GOLD MINING INVESTMENT POSSIBILITIES IN THE YELLOWKNIFE REGION, N. W. T.

W. C. STOLL

November, 1969

With a Chapter on

NOTES AND SUGGESTIONS ON PROSPECTING METHODS FOR GOLD DEPOSITS IN NORTHWEST TERRITORIES.

C. E. Gordon Brown

August, 1969

3100
25 KING STREET WEST
TORONTO 1, CANADA

November, 1969

Mr. John L. Carroll,
President, Gold Resources Inc.,
1270 Avenue of the Americas,
New York, 10020, N.Y.,
U. S. A.

Dear Sir,

Attached is my report on gold mining possibilities in the Yellowknife region, of which the final chapter, on economic geology and prospecting methods, was written by Mr. C. E. Gordon Brown. This report is one of several setting forth the results of a gold investigation in Canada, carried out from June through November, 1969, for Gold Resources Inc.

Respectfully submitted,

W. C. Stoll

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Geologic map of the northern part of Yellowknife Greenstone Belt (Compiled from several authoratative sources). - in pocket.

CONCLUSIONS

The conclusions listed here are only the practical ones that have to do with the possible future activity of Gold Resources Inc. in Yellowknife, such as acquisition of gold properties and gold mining shares, and exploration activity.

1) The Yellowknife district and surroundings have been thoroughly explored, and all worthwhile showings have been staked. A new primary exploration would be very expensive and probably should not be contemplated.

2) With its remoteness, severity of climate and consequent high exploration and mining costs, a profitable new mine in the Yellowknife region, with free market gold price in the recent range of $39.00 - $42.00 U.S. per ounce, would need to be based on an adequate ore supply of at least 0.6 Oz Au per ton average grade at 1,000 tpd; of 0.8 Oz per ton at 500 tpd and 1.0 oz per ton at 100-200 tpd. These are round figures and would naturally vary according to location and many other factors. The initial outlay to start a mine would be a good deal higher than in most other gold districts.

3) Considering the inherent disadvantages of operating in this region - - but by no means discounting the possibility of making new, rich gold strikes there - - it is specially important to compare its economic possibilities with those that may be open to the Company in other gold districts.

4) Attention ought to be focussed mainly on the Yellowknife Greenstone Belt itself, where nearly all the big gold discoveries have been made so far. The areas of sedimentary rocks are more or less unfavourable.

5) In the middle of the Greenstone Belt, there is an area of four square miles, north of Giant and Akaitcho mines and south of Crestauraum, that is covered by the Lynx Yellowknife, Captain Yellowknife, Ranney, P.R.W. and Ann claim groups. These are held by individual small companies, are strategically situated, and have possibilities for finding worthwhile gold deposits. They would have potent speculative value in a gold boom.

Share interests, large or small, according to convenience, ought to be acquired in some or all of these properties; but with the realization that they are all speculative, and that new ore that may be discovered and mined on any of them would probably have to be milled in the Giant Yellowknife mill. That is, unless such discoveries were extraordinarily large and rich.

6) Giant Yellowknife ML. shares appear much over-valued at around $10.00, in view of the short life of the ore reserves and the small earnings. Some of these might be bought in the unlikely event that they fall below about $5.00 in the very near future.

7) The Supercrest Mines Ltd. property, just north of Giant, owned 50% by Akaitcho Yellowknife Gold Mines Ltd., has an orebody much smaller than those at Giant, but possesses good potential for further ore. A share position in Akaitcho is worth taking, while gold share prices are depressed.

8) In that part of the Greenstone Belt lying west of North Bay Fault, there does not seem to be any good opening for gold mines investment. As a precaution, a small number of Yellorex shares could be purchased.

9) Among the outlying prospects, the most attractive seems to be the Colomac Dike, owned by one of the Byrne companies. The Messrs. Byrne might be willing to sell an interest in Colomac Dike, and they have on hand a feasibility report of recent date which probably could be made available. A part ownership in Colomac Dike might turn out to be worthwhile in the event of a large gold price rise.

10) Some highly speculative claim holdings in the sedimentary areas might be considered only as a secondary possibility.

INTRODUCTION

The work on which this report is based had the objective of investigating gold properties in the Yellowknife district and immediate surroundings, and deciding on the advisability of acquiring gold prospects or mines or gold mining shares for Gold Resources Inc. Twelve days, July 22nd to August 2nd, 1969, were spent in Yellowknife and about four weeks more finding additional information, studying reports and maps, and in writing. Mr. C. E. Gordon Brown, P. Eng., who has had many years' experience in gold exploration at Giant mine and in the whole Yellowknife region, was the writer's adviser and companian during the trip to Yellowknife. He contributed the final chapter to this report, and made available an MS report, written by him and C. Boldy, on the economic geology of the Yellowknife district. This is submitted as an annex to the present report.

In Yellowknife we visited a few mines and prospects, examining rock and vein exposures, and made two short flights in a chartered plane: one to the Clan Lake area, returning by way of Gordon Lake and the Thompson Lundmark mine, and the other to Russell, Slemon and Indin Lakes, the Colomac Dike, Spider Lake and return. One landing was made - at the NOSE prospect, near Clan Lake, on which we had encouraging reports that turned out disappointing. Most of the time at Yellowknife was spent interviewing mining people of the region, investigating mining claim titles, gathering and studying claim maps, and writing notes and a preliminary text.

It is well-known the Yellowknife geology is complicated and needs a great deal of field experience to gain more than a superficial insight into it. The present report, therefore, is not a geologic report, save that there are frequent allusions made to geologic facts and ideas originating almost entirely with Mr. Brown and other writers on the district. The report purposes to give a firm general economic appraisal of the present gold mining chances in the district, with a minimum of geologic and other description.

The following information is submitted herewith as annexes to this report:

C. E. Gordon Brown and G. D. J. Boldy, Reappraisal of Yellowknife District Geology, MS report, 20 pp, 10 figures, 1962.

C. E. Gordon Brown, Helicopter Exploration costs in Northern Canada, C.I.M. Transactions, Vol. LXXVII, 1964.

The Consolidated Mining and Smelting Company of Canada Ltd., Report No. 3, Project Terminate report, Lynx Yellow-Knife Gold Mines Ltd., by John A. Greig, MS report, 11 pp, with nine enclosed maps and sections, 1965. (This report was obtained from Lynx Yellowknife Gold Mines, Ltd. and copied, with their permission).

GEOLOGY

A geologic and mining map of the northern part of the Yellowknife Greenstone Belt, compiled by the writer from a number of reliable sources, accompanies this report.

The reader is referred to the final chapter for a short summary of the economic geology of Yellowknife, with suggestions for prospecting. The annexes already mentioned contain a great deal of further geologic and exploration information.

A comprehensive and detailed view of general and economic geology and of the numerous mines and prospects around Yellowknife may be had from the following well-known publications, each with an extensive bibliography, of the Geological Survey of Canada.

C. S. Lord, Mineral Industry of District of Mackenzie, Northwest Territories, G.S.C. Memoir 261, 336 pp, 1951.

R. W. Boyle, The Geology, Geochemistry and Origin of the Gold Deposits of the Yellowknife District. G.S.C. Memoir 310, 193 pp, 18 pl., 1961.

J. F. Henderson and I. C. Brown, Geology and Structure of the Yellowknife Greenstone Belt, District of Mackenzie, G.S.C. Bulletin 141, 87 pp, 1 map, 1966.

These standard works, as well as the geologic maps of Joliffe and other G.S.C. geologists, were studied in preparation of this report.

An interesting article of recent publication may have a bearing on future gold prospecting in Yellowknife and surroundings: R.E. Folinbee, et. al., A Very Ancient Island Arc, American Geophysical Union, National Academy of Sciences, 1968.

MINING PROPERTY SITUATION

All the quartz showings in and around the Yellowknife district have already been found. The whole region has been well explored during many years by foot and canoe and from helicopters and fixed-wing aircraft. This work has been carried out by energetic and capable prospectors, geologists and engineers, some of them financed by prosperous mining or exploration companies.

There are practically no quartz showings available by staking. Prospectors and others wait for years for claims to come open for staking, and there are in Yellowknife dozens of men who gain a livelihood by staking and selling mining claims. The chances of acquiring property of any known merit by staking are almost nil unless one retains a paid representative, resident in Yellowknife, for this purpose. This method is said to be followed by one outside group, who have appointed a prospector, on annual wage and expense basis, to watch the mining records, week by week, then go out and stake any desirable ground that falls open.

Mining properties, including the multitude of idle ones, are pretty closely held by owners who are for the most part financially self-sufficient and able to carry on protracted negotiations in order to exact their full price. The speculative value of these gold shows is fully taken account of by the claim holders.

To get gold properties of any promise at all, it looks like the only alternatives to mounting a long drawn-out exploration program are to buy them or buy participations, or take them under option with the unavoidable obligations of making cash payments and spending further money in mapping, trenching and diamond-drilling. Properties, perhaps many, are available by way of deals of these kinds, but, as usual, gold properties of real potential are few.

NOTES FOR AN EXPLORATION PROGRAM

If an exploration program were to be contemplated, the first principle would be to limit it to the greenstones of the Yellowknife group, not only the Yellowknife Greenstone Belt proper, but other similar belts in the region. Exploration in the graywackes and slates would have much less chance of making an important find, because the gold deposits so far found in these rocks and their metamorphic equivalents have been with the sole exception of the Discovery Mine, economically unimportant.

The second principle would be to prospect the greenstones where these are intruded by granite or quartz Monzonite. Further, if the exploration target is to be an important gold deposit of the type of the Con, Giant or Akaitcho deposits, one must seek not veins but schisted zones with quartz-sericite carbonate alteration.

The general ideas to be followed are straightforward as they go, but the execution of a program of this kind, as distinct from a hit-and-run exploration, is apt to be expensive and long, requiring careful, expert planning and supervision, and abundant financing, with the final results quite unforseeable.

The paper by Folinbee, already referred to, might be well worth studying; together with other similar literature, if grass-roots exploration at Yellowknife is ever contemplated. On the basis of it, Gordon Brown comments that the terrain between Crestaurum and Discovery mine now seems more interesting because there are in this belt considerable exposures of acidic volcanics containing sparse gold occurrences at the surface. For example, the Clan Lake area, near the NOSE group of claims might be underlain at no great depth by andesite similar to the Giant Yellowknife and Con host rocks. If such were the case, they might contain important gold deposits, taking into account that there is gold in the unfavourable (acidic) rocks at the surface.

The gold prospect near Sunset Lake, 65 miles northeast of Yellowknife, is in greenstone, several miles east of a quartz monzonite stock (see regional map in Brown's 1962 report) and has Giant-type structure. Unfortunately it is not available, but would be worth having it it ever fell open.

One or two bosses of granitic rock intruding Yellowknife type (?) greenstone can be seen on the G.S.C. maps of Indin Lake and its surroundings. If the intrusive were granite or quartz monzonite and the greenstones really of the Yellowknife Group, this area should be favourable. Evidently, however, no important gold occurrence has yet been recognized there.

MINES AND PROSPECTS IN THE YELLOWKNIFE GREENSTONE BELT

Giant Mine: Giant Yellowknife Mines Ltd.

