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REPORT ON SOME NEW PROSPECTS IN THE WHITEHORSE COPPER BELT  
( 4 groups of claims , totalling 170 claims )

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I. Summary .

The known deposits of the Whitehorse Copper Belt consist of a series of Magnetite-copper-deposits , which occur either in skarn zones or as disseminations in granodiorites . These deposits outcrop on a N.W.trending zone along the slopes of McIntyre Mountain . The extensions of the zone , both to the North and to the South , are shielded by large drift covered areas . The Belt is favourable located on the White Pass and Yukon Railway , which connects with the Oceanharbour Skagway. There is ample power , water and labour in the area .

An Aero Magnetic Survey over the Whitehorse Copper Area was recently completed . The known deposits do not show up ; but five magnetic anomalies of considerable size and relief were revealed in a similar geological environment as the known deposits. If the Magnetite that caused these anomalies is also associated with copper , then here is offered an exploration target , that could have a good potential tonnage .

Four groups , totalling 170 claims , were staked on these anomalies . In correlating these anomalies with the geological formations , it seems that they are all on the contacts of granodiorites with the sediments , and are thus believed also to represent contactmetamorphic zones , but of much greater extension , than the known deposits .

It is suggested to explore these claimgroups , firstly , by geological and magnetic mapping , which would require a 100 linemiles of linecutting , and , secondly , by a drilling-program , which would require 3 drillholes of 400 ft each on every group .

Toronto , January 25<sup>th</sup> , 1963 .



Dr J. F. Sijpkens .

## 2. The Whitehorse Copper Belt .

Location , The known copper-magnetite-mineralization occurs in a north-westerly trending belt , which is about 12 miles long and is located a few miles west of Whitehorse .

Accessibility , Whitehorse has an important airport . The Alaska Highway passes through Whitehorse . Local roads to the known copperdeposits are linked up with this highway . The White Pass and Yukon Railway connects Whitehorse with the seaport Skagway at the Ocean . There is adequate water and electrical power in the region to run a mining operation .

History , Copper was found in the so called Whitehorse Copper Belt as early as the Klondike Gold Rush . Various deposits were worked intermittently until about 1915 . After that time comparatively little mining has been done .

Because of the association of copperminerals with magnetite Noranda Mines in 1946 and 47 made ground-magnetic surveys around some of the principal showings . They drilled several magnetic anomalies including several of the known orebodies and did some trenching .

In 1955 and 56 Imperial Mines ( now New Imperial Mines ) explored the Arctic Chief property mainly by drilling .

Geology , The copper deposits occur chiefly at or near the contacts of limestones and granitic intrusives , the deposits being found both in skarn zones in the limestone and as disseminations in the granite . Numerous important copperdeposits of this type occur in the Western Cordillerian Region , and some of them , such as the Craignment , are of major importance .

The principal economic minerals of the district are two copper - sulfides , bornite and chalcopyrite . Skarn-minerals containing magnetite and hematite , are widely distributed . Magnetite is specially abundant , and lenses of this material from 2 to 380 ft. in length are found all along the Belt , mostly in the altered granite . Hematite ( probably as an alteration of the magnetite ) is less common , but is the principal mineral in some deposits .

Brief description of some of the best known copper deposits in the Copper Belt ( after Wheeler , 1961 , pg. 138 - 142 )

( 1 ) . Arctic Chief .

The orebody lies on the West side of a northerly trending limestone body intruded by altered quartz diorite . The granitic rocks near the Arctic Chief are strongly mineralized over a width of 400 ft for a length of 1000 ft along the limestone-quartz diorite contact. The mineralization gradually diminishes away from the orebody . The orebody , as defined by the workings on the main level 65 ft below the surface , consists of a northwest trending mass of magnetite about 230 ft long and from 25 to 40 ft wide .

Copper in the Arctic Chief lode exceeded an average of 4 per cent . Gold ranged from traces to over 2 ounces a ton , Silver averaged 2 ounces a ton , although assays of 147 ounces have been recorded .

