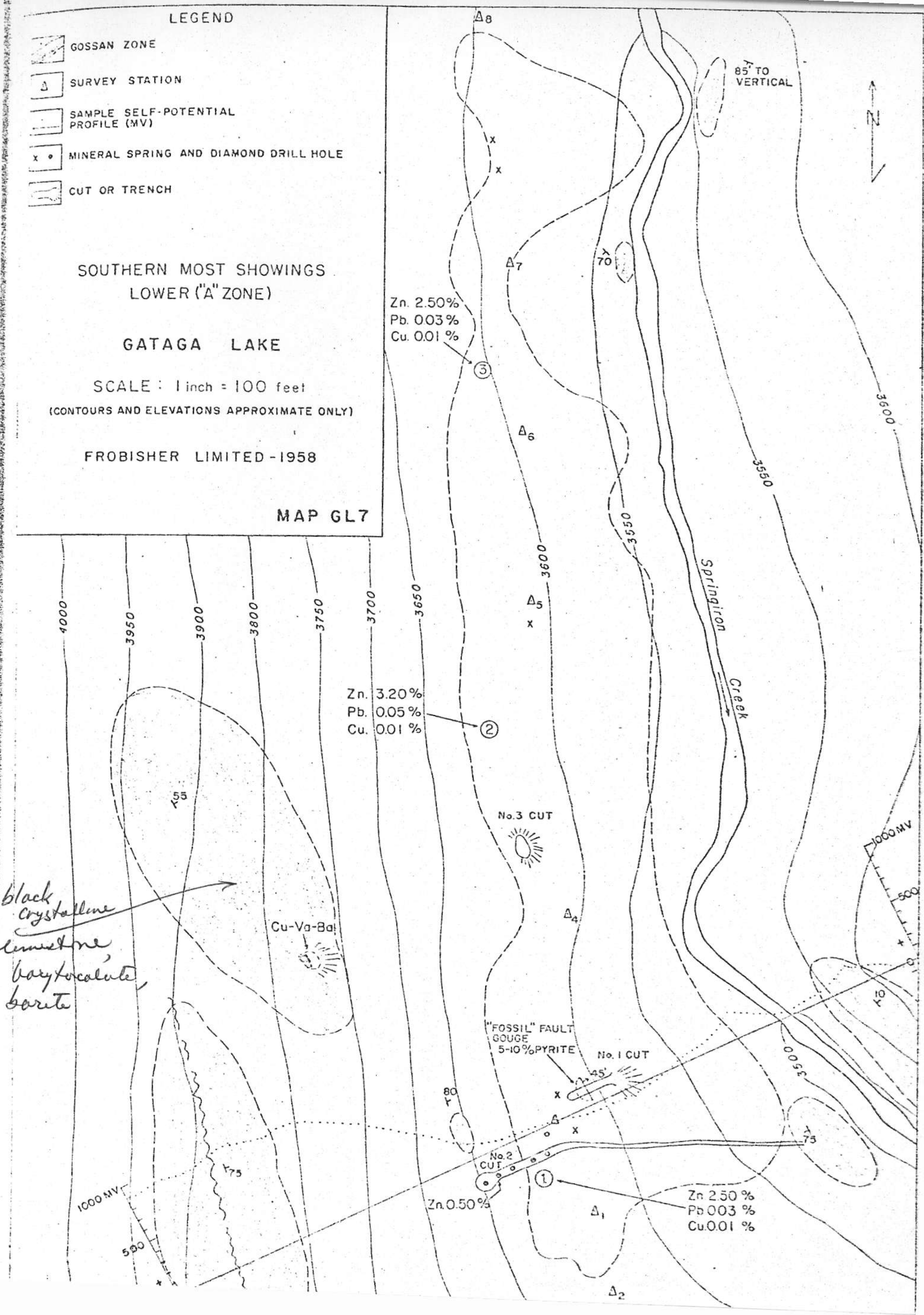
actually be fault breccia.