The geology and other particulars of this important gold producer can be studied from the many published and private reports available. Only a few notes can be given here. The following statistics are from a company publication:

	1968	Total since commencement
Tons ore milled	374,717	6,102,221
Mill heads oz gold/ton	0.634	0.745
Oz gold produced	237,738	4,546,155
Value of production	$ 8,739,180	$ 138,341,591
Dividends paid	$ 1,721,168	$ 34,541,675
Shaft sinking	-	3,696 feet
Drifting and X-Cutting	7,789 feet	167,330
Raising	4,063	95,229
Diamond Drilling	151,286	2,010,124
Employees	388	
Ore Reserves		
Tons	1,688,250	
Grade Oz Au/ton	0.725	

Net recoverable value of ore milled in 1968 was $23.30 per ton. Giant's total costs in the same year, adding depreciation, outside exploration and income tax were $18.68.

Working costs increased from $15.60 per ton ore milled, in 1967, to $16.03 in 1968, and to $16.29 during the first semester of 1969. These latter figures are given below:

Cost Per Ton Ore Treated

	Giant	Supercrest (Akaitcho Mine)
	First six months	
Mining		
General Mine Expense	2.02	4.10
Hoisting	.43	.78
U/G Diamond Drilling	.82	2.48
Drifting & Crosscutting	.26	2.22
Stoping	2.91	3.72
Tramming	.51	.80
Milling		
Total Treatment	2.72	2.48
Local Overhead		
Total Expense	5.91	7.17
	15.58	23.75
Surface Exploration	-	.26
	15.58	24.01
Total, Giant and Supercrest	$16.29	

Although working costs increased from 1967 to 1968, working profit rose from $6.92 to $8.05 per ton, because the average price of Giant gold, sold on the free market, improved from $37.99 to $41.60 per fine ounce. The operations at Supercrest and Lolar mines were eligible for assistance under the Emergency Gold Mining Assistance Act because of their higher production costs. Their gold was therefore sold to the mint.

Grade has tended to decline over the years and costs to increase.

From 1965 to 1967, net profit declined from $3.6 to $2.1 to $1.4 millions and dividends declined from $1.00 to $0.60 to $0.40. In 1968 earnings were 46¢ and dividends 40¢ per share. Shares (TSE) are selling around $10.00, which is 25 times the current dividend.

At end of 1968, ore reserves as stated in the Giant Yellowknife Mines Ltd. annual report for that year were:

	Tons	Oz Au per ton
Giant Mine	1,275,450	0.73
Lolar Mine	331,400	0.71
Supercrest Mine	81,400	0.76
Total developed ore	1,688,250	0.725

Reserves declined about 17% from 2,045,300 tons the year before. Exploration efforts did not produce any large tonnage of new ore.

Ore reserves as presently known will carry the operation until 1974, about 5 years more. High grade, wide ore reserves of the kind mined heretofore, contain about three years ore, and the rest is in narrower zones, not so well defined. Up to 1962 or so, the average stope width at the Giant mine was around 30 feet, with maximum ore widths up to 140 feet, but now they are having to run many narrower stopes. The present ore reserve naturally does not allow for new ore that may be explored and developed during the years to come, but the indications now are that these tonnages will not be very great and that ore reserves will continue to drop off.

Mr. Gordon Brown alludes to some tonnages of lower grade material that would be profitable with a sufficient increase in the metal price. The probably maximum quantity of low-grade (0.25 - 0.30 oz gold per ton) submarginal ore in the Giant mine might be set tentatively at several hundred thousand tons. This material would be commercial grade if the gold price rose to $75.00 or $80.00 per fine ounce.

In depth, below 1500 foot level, there are no chances of finding more ore, as is attested by the results of more than 2 million feet of diamond drilling. To the south, the ore is bounded by the West Bay Fault and by the Cominco claims. The only opening is to the north, on Supercrest claims, and on other claims still farther north, held by the Northbelt consortium, owned and controlled by Giant and Falconbridge.

In the Akaitcho mine, now worked by Giant, there are good possibilities of ore additional to the calculated reserve, but the thickness of the ore is much less than it is in the Giant mine. Likewise in the northernmost Giant claims, in the North Giant Shear Zone, the ore in the L.A.W. ore bodies is only 5 feet thick. So far the tonnage possibilities of the Akaitcho and L.A.W. ore deposits seem to be much less than those around Giant "B" and "C" shafts. On the other hand, we do not know the latest results of Giant Yellowknife exploration.

The Northbelt Yellowknife exploration, referred to elsewhere in this report, is an effort to find new ore bodies to keep the Giant mill running in the future, when present ore reserves give out. There is no telling how successful these efforts will be. Unless large ore tonnages can be

developed on the Supercrest and Northbelt claims, the outlook for Giant Yellowknife seems to be one of full production for a few years to come, followed by declining production as the mine is forced to rely more and more on narrower stopes.

In order to justify the present share price of Giant Yellowknife ML. the annual profit and dividend payment ought soon to rise by 3 or 4 times. There seems little likelihood of this, short of a drastic increase in the gold price. An increase to $70.00 gold would have a notable effect on the profits of the mine.

With an efficient, well capitalized operation such as Giant, working at 1,000 tpd., at a cost around $16.00, one can imagine that the working costs of a small tonnage operation, 200-300 tpd., in the Yellowknife district would likely be from $18.00 to $25.00 per ton. Both the Con mine and the Discovery mine reportedly were able to hold working costs below $20.00 per ton. To earn much money from gold mining on a modest scale, one should be able to count on an adequate supply of ounce ore, with the gold price as it now is.

Supercrest Property

Supercrest Mines Ltd. was formed in 1964, and took ownership of the A.E.S. claim group from Akaitcho Yellowknife GML. Akaitcho holds 50% and Giant Yellowknife 50% of the shares issued, which number 665,000 shares. Falconbridge, in turn, owns 36.7% of Akaitcho Yellowknife GML. Akaitcho is controlled and managed by Falconbridge, and Supercrest is (controlled and) managed by Giant Yellowknife, (or, indistinguishably, by Falconbridge).

Supercrest is a consortium in which all the shares issued are owned by the two participating companies, and they are not available, apparently, on the open market.

The A.E.S. claims now owned by Supercrest are a prime object of exploration and development of new gold ore reserves by Giant Yellowknife Mines Ltd. The claims lie north of the Giant group, south and SE of the Lynx group, and south of the P.A. group, on both sides of Akaitcho Fault.

The known ore deposit is near Akaitcho shaft, in a shear zone striking N 15° E and dipping 35° - 40° to the east. The ore rakes 45° or so to the north, where it is cut off by the Akaitcho Fault. This fault has been intersected underground in drifts. The ore body as now known lies between the 250 and 1100 levels. Above 250 level, the shear zone and the ore flatten, the ore cuts out or becomes poor, and the shear zone steepens again up to surface. The ore thickness is 5 or 6 feet, a great deal thinner than the main Giant ore bodies.

We do not know the shape of the entire Akaitcho shear zone structure. We were not able to see these particular structure sections at the Giant Yellowknife geology office. Apart from this, expert opinions do not agree.

At least from the zoning standpoint, as proposed by Brown and Boldy, physical-chemical conditions for gold ore deposition are favourable both east and west of Akaitcho shaft for a distance of 1/4 mile in either direction(see their 1962 report, Fig.10), so that any favourable structures that exist in this "hot zone" are likely to contain ore. The chances for ore additional to that already known can therefore be regarded as favourable.

The east-dipping Akaitcho shear zone, according to Brown's (1962) structural interpretation, should descend into a trough more or less 1200 feet deep beneath the surface, then rise again, still farther east, following the west limb of the anticline-like structure on which the Muir Zone ore body is situated 3/4 mile to the south.

According to Boyle (1961, see Fig.11, section B-B1) the whole Akaitcho structure, like that of Lynx, is anticlinal, with a steep west limit descending sharply from a crest running N-S, 1000 feet west of Akaitcho shaft. This hypothetical west limb is supposed to correspond to the Campbell Shear in its northward extension. This interpretation follows from the supposition that the Giant-Akaitcho foldform shear zone system is itself a continuation of the Campbell Shear. But as will be clear from a reading of Brown and Boldy's 1962 report, the geologists of Giant Yellowknife Mines Ltd. are not all in agreement with this idea. Rather, the Giant-Akaitcho system is better regarded as a distinct structure lying in the footwall of the Campbell Shear. This would place the Campbell Shear as well as the Con Shear system in their northern prolongations farther west, as much as 1/4 mile west of the Giant-Akaitcho ore zones (see 1962, Fig.10), passing through Trapper Lake. These fundamental disagreements on the part of expert geologists who have studied the local geology for many years certainly cannot be resolved in a superficial memorandum such as the present one, but they do serve to give some indication of the complexity of the geology and the difficulties in deciphering it.

In the Akaitcho shaft area, Giant Yellowknife has drilled and developed an ore reserve which, with conservatively calculated potential ore, is supposed to amount to several hundred thousand tons, at least, with grade around 0.7 oz. gold per ton. This, in any case, was the impression gained by the writer. The Supercrest (Akaitcho) ore reserve (blocked-out or drilled-out ore), as published by Giant Yellowknife, was 81,400 tons at 0.76 oz. gold, at the end of 1968.

Presently, Giant is mining ore from the Akaitcho shaft area at the rate of 135* tpd., assaying from 0.5 to 0.8 ounce gold per ton. The Akaitcho shaft has no hoisting gear, so ore is trammed underground about 1½ miles to the Giant "B" shaft, by battery locomotive. This quantity is about 1/7 of the daily tonnage (approx.1,000 tpd.) milled by Giant; the rest is coming from ore shoots on the Giant and Lolor claims.

Giant Yellowknife charges heavy costs to Supercrest for the Akaitcho ore - $24.01 a ton as compared to an average cost of $16.29 (see 30 June 1969 statement) for the whole Giant operation. Such costs charged to Supercrest all but wipe out any profit margin. Accordingly, the share-

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* 1969 Giant cost and variance budget gives 40,000 tons/yr for Supercrest ore or 135 tons/day. June budget statement gives 20,745 to 30 June equiv. 0.60 oz/ton grade

holders of Akaitcho Yellowknife GML are not yet profiting from the Supercrest arrangement.

Akaitcho Yellowknife GML shares now sell (TSE) around 70¢ and are sinking in concert with shares in general. Getting a block of Akaitcho shares would be the only way visible to participate in the Supercrest development and gold ore production, on the assumption that neither Giant nor Falconbridge are apt to sell their own shares, nor permit treasury shares to be sold to outsiders.

Akaitcho Yellowknife GML

Authorized	4,000,000 shares	
Issued:		
Falconbridge	1,198,230	(36.7%)
Others	2,067,882	(63.3%)
Total	3,266,112	(100.0%)
Treasury shares (diff.)	733,888	
(Total)	(4,000,000)	

Akaitcho is a popular gold mining share, and is widely held. It used to be more popular, when the "North Belt" rush was on during the earlier years of operations of the Giant mine. Most of the geologists in Yellowknife seem to own Akaitcho shares, including those who have participated in Northbelt exploration.

The situation of Akaitcho shareholders might be similar to that of the owners of the Rycon mine after they went into partnership with Cominco, who worked the adjoining Con mine. The Rycon owners finally had recourse to putting a representative with full powers in the Rycon mine, and this resulted in more profit to the junior partners.

If an interest is taken in Akaitcho it might best be a block of shares large enough to allow the new owner to obtain more benefit.

Akaitcho should have good leverage. These shares should be bought fairly soon, if at all, while prices are still going down, until sufficient are accumulated to give an important participation.

