

6CNL39 LORNEX MINING CORPORATION LTD. (LMN-V) 25 FEB 87

010281

<u>YEAR ENDED 31 DECEMBER</u>	<u>1986</u>	<u>1985</u>
Mine Production Revenue	\$206,700,000	\$243,700,000
Net Earnings	27,300,000	24,100,000
Per Common Share	\$3.30	\$2.92

PROFIT ROSE 13% - The 1986 net earnings and net revenue ^{921/66,7W} of Lornex Mining Corporation Ltd. include their 45% interest in Highland Valley Copper from 1July86 to 3Jan87 and 100% of Lornex's copper-molybdenum operation to 30Jun86. Highland Valley Copper is a partnership formed by Lornex and Cominco Ltd. to combine and operate the copper-molybdenum assets of both companies in the Highland Valley of B.C. about midway between Merritt and Ashcroft.

Lornex chairman George R. Albino attributes the increase in net earnings largely to reductions in operating costs and all other expenses which more than offset the effects of lower production of copper, molybdenum and coal. Part of the increase in net earnings is also attributed to the changed nature of the copper-molybdenum operations in the last half of 1986. Lornex's 39% share of the Bullnose metallurgical coal production in NE B.C. was 693,000 tonnes, compared to 831,000 tonnes in 1985. Lornex's net earnings for the last quarter of 1986 were \$7,200,000 compared to \$6,500,000 for the same period of 1985.

February 25, 1982

NM MINER 25 FEB 82

Lornex profit drops to \$2.81 per share

Lornex Mining Corp. had net earnings of \$25,248,000 or \$2.81 per share in 1981, compared with \$65,113,000 or \$7.87 per share for the previous year. Net revenue from mine production decreased to \$150.9 million from \$173.7 million.

The company attributes the poorer results primarily to lower prices for copper, molybdenum and silver, a reduction in investment income and increased operating costs. These negative factors more than offset increased production of copper concentrates.

Tonnage of ore milled in 1981, at 22.9 million tons, was up 29% from 1980, as a result of the commencement of operations on Aug. 1 of expanded mining and milling facilities. Copper production was 30% higher, while molybdenum output was approximately at the 1980 level.

HIGHLAND VALLEY
9217W
09215E008

NM MINER 3 MARCH 1986

1985 turnaround for Lornex Corp.

VANCOUVER — While most of British Columbia's base metal industry is wallowing in red ink, that is not the case at Lornex Mining which posted a net profit for the year ended Dec. 31, 1985, of \$24.1 million or \$2.92 per share compared to a \$3.3-million loss a year earlier.

Nearly one-quarter of the year's earnings (\$6.5 million) occurred in the last three months of 1985, notes the Rio Algom subsidiary.

Revenues from mine production were approximately 25% higher at \$243.7 million because of increased production of copper and coal, a stronger U.S. dollar in relation to Canadian currency and, to a lesser extent, slightly higher copper prices, says Lornex. The increased revenues, lower copper and molybdenum production costs and substantially lower net interest costs all contributed to the positive earnings performance.

The company's Highland Valley B.C., mine processed 32.2 million tons of ore, nearly 4% more than in 1984; copper production increased by 13% due to higher millheads and greater throughputs. Molybdenum production was about 2% higher.

Lornex's share of Bullmoose coal production was 831,000 tonnes, an increase of 25% over the previous year. The Bullmoose mine, which is located in northeastern B.C., is operated by Teck Corp. Lornex has a 39% interest in the project which earned partner Teck \$6.6 million in 1985 for its 51% direct interest.

Early in January, Lornex announced it had reached an agreement in principle with Cominco to combine the assets and operations of both corporations in the Highland Valley although a final agreement still has not been announced. Cominco's Valley Copper deposit is higher grade (averaging approximately 0.5% copper), has better metallurgy and significant precious metals credits which will add to the over-all value on a unit basis.

The Lornex mill would likely be expanded to accommodate the proposed 120,000-ton-per-day throughput and a conveyor system is being considered for the uphill haul to the expanded milling operation.

9217W

Lornex meets cost-reduction target ahead of schedule

9217W 092ISE008

By ALBERT SIGURDSON
Special to The Globe and Mail

LOGAN LAKE, B.C. — Lornex Mining Corp. Ltd. of Vancouver, as a result of the \$154-million expansion of its Highland Valley copper-molybdenum mine — started up Aug. 1 — has already achieved a 6 per cent reduction in unit production costs, according to vice-presi-

dent and general manager L. H. Hunter.

The reduction was Lornex's target for 1982 and the expansion is expected to make Lornex a lower-cost producer than three-quarters of the world's copper mines.

The expansion, with the concentrator processing 75,000 to 80,000 tons of ore a day, makes Lornex the second-larg-

est open-pit base-metal mine in North America, he said.

With some early problems overcome, "in October we averaged 83,000 tons a day, with highs of 115,000. We had excellent recovery in that month as well."

Despite startup expenses and depressed metals prices, Lornex remained profitable in the third quarter, while

some other efficient B.C. low-grade open-pit mines have been operating at a loss.

One of the main reasons, Mr. Hunter said, is that some other producers' molybdenum customers are not taking their contract amounts, so they are having to stockpile molybdenum, while Lornex sells its entire production on the spot market.

The price is depressed — under \$5 (U.S.) a pound — compared with the high of \$30 it reached about 18 months ago. Copper prices are also lower.

But, "now that we're expanded and ready, Lornex is in an excellent position to take advantage of the next upturn in metal prices."

If that prospect looks attractive from an in-

vestment point of view, 69 per cent owner Rio Algom Ltd. of Toronto will reap most of the benefit, since the share float is very thin — about 6 per cent — and it is hard to find shares to buy.

Teck Corp. of Vancouver has about 22 per cent, mine finder E. H. Lorntzen about 2 per cent and a Japanese investor about 1.5 per cent.

The copper concentrate, which contains valuable amounts of silver, is sold about 50 per cent on a long term basis to Japanese customers, about 25 per cent elsewhere in the Orient and about 25 per cent on the spot market.

Lornex is working on three operational wrinkles that it hopes will bring production costs even lower, Mr. Hunter said.