( 2 ) . The Grafter .

The orebody is near the east end of a band of marble - one of several bands alternating with diorite . The bands are terminated on the east by andradite-diopside skarn and altered quartz diorite.

The orebody , which has a nearly pure marble core , has a perimeter of about 150 ft. and a maximum thickness of 17 ft.

The ore consist of bornite and chalcopyrite , the latter locally intergrown with pyrite , disseminated through an andradite-diopside tremolite gangue . Malachite , azurite , cuprite , and native copper also occur in small quantities , Magnetite is common as disseminated grains . The copper minerals are generally most abundant close to the unaltered limestone , and the grade of the ore decreases away from it . Before 1907 , about 2000 ton of practically unsorted ore has been shipped , averaging 6 to 8 per cent copper .

( 3 ) . The Best Chance .

This property has the largest surface showing of cupriferous magnetite so far discovered in the district . The outcroppings of ore measure 360 ft in length , with a maximum width of 65 ft , and a average width of about 30 ft .

The geology of the Best Chance showing is similar to that of the Arctic Chief , in that the ore lies along a quartz diorite - limestone contact and both rocks are intensely altered near the contact . The zone of skarn is barely 50 ft thick .

The copper minerals , which are associated with the magnetite , consists mostly of bornite and chalcopyrite , and minor carbonates and oxides .

( 4 ) . The Pueblo .

The Pueblo orebody is in limestone close to its contact with granodiorite . The workings and outcrops indicate that the orebody is an irregular mass 300 ft long , 170 ft wide near the centre , and at least 100 ft deep . The ore is essential Cupriferous hematite . It grades in texture from a fine compact variety to a coarse glistening specularite which is everywhere slightly oxidized . The coppersulfides are more altered than the hematite , and the copper is present chiefly as carbonates , oxides and silicates . Bornite is apparently absent and chalcopyrite is preserved only in a few limited areas . The alteration of most of the original coppersulfides into various secondary minerals was accompanied by an impoverishment of certain parts of the lode and an enrichment of others , especially near the periphery . The grade on this account varies , ranging from 1 to 10 per cent copper .

( 5 ) . War Eagle .

Outcrops are scarce around the showing , and the few visible ones indicate that the eastern part of the claim is underlain by granodiorite and the western part by greywacke , containing lenses of limestone . The limestone is altered to skarn , containing sulfides along its contact with the granodiorite . The skarn covers an area 1000 ft long and 250 ft wide .

Samples indicated that the coppercontent was from 1,5 to 9 per cent and the silver from 1 ounce to 3 ounces a ton . Some molybdenite also occurs .

( 6 ) . The Anaconda .

The Anaconda is in limestone near its contact with granodiorite to the east . The ore is contained in steeply-east-dipping tremolitic bands about 10 to 15 ft wide alternating with layers rich in garnet . The sulfides , bornite and chalcopyrite , are most abundant in the tremolite bands farthest from the granodiorite . Some of the garnet-rich skarn bands are also rich in sulfides .

( 7 ) . The Copper King .

The claim is in a wedge-shaped limestone inclusion about 1200 ft long and 600 ft wide , entirely within granodiorite . The limestone is everywhere profoundly altered to an andradite -augite-tremolite-actinolite skarn . The copper sulfides , bornite and chalcopyrite are most commonly found near the cores of unaltered limestone . Magnetite , molybdenite , and locally free gold , occur in the ore . Shipments of high-grade ore , totalling about 500 tons , are stated to have averaged more than 15 per cent copper , 1 ounce to 3 ounces of silver and trace of gold .

( 8 ) . The Valerie .

The western part of the Valerie is underlain by limestone , and the eastern part by hornblende granodiorite , passing locally into diorite . The orebodies have developed along the ragged contact between the sedimentary and plutonic rocks . The limestone is partly replaced by diopside , garnet , chalcopyrite , and magnetite , whereas the adjoining granodiorite has been altered principally to garnet and epidote .