The geological situation as it bears on further potential ore reserves appears satisfactory:

SW of Akaitcho Fault

(1) In the Akaitcho shaft area, the ore body now being worked, with worthwhile blocked out and potential reserves, has further possibilities to the east.

(2) The ore body next south of Akaitcho shaft (the L.A.W. ore zone) might plunge north onto Supercrest claims at depth.

(3) Any shear zones west of the shaft area, such as those that might exist along Trapper Lake, would be on Supercrest ground, and should be ore-bearing from the lake northward to Akaitcho Fault.

NE of Akaitcho Fault

(4) Gordon Brown notes that, in 1958-59, two NW-SE cross-sections of boreholes were drilled across the Akaitcho property in that part of it lying NE of Akaitcho Fault. Perfect Giant-type folded schist zones were found in the bores, but no ore. This area is beyond the zone of gold ore deposition as defined on Brown's map. It lies southwest of the "Lynx Flat", apparently on the East Limb of the Lynx anticline-like structure, down-dip from that part of it that was tested on the Lynx Yellowknife property. (See chapter on Lynx Yellowknife).

A 1959 map shows the first section, of 5 boreholes, situated 900 to 2200 feet NE of Akaitcho Fault, and the second line, of 4 boreholes, 1600 feet NE of the first. There is a third line, of 3 holes, some 1600 feet NE of the second. These three are near the NE corner of the Lynx Yellowknife property. These drill sections define two anticlines and two synclines along a strike distance of around 5000 feet and a transverse distance of 1600 to 2000 feet. If these drillings are indeed decisive, then the ore possibilities of the Supercrest property north of the Fault are remote.

Northbelt Yellowknife Mines Ltd.

Northbelt Yellowknife Mines Ltd. is a consortium of which three companies - Falconbridge, Giant Yellowknife and Transcontinental Resources Ltd. of Vancouver - own practically all the shares issued.

Authorized	3,000,000 shares	
Issued (Dec.31,1967)		
Falconbridge	747,582	55.58%
Transcontinental Resources Ltd.	297,582	22.12%
Giant Yellowknife Mines Ltd.	284,000	21.11%
Other	16,000	
Total issued (end 1967)	1,345,164 shares	
Treasury (difference)	1,654,836 shares	
(Total)	(3,000,000)	

At the end of 1968, Falconbridge held a 38.7% interest, Transcontinental Resources 15.4% and Giant Yellowknife 45.8%.

Transcontinental Resources obtained their participation by contributing the Crestaurum Mines Ltd. property, which they controlled, to the Northbelt holdings.

This consortium has sought to consolidate the claim holdings north of Akaitcho Fault because the longer range future of the Giant Yellowknife operation may well depend on acquiring, exploring and eventually mining gold prospects ofthis area. So far, Northbelt has gathered together the following claim groups:

P.A.group	(formerly belonging to Giant Yellowknife)
Varga group	(formerly belonging to Falconbridge)
Midas-Goldcrest	(formerly belonging to Crestaurum Mines Ltd.)
Who Cares	(formerly belonging to Nib Yellowknife)
ED	(apparently acquired direct by Northbelt)
R.B.C. claims, at Berry Hill	

The A.E.S. (Supercrest, ex-Akaitcho) claims are not included in

Northbelt. Three other properties, all north of and close to Akaitcho Fault, also remain outside the Northbelt consortium - the Lynx Yellowknife group of claims, the Protection group of three claims, held by Captain Yellowknife (now Captain Mines Ltd.), and the P.R.W. group of PROW Yellowknife, which is controlled by Ryanore Mines Ltd.

Giant Yellowknife has been exploring Northbelt ground at least since 1964. They laid out a new coordinate grid on direction N 60° W and N 30° E, so that it coincides more or less with the general strike and dip directions of the rock formations and schist belts. A good deal of drilling has been carried out, some of it to depths of more than 1000 feet, as well as detailed geological mapping on 1" = 100 feet scale. The continuity of the work and the expressions of modest satisfaction with the results achieved show that the outlook is optimistic.

In exchange for funds expended in exploring Northbelt ground, Giant Yellowknife receives shares from the Northbelt treasury. In 1967, $87,527.00 was spent, for which the mining company will receive 350,109 new shares in Northbelt; the price thus comes out at around 40¢ per share. (See Canadian Mines Handbook, 1968-69 under "Giant Yellowknife Mines Ltd." for an account of this exploration and share acquisition arrangement). In 3 steps, Giant Yellowknife can spend an additional $420,000 by the end of 1970 and receive therefor up to 1,300,000 new Northbelt shares. If all options are exercised Giant would then hold a 60.9% share interest in Northbelt. After this, all participants may contribute further funds in proportion to their shareholdings.

We obtained copies of a few Northbelt Yellowknife Mines Ltd. progress reports and annual reports. In the 1967 report the belief is expressed that "Geological conditions on portions of Northbelt ground are very similar to the situation at Giant and Akaitcho. There is a very good chance for locating Giant-type ore bodies on the property".

Interest appears focussed on the Berry Hill claims R.B.C. 11 and R.B.C. 14 (off the map), just west of Upper Walsh Lake, where a schist zone, supposed to be on the northward continuation of the Giant-Akaitcho zone, crops out; also on the Crestaurum schist, near Crestaurum shaft, and its faulted segment which runs south through Daigle Lake onto P.R.W. ground, as well as on the northwest and northeast arms of Vee Lake.

The 1968 report notes that "Results to date have been moderately

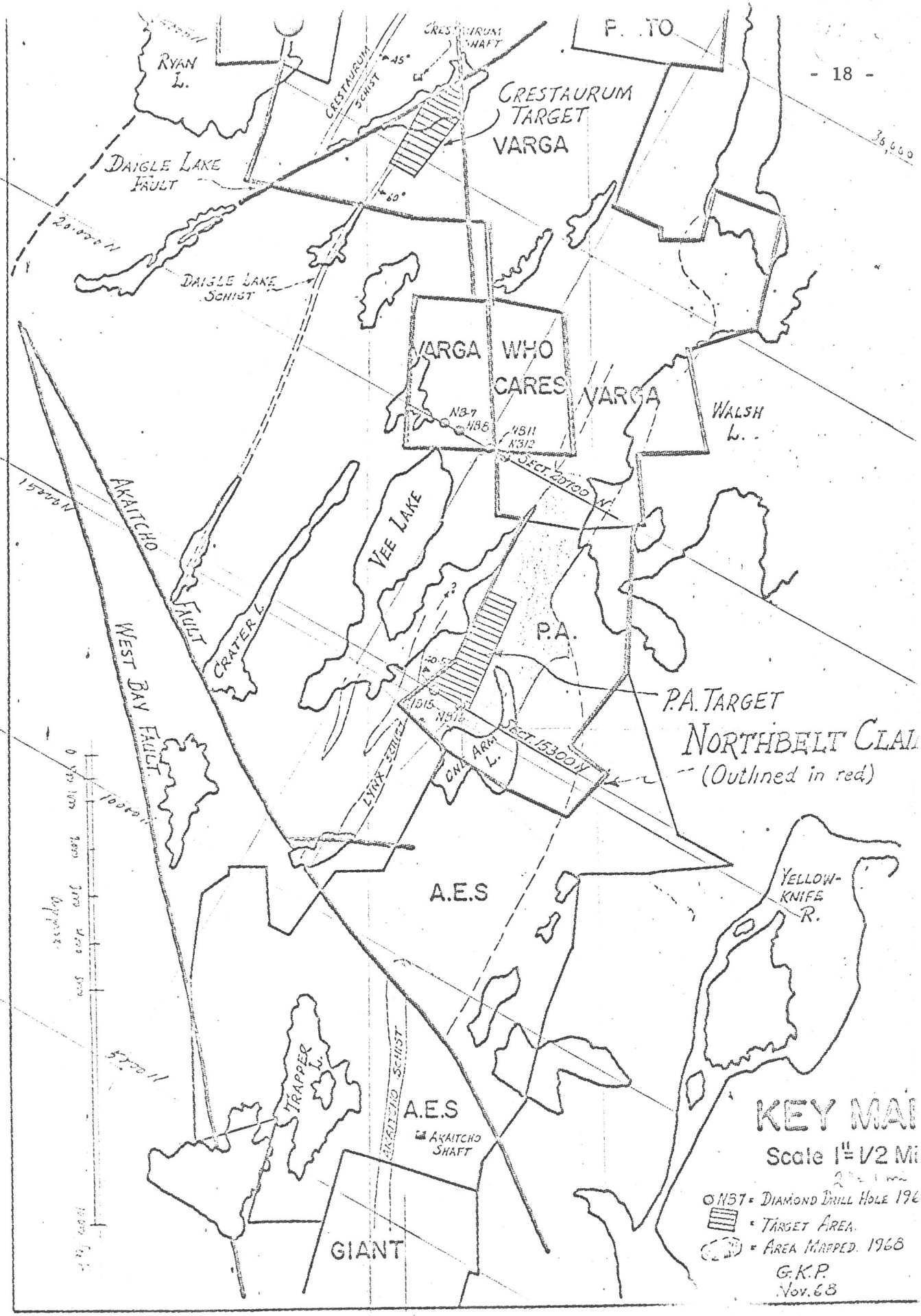
encouraging in that schists similar to those at Giant have been located beneath old drilling at the south end of the property - - -", and "Good schist was located in the two holes on section 15,300 N. This schist is up to 300 feet in width and believed to be a strike extension of the Giant-Akaitcho system". These quotations refer to the discovery made in D.D. holes NB15 and NB16, in the southwest corner of the P.A.group, very close to Captain Yellowknife ground on the west and to Lynx ground on the south, which appear to indicate the presence of the main schist zone trending about NNE through Lynx Lake, dipping 40° to 60° to the east, and extending southward onto Lynx claim and, on Captain Yellowknife property, running NNE up the NE arm of Vee Lake. (See accompanying sketch map, which is a photocopy of that accompanying the Northbelt report cited). Information from another knowledgable source was that each borehole intersected a 5-foot core length assaying 2½ ounces gold per ton.

On the basis of these drill results a target area 2500 feet long and 1000 feet wide was delimited, along the west edge of the P.A. group, to be further tested during 1969 by diamond drilling on 400-foot centers (see sketch map).

The possible significance of this discovery for the adjoining Lynx Yellowknife claims is discussed in the chapter devoted to that property.

The 1968 report further notes that "No significant schist intersections were encountered in (four) drill holes on section 20,700 N - - --", which would appear to minimize the possibility that an important schist zone runs NNE, up the NW arm of Vee Lake.

"Mapping and compilation of all drilling has now indicated favourable targets east of Vee Lake on P.A. claims (described above) and (also) east of Crestaurum shaft on Varga claims - - -". The accompanying sketch map also shows the "Crestaurum target" and the possible significance of this find to the P.R.W. claims to the south, which appear to be crossed by the same Daigle Lake schist as that on which the target area lies. Another Northbelt report, explaining the 1964-65 drilling program, notes that, "The area to the south of Daigle Lake (i.e. the P.R.W. group) is especially important", and the February 1965 progress report comment that "Kerr Addison has done a little EM test work on the P.R.W. group to the SW of Northbelt. Apparently the results were inconclusive."



