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ONTARIO
DEPARTMENT OF MINES

HON. G. C. WARDROPE, *Minister*

D. P. DOUGLASS, *Deputy Minister*

Annual Report for the Year 1965

**Statistics of the Mineral Industry
and
Mining Operations in Ontario
for 1965**

**By
G. S. Riddell**

Ontario Department of Mines Volume 75

TORONTO
1968

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INTRODUCTORY LETTER

TO THE HONOURABLE G. C. WARDROPE
Minister of Mines

SIR:

The undersigned has the honour to submit to you the Seventy-fifth Annual Report of the Ontario Department of Mines, consisting of the statistics of the mineral industry and mining operations in the Province of Ontario in 1965.

Respectfully submitted,

D. P. DOUGLASS

Deputy Minister of Mines

DEPARTMENT OF MINES
Toronto, 1968

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Statistics of the Mineral Industry and Mining Operations in Ontario for 1965

By

G. S. Riddell

P. Eng., Engineer of Mines

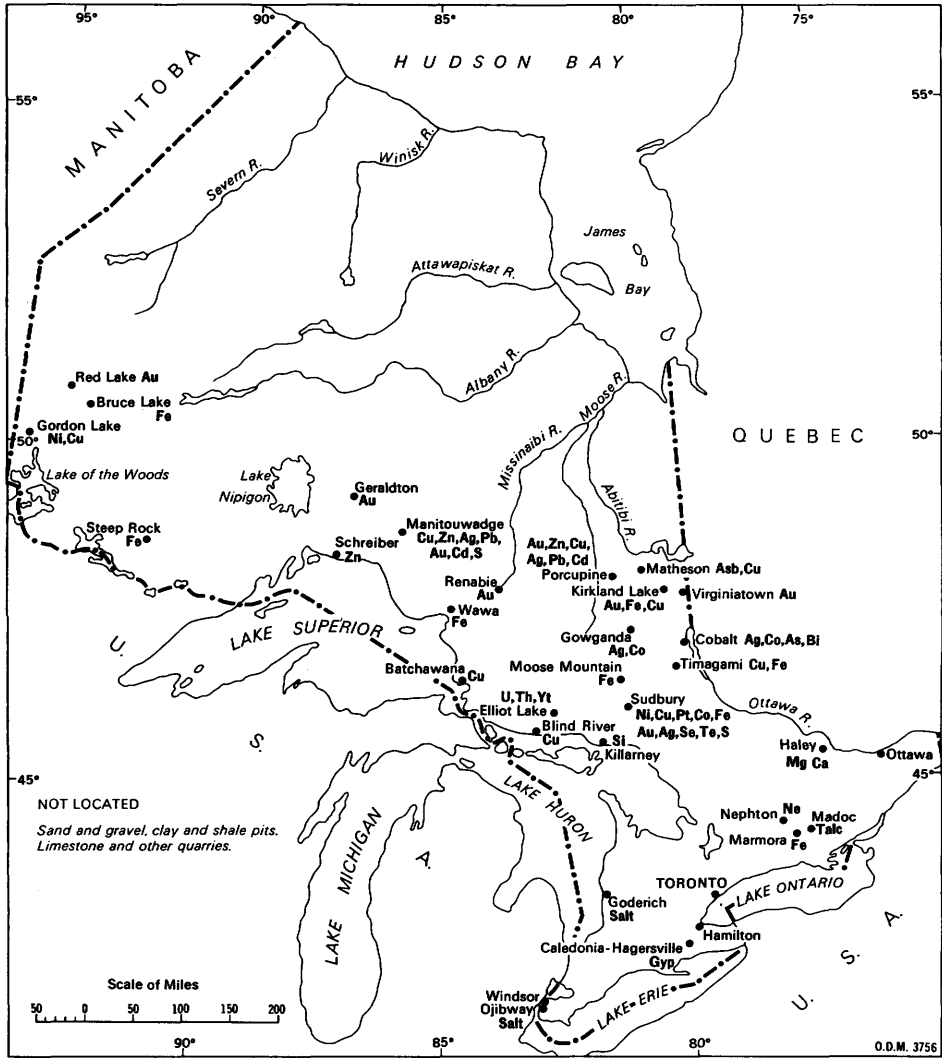
Mines Inspection Branch, R. L. Smith, Chief Engineer of Mines