The zinciferous, limonitic gossans are commonly deep brick red to yellow in color, although black and white gradations occur. Creeks or springs cutting or originating in them appear vividly colored, due to various iron-rich precipitates. Much of the surface crust is porous or cellular, and has obviously been deposited as a "transported gossan" by the small but numerous springs present. Material below the one to four foot deep crust, as far as penetrated, is largely a fairly compact, limonite-cemented "recent conglomerate" or breccia. Shale fragments of various sizes make up 30 to 40% of the rock and quartz pebbles and boulders(?) are common. Small but consistent amounts of pyrite are present in all but the spring-deposited material.

The actual areal extent of the bodies is unknown as they are conspicuous only where spring activity has been great or vegetation has been removed. About 30 acres is exposed on the A and B Zones. (See photos #G2 and G3).

The lower or "A" showing is well exposed as a northerly striking rectangular patch at least 1000' long and 1 - 200 feet wide (see Map GL7).

The western border is almost a straight line following a distinct bench which ''contours' along the sidehill. Above this bench the slope of the hillside increases from the average 30° to 45 or 50°. The eastern limit is poorly defined because of the large amounts of slumped material from above. Overburden obscures any immediate southern or


LEGEND
GOSSAN ZONE
SURVEY STATION
SAMPLE SELF-POTENTIAL PROFILE (MV)
MINERAL SPRING AND DIAMOND DRILL HOLE
CUT OR TRENCH
SOUTHERN MOST SHOWINGS
LOWER ("A" ZONE)
GATAGA LAKE
SCALE: 1 inch = 100 feet
(CONTOURS AND ELEVATIONS APPROXIMATE ONLY)
FROBISHER LIMITED - 1958
MAP GL7
N
85° TO VERTICAL
Zn. 2.50%
Pb. 0.03%
Cu. 0.01%
Zn. 3.20%
Pb. 0.05%
Cu. 0.01%
No. 3 CUT
Cu-Va-Ba
"FOSSIL" FAULT GOUGE 5-10% PYRITE
No. 1 CUT
No. 2 CUT
Zn. 0.50%
Zn 2.50%
Pb 0.03%
Cu 0.01%
Springiron Creek
4000
3950
3900
3800
3750
3700
3650
3600
3550
3500
1000 MV
500
black crystalline limestone, barytocalcite, barite

northern extension.

No recognizable outcrop occurs within the zone as marked. Black, carbonaceous to graphitic shales and argillites east of the deposit dip westerly, and similar rocks immediately west dip easterly.

True width and depth are not known. There is no marked change to the 20' depth obtained by drilling and blasting.

What can be best explained as a "fossil fault gauge" occurs in the upper central portion of the zone and may be considerably more widespread than indicated. This consists of an extremely sticky, blue-grey putty-like material encountered in irregular bodies at least 10' in thickness (see photo). A distinct 45° downhill dipping contact with the limonite is indicated in one section but the contact appears flat elsewhere. The gouge(?) appears to be composed of finely ground highly calcarious argillite. It carries considerable pyrite (5%) as grains or crystals up to 1-2" in size but lacks evidence of other mineralization. It has not been influenced in the least by the surrounding limonite or highly acid waters and does not contain the splintery fracturing shale fragments so common elsewhere. It is this material which so thoroughly and rapidly stops the diamond drill bit. Its origin is somewhat of a mystery unless one concludes that the gossan is largely in place (residual rather than transported) and that it is a 'fossil' remnant.

A small pocket-like "inclusion" of black crystalline limestone in the shales about 200' above the central portion of the zone contains a green weathering, bronze, cubic mineral positively identified as sulvanite - a sulphide of vanadium and copper. This relatively rare mineral has not been previously reported in Western Canada. It is associated with somewhat rare barytocalcite and barite. Similar material, in equally small amounts, was discovered in three other locations along the same general horizon to the south (see Map GL6) and small amounts, along with sphalerite, were identified in quartz boulders(?) in the limonitic zone. Its importance is in indicating sulphide mineralization related to the gossan zone at this horizon.

Numerous large boulders of what, "freckled" quartzite are present in Springiron and Ridge Creeks. Low zinc values associated with them are due to the zinc content of small, thin, light brown patches evenly disseminated through the rock. It is possible they may be an impurity gaining their metal content through contamination. Similar rock reportedly outcrops near the massive limestone several miles to the northeast.