One is computerized truck dispatch. In open-pit mines, the ore is blasted free and electric shovels load it onto huge diesel-electric trucks that haul it to the top of the mine.

Lornex has 56 of these trucks and nine shovels

and in the vast pit — 8,400 feet long, 5,000 feet wide and 1,000 feet deep — it is hard to direct the trucks visually for maximum efficiency.

Under the new system, developed with Glenayre Electronics Ltd. of Vancouver and the National Research Council, a computer will direct the trucks through a system of beacons within the pit and "black boxes" in the trucks. This is being tested on 10 trucks and three shovels. "By the end of the year we will have enough data to decide whether we are going ahead with it or

not."

The mine is on a hillside, and, as mining progresses, by the end of this year it will have reached a contour that will actually allow downhill or level hauling from the pit to the concentrator for four years.

During this period Lornex will be evaluating in-pit crushing and conveying — to allow shovels and trucks to operate more continuously and efficiently. And it will be looking at electric trolley assist for the trucks' upward haul.

"Because by 1986 we'll be hauling uphill

again, we want to have a better method than (diesel-fuelled) trucking."

A South African sister company to Lornex (through Rio Algom controlling shareholder Rio Tinto Zinc Corp. of Britain) has installed such a system and reports a saving of 22 million litres of diesel fuel a year.

In addition, "we are currently investigating conversion of the total (gasoline-burning) small vehicle fleet — about 100 vehicles — to natural gas. The savings in fuel cost could be as high as 50 per cent."

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Company	Purpose of expenditure	\$000s to be spent			
		1981	1982	1983	Beyond 1983
Scottie Gold Mines 104B/11E 104B 074	The company's gold-silver mine was recently placed in production. Total: \$7.5 million	7,500			
Teck Corp	Construction is slated to begin on the Bullmoose coking coal mine in northeast BC in the spring of 1982. It is designed to supply 1.7 million tons of coal annually, beginning in late-1983. Total: \$220 million		110,000	110,000	
Westmin Resources 92AF/12E 072F 071 072	The shaft is being sunk for development of the Creek zone copper-lead-zinc deposit near the Myra and Lynx mines at Buttle Lake, BC. Production is expected by 1983 and ore will be milled at the existing concentrator. Total: \$15 million	5,000	5,000	5,000	

Company	Purpose of expenditure	\$000s to be spent			
		1981	1982	1983	Beyond 1983
Equity Silver (continued)	Regional exploration		100		111
	Replace mill equipment	155	6		6
	Buy on-stream analyzer	200			
	Additions to flotation	200			
	Mill expansion				2,500
	Replace plant equipment	121	300	70	280
	Move carpenter shop	55			
	Replace misc. equipment	41	177	39	363
	New warehouse storage	50			
	Buy computer facilities		75	75	
Replace telephone system	20				
Total: \$11.64 million					
Esso Minerals Canada	Having just bought the Byron Creek colliery in southeastern BC, Esso plans to expand it.	35,000	35,000		
	Total: \$70 million				
Fording Coal Ltd	The \$115 million coal mine expansion at Elkford is well under way.	38,000	26,000	20,000	
	Total: \$84 million				
Lornex Mining Corp Ltd <i>92I/7W</i> <i>0TAISE008</i>	The \$160 million expansion of the copper mine at Logan Lake, BC, is complete. Project included upping the milling rate to 80,000 tpd and purchasing additional pit equipment.	78,300			
	Total: \$78.3 million <i>HIGHLAND VALLEY</i>				
Noranda Mines Ltd <i>82M/9W</i> <i>082M 141</i>	The Goldstream copper-zinc mine near Revelstoke is scheduled to be in production late in 1982 at a rate of 1350 tpd. Total cost of the project is estimated at \$62 million.	27,600	16,300		
	Studies have started on modifications to the ore handling and processing systems at the Granisle mine.	300	300		
	Total: \$44.5 million				
Norco Resources	A hydraulic and longwall coal mine is planned at Bowron River, near Prince George, BC. Output will be sold to Taiwan Power Co.	40,000	41,000		
	Total: \$81 million				
Placer Development Limited <i>93K/3E</i> <i>093K 006</i>	The bulk of spending at the Endako moly mine will be for upgrading the mill.				
	Replace mobile equipment	50	1,291	1,511	
	Upgrade and replace process equipment	536	1,815	1,040	
	Complete flotation expansion	185			
	Complete roaster expansion	1,697			
Total: \$8.125 million					
Ruth Vermont Mine Limited <i>82K/15W</i> <i>082KNE009</i>	This silver-lead-zinc producer was reopened this summer in southeastern BC.	4,000			
	Total: \$4 million				

S000s to be spent

Company	Purpose of expenditure	Beyond			
		1981	1982	1983	1983
BP Canada	Plans are being made for the Sukunka coal mine development near Chetwynd, BC. Total: \$400 million			400,000	
Carolyn Mines Ltd 92H111W 0924NW003	The Ladner Creek gold mine development was completed this year. Total: \$10 million	10,000			
Cominco Ltd 82F19E 082FNE052	The modernization and associated metallurgical projects at the Trail smelter will receive the bulk of spending - \$355 million. Trail modernization Sullivan mine and mill Minor projects Total: \$443 million	85,000 7,000 12,000	105,000 10,000 12,000	160,000 40,000 12,000	
Crows Nest Resources Ltd	The Line Creek coal mine at Sparwood is nearing production set for next year. Total: \$120 million	70,000	50,000		
Dankoe Mines Ltd 82E14E 082ESW002	Spending is modest at the silver mine near Keremeos, BC Total: \$750,000	250	250	250	
Denison Mines Ltd	With the promise of a rail line to northeastern BC, development of the Quintette coal deposit is planned by 1985. Total: \$700 million		100,000	100,000	500,000
Dickenson Mines Limited KAM-KOTIA 82F114W 082F11125	The silver-lead-zinc mine near New Denver, BC is receiving several improvements. Conversion to central diesel plant for mine and mill plus upgrading and increasing hydro plant Replacing mill equipment and upgrading capacity 60 per cent to 200 tpd Total: \$550,000	100	300	150	
Dimac Resource Corporation 82M13E 092M136	This small tungsten mine was recently placed in production near Clearwater, BC Total: \$2.5 million	2,500			
DuPont Canada Inc 74E16E 074E006	The Baker gold mine at Chappelle, BC, is in production. Total: \$6 million	6,000			
Equity Silver Mines Ltd 93L11W 093L001	This newly-opened silver mine is planning expenditures of about \$7 million for mining and \$3 million for milling. Replace pit equipment Total: \$10 million	477	695	4,673	855