With Northbelt in the control of Giant Yellowknife and Falconbridge, and taking into special account the former company's need and fixed intention to expand their mining operations northward, the chances of an outside group being able to buy Northbelt treasury shares seem remote. Another approach would be to seek to acquire the shares owned by Transcontinental Resources Ltd., if a 10 percent interest seems worthwhile having. As it turned out, these shares are not for sale. A third solution - acquiring shares of Transcontinental Resources Ltd. - - would not be advisable from the strictly gold point of view because that company has many interests other than gold, e.g. copper and other base metals, petroleum, etc., which are not of interest in the present investigation.

A factor of importance is that whatever ore is found and mined on the Northbelt property will surely be treated in the Giant Yellowknife mill and, logically, such future operations would be manned and managed by this same mining company.

The writer interviewed F.B. Kilshaw (Victoria, B.C.) and W.B. Milner and F.W. Schroeder (Vancouver, B.C.) about Northbelt, Lynx and Transcontinental Resources. They are directors of T.R. and Lynx. Mr. Milner controls T.R. (2,400,000 shares) and through it, Lynx Yellowknife. The upshot of these conversations was : (1) Lynx is being held as a speculation against favourable exploration results on the adjoining Northbelt ground. Lynx, however, is negotiable, according to Mr. Milner, at a price around that of the current share market, said by Mr. Kilshaw to be 2½ to 5¢ per share. (The Lynx shares were suspended from T.S.E. trading a few years ago). Lynx is negotiable, it may be assumed, because the several diamond drilling and mapping campaigns carried on since 1938 and culminating with the Cominco 1965 investigation, found no ore deposits. (2) T.R. wants to keep its participation in Northbelt Yellowknife. Transcontinental Resources shares might be purchased from Mr. Milner. He is thinking about liquidating his holdings and somehow reducing estate taxes, but is nevertheless insistent that his T.R. shares would not be available at current market (approx.30¢) because this price does not really reflect the potential earning power of the numerous T.R. share and property holdings (which, as already noted, include much other than gold mining interests).

Conclusion : there is no way, or no easy way, to get a participation in Northbelt Yellowknife. On the other hand, the encouraging finds made by Northbelt on their own ground reflect new interest and value on the adjoining ground, Lynx, Captain and P.R.W., some, perhaps all, of which is available.

Southern part of Yellowknife, Greenstone Belt - Campbell Shear - Rycon, Negus, Yellorex, Con and Yellowknife Bear Claim Group

The southern part of the Yellowknife Greenstone belt west of the West Bay Fault and south of Giant claim group is staked solid and largely controlled by Cominco, who hold, in one way or other, the Con, Rycon and Negus groups, and many others including AYE, NKANA, MEG (?), KAM and KAMEX. The only openings along Campbell Shear appear to be PRW group, belonging to Yellorex ML and HOPE group held by Yellowknife Bear. The HOPE group is 5 to 6 miles SSW of the southernmost known gold occurrence in the Campbell shear and moreover extends well into the west arm of Great Slave Lake. That leaves only the Yellorex PRW claims to be considered.

The PRW group, located immediately south of Negus Mine, extend one and a half miles along the Campbell Shear. Cominco has an agreement with Yellorex (see C.Mines Hdbook) for exploring these claims by drifting south on the Shear from the Negus workings. One drift heading south on 2300 level is already in progress, according to reports. Sampling results are not available.

The best ore on Campbell Shear was found on the Rycon property (Rose, Star, P and G3 and P and G4 claims) along a strike length of about 2,000 feet just west of the West Bay Fault. In this mine, this mineralized shear zone, dipping 50 degrees to the west (opposite dip to A.S.D. zone of Giant system, with which the Campbell was supposed to correspond!), was mined over an average thickness of about 30 feet (maximum 50 feet) and produced some 300,000 to 400,000 tons ore with average grade around 0.6 oz. In the upper levels and right next to the West Bay Fault the ore was poor. The best ore was on the Rose and Star claims. Farther south, on the Negus claims, the ore continued another 1,000 feet or so southward with diminished grade of around 0.35 oz., then the gold petered out entirely. (This information from Gordon Brown). Regarding this intelligence in the light of Gordon Brown's "hot zone", or zoning, theory -- according to which the gold was deposited within a narrow range about two miles from its source in the Stock Lake quartz monzonite stock -- it can be tentatively concluded that the Campbell Shear farther south of the present Negus workings is barren, and the chances of finding important quantities of ore in the Yellorex claims - which are 3,000 feet south of the southernmost working in Negus -- are not great, even though these claims lie athwart this powerful persistent shear structure. In Yellorex and farther south, the existence of gold values in the Campbell Shear would have to be predicated on the, as yet unknown, presence of another magmatic source similar to the Stock Lake source, but nearer.

The claim situation along Campbell Shear south of Negus offers no hope of getting free ground. From the Yellorex PRW claims, the Shear passes south into KAM and KAMEX claims, all controlled by Cominco, and then supposedly into the HOPE group of Yellowknife Bear. The Shear is thus staked SSWestward 6½ miles from the Negus boundary, well out into the West Arm of Great Slave Lake. It does not seem worthwhile to add more claims to the end of this long chain.

West of the belt of claims following Campbell Shear and toward the contact of the Greenstone belt with the granodiorite batholith to the west, is another tier of claims comprising the AX group, controlled by Con, the Eagor group held by Ralph Froment of Yellowknife and the Shear and Dove group, owned by Frank Avery, also of Yellowknife. These latter three would probably be available, but there does not appear to be any positive reason for optioning them. A shear zone passes through the N end of Octopus Lake. It was drilled and found to contain no quartz and no gold. Further SE on the coast of West Arm are three small cuts on a shear zone, which likewise turned out barren (C.E.G.B.).

The claims lying east of West Bay Fault would lie in the sedimentary rocks of the Yellowknife group and are considered to be without value. (e.g. CAG, D, and other groups in Yellowknife Bay, south of the town).

The conclusion is that there is nothing to be done in this southern part of the Yellowknife Greenstone Belt.

Lynx Yellowknife Gold Mines Ltd.

Company and property:- Domicile Vancouver. Cap. 6,000,000 sh., issued 4,018,008. F.B. Kilshaw, Victoria, president, Transcontinental Resources Ltd., also of Vancouver, W.B. Milner, president, holds 1,685,455 shares and controls Lynx YK. (Canadian Mines Handbook).

The Lynx Yellowknife GML property consisted at one time of 34 claims in three groups acquired about 1946 from various owners. The present report is concerned solely with 9 claims comprising a block situated mainly between Gold Lake and Vee Lake, and bounded by the A.E.S. (Akaitcho, now Supercrest), P.A. (Northbelt YK.), Captain Yellowknife, P.R.W. and Ranney claim groups.

Availability of property:- The writer considered the Lynx Yellowknife claims to have speculative interest for reasons set forth in the following, so in Vancouver and Victoria arranged to meet Mr. Milner and Mr. Kilshaw, who confirmed that the property is available and that control could probably be bought from Transcontinental Resources Ltd. for a price around that of the going market -- reportedly 2½ to 5 cents a share in August, 1969. It is surmised therefore that the shareholders of T.R. Ltd. and control of the Lynx company might be purchased for around $50,000.

Mineralized shear zones:- Those who have studied the Greenstone Belt and the Lynx YK property are in agreement that the principal explored mineralized zones on the Lynx property are the northward continuation of the Giant-Akaitcho shear system, offset northwestward some 4000 feet by the Akaitcho Fault (measured horizontally along the trace of the fault). This fact is of course sufficient cause for focussing attention on the Lynx property, and the Lynx has accordingly been intensively explored. To date 42,000 feet of diamond drilling have been carried on, without, however, finding ore grade mineralization in big enough bodies to be worth mining.

The Cominco report and maps (1964-65) and the C.G.S. maps by Boyle (1961) and Henderson and Brown (1966) are in agreement that the Lynx mineralized structure consists of two main members : (1) a north-northeastward-trending "West Shear Zone" extending from the Lynx Fault at Gold Lake northward 3,000 feet to and beyond the south end of Vee Lake, with various ramifications or braidings. This shear zone (perhaps corresponding to the Campbell shear?) is a powerful early thrust fault, with dip steep to the west, and (2) several hundred feet to the east, the "East Limb"- - a northeastward trending shear zone dipping gently eastward. It is believed that these two zones, having upward-converging dips, formed at one time an

anticline-like structure, the crestal part of which has been eroded away. Such structure would be analogous to the fold structure of the ore-bearing zones in the Giant mine. The East Limb is likened to the east-dipping ore zone of the Akaitcho mine.

Gold discoveries:- The "Original Discovery" on Lynx Yellowknife ground was made on the East Limb, which is thin, flat-dipping, and crops out in places in an area as much as 400 feet wide and 1000 feet long. This outcrop area is known as the "Lynx Flat". It has been the object of intensive exploration. No ore body was ever found, but there were reportedly many places with good gold mineralization.

Two other later gold discoveries, the "Core Shack Discovery" and the "Kidder Discovery" were made at two places along the eastern side of the West Shear Zone. Some of the drill holes and trenches of these localities gave very high gold assays, but still no commercial quantity of ore was found.

Exploration in 1936-37 in Lynx Flat:- The present Lynx property was staked in 1936. In 1936-37 it was trenched and drilled by Ventures Ltd., under option. This work established a N.E. zone 1000 feet long and 100 feet wide (part of the Lynx Flat), marked by steeply dipping schistosity (although the zone itself dips flatly), altered to carbonate with narrow quartz stringers containing pyrite and arsenopyrite. A chip sample across 60 feet of the zone near the N shore of Gold Lake assayed 0.11 oz. Au per ton (Lord, G.S.C. Memoir 261, 1951, p. 200-201).

Exploration in 1945-47 on East Limb:- Exploration was resumed in 1945-47 by Lynx Yellowknife Gold Mines Ltd. by diamond drilling, mapping and prospecting. During 1947 drilling amounted to 9000 feet. No ore bodies were found. The East Limb, including the Lynx Flat, was drilled further and found to dip to the east (idem). According to the Cominco geologic sections of Lynx, the East Limb was drilled and intersected at depth in at least three holes situated very near the S.E. property boundary, so that in this area - - along approximately 1000 feet of strike - - whatever ore there may be farther down the dip would be on Akaitcho (Supercrest) property. (See chapter on Supercrest for drilling results down-dip on East Limb). The eastward and down-dip extension of the East Limb in the area explored therefore has no ore potential. A little farther south, the East Limb is cut off by the E-W Lynx Fault, which joins the NNW Akaitcho Fault just west of Gold Lake. There ought to be a piece of the East Limb in the triangle bounded by these two faults, but this possibility has apparently not been explored - - probably because the extension of the Lynx

Yellowknife property in this area (from the fault junction near Gold Lake to the southeastward) is too small to be an attractive exploration target. Nevertheless, this small area is well situated from the zoning viewpoint.

Drilling on N.E. limit of Lynx claims, 1947:- Some of the holes drilled in 1947 (Nos. 72, 73, 75, 76, 77 and 85) were put down along the N.E. limit of the Lynx 1 claim, the northeasternmost of the claim group. All the essential drill data are at hand (got from the Bureau of Indian Affairs in Yellowknife) except the assays. Two holes, 73 and 76, showed "main ore zone type of shearing and alteration" (and "mineralization" in No.76), and another, No. 72, showed silicification and quartz veining. These three holes might indicate a thick mineralized schist zone striking N.E. (?) and dipping at moderate angles to the S.E.(?). A cross-sectional plot of these diamond drill data show that they are not inconsistent with a hypothetical N or N.E. shear zone dipping at least 55° S.E. and surfacing in and around Lynx Lake. The position and results of this drilling are important when considered in relation to the good results obtained in 1968 in Northbelt D.D. holes Nos. NB15 and NB16, 800 to 900 feet to the north. (See further on for interpretation of these data).