The Upper or "B" zone is similar to the "A" zone except that it covers a larger (superficial) area and lacks the elongate control of the former (see Map). A distinct white hue is imparted the lower section of the gossan (see photos G4 and G5).

Several outcrops occur within the gossan area and offer the only glimpse of bedrock geology. The rocks consist of thin beds or layers or argillite alternating with a very soft, brownish shale or impure fine-grained sandstone.

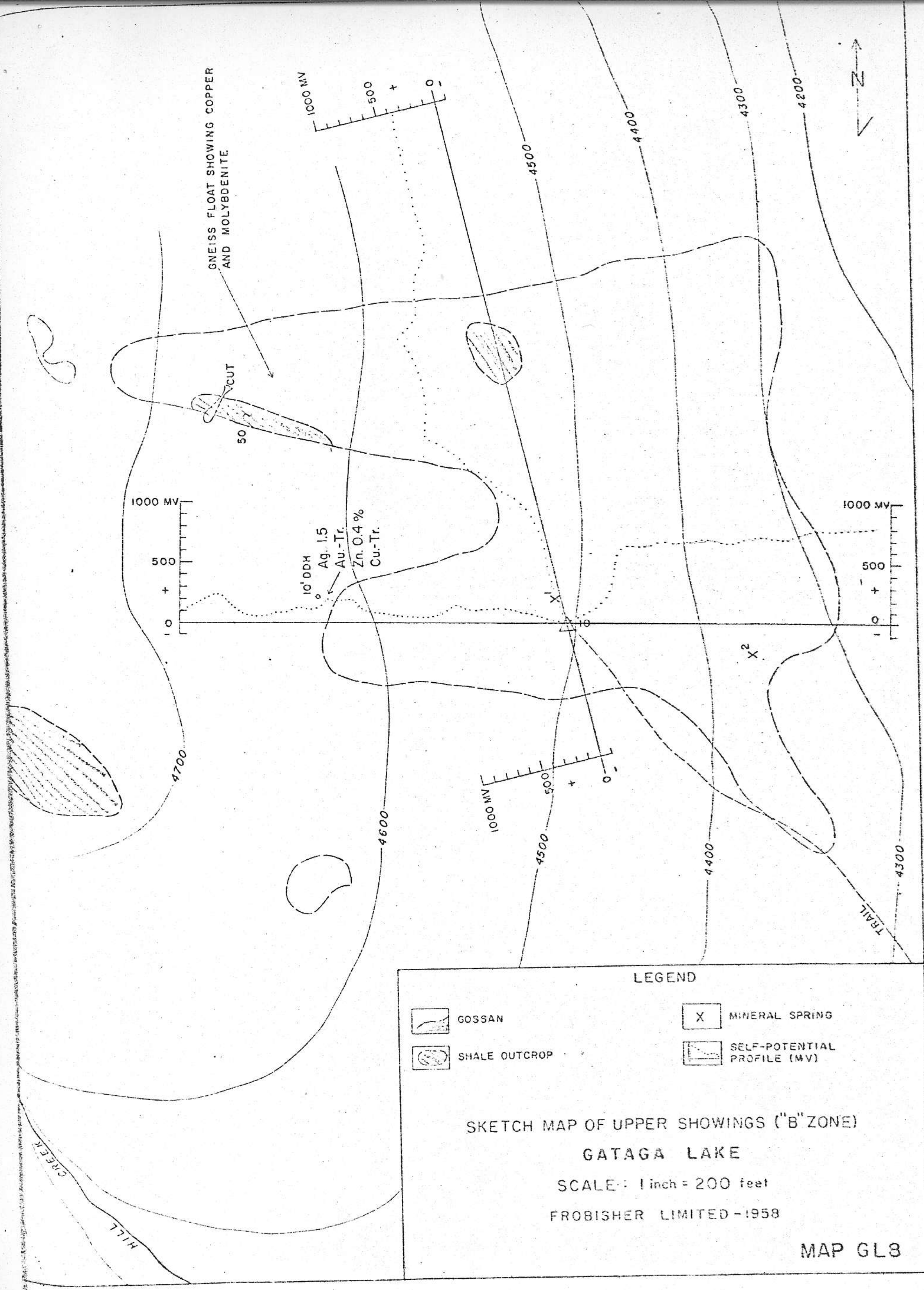
The latter is so soft and highly altered - at least near surface - that field identification is impossible. Scattered through it are occasional minute, highly splendent flakes suggestive of molybdenite but reported to be non-metallic. It is this brown material which the writer feels bears some relation to the widespread zinc mineralization. These shales contain barite, zinc, silver, manganese and iron in amounts lo to 100 times greater than those found in average shales.