92I/7W

CMJ Capital Spending Report

BRITISH COLUMBIA \$2.996 Billion

Company	Purpose of expenditure	\$000s to be spent			
		1981	1982	1983	Beyond 1983
Afton Operating Corporation 92I/10E 092INE003	Mobile equipment for open pit copper mine	3,500	3,500		
	Systems improvements at mill	750	750		
	Systems improvements at smelter	750	750		
	Total: \$5 million				
BC Coal Ltd	The \$278 million Greenhills coal mine is expected to begin production in mid-1983 at a rate of 1.8 million tonnes/year.	63,000	100,000	60,000	
	Expenditures at Sparwood include \$17.6 million for pit equipment, \$13 million for land acquisition and residential construction and \$1.6 million for a new lab.	53,000	46,000	28,000	10,000
	Construction at the Harmer mine includes a new dry and office and maintenance shop extension.	9,458	7,635		
	Cost of increasing the throughput of Westshore terminals and upkeep.	43,000	74,000	38,000	
Total: \$472.093 million					
BC Hydro	The price tag of the Hat Creek coal mine and generating plant due to come on stream in 1988 has risen to \$5 billion, with roughly 45 per cent of the cost being for the mine.	32,000	32,000	32,000	129,000
	Total: \$2.25 billion				
Bethlehem Copper Corporation 92I/7W 092ISE001	Spending at this open pit copper mine has nearly doubled this year over last.				
	Replace mining equipment	4,554	2,117	1,468	
	Construct tailings dam	7,316	2,376		
Total: \$17.831 million					
Brenda Mines Ltd 924/116E 092HNE047	A new mining shovel and mill equipment were added at this copper-moly producer.				
	New mining shovel	2,000			
	Classifying and flotation equipment	4,250			
	Normal equipment replacement	3,500	4,000		
Total: \$13.75 million					

depressed world nickel markets. Only two mines, the Falconbridge and Stratcona operated for the full year. The Lockerby and North mines were closed and a seven-week vacation shutdown of the entire operation began on 1 July 1978.

A new labour agreement was negotiated in the last quarter of 1978, for the mine, mill and smelter workers, enabling a continuation of the company's copper and nickel production in the Sudbury area.

A strike at the Inco mine in Sudbury curtailed that company's copper production severely. Production of copper by Inco in Canada was 197-million lb in 1978, compared to 328-million lb produced in 1977.

In the first quarter of 1979, earnings of Inco Limited dropped to \$0.5-million from \$34.9-million for the first quarter in 1978. Factors contributing to the decline include costs of \$41-million attributable to the Sudbury strike, lower nickel prices, and costs related to the Guatemalan and Indonesian projects.

The Sudbury strike, which began 16 Sept 1978 had not been settled at end-April 1979 although negotiations were currently in progress.

At Texasgulf's Kidd Creek mine in Timmins, Ontario, construction of a new copper refinery and smelter is underway, with completion scheduled for 1981. The expansion project is expected to increase copper output at the mine by more than 50%. A fourth circuit at the Kidd Creek concentrator was in operation by May 1978 and maintenance work was carried out on the other circuits.

During 1978 a major underground development project was begun at the Ruttan mine of Sherritt Gordon Mines Limited. This year, the transition from the open pit to underground mining commences and the operation will be combined until the pit is mined out in 1981. After 1981, a 2,500,000-ton ore production rate is expected to be maintained from underground.

The improved outlook has also been evident in Québec, where financial agreements between the Québec government and Campbell Chibougamau Mines Limited and Orchan Mines Limited have averted closures of both mines. Mine development has been carried out by both companies.

Madeleine Mines Limited also intends to reopen its copper mine in Gaspé area of Québec by July 1979. The mine closed in 1976 because of weak copper prices and will reopen with an initial extraction rate of 2000 tons/day for a five-day week.

The reopening decision was based on the rising prices of copper, declining world inventories and projections showing consumption exceeding production.

These projections are the basis for a much brighter outlook for copper in Canada in the years ahead. WM

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a net loss of \$2,381,000, compared to a loss of \$142,000 the previous year. For the first quarter of 1979 it incurred a loss of \$593,000.

Copper inventories in 1978 were also affected by a strike at Noranda Mines' Gaspé operation in Québec. The strike began 18 Oct 1978 and was not settled at end-April 1979.

With projections for improved copper prospects, Noranda has recently announced a \$19-million expansion project at its Bell Copper Division near Granisle, B.C. The expansion will increase the daily ore throughput from 1500 tons/day to 1700 tons/day by 1981.

About \$12-million will be spent on mining equipment to expand the pit operation where mining of ore and waste rock will increase from the current rate of 27,000 tons/day to 55,000 tons/day.

The Bell Copper Division was facing closure by 1982, but this expansion project will extend the life of the mine until 1988. The current number of 280 people employed will increase to about 330.

Noranda Mines Limited

Granduc - 104B/1W
104B/2I
08408

Copper Mt. - 92H/7E
- 92H/5E-5
- 01268

Lornex - 92I/6E
- 92I/SW-45
- 03771

Bethl. Copper - 92I/7W
- 92I/5E-1
- 04819

92I/6E

J. B. KNAPP

Noranda Mines Limited announces the appointment of J.B. Knapp as General Manager of its Bell Copper Division, which is located in Granisle, B.C. Mr. Knapp is also Vice President and General Manager — Mining Operations of Brenda Mines Ltd., a subsidiary of Noranda Mines Limited, in Peachland, B.C.

This appointment is effective April 1, 1979.

An agreement reached last year to sell the Bell Copper Division to Zapata Granby broke down in March after Noranda refused to grant a third extension to the agreement.

Another boost to development in western Canada came with the announcement by Esso Minerals Canada that it will re-open the Granduc copper property near Stewart, B.C.