Copperminerals are irregular distributed along the limestone - granodiorite contact and occur as massive lenses separated by lean stretches . The ores resemble those of the Pueblo by having no Bornite but consisting of chalcopyrite and derived carbonates and oxides . Other minerals are arsenopyrite , magnetite . About 40 tons of selected ore , obtained from surface workings , is said to have averaged 18 per cent copper .

N.B. On the Geological Map overleaf , these occurrences are marked , while also the mentioned newly discovered 5 aerial magnetic anomalies have been transferred to this Map .



**LEGEND**

- |  |             |
|--|-------------|
| 13 Alluvium                            | Pleistocene |
| 12 Basalts                             | Tertiary    |
| 9 Pink Granite                         | Cretaceous  |
| 8 Granite, granodiorite, quartzdiorite | Cretaceous  |
| 4B Mainly conglomerates                | Jurassic    |
| 3A Sediments                           | Triassic    |
| A Metamorphosed rocks                  |             |
| B Volcanic rocks, uncertain age        |             |
| C3 Limestone                           | Triassic    |

- |                   |
|-------------------|
| 1 Arctic Chief    |
| 2 The Greffer     |
| 3 The Best Chance |
| 4 The Pueblo      |
| 5 War Eagle       |
| 6 The Anaconda    |
| 7 Copper King     |
| 8 Valerie         |

**THE WHITEHORSE COPPER BELT, YUKON**

Scale 1" = 2 miles

3. Aero Magnetic Survey, 1961.

An Aero Magnetic Survey of the Whitehorse Area was done by Aero Surveys, Ltd., in 1961, for the Geological Survey of Canada.

The Map-sheets were made available for the public on January 4<sup>th</sup>, 1963 at 9 o'clock a.m. Copies of these maps are attached, to this Report.

The survey was flown at a flight altitude of nominally 1000 ft above groundlevel, where terrain permitted; flightline spacing was 1/2 mile.

There is considerable topographic relief in this area. For example, Mount McIntyre west of Whitehorse has an altitude of over 5000 ft, while the Valley of the Yukon River 3 miles to the east has an altitude of 2500 to 3000 ft, and Mnt Canyon a further 3 miles to the east rises again to 4500 ft. It is unlikely therefore, that the flight altitude of 1000 ft above ground was maintained and deviations of up to 1000 ft from this figure might be expected. Also the flightlines are in some places more than 1 mile apart. This survey is more of an exploratory or reconnaissance type, rather than the more standard aerial survey, where 500 ft altitude, and 1/4 mile line spacing are maintained.

It must also be clear from this, that the known copper-magnetite-deposits of the Whitehorse Copper Belt, the biggest being 1000 ft long and 250 ft wide, have only little chance of showing up on these aero magnetic maps, unless one of the flightlines happen to go right over the deposit at a relatively low level.

On the other hand, it means that any aerial anomaly near the Whitehorse-Copper-Belt Area, that can be explained by magnetite concentrations, could represent mineralization large in size. Furthermore, if the anomaly is in the same geological environment as the known Whitehorse copper deposits there is a good chance to have copper associated with the magnetite.

Five of such anomalies were revealed in the direct vicinity of the Whitehorse Copper Belt , and subsequently staked in 3 groups of 40 claims each and 1 group of 50 claims , totalling 170 claims . The position of the 4 groups of claims is shown on the accompanying maps . The centre block has the highest readings , and is crossed by the Alaska Highway and the White Pass and Yukon Railway .

A description of each claimgroup follows :

#### North Group

This group of 40 claims was staked on a aeromagnetic closure of the order of 500 gammas local relief , striking roughly east-west . It lies on the broad northeast flank of Mt McIntyre near the contact of the MtMcIntyre granodiorite and the sedimentary rocks to the north . As these rocks include some limestone the anomaly is in good geological environment . In this locality the flightlines runs nearly parallel to the topographic contours , so that the terrainclearance was probably of the order of the directed 1000 ft .