The limonite zones are weakly but distinctly radioactive and give 'mass effect' scintillometer readings up to 4 times surrounding rock background. No individual specimen is appreciably radioactive.

The bounding shales are somewhat graphitic and are believed largely responsible for very high (1000 mv) self-potential readings. Thus this method could not be expected to outline low grade sulphide deposits, although it did effectively outline overburdened rock and structural features. Only minute amounts of pyrite are present in the bounding rocks of either zone.

ASSAYS:

Assay results are plotted on Maps GL7 and GL8. Judging from the results of about 6 samples, the average zinc content of the limonite exclusive of the large shale fragments is about 2%. In some sections a content up to 4% is evident. The hard, unmineralized argillite and shale, which, with minor cellular limonite was all that could be recovered by drilling, assays about 0.5% Zn. One sample of the latter type assayed 1.5 oz. of silver.



SKETCH MAP OF UPPER SHOWINGS ("B" ZONE)

GATAGA LAKE

SCALE : 1 inch = 200 feet

FROBISHER LIMITED - 1958

MAP GL8

Water from a fast flowing spring in B zone was tested at U.B.C. and the results are enclosed. In general the water has a metal content greater than that found in the immediate vicinity of several well-known copper-zinc mines.

Results of a spectrochemical assay of several pounds of shale from an outcrop high on B zone are also enclosed.

The iron content of the gossans is not known but it is probably in the 30 - 50% range.

No attempt was made to evaluate the deposits tonnagewise.

CONCLUSIONS:

The zinciferous, limonite gossans described are probably as large as any so far reported in B. C. and the belt as a whole contains more limonitic material than has ever been reported in Western Canada. Zinc in the amounts present in such an environment is unique in Canada, although the metal may have escaped detection elsewhere.

An attempt should be made at solving the problem of origin in this particular case before an evaluation is considered. If the gossans are merely spring deposits formed by precipitation from charged waters travelling a great distance, as has been suggested, they are valueless as a potential base metal source. However, if they are at least in part residual, there still remains the possibility of a conditionally workable deposit. Views to support the latter are based on the following considerations:

1. Elsewhere in the Rocky Mountains combined indications of associated minerals, such as quartz, pyrite and barite, are simply not present unless directly related to a mineral deposit. The unique occurrence in place of a primary vanadium-copper sulphide strongly suggests association with a hydrothermal mineralizing process. The minerals referred to could not, physically or chemically, have formed by surface deposition of spring water.

2. The blue-grey water resistant clay described, which is evidently enclosed by gossan material, cannot be satisfactorily explained except as a "fossil fault gouge". It is composed of a pulverized calcareous rock similar to that containing the copper-vanadium sulphide. The unusually high content of clean, bright cubic pyrite, up to 1/2 inch in diameter, is certainly not characteristic of a spring deposit or of stream or glacial origin-suggested alternatives. A complicated chemical origin seems very unlikely in view of the physical make-up of the material itself.

3. The high acidity and metal content of the Gataga spring water as against that described elsewhere as "issuing from great depth" is believed indicative of a near surface deposit. For example, the highest zinc concentrations obtained in waters immediately associated with the Britannia copper-zinc deposits were two 3.6 and 9 milligrams per litre as against 6 at Gataga. A recent G.S.C. publication (Paper 58-1) dealing with the heavy metal content of waters in the Nova Scotia zinc district gives 0.26 ppm as the highest concentration of zinc in saline mine-waters of a zinciferous barite quarry,

and concludes that "such large amounts suggest the presence of zinc (& copper) in much greater abundance than presently seen in the quarry."

4. The negligible acidity of the "drinking water springs" along the same structural zone several hundred feet south of the Gataga Gossans is believed an important feature. If the sulphate water originated at great depth, and were widespread enough to form the whole gossan, then springs only a short distance from the gossans should also be somewhat contaminated.