The mine, which was closed in June 1978, will resume operations in mid-1980. Rehabilitation work is scheduled to begin this summer at an estimated cost of \$20-million.

Esso is purchasing mining and mill machinery owned by Newmont Mining Corporation and used in the Granduc operation.

Newmont Mines has also begun work to expand its Similkameen Division by developing the Copper Mountain orebodies east of the Similkameen River and across from the Ingerbelle pit and concentrator.

The project, estimated to cost \$23,400,000, includes a new primary crusher and a conveyor system to transport crushed ore from the new mine area to the present concentrator via a new suspension bridge. It is scheduled for completion in early 1981.

'Anyone who predicts copper prices is usually wrong', comments J Harvey, Parliament, president of Newmont. He adds that 'with the demand having overtaken production, the current prices in the 90c range are very realistic. However, with the high costs of producing copper, it is still below the price needed to bring new mines into production'.

He admits to feeling quite bullish and optimistic for the mining industry in Canada and adds that, with a continued high demand, there could possibly be some shortages in the next few years.

In view of the much improved outlook for both copper and molybdenum, expansion options for Lornex mine in the Highland Valley are now under detailed study. An earlier uncompleted expansion feasibility study has been reactivated and should be finished during 1979.

'The orebody could support an expansion of up to 50%, which would include a third mill line, and still have a remaining life of over 20 years', reports R D Armstrong, chairman and chief executive officer.

Earnings for Lornex for the first three months of 1979 rose to \$8,487,000 from \$2,252,000 in 1978. The improvement was primarily due to increased copper prices and the lower value of the Canadian dollar.

Also in the Highland Valley area is Bethlehem Copper. Exploration work is continuing to expand ore reserves at the mine site, and Bryan J Reynolds, president, states that although there are no specific plans for expansion at this time, if the exploration continues to be suc-

cessful, mine expansion would be considered.

'Prices are going to be stronger over the next few years primarily as a result of a tightening of supply and because of the time period involved in bringing new copper into production', says Mr Reynolds.

Adjoining the Bethlehem mine is the large Highland Valley copper property owned 80% by Valley Copper Mines (Valley Copper is owned 81.35% by Cominco, with Bethlehem holding another 5.1%).

The largest known deposit in BC, it is estimated to contain 800-million tons averaging 0.45% copper. Due to the earlier depressed prices of copper, it was decided that development was not feasible. In spring 1977, it was calculated that a copper price of 85c would be necessary to support the investment needed to bring the project into production.

In Eastern Canada, Hudson Bay Mining and Smelting Company Ltd forecast an improved outlook for 1979.

'Disruptions of copper supplies and a sustained strong demand has reduced stocks overhanging the market. This, together with a lack of availability of good-grade cathode and wire-bars should give rise to a firm base for copper in 1979', the annual report states.

Major projects undertaken by the company include the construction of a \$26-million concentrator near Snow Lake, Manitoba. The 3800-ton concentrator has two separate treatment circuits to produce zinc and copper concentrates. The concentrates will be railed to the metallurgical plants at Flin Flon.

The Western mine in the Flin Flon area was brought into production 3 Jan 1978, and production improved steadily throughout the year. In the same area, the White Lake mine resumed operations in 1978 after being out of production for shaft deepening and redevelopment. Construction of the new Spruce Point mine on the north shore of Reed Lake was started in August 1978.

In the Snow Lake area, the Stall Lake mine continued deepening its No 1 production shaft. Work on the proposed open pit site at the Chisel Lake mine continued and, following development of the Lost Lake ore zones, production is scheduled from the Ghost Lake mine in 1979.

Proven reserves of copper-zinc ore in the company's mines in the Flin Flon-Snow Lake area at the end of 1978 totalled 17,016,000 tons assaying 2.76% copper, 2.7% zinc, 0.40 oz/ton silver and 0.037 oz/ton of gold.

Production of refined copper from all sources in 1978 amounted to 137,192,585 lb, compared to 135,363,453 lb in 1977.

In the Sudbury area of Ontario, Falconbridge Nickel Mines Limited reduced its operating rate, and copper production also dropped, primarily because of the

92I/7W

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92H/7E

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Highmont - 92 I/7 W
 - 92 I/SE - 13
 - 04830

Highland Valley - 92 I/7

Afton - 92 I/10E
 - 92 I/NE - 23, 113
 - 01850, 01969

Gibraltar - 93 B/10
 - 00541

Copper

Canadian operators on the move — ahead

After several years of depressed prices, prospects for the copper industry in Canada are on the upward trend. Copper consumption reached record levels in 1978 and as worldwide copper inventories declined, prices improved steadily.

The forecast by several major copper producers is for continued improvement.

Demand for most metals, including copper, was much stronger than expected in the first four months of 1979, says Don McIntyre of Noranda Sales Division.

In the case of copper, the serious and continuing production problems in Zaire have caused a shortfall in world supply for most of 1978 and to the present.

In addition, Canadian copper production was sharply reduced through a combination of production cutbacks and strikes at the Inco and Gaspé mines. Copper production amounted to an estimated 657,000 tons, a 13.4% drop from 760,000 tons in 1977.

Mr McIntyre adds that 'the combined effects of a healthy demand in USA, Japan and Europe, and the supply problems, resulted in a drop in world surplus stocks of some 485,000 tons in 1978, and an estimated further drop of 17,000 tons week through to at least June 1979. Under these stimuli, prices finally broke out of their rather lethargic performance of last year'.

The US equivalent of the LME copper price rose from 71¢ at the end of 1977 to the 98¢ to \$1.00 range by early May 1979, and the US producer price also moved in the same period from 71¢ to the 98¢ to \$1.00 range.

Even assuming a slow-down in the economy later this year, the supply situation in Africa will continue to support the fundamentals and copper prices are expected to remain at least in the \$1.00 to \$1.00 range in 1979, Mr McIntyre predicts.

At the same time as copper prices are

improving, recent expansion and development decisions by several major producers have reinforced the sense of well-being in the industry.

Teck Corporation has announced it will spend \$150-million to develop a new copper-molybdenum mine in the Highland Valley of BC.