Prefatory Notes

Note: Prior to the publication of Volume LXX, the Annual Report consisted of: Statistical Review of the Mineral Industry (Part 1); Mining Operations (Part 2); subsequent parts of the volume were geological reports.

Starting with Volume 70, the Annual Report consists of only former Parts 1 and 2, which are now combined. Geological reports were separated in 1960 from the Annual Report to form a new series of Geological Reports.

PRINCIPAL MINING AREAS OF THE PROVINCE OF ONTARIO



KEY TO SYMBOLS

| | | |
|----------------|------------------------|----------------|
| Ag — Silver | Mg — Magnesium | Se — Selenium |
| Asb — Asbestos | Ne — Nepheline syenite | Si — Silica |
| Au — Gold | Ni — Nickel | Talc — Talc |
| Bi — Bismuth | Pb — Lead | Te — Tellurium |
| Co — Cobalt | Pd — Palladium | Th — Thorium |
| Cu — Copper | Pt — Platinum | U — Uranium |
| Fe — Iron | Salt — Salt | Yt — Yttrium |
| Gyp — Gypsum | S — Sulphur | Zn — Zinc |

GENERAL SUMMARY

MINERAL PRODUCTION

The total value of mineral production in Ontario for 1965 increased 9.75 percent, from \$904,582,694 in 1964 to \$992,788,746 in 1965. The increase is accounted for by major advances in production and value of nickel, copper, platinum metals, and iron ore; there were minor advances in cobalt, silver, magnesium, calcium, selenium, tellurium, and bismuth. Major decreases in production and value were recorded again in gold and uranium oxide; there were minor decreases for cadmium and zinc; no production of molybdenum was recorded in 1965. In the non-metallics and fuels there was an increase in production and value of salt, gypsum, and crude petroleum; there was a slight decrease in talc production with a slight increase in value; the production of quartz and arsenious oxide increased but there was a decrease in value; slight decreases in production and value were recorded in asbestos, natural gas, nepheline syenite, and peat moss. There was no recorded production for mica; gem stone made an initial appearance. In the structural materials all items increased in production and value in the following order: sand and gravel, cement, stone, clay products, and lime.

Metallics accounted for 78.17 percent, non-metallics and fuels 3.23 percent, and structural materials 18.60 percent of the total value of mineral production for Ontario in 1965. Compared with 1964 the value of metallic production increased 10.66 percent, from \$701,272,213 in 1964 to \$776,031,532 in 1965; non-metallics and fuels decreased 6.45 percent from \$34,247,115 in 1964 to \$32,037,840 in 1965; structural materials increased 9.26 percent from \$169,063,366 in 1964 to \$184,719,374 in 1965.

The value of metallic production from the various areas, in percentage of the total value, was as follows: Sudbury 65.24, Rainy River and Kenora 7.06, Thunder Bay 6.51, Blind River 6.49, Porcupine 5.84, Kirkland Lake and Larder Lake 3.30, Algoma 2.33, Eastern Ontario 1.78, and Cobalt 1.45.

The gold, silver-cobalt, base metal (nickel, copper, lead and zinc), and uranium mines paid out \$151,864,950 in dividends during the year. Twenty-five of the thirty-one gold mines reporting production in 1965 received assistance under the Emergency Gold Mining Assistance Act.