The evidence in favour of an overall "spring" origin has been advanced as follows:

1. The extremely widespread or regional nature of the gossan zones.
2. Issuance of such sulphate springs elsewhere in entirely unmineralized, well exposed rock.
3. The obvious precipitation of iron and zinc salts evident in the gossan zones.

The origin not having yet been proven, the regional distribution data could be used both ways. Descriptions of the only other described sizeable limonitic deposits in B. C., those at Taseko and Zymoetz River, and described by some as strictly of spring origin, offer considerable evidence that the gossans are formed by redeposition of iron originating in pyrite concentrations in country rock immediately underlying or a short distance from the limonite. The Taseko deposits occur along a zone at least 12 miles in length.

The issuance of springs from unmineralized rock is the best argument in favour of spring deposition. The writer believes that in the upper and lower gossan zones described in this report the mineralization responsible for the zinc and iron has been eroded to surface. This need not be the case in other deposits around which cellular gossan has been formed; thus the question of relative distance travelled is involved. Certainly the geological environment is such that routes are available for such water to escape without being absolutely confined to the zones as presently exposed on surface.

Primary zinc sulphide is readily attacked by acid waters, and there is no doubt that eventual precipitation has caused surface enrichment. Our indecisive testing program was designed to determine the extent of this enrichment and the nature of the primary mineralization.

There is a possibility that the deposits have some relation to "heavy mineral concentrations" commonly found in sediments during oil well drilling. However, such minerals as they occur in their present state at Gataga could hardly be explained. Actually the whole mineral assemblage is one which would readily fit the low temperature (epithermal) range of the hydrothermal mineralizing process. As such, there are no surface indications of anything more than a low grade pyritic zinc deposit.

RECOMMENDATIONS:

Enough assessment work has been done on the key claims to hold them for several years. Should the price of base metals, especially zinc, become more favourable, further work is warranted. This should consist of several diamond drill holes put in under the gossans using at least an EX drill. Such a machine could be flown into the lake by Beaver.

There is a possibility that Lundberg Explorations, the "mining" arm of the Wenner-Gren organization which envisions a railroad and extensive hydro development in the area, may be interested at present in the joint testing of these deposits.

Should a helicopter ever become available to us in this region, a number of important-looking deposits (apart from the gossan zones), which we were unable to find time to check this summer, should be looked at.

A large rust zone along a branch of the Racing River demands checking as does an extensive fluorite-rich area reported to us west of the Trench.

Copper showings associated with dykes, including some of those reported by us last year, have received considerable attention this year. These are on the Toad and Racing Rivers to the north and east of Gataga.

Our mapping of a large area south of these deposits shows a series of clear-cut basic dykes with an overall pattern suggestive of the well known "ring dyke" systems elsewhere. So far our limited prospecting along some of these dykes has indicated small copper deposits. Certainly they are so numerous that deposits resembling those on the Road and Racing (Fort Reliance Minerals and Magnum Mines) could still be found in this unprospected section. As our

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March 26, 1958

Frobisher Limited,
101 - 102 West Pender St.,
Vancouver, B.C.

Dear Sirs:

We have made a qualitative spectrographic analysis on sample of ORE submitted and report as follows:

MARKS: Check for Vanadium #199S Composite

Silicon, Iron (Oxygen) ....MAJOR CONSTITUENTS

Zinc, Aluminum ...........INTERMEDIATE CONSTITUENTS

MINOR CONSTITUENTS

Magnesium	....	1%
Sodium	....	1%
Copper	....	0.1%
Titanium	....	0.1%
Nickel	....	0.1%
Manganese	....	0.1%
Potassium	....	0.1%
Potassium	....	0.1%
Calcium	....	0.1%
Barium	....	0.1%
Vanadium	....	0.01%
Chromium	....	0.01%

Molybdenum, Antimony, Silver, Zirconium, Cobalt, and Cadmium .... Traces

This sample was spectrographed against a known Vanadium Standard. Only low amounts of Vanadium were detected in your sample.

Respectfully submitted,
G.S. ELDRIDGE & CO. LTD.
per Robt. C. Farrell

RCF*jl

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