Designed to handle 25,000 tons/day, the annual output will be approximately 50,000,000 lb of copper and 4,500,000 lb molybdenum, with higher molybdenum output in the initial years. The molybdenum will be sold to Metallgesellschaft, of Germany, and arrangements for the sale of copper concentrate on world markets are being finalized.

Construction is scheduled to begin in spring 1979 and will take about 18 months to complete. Over 400 new jobs will be created by the project.

The Highmont project is owned 70% by Highmont Mining Corporation and 30% by Teck. For Teck, which also owns 53% of Highmont, this will be its fourth new mine in the last five years.

Its third mine, the Afton mine and smelter near Kamloops, BC, was officially opened 27 April 1978. During the five months of operation in the fiscal year ended 30 Sept 1978, net earnings were \$2,951,000. Production during the five month period was 21,372,000 lb of copper and 20,735 oz of gold.

The concentrator began tune up operations in December 1977 and throughput to 30 Sept 1978, was 2,113,000 tons with an average recovery rate of 85.2%. A total of 34,780,000 lb copper and 27,973 oz of gold was produced in concentrate.

For the five months to the end of February 1978, a total of 1,228,000 tons grading 0.97% copper was milled. Copper production for the five month period was 20,642,000 lb, gold was 22,352 oz, and silver totalled 106,849 oz.

R E Hallbauer, president of Afton Mines projects that 'the price of copper will probably stay somewhere around its

present level for 1979 but will head for an improvement after that'.

Echoing Mr Hallbauer's comments, R P Taylor, president of Zapata Granby predicts a continued improvement in prices.

He adds that 'given the long lead times for planning, financing and developing new mines, the probability of substantial supply shortages in the next five years is greatly increased'.

'The consumption of copper will exceed supply resulting in significant shortages developing in the early 1980s. Production will increase slowly over the next few years which could possibly lead to another situation of over-supply and a resulting downward cycle in the mid-1980s', Mr Taylor claims.

A different outlook, particularly for the second half of 1979, is expressed by Donn Morgan, marketing manager for Placer Development.

The seasonal pattern of consumption (being 5% greater in the first half of the year), combined with inflation and a resulting drop in investment, will cause the demand for copper to go down in the last half of 1979, says Mr Morgan.

At the same time, supply will increase because improved prices encourage expansion and new mine development as well as a response from the scrap copper market.

He predicts that 'prices are going to drop to the 72¢ to 80¢ range by fall this year. This will be followed by a gradual strengthening to a new stabilization point around 75¢ to 80¢ by 1981, and rising to the \$1.10 to \$1.50 range by 1982-83, in order to justify new investment. Refined production will be approximately 6.9-million tons with consumption around 7.2-million tons in 1979'.

Gibraltar Mines Limited, owned 71.9% by Placer, had a disappointing year in 1978 because of a labour dispute which halted operations from 26 May through to 6 Feb 1979. The company had

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Lornex milling reaches record rate last year

Milling at the Highland Valley, B.C., copper-molybdenum operation of Lornex Mining reached a record daily rate in 1978 of 48,100 tons and for the past three years has averaged about 47,000 tons a day, or 23% above the design capacity of 38,000 tons a day.

Copper produced last year, due to a lower millhead grade, however, declined to 135,422,000 lb. from 141,111,000 lb. in 1977. Molybdenum produced increased slightly to 3,985,000 lb. from 3,795,000 lb. With both copper and molybdenum prices higher, net profit for 1978 was up 85% to \$14.4 million, or \$1.74 a share, from \$7.8 million, or 94¢ a share, in 1977 (N.M., Mar. 1, 1979).

The company paid its first dividend, 20¢ a share, on Nov. 29, 1978 about six years after the commencement of production.

The operation, R. D. Armstrong, chairman, and G. R. Albino, president, state in the annual report, can reasonably be expected to continue into the next century.

They point out that through risk taking, initiative and technical and

entrepreneurial skill the low grade Lornex mineral deposit has been developed into a world-scale operation in the course of which a most substantial contribution has been made to the Canadian economy.

"Lornex," the two executives said, "has been a private sector achievement; no governmental subsidies or loans have been involved. Despite the major benefits that so clearly flow to Canadians from a project of this type there are no established systems whereby financial support or other incentives are made available to develop Canadian mines. However, through one of its agencies, the federal government is utilizing the resources of Canadian taxpayers to provide financial support for the development of competitive mines in foreign countries. It is suggested that this is a gross misuse of Canadian resources."

Balance sheet at Dec. 31, 1978, indicates working capital of \$27,206,000, up from \$26,209,000 a year ago.

The annual meeting will be held in Vancouver on Apr. 19, 1979.

N. MINER 22 MAR. 1979

Lornex founder Egil Lorntzsen to become honorary director

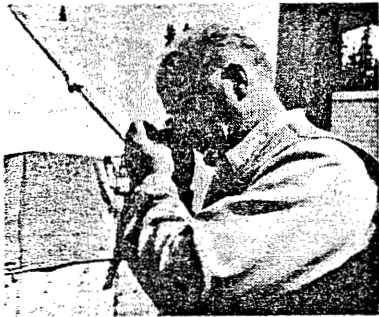
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Entrepreneur, mine founder and mining executive Egil Harald Lorntzsen, honorary chairman of Lornex Mining Corp., will be stepping down as a director of the Company as he has reached retirement age.

The discoverer of the Highland Valley, B.C., copper-molybdenum

J. Herbert Smith and R. W. Wright, two men who have played an important part in the progress of Lornex, will not stand for re-election as directors in order that they may relinquish some of their responsibilities. It is intended that J. G. Edison, a director of Rio Algom, be elected to the board.

With the change in control of The Yukon Consolidated Gold Corp., which holds about 20% of the Lornex shares, and the subsequent merger of Yukon with Teck Corp. and Brameda Resources, two Teck representatives have been placed on the Lornex board. These are Norman B. Keevil, Jr., executive vice-president and R. E. Hallbauer, vice-president of Teck, who replaced as directors R. A. Hammond-Chambers and I. F. Rushbrook. Also, D. L. Hiebert, vice-president, Teck, will stand for election to the board instead of N. B. Ivory.



Egil H. Lorntzsen

deposit that became the Lornex mine and the founder of the company. Mr. Lorntzsen will be appointed an honorary director in recognition of his great contribution to the development of Lornex.