TOTAL MINERAL PRODUCTION VALUE

| YEAR | METALLICS | NON-METALLICS | STRUCTURAL MATERIALS | CLAY PRODUCTS | TOTAL |
|-----------------|------------------|-------------------------|----------------------|---------------|------------------|
| To 31 Dec. | | | | | |
| 1960 | \$10,287,421,559 | \$721,142,780 | \$1,389,773,615 | \$380,346,441 | \$12,778,684,395 |
| 1961 | 780,784,843 | 32,791,193 | 111,056,864 | 19,036,556 | 943,669,456 |
| 1962 | 729,769,944 | 36,784,690 | 126,640,754 | 20,146,786 | 913,342,174 |
| 1963 | 683,175,291 | 36,435,466 | 132,397,853 | 21,819,687 | 873,828,297 |
| 1964 | 701,272,213 | 34,247,115 ¹ | 145,339,854 | 23,723,512 | 904,582,694 |
| 1965 | 766,031,532 | 32,037,840 | 159,588,665 | 25,130,709 | 992,788,746 |
| To 31 Dec. 1965 | \$13,958,455,382 | \$893,439,084 | \$2,064,797,605 | \$490,203,691 | \$17,406,895,762 |

¹Revised figure for salt production for 1964.

Annual Report for 1965

COMPARATIVE OUTPUT AND VALUE OF MINERAL PRODUCTION

| PRODUCT | | 1961 | 1962 | 1963 | 1964 | 1965 |
|---|-----------|--------------------|--------------------|--------------------|--------------------|--------------------|
| METALLICS | | | | | | |
| Bismuth | lb. | 19,923 | ..... | 65 | 541 | 3,883 |
| | \$ | 22,388 | ..... | 146 | 703 | 9,600 |
| Cadmium | lb. | ..... | ..... | ..... | 187,609 | 209,724 |
|  | \$ | ..... | ..... | ..... | 607,853 | 583,033 |
| Calcium | lb. | 99,355 | 123,511 | 98,673 | 138,357 | 159,434 |
| | \$ | 100,881 | 124,412 | 117,247 | 151,694 | 152,848 |
| Cobalt | lb. | 2,844,420 | 2,649,193 | 2,156,732 | 2,212,016 | 2,620,810 |
| | \$ | 4,309,912 | 4,765,808 | 4,409,262 | 4,259,215 | 5,511,436 |
| Copper | lb. | 423,293,547 | 377,990,690 | 357,919,536 | 395,833,331 | 432,544,119 |
| | \$ | 122,421,860 | 116,347,723 | 112,048,454 | 131,458,795 | 161,665,138 |
| Gold | oz. | 2,637,720 | 2,421,249 | 2,338,854 | 2,155,370 | 1,946,003 |