Exploration 1950 on West Shear Zone and Kidder Discovery:-

In 1950 more diamond drilling was carried out several hundred feet west of the Lynx Flat, on and next to the West Shear Zone. At least 35, perhaps 50 or 60, diamond drill holes were put down, some aimed at intersecting this main shear and others at exploring certain vague mineralized zones that seem to branch off on the east side of the West Shear.

The West Shear Zone was penetrated by about 14 holes, so far as known, some from the east and some from the west, to depths of about 200 feet or less, except for hole No.23, which cut at about 550 feet beneath the surface. The drilling was unequally spaced along a strike length of 900 feet on Gold 1 claim, and seems to show that the West Shear Zone, in the part explored, contains scattered ore values along a length of 400 feet or so, but no gold ore bodies. The best results were these:-

D.D.H. Nos. 23	1.5'	0.3 oz. Au/ton
100	6'	0.51
	2'	0.28
104	2'	0.45
105	3.5'	0.5

The two southernmost holes, located 300 feet N of the Lynx Fault, showed no mineralization.

All the remaining 1950 drill holes, both vertical and inclined,

were situated to explore an area of dacite and gabbro containing indefinite streaks of shearing and alteration along the east side of the West Shear Zone. This area, roughly 700 feet long and 250 feet in maximum width, lies 100 to 200 feet east of the West Shear and 500 feet west and northwest of the Lynx Flat, in the crestal part of the "anticlinal" structure that would be formed by the intersection of the two principal (viz. East and West) structures. Many of the drill holes here cut across narrow widths of high grade gold mineralization. Among others there was a series of shallow vertical holes spaced on 10 foot centres. A good number of these penetrated highgrade at or within a few feet of the surface, over core lengths of 2 to 8 feet. (e.g. DDH A3, A4, B4, C3, C4, D3 to 6). No.C4, for example, showed, between depths of 10 to 18 feet below surface, assays of 0.79, 4.34, 3.63 and 3.64 oz.gold per ton in 2-foot core sections. Data are available only for plotting the position of A2, but the others were certainly close by. Altogether they constitute the "Kidder Discovery".

Beneath the good assays the drilling encountered low-grade or barren rock. The Kidder Discovery does not, according to the drilling results available to us, continue very far to the northeast, so seems to be a local occurrence - - a narrow, rich zone dipping gently to steeply westward and representing, as the Cominco maps indicate, an offshoot of the West Shear Zone. Still, there are alteration streaks further northeast that might be a continuation of this zone.

Cominco exploration, 1964-65:- Cominco optioned the property in 1964 and explored it in that and the succeeding year. The claims were mapped at 1" = 100 feet and selected drill cores were re-logged, in order to find parcels of ground that had been insufficiently tested. By this time, 40,000 feet of diamond drilling had been performed (up to 1950), and an additional 2500 feet X-ray diamond drilling in 1950. Therefore, the drilling results recounted so far in this report represent only a part of the total drilling performed. There had also been detailed geologic mapping, surface trenching, prospecting and relogging of cores.

Cominco found that the northern extension of the West Shear Zone was untested. Thereupon they drilled two shallow holes (201 and 202) to locate the structure and one deep hole (No.203) to intersect the shear zone below a depth of 1500 feet, in the hope that at greater depth more favourable conditions for ore would have existed. These holes were sited between the Core Shack Discovery and the S end of Vee Lake on Gold 2 claim. The deep hole was 2,277 feet long at 70° to 56° inclination, and all drilling totalled 3,598 feet in the three holes. All gave low values, ranging from a trace to 0.04, except for a few inches of core in No. 201 that assayed 0.48 and 0.16 oz. It was concluded that chances of finding important ore bodies on the West Shear Zone were small, that the East Shear did not merit further work, and that other shear zones on the property are sub-

sidiary to the main ones and do not merit drilling. Cominco's study showed incidentally that in the Lynx Flat the mineralized shear zone, although it cuts across the steeply dipping stratification of the greenstones, has the form of a shallow syncline pitching southwesterly. This undulation terminates northward in a nose not far south of the boundary between Fox 1 and Lynx 1 claims.

Cominco report and maps 1964-65:- A copy of Cominco's final 1965 report on Lynx Yellowknife together with most of the accompanying geologic maps and sections is being submitted as an auxiliary or supporting document to this report, so it is not necessary to enter into the details of their procedures and findings.

On the Cominco maps, the undersigned has plotted some of the diamond drill hole sites, but there are certainly many more drill holes than appear on these maps and sections. As one instance, the "Core Shack Discovery" has probably been intensively drilled, yet only two drill sites are indicated on the map showing this place.

Northbelt Yellowknife M.L. diamond drilling 1968:- The information gathered by exploratory work from 1938 to 1965 would probably be enough basis to eliminate the Lynx YK claims from further consideration, at least for the time being. The mineralized shear zones explored on this property, even though they are continuations of the main ore-bearing zones of Giant Yellowknife and Akaitcho mines, contain scattered gold mineralization, including high-grade streaks, but these are too small to make ore deposits.

This disappointing result is surprising not only because the structure is favorable but also because part of the explored area lies within the "hot belt" zone of gold ore deposition postulated by Brown and Boldy on the grounds of many years of detailed observation of Yellowknife ore occurrences by geologists of Giant Yellowknife Mines Ltd. (See Reappraisal of Yellowknife District Geology, by C.E.Gordon Brown and G.D.J. Boldy, 1962, Fig.10). No gold ore bodies have been found in Lynx claims in spite of good structure and favourable zonal position with respect to the Stock Lake intrusive center of heat and hydrothermal emanations.

Northbelt Yellowknife Mines Ltd., as is related in the chapter dedicated to this group, drilled, in 1968, two holes, NB15 and NB16, to greater than usual depths at sites about 900 feet north of the N.E. boundary of the Lynx property, east of Vee Lake, on P.A. claims. Good schist, up to 300 feet in width and believed to be a strike extension of the Giant-Akaitcho system, was found in both holes. Assays are unavailable but it is authoritatively

stated that ore grade and widths were intersected. These discoveries, according to Northbelt 1968 report, were made "beneath old drilling".

Based on these drilling results and on surface mapping, the Northbelt geologist postulates a NNE-striking schist belt, dipping 40 to 50 degrees to the east that reaches the surface along the east shore of the N.E. arm of Vee Lake (in Captain Yellowknife group) and continues south through the NW corner of Lynx 1 claim at Lynx Lake to join up with the Lynx Flat. This sketch map is shown in the Northbelt chapter of this report. No other geological maps of the area show such a belt except Gordon Brown's map.

The two Northbelt boreholes determined a new target area ("P.A. Target") for further diamond drilling by that company in 1969, but the new results are unknown to us. If an ore deposit is drilled out in P.A.Target area, what are the chances that it extends south onto Lynx claim?

A rough plot of DDH NB15 and NB16, using the scanty data provided in the Northbelt report, seems to indicate that NB15 cuts across the schist zone somewhere between 400 and 800 feet vertical depth, and NB16 perhaps in the range 900 to 1300 feet vertical depth. If the strike is about North, an eastward dip of 45^{o} - 50^{o} is indicated.

It was noted earlier ("Drilling on NE limit of Lynx 1 claim,1947") that diamond drilling along the Lynx YK NE property boundary in 1947 disclosed, in DDH 72 and 73, wide alteration zones, one of which was described as "Main ore type sericitic shear", gold content not stated, and that these and other intersections would not be inconsistent with a N-S shear cropping out around Lynx Lake and dipping 55^{o} or more to the east. Only the northwesternmost DD holes cut this zone; the ones farther SE were, by hypothesis, not deep enough.

A likely conclusion to be drawn from these drilling data - Northbelt 1968 as well as Lynx 1947 - is that a powerful Giant-type schist zone enters Lynx property from the north, crossing southward under Lynx Lake and the N.W. corner of Lynx 1 claim, and that the shear zone might extend, at depths a good deal greater than those tested hitherto, as much as 1,500 feet into unexplored parts of Lynx 1 claim. Moreover, this zone might split near Lynx Lake, shooting off a branch from Lynx Lake southwestward to join the West Shear Zone. If this exists it has not been explored either.

Conclusion:- There may be deeper, virtually unexplored, ore possibilities in the NE part of the Lynx property. If a strong ore-bearing shear zone

extends into Lynx claim from the north, dipping 45 - 60 degrees to the east, the ore potential could be 1,000,000 tons or more within the confines of one claim. Obviously this is all highly conjectural and needs more study and more information. The Lynx property is available, and there are many favourable signs but still no ore bodies found. Buying it would be a gamble, but, depending on the personal viewpoint and pecuniary resources of the purchaser, perhaps not an unreasonable one. One of the first things to do is try to obtain the Northbelt Yellowknife 1969 report from the Lynx people.

Ranney Property

Ranney Gold Mines Ltd. owns the Contact, Crater Fr., Milky Way, Blue Quartz, Quartz, Art, Rainbow, David and Caribou claims, all forming a triangular block between Akaitcho and West Bay Faults, NW of the Akaitcho and Lynx groups and south of the PRW groups, in the Yellowknife Greenstone belt.

Brown and Boldy (1962, p.19) note that several narrow quartz lenses in schist zones contain very high values in native gold in the vicinity of David Lake, which is situated in the zone considered by them favourable to gold ore deposition.

"Considerable drilling" was done at one time, when the property was under option to Pioneer Gold Mines, of B.C. Mr. Brown says he might be able to get the drilling results from Charles Ney in B.C., who supervised the drilling for Pioneer.

We have a note dated 24 July, 1946 by C. Riley, from the files of Lynx YK, GML, Vancouver, written while one of the Lynx explorations was in progress, recounting his observation, on the Ranney group, of two small outcropping gold occurrences.

Henderson and Brown (1966, p. 57-58) describe the Ranney Shear Zone system as being one of those shear zones that strike and dip parallel to the lava flows of the Greenstone Belt. The Ranney Shear system formed along the Ranney tuff, which outcrops west of West Bay Fault near Giant "A" shaft. It has been displaced north by this fault to David Lake (on the Ranney property) where it outcrops at the N end of the lake and contains quartz lenses and pyrite with some gold. North of David Lake it is displaced some 3,000 feet NW by the Akaitcho Fault and has been traced northeast from the fault to Daigle Lake. The Ranney system (on P.R.W. claims) therefore is near and about parallel to one of the shear zones considered of interest by Northbelt Yellowknife ML., and on which, north of Daigle Lake, their "Crestaurum target" is situated (See chapter on Northbelt Yellowknife).

If this Ranney Shear system is so continuous (at least 2½ miles long) it might be important for gold, even though Boyle (1961) believes that shears parallel to the flows are much less important as carriers of gold ore bodies than those which transect the flows at acute angles. On

the Ranney property, the maximum length of this shear zone system, bounded both to north and south by great faults, would be around 4,500 feet. From the zonal standpoint, this shear system, within the Ranney property, is very well placed.