Among other board changes, L. H. Hunter, who was appointed vice-president and general manager in February, will be on the slate of directors to be presented for election at the annual meeting in Vancouver on Apr. 19, 1979.

92I/6E; 92I/SW-45; 03771
LORNEX MINING CORP: Net earnings for the year ended 31 Dec 1978 rose to \$14,354,000, or \$1.74/share, compared to \$7,781,000, or 94¢/share in 1977.

The improvement was mainly due to higher prices for copper and molybdenum, although the effect of the higher price was modified slightly by lower copper production and increased smelting and refining charges.

At the company's Highland Valley mine in BC, the decline of copper concentrate production from 141,111,000 lb in 1977 to 135,422,000 lb in 1978 was due to a lower average mill head grade of ore. Production of molybdenum concentrate increased to 3,985,000 lb from 3,795,000 lb in the previous year.

MISSISSIPPI ISLAND MINES: The company reports encouraging results from several joint venture projects carried out in 1978.

Participating with Flin Flon Mines and other partners in the Athabasca joint venture, encouraging amounts of uranium were located at the base of the

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opened up by means of about 218 feet of adit tunnelling or drifting and 55 feet of crosscutting, the latter to determine the width of the vein at regular intervals. The 50-foot winze near the portal of the tunnel and the shaft beyond the ore dump were inaccessible October 1915. The ore is chalcopryite, with decomposition products in a soft easily broken gangue of quartz, sericite, and altered wall rock, the sericite being the most abundant gangue mineral. The country rock is the normal coarse-grained granodiorite, intruded by a spotted porphyritic phase containing large phenocrysts of quartz along with chlorite and biotite in a feldspar base. The spotted porphyry was noted at several of the properties and should in future mine work be carefully differentiated from the normal granodiorite.

The ore occurs in a warped fissure vein with a general east-west strike and a vertical to steeply southerly dip. About 120 feet in from the mouth of the tunnel, the vein is cut by a fault which horizontally displaces or heaves the portion of the vein east of the fault, northward or to the foot-wall side. The nature of this faulting is indicated on both sides of the fault plane by drag structures and by a general swinging of the vein in the direction of the faulting. The hanging-wall of the vein is well defined and marked by gouge material and the foot-wall is indefinite and might be defined as a commercial rather than structural wall. The width of the vein matter containing ore has been determined by crosscuts into the foot-wall to be, on an average, about 10 feet. Average assays of the ore are stated to give 5 per cent copper, and gold and silver together 60 cents to the ton.

Tamarac Group. The Tamarac or Sanson group, consisting of seven claims, six of which are surveyed, adjoins to the northeast the Top Notch group. The surveyed claims are the Tamarac, Shamrock, I.X.L. Fraction, Major Fraction, Star, and Duke. The main workings are at an elevation of 5,200 feet above sea-level. The property is owned by Dr. Geo. Sanson and Geo. Ward and was located in July, 1902, by A. M. Leitch and Henry Cargile. The Sanson group is under bond to the Highland Valley Mining and Development Company of Spokane, Washington.

Several parallel quartz veins with general east-west (magnetic) trend and steep northward dip have been disclosed by means of three prospect shafts (inaccessible October 1915), one tunnel, and a number of open-cuts. The veins correspond in strike and dip to the master joint planes in the grey, coarse-grained biotite granite and quartz diorite. The ore is chalcopryite, bornite, pyrite, and copper carbonates in a quartz-sericite-chlorite gangue of hydrothermally altered granite. Molybdenite and molybdite, the yellow oxide, also occur in small quantities at the Tamarac property¹ and indicate pneumatolitic conditions of deposition. The average metal contents of the surface ore are given as 2.80 per cent copper and about \$1 a ton in gold and silver.

Transvaal Group. The Transvaal group of six crown granted claims viz., the Transvaal, Imperial, Chamberlain, Ladysmith, Pretoria, and Mafeking is situated on the northeast side of Highland valley about 19 miles distant from Ashcroft. The property was located in September, 1899, and is owned by Jas. Hosking, Wm. Knight, and Geo. Novak. This property was extensively developed while under bond to the Consolidated Mining and Smelting Company of Canada. Time did not permit its examination, but the following description is taken from the Annual Report of the Minister of Mines, British Columbia, for 1907: "The shaft has two compartments, and is reported to have been sunk 200 feet, with, at the 100-foot level, a drift to the west of 160 feet in length, and another to the east, of 180 feet, and from the latter a 40-foot

¹ Report on the Molybdenite Ores of Canada by T. L. Walker, Mines Branch, Dept. of Mines. No. 93 (1911) p. 12-13.

NW-40

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has shipped 108 tons of first grade ore from the above described ore-shoot. Some second grade ore in which the bornite occurs disseminated through the altered granite, lies on the dump awaiting better transportation facilities. Practically no development work has been done in search of additional ore-shoots on the main vein or to locate parallel shoots. Surface prospecting farther up the hill is restricted by the occurrence of capping flows of basaltic lava belonging to the Kamloops Volcanic group (lower Miocene).

921/NW-11 *Glossy Group*. The Glossy group of seven mineral claims is located on the western end of Mount Glossy, 26 miles distant by wagon road from Ashcroft and 9 miles from Spatzum, a siding on the Canadian Pacific railway. The elevation of the main workings is about 5,500 feet above sea-level.

The Glossy, Forge, and Cinder claims were located by the late Isaac Decker, May 31, 1904, and are owned by J. W. Burr and John Wood. The property was bonded to O. B. Gerle, S. P. Dunlevy, and L. Carlson, September 8, 1915, and energetic development work was being pushed with a view to proving sufficient ore to warrant the construction of a railway spur from Spatzum. A wagon road was built to connect the property with the main Ashcroft road; and mine buildings were erected.