| | \$ | 93,533,551 | 90,578,924 | 88,291,739 | 81,365,217 | 73,420,747 |
| Iron ore | tons | 5,772,664 | 6,414,936 | 6,749,617 | 8,046,769 | 8,475,218 |
| | \$ | 62,350,773 | 64,479,510 | 70,033,690 | 85,613,354 | 94,209,236 |
| Lead | lb. | 1,670,535 | 2,287,087 | 3,077,814 | 4,054,865 | 3,887,218 |
| | \$ | 170,562 | 226,879 | 338,560 | 544,974 | 602,518 |
| Magnesium | lb. | 15,270,618 | 17,631,310 | 17,810,348 | 18,706,020 | 20,216,369 |
| | \$ | 4,307,570 | 4,821,823 | 5,357,816 | 5,587,909 | 6,067,057 |
| Molybdenum | lb. | ..... | ..... | ..... | 11,393 | ..... |
|  | \$ | ..... | ..... | ..... | 19,026 | ..... |
| Nickel | lb. | 392,435,773 | 333,163,344 | 298,178,570 | 324,187,190 | 382,566,712 |
| | \$ | 295,423,149 | 274,219,955 | 246,252,488 | 267,764,039 | 316,332,366 |
| Platinum metals | oz. | 418,278 | 470,782 | 357,649 | 376,238 | 463,217 |
| | \$ | 24,534,349 | 28,848,262 | 22,585,055 | 25,404,117 | 36,109,799 |
| Pyrrhotite | tons | ..... | ..... | ..... | ..... | ..... |
| | \$ | | | | | |
| Selenium | lb. | 164,800 | 142,915 | 95,100 | 104,905 | 123,175 |
| | \$ | 1,071,200 | 821,761 | 461,235 | 508,789 | 597,399 |
| Silver | oz. | 8,870,402 | 9,383,445 | 9,601,621 | 9,929,858 | 10,822,213 |
| | \$ | 8,361,240 | 10,931,713 | 13,288,643 | 13,901,801 | 15,151,098 |
| Tellurium | lb. | 8,050 | 7,011 | 7,705 | 7,900 | 9,315 |
| | \$ | 39,043 | 42,066 | 50,082 | 51,350 | 60,548 |
| Thorium | lb. | See note 1 | See note 1 | ..... | ..... | ..... |
| | \$ | See note 1 | See note 1 | ..... | ..... | ..... |
| Uranium oxide (U ₃ O ₈) | lb. | 14,970,593 | 12,805,203 | 12,770,421 | 11,805,143 | 6,825,046 |
| | \$ | 151,060,610 | 118,283,081 | 102,951,146 | 63,606,944 | 47,234,892 |
| Zinc | lb. | 103,874,146 | 126,264,684 | 132,939,970 | 144,152,666 | 121,349,121 |
| | \$ | 13,077,755 | 15,278,027 | 16,989,728 | 20,426,433 | 18,323,817 |
| Total Value | \$ | 780,784,843 | 729,769,944 | 683,175,291 | 701,272,213 | 776,031,532 |