Captain Yellowknife Property

This property, belonging to Captain Mines, formerly Captain Yellowknife GML., of Toronto, P.E.Boylen, president, comprises the 3 Protection claims, which are situated along the NE arm of Vee Lake, bounded on the NW by the PRW group, on the south by the Lynx Yellowknife group, and on the east by the P.A. group belonging to Northbelt Yellowknife Mines Ltd. The principal target area for exploration by Northbelt YK ML., on the P.A. claims, adjoins the Captain Yellowknife claims on the southeast. Ore that may be found on this P.A. target area might continue up-dip onto Captain ground, and might surface under the NE arm of Vee Lake.

The postulated east-dipping shear zone, if it comes to the surface under NE arm of Vee Lake, would be on Captain ground from the lake down-dip only 400 to 500 feet, where it would pass into P.A. ground. Nevertheless if such a zone were really part of the Giant-Akaitcho system, it would be folded,and there might exist, therefore, a west-dipping west limb, which would give added potential to this property. In the absence of hard facts, it is necessary to rely on this kind of conjecture. The Captain property would ordinarily be brushed off, but the facts and circumstances explained in this report show that it has appreciable speculative value.

PRW Claim Group

This group, property of PROW Yellowknife GML, in turn controlled by Ryanore Mining Co., both of Toronto, lies south of Crestaurum, north of Ranney and Lynx Yellowknife and west of the Varga claims of Northbelt YK. ML.

The claims are traversed by the northward prolongations of the Ranney and A.E.S. shear system (Boyle, 1961, Fig.3). The Daigle Lake schist zone, in its extension southward from the "Crestaurum Target Area" of Northbelt Yellowknife ML. would cross the P.R.W. group (see Northbelt sketch map, included). Brown (1962, p.19) notes that, in 1958, an electro-magnetic long wire survey was made which disclosed an anomaly extending NE, between Vee and Crater Lakes, and that this could be an extension of one of the Con mine shear structures. Most of this hypothetical structure would lie in the P.R.W.claims.

Ann Group

The Ann group of 7 claims forms a fringe on the west boundary of the PRW group. The ground appears well situated but there are no drilling nor other data presently at hand.

Conclusions on Lynx Yellowknife, Ranney, Captain, P.R.W. and Ann claim groups

The individual possibilities of these five claim groups have been described as well as might be. All are highly speculative. Taken altogether they form a compact block of roughly 4 square miles extent in the middle and west part of the Yellowknife Greenstone Belt, bounded by Northbelt Yellowknife claims on the north and west, and by Supercrest claims on west and south, each with its known and prospective gold ore deposits: Akaitcho, P.A. Target, Crestaurum Target and Crestaurum mine. The block of 5 claim groups is strategically situated, in "elephant country". The gold ore potentialities seem to be pretty good, but would eventually require a large outlay for exploration. Once consolidated under single control, this block of ground could have potent speculative value if the gold price takes a big upward jump. Claims situated such as these ought to have much greater speculative value than any of the gold prospects we know about in the Yellowknife Sedimentary Series.

Except for Lynx Yellowknife, the availability of the five properties remains to be investigated. As a first guess, it would require an outlay of several hundred thousand dollars to buy control of all the properties concerned.

Once consolidated, it is conceivable that the group could be negotiated, if so desired, with the Northbelt consortium in exchange for a Northbelt shareholding, or with Giant Yellowknife Mines Ltd. in the way that the Akaitcho property was negotiated. Still, if the properties are available, they could likewise be negotiated by their owners, probably to greater advantage, directly with Northbelt or with Giant Yellowknife, but the writer is not aware that any such offers have been made one way or the other. Probably, any successful negotiation would have to wait upon a substantial gold price increase.

Unless new, very large ore discoveries could be made on the contemplated block of claim groups - - that is enough ore to warrant investment in a complete mining and treatment plant - - any new ore discovered and mined would almost certainly have to be treated at the Giant Yellowknife mill. This situation obviously would place the claim holdings in a situation tributary to the principal mining company of the district.

An alternative, less risky and expensive way of proceeding would be to purchase, on open market or from company treasuries, smaller shareholdings, then observe developments and decide the real possibilities at greater leisure.

OUTLYING MINES AND PROSPECTS

Gordon Lake

Around Gordon Lake, in the sedimentary series of the Yellowknife Group, there are a lot of little quartz veins - bedded veins and veins occupying different kinds of dilation structures. A few have good gold content, but there is nothing big. Rich gold can be found from place to place but in between the vein material is apt to be low grade, so that the average assay is low. In other words the veins are spotty and usually won't average out to ore grade. Naturally, some of these deposits are bigger and richer than others, but at Gordon Lake, as in the sedimentary series in general, none of them are really good and the probability, based on experience, of finding a deposit large, rich and consistent enough to support a sustained mining operation is very small.

Giant Yellowknife Mines Limited, under the direction of Gordon Brown, made a systematic study of all the vein outcrops east of Yellowknife for many miles including the Gordon Lake area and areas to the south. The work was carried out from helicopters flying on lines ¼ mile apart, back and forth, with hoverings or landings at all the places of interest noted by the pilot and accompanying geologist. The quartz outcrops were examined geologically and mineralogically and, if sampling was warranted, a prospector was immediately flown in with jackhammer and dynamite to drill and blast, thus obtaining, for the most part, samples of fresh material.

The great majority of these veins and other quartz bodies in sedimentary rocks contain practically no gold at all, or at most only 0.1 oz. Au. average. Most are structurally very irregular as well as irregular with respect to gold content. A mistaken idea of them may be received from a casual reading of C.S. Lord's 1951 G.S.C. Memoir. Lord received some of his data on tenor, widths and tonnage from the promotors and prospectors concerned, who were apt to exaggerate or to cite only exceptionally high assays, forgetting about all the poor results. Apparently, then, no great expectations should be attached to the Gordon Lake and similar gold deposits. To be worthwhile the gold price would have to be much higher than it is now. Yet geological study has been limited to the surface, and drilling has been inconclusive. This is so, it would seem, because none has demonstrated enough tonnage and grade potentiality to attract the sustained attention of responsible and well-staffed mining companies. Finally, in considering the possibilities, the ignorance factor, the chance of mistakes of geological judgment and the off chance of hitting on a really exceptional deposit, such as that mined at the Discovery mine, ought to be remembered.

Some very brief notes on the better of the known deposits near Gordon Lake, as recollected by Gordon Brown and other immediate sources, are given

below. Additional data can be got from Lord's 1951 and 1941 reports, and from P.J. Parker's private report for Gold Resources Inc.

Mineral Claim Sheet 85 - I - 14, Gordon Lake South

MYRT/W.T. groups owned respectively by Sam Otto and the Byrne interests. See Lord (1951) pp.257-258, under S.D.C. group. There is an unusually large quartz blowout situated on or near the boundary line between MYRT and W.T. It was repeatedly sampled and diamond-drilled by a number of groups. Dome Mines Ltd. estimated 503 tons per vertical foot with average grade 0.2 oz. gold. Giant Yellowknife Mines Ltd. repeated this work and got the same results. Discovery Mines found by drilling that the deposit goes down at least 200 feet. There would then be, according to this, about 100,000 tons indicated ore at 0.2 oz. gold, average. Yet there are persistent rumours about a Dome Mines Ltd. report that gives (perhaps to the entire claim group) a potential of a million tons low-grade ore. I did not see this report. The claims have been held tenaciously by their owners for some years, and others have staked all around (DOME, A.P., KHAN, RAJA, L.J.R., D.D. groups), so the properties probably have more than ordinary interest. According to Gordon Brown a certain worthwhile tonnage could be mined open-pit cheaply. It would have to be cheap with 0.2 ounce ore. Note that the present "DOME" group takes in part of the old S.D.C. claims, but apparently not the claims where the main showing is. J. Kelly says the MYRT/W.T./DOME groups are a better show, with greater tonnage possibilities and more gold, than the others.

TREACY group is on the S.W. shore of Gordon Lake, 7 claims. Gordon Brown recollects some small showings with gold. Sampling by Giant gave low average results, but this property is still better than average.

SAMBA group of 6 claims, belonging to Sam Otto, were formerly called J.F. and BUD claims. Gordon Brown remembers that there was one persistent vein, a bedded one, that was only about a foot wide. J. Kelly remembers seeing a lot of quartz on TREACY. The best assays gave 0.7 oz. over 5 feet and 0.32 oz. over 7 feet from chip samples. Seven D.D. holes gave lower, more erratic assays.

CAMLAREN group, on Camlaren Island, near the east shore of Gordon Lake. Belongs to the Messrs Byrne (Discovery Mines Ltd.) through their control of Camlaren Mines Ltd. About 1965 they mined about 12,000 tons of ounce ore that was trucked (cost $4.00 per ton) over a winter road 25 miles to the mill at the Discovery Mine near Giacque Lake. (We flew over the Camlaren mine on July 26, 1969 and photographed it out of curiousity. This was on our flight to the NOSE property (Clan Lake) returning to Yellowknife by way of Gordon Lake and the Thompson-Lundmark and Hidden Lake Mines).

Mineral Claim Sheet 85 - P - 3, Gordon Lake

MSSL (ex-Bairn) group, 9 claims, at Murray lake, a mile south of TREACY and 8 miles NNW of MYRT. Belongs to Sam Otto, of Yellowknife. See under PAN group in Lord (1951), pp. 227-229. Gordon Brown remembers a lot of little veins. Cominco did a lot of work here at one time, and Mr. Otto showed me geologic sketch maps by a Cominco geologist on which were placed the assays of channel samples cut by another former owner, Mr. Mitchell. These maps show several small, highly contorted quartz veins, very irregular in structure and width, with width of a few inches to 9 or 12 feet (?), of which the most important is around 200 feet long, and the others a good deal smaller. The assays are very spotty, and jump from less than 0.1 oz./ton to several ounces per ton in the rich pockets. It would be some trick to make a mine out of this show. Mr. Otto says as much, and insists that much work should be done -- not trenching, not short hole diamond drilling, but deep-drilling. Maybe so, but what reason is there to expect any improvement in depth?

In considering prospects of this kind, some regard could be given to the experience of the Currie brothers (Earl-Jack Syndicate) of Edmonton on their NOSE claims at Clan lake, north of Yellowknife. They spent $35,000 - in cutting rock trenches, mining and diamond drilling some rather widespread quartz showings extremely erratic as regards gold content (we got less than 0.1 oz. per ton on all of almost a dozen chip samples collected by us), and recovered $20,000 from the mining of 1,141 tons ore from a big pocket at the surface. From this tonnage, trucked to and milled at Discovery, they recovered 467.7 ounces of gold, lost 14.6 oz. in the tailings, for a recovery of 97% and calculated heads of 0.423 ounce. The outcrops assay very low except for an occasional bunch of rich ore. During milling, the mill head grade fluctuated wildly (reflecting the irregular distribution of gold in the veins) from 0.02 ounce Au per ton during a number of successive shifts, then a shift when the average grade would jump to 1 - 2 ounces. The heads, as above related, averaged out 0.423 ounces. Diamond drilling, they have concluded, is no good for the NOSE property and they are now planning to spend $250 - $300,000 in sinking a shaft to 150' or 200' and driving a level to explore and sample underground. This experience probably has bearing on the MSSL and other showings.

A possibility for getting some well selected claims around and south of Gordon lake came up on 31 July, when I met Mr. Sam Otto of Yellowknife, an elderly man who has spent many years prospecting and claim-staking in the region.