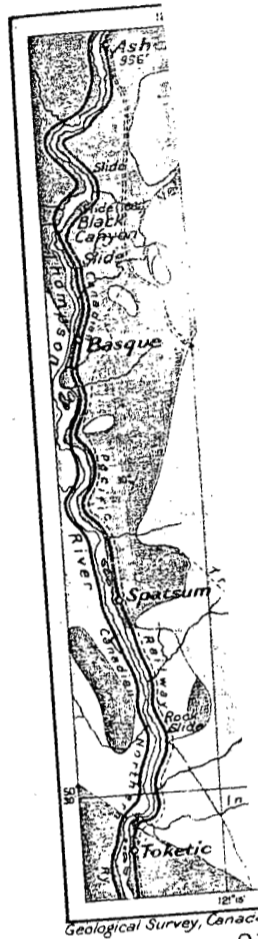
The main vein on the Glossy property is developed by means of a shaft (30 feet deep October 1915) and numerous open-cuts. It has been traced in this manner for a distance of about 2,000 feet along its apex. The strike of the vein at the shaft is north 77 degrees west with a steep northerly dip. It varies in width from a few inches to 9 feet as exposed in a surface trench. The country rock is grey granite and the best values are found on the hanging-wall side of the vein. Owing to the recency of the removal of the protective capping of basaltic lava¹ (Kamloops Volcanic group of lower Miocene age) the upper oxidized zone of the vein is present to a considerable depth. At other properties more remote from the lava remnants, erosion and glaciation removed the oxidized zone and laid bare the sulphides at the surface.

The brightly coloured decomposed ore of the Glossy mine contains malachite, azurite, chrysocolla, melanterite, tetrahedrite, bornite, and probably some undetermined oxides in a gangue of quartz and altered granite. Tetrahedrite or grey copper is more plentiful in depth and the shaft has exposed two streaks, near the centre of the vein, one 4 inches in width and the other 8 inches. About 20 tons of ore were sacked and ready for early shipment at the beginning of October, 1915. Specimens of this ore assay 31.8 per cent of copper (\$111.30), 0.10 ounces of gold (\$2), and 6.24 ounces of silver (\$3) with a total value of \$116.30 per ton. A sample of the decomposed ore weighing 1 pound 8 ounces assayed by the Mines Branch was found to contain 0.04 ounce of gold, a trace of silver, and 20.68 per cent of copper to the ton of 2,000 pounds.

Adjoining the Glossy group are five other claims also bonded to the same syndicate. These include the Top Nitch and Spokane located by P. Sawyer and P. Gilbeau. Prospect pits and trenches expose parallel mineralized joint planes in the granite.

Top Notch or Chataway Group. The Top Notch group of four full-sized claims, three of which are surveyed, is located on the southwest side of Highland valley, the Chataway ranch being 25 miles distant from Ashcroft. The mine workings are about $3\frac{1}{2}$ miles from the ranch and wagon road and at an elevation of approximately 5,400 feet above sea-level. The Top Notch claim was located by Geo. Chataway, July 3, 1907. Most of the tunnelling and development work has been done by Chataway and John Cowan. The property was bonded in 1914 by F. Keffer and H. Johns of Spokane, Washington. The main vein is

¹ The lava capping and cliffs are present about 1,000 feet north of the workings and the soil and subsoil at this end of the mountain contain much amygdaloidal basalt derived from the receding lava cliffs.



To accompany Summary Re

Table of Formations.

Era.	Period.	Formation name.	Approx. thickness in feet.
Quaternary.....	Recent.....	Soil and subsoil.....	
	Pleistocene.....	Fluvioglacial deposits.....	
Tertiary.....	Lower Miocene.....	Kamloops Volcanic group..... Basalt, andesite, agglomerate, breccia, and tuff (Tranquille beds).	3,000 ±
	Oligocene (?).....	Ashcroft rhyolite porphyry..... Coldwater group..... Conglomerate, sandstone, and shale.	1,000 ± 5,000 ±
Mesozoic.....	Lower Cretaceous...	Queen Charlotte Islands formation (?)..... Chiefly shale, conglomerate, and sandstone.	5,000 ±
	Jura-Cretaceous....	Spence Bridge Volcanic group..... Liparitic and andesitic lava, tuff, arkose, and conglomerate.	5,000 ±
	Upper Jurassic.....	Granitic intrusives. Batholith and cupola stocks. Country rock of copper veins.	
	Jura-Triassic.....	Nicola group..... Greenstone (porphyrites), impure quartzite, argillite, limestone, agglomerate, and tuff.	10,000 ±
Palaeozoic.....	Carboniferous.....	Câche Creek group..... Cherty quartzite, argillite, greenstone, and limestone (Marble Canyon limestone).	9,500 ±

DESCRIPTION OF PROPERTIES.

Snowstorm Group. The Snowstorm group of four crown granted claims, and other claims, is situated on Kirkpatrick mountain on the northeast side of Highland valley, 30 miles distant from Ashcroft. The elevation of the main workings is about 5,075 feet above sea-level. The property was located in 1905 by Gilbert Couvrette and is owned by Couvrette, G. Ward, and S. Henderson.

The main vein on the property is opened up by means of a 100-foot shaft with a 62-foot drift at the 50-foot level. The level is connected with the surface by a 70-foot crosscut tunnel. The vein varies in strike from north-northeast to north (magnetic) and dips to the east at an angle of 75 degrees. The ore-shoot from which the shipping ore was mined, has a pitch length of about 125 feet, a stope length, at a point 65 feet below the shaft-collar, of 75 feet, and a stope length in the shaft bottom said to be from 15 to 20 feet. The shoot has a tendency to pitch steeply to the southwest. The average width of the ore-shoot is 2 feet, with a maximum width of 4 feet. Above the tunnel level, the vein makes a sharp bend of 20 degrees and it was in that part of the vein that the highest grade of ore was obtained. The best ore was found to follow the hanging-wall which is well defined and marked at the southwestern end of the ore-shoot by a gouge 11 feet wide. When the shaft was visited October 1915 it was full of water and inaccessible below the tunnel level. The walls of the vein are an altered granite with, in places, a porphyritic phase on the foot-wall. To date, Mr. Henderson

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y proved to be a quartz diorite.

in copper. About 20 tons of high grade ore were sacked and ready for shipment at the beginning of October. The cost of wagon-haulage from the Glossy mine to Ashcroft is \$6 per ton, while that from the Snowstorm to Ashcroft is \$10 per ton. Freight rates to Tacoma from Ashcroft are about \$6 per ton.