¹Not available

COMPARATIVE OUTPUT AND VALUE OF MINERAL PRODUCTION—concluded

| PRODUCT | | 1961 | 1962 | 1963 | 1964 | 1965 |
|-------------------------------|-----------|-------------------------|-------------|-------------|-------------------------|-------------|
| NON-METALLICS | | | | | | |
| Arsenic trioxide | lb. | 419,300 | 160,750 | 187,450 | 323,900 | 403,011 |
| | \$ | 16,772 | 6,832 | 7,498 | 16,195 | 13,150 |
| Asbestos | tons | 25,047 | 35,551 | 33,715 | 15,512 | 1,758 |
| | \$ | 4,362,668 | 5,686,720 | 5,372,645 | 2,199,918 | 69,258 |
| Fluorspar | tons | ..... | ..... | ..... | ..... | ..... |
| | \$ | 38,400 | ..... | ..... | ..... | ..... |
| Garnet | tons | 80 | ..... | ..... | ..... | ..... |
| | \$ | 3,200 | ..... | ..... | ..... | ..... |
| Gem stone | lb. | ..... | ..... | ..... | ..... | 64,000 |
|  | \$ | ..... | ..... | ..... | ..... | 7,106 |
| Gypsum | tons | 425,287 | 435,140 | 439,206 | 517,239 | 531,918 |
| | \$ | 991,944 | 1,007,818 | 1,225,301 | 1,376,992 | 1,444,293 |
| Mica | lb. | 192,960 | 501,272 | 342,185 | 432,348 | ..... |
| | \$ | 14,962 | 9,248 | 5,114 | 6,417 | ..... |
| Mineral water | gal. | 6,985 | 5,200 | ..... | ..... | ..... |
| | \$ | 2,786 | 2,780 | ..... | ..... | ..... |
| Natural gas | M cu. ft. | 14,544,165 | 15,648,294 | 15,920,055 | 13,815,967 | 12,619,867 |
| | \$ | 5,614,048 | 5,802,387 | 6,049,621 | 5,759,876 | 4,856,125 |
| Nepheline syenite | tons | 240,320 | 254,418 | 254,000 | 290,300 | 339,982 |
| | \$ | 2,572,169 | 2,605,421 | 2,699,202 | 3,097,172 | 3,415,387 |
| Peat moss | tons | 15,113 | 24,801 | 30,659 | 27,065 | 20,115 |
| | \$ | 251,352 | 455,826 | 610,784 | 573,538 | 389,615 |
| Petroleum, crude | bbl. | 1,149,087 | 1,134,534 | 1,205,376 | 1,246,682 | 1,279,321 |
| | \$ | 3,546,740 | 3,661,174 | 3,459,429 | 4,014,316 | 4,093,318 |
| Quartz and quartzite | tons | 1,540,016 | 1,352,613 | 952,166 | 1,127,425 | 1,301,583 |
| | \$ | 827,061 | 1,077,784 | 644,287 | 836,937 | 790,245 |
| Silica brick | M | ..... | ..... | ..... | ..... | ..... |
| | \$ | | | | | |
| Salt | tons | 2,861,705 | 3,155,589 | 3,187,491 | 3,335,683 | 3,900,484 |
| | \$ | 13,586,373 | 15,387,911 | 14,793,161 | 14,552,559 ² | 15,499,274 |
| Sulphur ¹ | tons | ..... | ..... | ..... | ..... | ..... |
| | \$ | 855,058 | 952,877 | 1,460,438 | 1,676,727 | 1,322,611 |
| Talc and soapstone | tons | 7,417 | 8,082 | 6,903 | 8,060 | 8,028 |
| | \$ | 107,660 | 127,912 | 107,986 | 136,468 | 137,458 |
| Total value | \$ | 32,791,193 | 36,784,690 | 36,435,466 | 34,247,115 | 32,037,840 |
| STRUCTURAL MATERIALS | | | | | | |
| Portland cement | tons | 2,226,923 | 2,510,783 | 2,552,665 | 3,043,771 | 3,145,873 |
| | \$ | 35,671,569 | 38,704,090 | 39,551,719 | 46,804,126 | 50,055,554 |
| Lime, hydrated, and quicklime | tons | 865,130 | 910,930 | 952,945 | 1,049,798 | 1,132,193 |
| | \$ | 11,548,132 | 10,527,910 | 11,434,223 | 13,127,550 | 13,842,169 |
| Sand and gravel | tons | 70,208,199 ² | 76,600,813 | 80,259,750 | 76,917,396 | 88,564,687 |
| | \$ | 40,344,071 | 52,365,204 | 56,338,204 | 54,589,444 | 63,405,954 |
| Stone | tons | 18,361,843 ² | 18,797,648 | 20,402,614 | 23,845,993 | 24,659,053 |
| | \$ | 23,493,092 | 25,043,550 | 25,073,707 | 30,818,734 | 32,284,988 |
| Clay Products | \$ | 19,036,556 | 20,146,786 | 21,819,687 | 23,723,512 | 25,130,709 |
| Total value | \$ | 130,093,420 | 146,787,540 | 154,217,540 | 169,063,366 | 184,719,374 |
| Grand Total | \$ | 943,669,456 | 913,342,174 | 873,828,297 | 904,582,694 | 992,788,746 |

¹Value of elemental sulphur and sulphur content of sulphuric acid produced from smelter gases.²Revised figures.