Mr. Otto holds the following claim groups, all for gold:

	Ref. C.S. Lord (1951)
1. MSSL group (ex-Bairn group) 9 claims, at Murray lake, S side	see under PAN group, pp.227-229
2. BON group 9 claims, E shore Gordon Lake	see under Galloway Gordon Lake Ltd. in Lord (1941)
3. SAMBA group, formerly J.F. & BUD, 6 claims	not in Lord's book
4. MYRT group 9 claims, south of Gordon lake	See under S.D.C.group,pp. 257-258
5. Au group, 6 claims on Camlaren Island, E side Gordon lake, N of C amlaren mine	
6. OP group, about 14 claims, on Zenith island, E side Gordon lake S of Camlaren mine - Held in 50/50 partnership with Fred Peet of Victoria, B.C.	

Total about 53 claims

The MYRT claims are patented and surveyed and good for 20 years without assessment work. The other 44 claims are held by $100.00 of assessment work per year for each, so taking over all of them would entail annual assessment work of not less than $4,400.

Mr. Otto says he spent $13,500 out of pocket on the MYRT during the years he has held it, including $2,700 for the claim survey. His cash expenses on the other claims might total $3,000 or so. He wants to receive in cash the reimbursement of these expenses (i.e. about $16,500) which do not include his labour, as the essential condition to making a deal and, if a company is formed on basis of his properties, he would request a participation of 250,000 shares (of the permissible 600,000 promotors' shares) of a 3,000,000 share company (i.e. a share participation of 8 1/3%). Gordon Brown thinks he might be satisfied with $10,000 and 200,000 shares.

In Mr. Gordon Brown's opinion, founded on plenty of experience of the gold deposits of the Yellowknife region, none of the deposits in sedimentary rocks, not excluding the ones here in question, have any worthwhile tonnage potential at present gold price, and the gold content is always spotty or pockety. I think we may accept this as pretty close to the truth. Nevertheless at a much higher gold price, some of these showings may have interest from the small-scale production standpoint, and when a gold mine boom develops in Canada, these properties and many like them will be available only at a large premium. With these indispensable facts in mind it should be considered by the entrepreneurs in this venture whether a small portion of the available capital should be sunk in Mr.Otto's gold prospects, or in other similar prospects held by different owners.

We did not visit these showings. To do so to any purpose would require several days for each, and there was no time for such examination work, especially in that the claims were brought to our attention two days before departure from Yellowknife. G. Brown knows the MSSL (Bairn) and MYRT groups from his earlier work in this region. They are among the better shows of this type.

Gordon Brown is of the opinion that diamond drilling of the ore deposits in the Yellowknife sedimentary series is an inefficient, uneconomical way to explore them. Drilling in the Yellowknife region now costs around $9.00 a foot, shaft sinking around $200 a foot and drifts and raises, $30 a foot. It costs not much more to sink and drift one level than to diamond-drill a deposit adequately from the surface, and the results of the work are much less open to question.

If these properties are taken up, the new owners ought to consider mapping the surface geologically and eventually getting around to sinking shafts and drifting one or more lev els on each, the work being necessarily carried out during the summer months. Possibly $100,000 to $200,000 would thus, in due course, be spent on each group. With favorable results and at a propitious time, a small central mill would be put up and would mill continuously in ore stockpiled at each mine and brought to the plant on winter roads. At the same time there would be a good chance that a custom milling business could be built up among the other small prospects of the area, whose owners would be encouraged by the existence of a nearby mill to mine their showings. That at least is the general idea.

This scheme might be a way to get started at Yellowknife and get some ground, at the same time not forgetting that the main objective should be to get interests in some of the properties -- of much higher potential -- in the Yellowknife greenstone belt.

Indin Lake

Lord's (1951) account of the gold deposits at Indin Lake covers a block of several claim groups at the north part of the lake, and the Ann group at the south end of the lake (Lord, p.74-75). The northern claim groups, when visited by Lord, were held by Diversified Mining Interests (Arseno and R.A. claims), Lexinden Gold Mines (Leta group) and North Inca Gold, Inca Gold Mines (Tartan 44, North and Dip groups). Most of these old claims are still extant, they form a block of ground 5 3/4 miles long NS and ¼ to 1¼ miles wide, following the north arm of Indin Lake. According to the Mining Recorder in Yellowknife, the Leta, Arseno, Dip and Tartan 44 claims belong to Polaris Development Corporation. We did not find out about R.A. or North claims but these too probably now belong to Polaris. The Ann group, some miles south, has evidently been restaked, as it is now called the Anna group.

On 28 July we flew over Indin Lake and Leta Arm and took photos of the North Inca shaft and the Diversified shaft. Both are more or less in ruins and there is no sign of present activity.

There is no need to repeat Lord's descriptions here. The drill intersections and sampling reported by him indicate that the ore shoots are narrow and the gold content unexceptional, especially when the probable costs of exploration and working are considered.

It probably would not be worthwhile to play around with these rather meagre deposits until the gold price reached around $100. Gordon Brown visited North Inca many years ago while they were working and obtained assay plans of the workings, which, he reports from memory, looked pretty discouraging. We have up-to-date claim maps on Indin Lake.

North Inca consists of veins in the Yellowknife group andesites (a narrow band) but the Diversified showings are in sediments (of Yellowknife group) just east of the same band of andesites.

Prospecting in the Indin Lake area at places where the Yellowknife volcanic series is intruded by granitic rocks should be considered if a general exploration program is decided on for the region around Yellowknife.

I saw Dr. A.P. Beavan in Montreal on 26 August and asked him to relate his impressions of Indin Lake and other gold deposits of this region where he had worked many years ago when he was con-

sultant to North Inca, who owned the southernmost of these three properties lying along a N-S belt at the N. end of Indin Lake.

There are veins in the volcanics near the North Inca shaft at the end of the Peninsula. These veins are 3 to 4 feet thick, well defined and high grade, but they petered out to the north. Later, attention was focussed on a belt of quartz lenses east of the shaft, under the lake, in the sedimentaries just east of their contact with the volcanics. These lenses were pretty rich but did not seem to have much extension on strike or dip, and it therefore did not seem feasible to try to mine them individually. Instead, the people concerned began to think about mass-mining the whole belt of gold-quartz lenses and interposed rock. Such a belt would have been 40 to 50 feet thick and 700 feet long on North Inca property, with grade around 0.1 oz. gold per ton.

The same belt may have continued northward into Diversified Mining property, but Dr. Beavan seems to remember that in this direction the belt weakened. It may have strengthened again in the Diversified workings? Still further north (Lexindin) there was drilling but no underground work.

Colomac Dike

The Colomac Dike deposit is described by C.S. Lord in his G.S.C. Memoir No.261, Mineral Industry of District of MacKenzie, N.W.T., pp.95-96, 1951.

The NNE dike of quartz-albite rock, 4 miles long, crops out along a low, wooded ridge bordering Baton Lake on the west. We flew over it in the Cessna 180 of Ptarmigan Airways on 28 July, 1969 and made several passes to get a look at the place and to take a few photos. The adit portal and dumps from the Ventures Ltd. underground exploration workings are clearly visible from the air. Ventures Ltd. tested the dike with the idea of mining the richer parts. The whole dike runs 0.085 oz. Au per ton. Evidently nothing much has been done since Lord (1951) wrote his description.

We obtained the claim maps and owners from the mining recorder in Yellowknife. According to his data the whole dike is staked solid in 4 claim groups, BOB (Discovery Mines Ltd.) and DID, IF, GI (H.E.Martin, who is said to represent Colomac Yellowknife Mines Ltd. in Toronto). Later, talking to Mr. Norman Byrne in Yellowknife, we were told that Discovery Mines Ltd. had bought the holdings of Colomac Yellowknife Mines, so are now the owners of the whole claim block on and around the dike. Mr. Byrne said that Discovery had a feasibility study made, the conclusion of which was that mining the dike would be very profitable when the gold price reaches $70.00 an ounce. We can see a copy of the report at Mr. J.J. Byrne's office in Toronto.

Colomac Dike is an hour's direct flight - about 120 miles - north by west from Yellowknife. Flying over this uninhabited terrain, one is impressed by the difficulties of topography and distance that would attend any effort to start up a mine. Most likely heavy transport would be by winter road only.

Mr. Byrne thought that the potentialities of Colomac Dike far exceeded those of the known deposits of Indin Lake, which are around 16 miles to the SW.

This property would probably be worth getting an interest in,

if this were possible. Inquiry could be made of Mr. Byrne, in Toronto.

Arseno Lake

At Arseno Lake, W. of Indin Lake, the Jingo (ex-Dingo) group is held, but many more claims in the surroundings have been dropped.

Spider Lake

At Spider Lake, N. of Indin Lake and Colomac Dike, Falconbridge and Jason Holdings Ltd. (James D. Mason of Vancouver) have the Jerry and DAN groups respectively. Lord (1951) reports on these (p.266-268) under the heading Spinet Gold Mines Ltd. A little farther north there are yet other claims, of the FLY group, belonging to Mr. J.D. Mason, mining engineer and former associate of Mr. W.A. Carr. These are for sale, and Mason is tired of holding them (C.E.G.B.).

Dr. Beavan, of Montreal, remembers that there were good but spotty gold values at Spider Lake.

Slemon Lake; Snare River

The highway from Edmonton to Yellowknife passes along the north coast of West-Arm of Great Slave Lake, passing through the town of Fort Rae, near the southern end of Russell Lake. Following Russell Lake north, then NW, as we did by plane on July 28, one arrives at Slemon Lake, on the north side of which is the old property of Slemon Yellowknife Mines Ltd. (Lord, 1951, p.259-262) whose claims (Au, Faye and Cher groups) are still extant, but now under the ownership of Rio Algom Mines Ltd., from whom it is unlikelythat they could be dislodged. This is too bad because Lord's description of this ground is attractive and it would be fairly accessible from the highway,which is only 25 or 30 miles to the south. We flew around this area for 15 minutes but could not sight any old workings.

Continuing NW and N along Slemon Lake and Snare River one finds not far from the Snare River dam, the old property of Snare River

Mines Ltd. (Deloro claims) (Lord 1951, p.263), now held by Anglo United Development Co. Ltd. (Northgate), as the I.O. and C.J. claims. An interesting account of exploration carried out here in 1965 is related in R.I.Thorpe, Mineral Industry of the Northwest Territories, 1965, G.S.C. paper 66-52, 1966, p.6-7.

According to the literature cited, good grade ore shoots have been found in these properties, both of which lie in sedimentary rocks of the Yellowknife series.

Contwoyto Lake

Published information on this area is found in the following G.S.C. papers:-

L.P. Tremblay, Paper 65-21, Contwoyto Lake Map Area, District of Mackenzie (W/Map) 1966.

L.P. Tremblay, Paper 66-28, Contwoyto Lake Area (North Half), District of Mackenzie (W/Map) 1967.

Barager and Hornbrook, Paper 63-9, Mineral Industry of District of MacKenzie, 1962; 1963.

Schiller and Hornbrook, Paper 64-22, Mineral Industry of District of MacKenzie, 1963; 1964.

Fraser, J.A. (1964) Geological Notes on NE District of Mackenzie, N.W.T.; G.S.C. Paper 63-40.