The approximate positions of the various properties are indicated on the accompanying outline map, compiled in large part from Dawson's Kamloops map-sheet. The district, it will be seen by the map, is within a short distance of the Canadian Pacific railway at Spatzum.

At the close of the field season of 1915 the writer made a short reconnaissance trip to a few of the main properties in Highland valley. Among those visited were the Glossy and Snowstorm, on the northeast side of the valley, and the Tamarac (Sanson), Shamrock, and Chataway group of claims, on the southwest side.

ORE OCCURRENCE.

The copper ore occurs in fault fissure veins traversing a grey granitic rock varying from a granite to a quartz diorite and of upper Jurassic age. The veins so far discovered, are from a few inches to several feet in width and can be traced on the surface for distances varying from 100 to 2,000 feet. They are bent and faulted in places. At least two systems of fissuring are present, one trending in a general north-south direction (magnetic) and with steep dips to the east, the other in a general east-west direction and either vertical, or dipping steeply to the north or south. The Snowstorm fissure belongs to the north-south system and the Chataway, Tamarac, and Glossy belong to the east-west system. The fissures are warped fracture planes and vary a great deal in trend from place to place. The two systems of fissuring correspond closely in direction and dip to the master joint planes in the granitic mass and probably bear genetic relationships to them.

The ore minerals include bornite, chalcocite, chalcopyrite, tetrahedrite, chrysocolla, azurite, malachite, and melanterite with occasionally molybdenite and molybdate; the gangue is made up of quartz, sericite mica, chlorite, and altered granite. The Snowstorm ore, shipped in July 1915, ran 30.78 per cent in copper, 6.44 ounces in silver, and \$1.40 in gold per ton.

GENERAL GEOLOGY.

For a description of the general and structural geology and physiography of this region reference may be made to Dawson's "Report on the Area of the Kamloops map-sheet,"² and to more recent work by the writer during the field season of 1912.³

The following table of formations, taken from the Summary Report, 1912, gives the geological sequence, age, and approximate thickness of the different formations present.

¹ Microscopic examination of a specimen from the Tamarac property proved to be a quartz diorite.

² Geol. Surv., Can., Ann. Report, Vol. VII, 1894, pp. 1-427B.

³ Summary Report, Geol. Surv., Can., 1912, pp. 115-150.

Era.	Period.
Cenozoic.....	Recent.....
	Pleistocene.....
	Lower Miocene.....
Tertiary.....	Oligocene.....
	Lower Cretaceous.....
	Jura-Cretaceous.....
Mesozoic.....	Upper Jurassic.....
	Jura-Triassic.....
	Carboniferous.....
Palaeozoic.....	Carboniferous.....

Snowstorm Group and other claims, is in Highland valley, 30 workings is about 5,000 feet by Gilbert Couvrette.

The main vein consists of a 62-foot drift above by a 70-foot crosscut to north (magnetic) shoot from which the vein is 300 feet, a stope length, at length in the shaft bottom to pitch steeply to the north with a maximum width of sharp bend of 20 degrees of ore was obtained. The vein is well defined and may be 1½ feet wide. When the vein is inaccessible below the surface, in places, a portion

1915 GSC

SUMMARY REPORT

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level) has exposed 8 inches of massive stibnite in a lens striking north 35 degrees west (magnetic). The ore appears to be scattered in lenses throughout the sheared porphyry mass, several such lenses having been opened up by the tunnel. Near the portal of the tunnel, the vein and porphyry is faulted to the hanging-wall for a distance of about 20 feet. The highest gold values (\$12 per ton) are reported from the hanging-wall where the wall is composed of the Bridge River metabasalt. In September, 1915, the stibnite property had several tons of high grade ore bagged and ready for shipment.

The stibnite is considered to have been deposited from hot ascending waters charged with igneous emanations connected with a Tertiary volcanic cycle. The decomposition and concentration of ore in "nests" and "pockets" probably took place at slight depth under moderate pressure. The solutions spread widely through the brecciated and fractured country rocks. It is quite probable that cinnabar (HgS) the sulphide of mercury, which has been reported from several localities associated with the so-called Big Sheep volcanics and which deserves further diligent search, was deposited during the same solfataric stage of volcanism as the stibnite and associated gold.

The occurrences of stibnite so far developed in this region are of such small dimensions and necessitate so much dead work in mining that under present conditions it is very doubtful whether they can be profitably worked. The only chance for the future lies in detailed systematic prospecting and development, in the amalgamation of interests, and, after sufficient ore has been blocked out, the installation of a small smelting plant in the district to produce crude antimony or antimony metal.

Highland Valley Copper Camp, Ashcroft Mining Division.

INTRODUCTION.

The Highland Valley copper camp is situated about 27 miles, by wagon road, southeast of Ashcroft, on the watershed halfway between Ashcroft and Nicola. The occurrence of copper ore at this locality has been known of for more than fifteen years; but, since discovery, the properties have been only sporadically worked, owing, largely, to the long wagon-haul which discouraged active mining operations, other than the regular annual assessment work on the various properties. The early work was done mainly in the capping basaltic lava which is not so favourable an ore-bearing formation as the underlying granitic rocks. Furthermore, a thick mantle of drift and soil covering most of the district and the lack of an abundant water supply render prospecting a difficult task.

Recently, with the increasing demand for ores of copper, more attention has been given to the Highland Valley camp. Bonds have been taken up on certain properties and others have resumed operations. During 1915 the Snowflake mine, owned by Messrs. G. Couvrette, Geo. Ward, and Stuart Henderson, shipped three cars of high grade ore to the Tacoma smelter. The first car load of 14 tons netted \$78 per ton, the second of 32 tons \$101 per ton, and the third of 17 tons \$77 per ton. The Chataway and Sanson group of claims were bonded in 1914 to Messrs. Frederic Keffer and Henry Johns of Spokane, who have organized the Highland Valley Mining and Development Company and are carrying on systematic development work and accumulating ore on the dumps. On September 5, 1915, the Glossy mine, owned by Mr. J. W. Burr and others, was bonded to Messrs. L. Carlson, O. B. Gerle, and S. P. Dunlevy. A shaft is being sunk and at 30 feet shows 5 feet of ore assaying \$28 per ton, the values being mainly

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