#### Central-Western Group

Adjoining the North group on its southeastern corner , the Central western group was staked on a 600 gammas magnetic high , striking northwest along the east flank of MtMcIntyre . Geologically this anomalie lies in a location similar to the north anomalie and is therefore of similar interest as a possible contact-metamorphic zone . It lies 1 to 2 miles west of , and parallel to the known Whitehorse Copper Belt .

#### Central Group

In the Valley of the Yukon River , about 2 miles southeast of MacRae , lies a local magnetic closure of the order of 700 gammas relief . Is covered by overburden on all sides . Since the nearest outcrops to the west are granodiorites , and to the northeast are sediments including limestone , the possibility of a contact-metamorphic deposit is good . The access is , of course , excellent . Flightaltitude was probably over 1000 ft as

explained on page 3 - 1 , so this anomaly already highest of the five , should comparatively to the others read still higher . The group staked on this anomaly consists of 40 claims .

Eastern Group

An elongated magnetic ridge , with two tops , of the order of 600 gammas local relief strikes northwest along the east side of Cantlie Lake . It is partly within and partly outside of what is mapped as a mass of Hornblende-diorite . The rocks on the other side of the diorite contact are presumably limestones . Some limestone was observed outcropping on this group in the course of staking . 40 claims in all were staked on this group .

#### 4 . Suggestions for Exploration .

The recommended exploration sequence on these groups would be as follows :

- I . Geologic and magnetic mapping of the main areas of aeromagnetic interest . Lines should be at 400 ft intervals across the indicated magnetic trend .  
( The pattern of magnetic indications on the known old occurrences in the area , is of strong highs , of the order of several thousands to tens of thousands of gammas , but localized in extent to a few hundreds of feet in diameter . See attached magnetic map of The Best Chance deposit )

It is not expected that there will be much outcrop found in the interesting area on any group . This phase should start as soon as possible , after the snow has left the ground , i.e. about May 15 .

In total , possibly 100 linemiles of linecutting and magnetometer survey would be required .

- 2 . Drilling of the main magnetic highs as defined precisely by the magnetometer survey . It is expected , that at least three drillholes , 400 ft each in length , would be required on each claimgroup .

5 . Bibliography .

McConnell, R.G. , Yukon ; Geol.Surv., Canada , Sum. Report for 1900 and Ann.Rept.Vol.XIII,1900. pt. a., pp 52 , or Mem. 284, pp 33 .

Brock, R.W., Yukon Territory ; Geol.Surv.Can., Sum. Rep. for 1909 , pp.15, or Mem. 284 pp 316 .

McConnell, R.G., The Whitehorse Copper Belt , Yukon Terr. Geol. Surv. Can. Pub. 1050 .

MacLean, T.A., Lode Mining in Yukon ; Mines Branch , Canada , No 222 , pp. 159 - 168 .

Cockfield , W.E., Bell, A.H. , Whitehorse District , Yukon, Geol.Surv. Can. , Memoir 150 pp. 48 .

Cockfield , W.E., Pueblo , Tamarack-Carlisle and War Eagle-Le Roi Properties , Whitehorse Copper Belt , Yukon ; Geol.Surv.Can. Sum.Rep. 1927, pt.A , pp. 14-18 , or Memoir No 284 , pp. 581 - 85 .

Wheeler, J.O., Geology and Mineral Deposits of Whitehorse Map area , Yukon Territory , Geol.Surv.Can. Paper 52-30 .pg 14. 1952 ,

Bostock , H.S., Potential Mineral Resources of Yukon Territory, Geol.Surv.Can. Paper 50-14 , p.10 .1954 .

Wheeler, J.O., Whitehorse Map Area , Yukon , Geol.Surv.Can. Memoir 312 , 1961 , pp. 156 .

6 . Maps .

Aero Magnetic Maps	:	MacRae I34I G Whitehorse I413 G
Geological Maps	:	52-30-A ( G.S.C. Ottawa ) I093-A ( G.S.C. Ottawa )
Topographic Maps	:	MacRae I05 D/I0 Whitehorse I05 D/II
Claimmaps	:	MacRae I05-D-I0 Whitehorse I05-D-II