Gold mining claims were first staked at Contwoyto lake in 1961 by Canadian Nickel Ltd. Immediately thereafter, and into 1962, claims were staked also by Big Four Syndicate (Byrne group), Earl Jack Syndicate, Conwest and others. After a few years of mapping, drilling, etc. the excitement died down. Gordon Brown spent much time in the region during 1962-63 in charge of exploration for Falconbridge, who had optioned the Conwest claims.

The claims on which much work was done cover an EW belt of Yellowknife Group type metasedimentary rocks extending from the middle third of Contwoyto lake west about 15 miles. These rocks are in contact with massive granite rocks to the north and grade into gneiss, schist and granite on the south. Gold is found here and there, in association with sulfides, in beds of mineralized amphibolite interlayered with the other sedimentaries. The amphibolite consists principally of amphibole, garnet and quartz. Sulfides are limited to the amphibolites, and include arsenopyrite, pyrrhotite, pyrite, etc., with which almost all the gold is associated. Free gold is rare. Sulfides throughout the area are generally gold-bearing. Values of 0.1 oz/ton are common in the many "gossans".

The main gold occurrence, maybe the only one of some importance, is in folded amphibolite on one of the INCO claims, G.S.C. chip samples from several trenches at this occurrence gave 0.07 to 0.65 oz gold/ton. An eight foot chip sample across heavily mineralized rock in one of the Falconbridge trenches yielded 0.325 oz/ton.

The INCO occurrence, 3/4 mile west of the INCO camp on Contwoyto lake was visited by Gordon Brown, who took 30 or 40 samples. From memory one sample along 60 feet of one trench gave 0.5 oz. The highest assay was 1¼ oz from part of one cut. The average assay of the samples from three cuts was about 0.5 oz gold/ton. Some 30,000 feet of DDH were drilled by INCO but the results are not available. Falconbridge had a showing with plenty of sulfide mineralization, but containing only 0.10 oz Au per ton. In the Giant Yellowknife area west of INCO no gold was found. Here, the rock is mainly granite, with only some remnants of sedimentaries. One rich sample (2.29 oz) was got from one of the claims held by Big Four Syndicate. On ground belonging to North Goldcrest Mines (Byrne), south of the Falconbridge claims, nothing was found.

Gordon Brown states that the area is not important for gold, a conclusion based on many months of prospecting there. The INCO show -- the first discovery -- turned out to be the only one of any possible importance. The grade of metamorphism is too high - the rocks are too close to the granite - and the potential ore bearing structures are hard to define.

XI - 1969.

REAPPRAISAL OF YELLOWKNIFE DISTRICT GEOLOGY

by: C.E.G. Brown and G.D.J. Boldy, 1962 (MS Report)

ADDENDUM to this Report
by: C.E. Gordon Brown 29th July, 1969

Notes and Suggestions on Prospecting Methods for Gold deposits in Northwest Territories.

During the course of a visit to Yellowknife and district in company with Walter Stoll, for the purpose of reviewing the claim holdings of property owners in the area, it was discovered that considerable discussion had taken place among local geologists regarding the above memo and it's application to ore hunting techniques during the past few years.

Subsequent work by J. A. Kelly, in a master's thesis, Montana State University, established in 1964 that the quartz mongonites and granites are differentiates from granodiorite magma, thus confirming a single age for the majority of the plutonic rocks of the area.

The gold bearing deposits fall in to two principal categories as follows:

Quartz Veins in Sedimentary Rocks

Quartz veins are numerous in the thermal aureoles surrounding granite and quartz monzonite intrusions. They usually occupy tensional openings in folded rocks or occur as bedded veins on the limbs of the structures. The rocks are greywackes, argillites and phyllites, sometimes associtated with small intercalations of dacite and basalt flows.

In the general district extending sixty miles north and sixty miles east of the Town of Yellowknife, quartz veins are extemely numerous. Many of them contain small pockets of visible gold, of sporadic occurrence and erratic distribution. The enclosing rocks belong to the Yellowknife series of Archaean age, having a K-Ar isotopic age dating of $\pm$ 2400 million years. In contrast, the proterozoic rocks of the Snare Group situated West of the Yellowknife Group

have a K-Ar istopic age of ± 1700 million years, and do not appear to contain gold bearing quartz deposits.

Many of these veins are easily visible from the air and several hundred occurrences were mapped and sampled during the helicopter survey conducted by Giant Yellowknife Mines Ltd in 1959-61 when traverse lines, one quarter of a mile apart were flown with frequent hoverings and landings where necessary. In addition, many thousands of trips have been made by fixed wing aircraft, by various routes carrying experienced observers and prospectors, across this terrain during the past thirty years. In consequence, it is doubtful whether any important deposits have escaped observation and subsequent staking.

The veins consist of vitreous quartz, often of a dark streaky grey or black cast, containing very sparse mineralization, usually arsenopyrite. Very occasionally, visable gold occurs in small patches of limited extent. Most of the veins are six inches to two feet wide with expansions on favorable structures to greater widths. The average gold content is generally very low although assays taken across a few such sections may range up to 2-3 oz./ton.

The quartz veins in sediments have been mined productively in only three places. The best of these was Discovery Gold Mines Ltd. at Giaque Lake, 50 miles north of Yellowknife. At this place a horseshoe shaped oreshoot, of average width less than one foot, and length 400 feet, was followed to the 3950 foot level on steeply pitching fold structure. The average vein quartz contained in excess of one ounce of Au per ton. Total dividends were more than $6,000,000; the production was $37,000,000 from slightly more than one million tons ore.

At Thompson Lundmark Mines Ltd., two main veins were mined, and several others were prospected. Total production was 122,281 tons from which 65,347 oz. Au were recovered at an average grade of 0.534 oz./ton Au. Production took place between the years 1946 - 1949.

At Ptarmigan Mines Ltd., one vein was mined yielding 34,429 tons ore for a recovery of 11,921 oz. Au or an average grade of 0.346 oz./ton Au. Production took place during the years 1939 - 1942.

It would therefore appear that vein deposits in the sedimentary members of the Yellowknife group statistically do not offer much attraction, either as a long term investment or an immediate target for development. It is considered that an appreciation in the price of gold to double the present figure would not change the picture much due to their small size and low average grade. In this event, however, stock promotions would probably become very numerous with resulting market activity.

Gold Bearing Schist Zones in Andesite Flows (Greenstone rocks) of Yellowknife Group

At the Negus, Con, Giant and Akaitcho mines, in the Yellowknife township, several profitable ore deposits have been developed in schist zones. The zones are clearly premineral and in many cases do not outcrop. The proportion of sheared rock in the greenstones is relatively small, and these sheared zones are weak, therefore likely to be covered by lakes and muskeg, some are folded over and do not reach the surface.

The first important mineral discoveries were made on Con and Negus claims in 1935, where gold bearing shears and associated veins were discovered by prospectors. This locality is the only one in which the deposits are exposed in outcrop. At Giant Mine and Akaitcho the shears do not appear at the surface.

The orebodies are quartz-carbonate-sericite replacements of portions of an irregular pre-ore schistosity, carrying accessory minerals arsenopyrite, stibnite, pyrite spalerite, galena and gold. They are contained in the green schist facies of the andesite flow rocks of the Yellowknife group. As explained in the body of the 1962 report, an important element of hydrothermal control of ore deposition, or zoning, appears to be a lineal or arcuate distribution of gold deposits around an intrusion of quartz monzonite at Stock Lake. Subsequent work by Kelly has shown that this body is composed of normal granodiorite around the margin grading to a quartz monzonite core, so that the latter is evidently a differentiate from a much larger mass of granodiorite, adjacent to the west.

All known orebodies, so far discovered in the Negus, Con, Giant, Akaitcho systems, are located linearly along an arc of radius 2 miles, cutting the Yellowknife flows, having the south shore of Stock Lake as the center. No ore is closer than 1½ miles nor further out than 2¼ miles.

Prospecting for Schist Zone Type Ore

Using the Yellowknife district as a criterion, since it has been studied most intensively, an effort should be made to extend these principles to other areas of the MacKenzie District which are underlain by andesites of the Yellowknife Group. Most of these areas also contain large exposures of granodiorite of which the margins may have become differentiated, during the course of crystallization, in the manner described in the 1962 report.

Many other areas contain andesites of the Yellowknife group, most of which are associated with granodiorite, granite and quartz monzonite differentiates and therefore ought to be suitable for the occurrence of gold bearing quartz-carbonate schist zones.

These are, among others, Russel Lake, Cameron River, Beaulieu River, Lower Snare River, Indin Lake, Spider Lake, Courageous Lake, etc.

Once having selected a prospecting area where granodiorite bodies intersect andesite rocks of the Yellowknife Group, it will be necessary to limit further the area for intensive search by looking for two principal indications.

(1) Rocks of the Yellowknife Group should be mapped where they exhibit low grade metamorphism of the greenschist facies. More intense alteration in the garnet-epidote facies or higher seems to be detrimental to the formation of schist zones which might sustain quartz-carbonate mineralication. Moreover, such high-grade metamorphism is indicative of temperatures too high to be favorable to abundant gold deposition, if we may judge by the above described relationships mainfest in the Yellowknife Greenstone belt.

(2) Granodiorite contacts and adjacent igneous rocks should be searched for evidence of differentiation to granite or quartz monzonite. This is not as difficult as it may appear, if recently developed staining techniques are used "Staining of plagioclase feldspar with F.D.and C Red No 2" U.S. Geol. Sur. Prof. Paper 501B, 1964.

"Changes in K-Feldspar Staining Methods and adaptations for field use."

Amer. Mineralogist, Vol 52, 1967.

Indeed, since schist zones in outcrop are comparatively rare in the Yellowknife andesites, it might be easier, first to locate a suitable intrusive and later prospect in the immediate area for schist zones. It might even be necessary to drill a shallow section to determine whether the rocks are sheared or not. The use of a helicopter for fast ground coverage is highly recommended.

"Helicopter Explorations Costs in the Northwest Territories

C. E. Gordon Brown

C.I.M. Tranactions 1963

For a base map in the field an ordinary half mile staking map is adequate, cheap and accurate.

Cost of Mining

The average grade of ore at the Giant Mine is currently 0.64 oz/ton or a value $26.10 (at $40.85 per ounce). Cost per ton ore treated is estimated at $16.24 which leaves a operating profit of $9.86 per ton treated. Rate of treatment of ore is 1,035 tons per day. The breakeven grade is 0.40 oz/ton.

It is probable that an ore deposit of the type and size of the Giant Mine would cost at least twenty five per cent more to operate if ore were found in another region, remote from the present transportation and power facilities located at Yellowknife. Hence the cost per ton of ore treated would be $20.25 and therefore the breakeven grade would be 0.50 oz/ton at the present ($40.85) gold price.

The probable costs of a 200 tons/day mine today might be guessed as follows:

(1) At Yellowknife, $18.50 per ton treated per day.
(2) 50 miles from Yellowknife, $22.50 per ton treated per day.
(3) 100 miles from Yellowknife, $26.00 per ton treated per day.

The initial investment required to start up such a mine would not be less than $15,000,000.

Any large increase in the current price paid for gold would therefore have a profound effect on the profitability of the Giant Mine. The increase in ore reserves by several hundred thousand tone of 0.2 - 0.3 oz/ton ore in South ASD zone and elsewhere would increase its life by some years.

A Gold price increase would also bring within the range of possible development other new ore bodies in the 0.4 - 0.5 oz/ton range which might be found in other regions.

Respectfully submitted

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