Annual Report for 1965

SUMMARY OF MINERAL STATISTICS, 1965

| PRODUCT | QUANTITY | VALUE | WAGE EARNERS ¹ | WAGES |
|--|-----------------------|----------------------|---------------------------|----------------------|
| METALLICS² | | | | |
| Gold | oz. 1,946,003 | \$ 73,420,747 | 7,954 | \$ 32,879,958 |
| Silver | oz. 10,822,213 | 15,151,098 | 483 | 2,109,930 |
| Bismuth | lb. 3,883 | 9,600 | ..... | ..... |
| Copper in matte, metal, and concentrates | lb. 432,544,119 | 161,665,138 | | |
| Nickel, matte, metal, and salts | lb. 382,566,712 | 316,332,366 | | |
| Platinum metals | oz. 463,127 | 36,109,799 | 20,443 | 111,796,894 |
| Selenium | lb. 123,175 | 597,399 | | |
| Tellurium | lb. 9,315 | 60,548 | | |
| Cobalt, metal and salts | lb. 2,620,810 | 5,511,436 | see note 3 | see note 3 |
| Iron Ore | ton 8,475,218 | 94,209,236 | 2,447 | 13,863,148 |
| Calcium | lb. 159,434 | 152,848 | ..... | ..... |
| Magnesium | lb. 20,216,369 | 6,067,057 | ..... | ..... |
| Cadmium | lb. 209,724 | 583,033 | | |
| Lead | lb. 3,877,218 | 602,518 | 754 | 4,132,279 |
| Zinc | lb. 121,349,121 | 18,323,817 | | |
| Uranium oxide (U ₃ O ₈) | lb. 6,825,046 | 47,234,892 | 1,087 | 6,517,491 |
| Total | | \$776,031,532 | 33,168 | \$171,299,700 |
| NON-METALLICS AND FUELS⁴ | | | | |
| Arsenic trioxide | lb. 403,011 | \$ 13,150 | see note 5 | see note 5 |
| Gem stone | lb. 64,000 | 7,106 | ..... | ..... |
| Natural gas | M. cu. ft. 12,619,867 | 4,856,125 | not available | not available |
| Petroleum | bbl. 1,279,321 | 4,093,318 | | |
| Quartz | ton 1,301,583 | 790,245 | 9 | \$ 47,305 |
| Salt | ton 3,900,484 | 15,499,274 | 460 | 2,681,498 |
| Sulphur ⁶ | ton 140,116 | 1,322,611 | see note 7 | see note 7 |
| Asbestos | ton 1,758 | 69,258 | | |
| Gypsum | ton 531,918 | 1,444,293 | | |
| Nepheline syenite | ton 339,982 | 3,415,387 | 257 | 1,350,980 |
| Peat moss | ton 20,115 | 389,615 | | |
| Talc | ton 8,028 | 137,458 | | |
| Total | | \$ 32,037,840 | 726 | \$ 4,079,783 |
| STRUCTURAL MATERIALS⁵ | | | | |
| Cement | ton 3,145,873 | \$ 50,055,554 | 882 | \$ 5,565,175 |
| Lime | ton 1,132,193 | 13,842,169 | 332 | 1,815,161 |
| Sand and gravel | ton 88,564,687 | 63,405,954 | 1,374 | 6,465,594 |
| Stone | ton 24,659,053 | 32,284,988 | 918 | 4,508,035 |
| Clay Products | ton | 25,130,709 | 1,606 | 6,854,731 |
| Total | | \$184,719,374 | 5,112 | \$ 25,208,696 |
| Grand Total, 1965 | | \$992,788,746 | 39,006 | \$200,588,179 |
| Grand Total, 1964 | | \$901,582,694 | 36,185 | \$178,561,611 |

¹"Wage Earners" for any mineral industry represents the employees of companies whose chief product is that mineral, or employees of the companies who produce the greater part of the total quantity of that mineral.

²Further information is given in the "Metallics" section.

³Included with Nickel and Copper, and Silver and Cobalt.

⁴Further information is given in the "Non-Metallics and Fuels" section.

⁵Included with Silver and Cobalt.

⁶Value of elemental sulphur, and sulphur content of liquid sulphur dioxide and sulphuric acid produced from smelter gases.

⁷Included with Nickel and Copper.

⁸Further information is given in "Structural Materials" section.

Metal Production

Metallic minerals have accounted for 80.20 percent of the accumulated mineral production value for the recorded history of the mining industry in Ontario.

METAL PRODUCTION TO 31 DECEMBER 1965

| METAL OR PRODUCT | TO | | TO | |
|--|---------------------|---------------|---------------------|------|
| | 31 DECEMBER 1964 | 1965 | 31 DECEMBER 1965 | 1965 |
| Barium | \$ 9,266 | \$ | \$ 9,266 | |
| Bismuth | 416,915 | 9,600 | 426,515 | |
| Cadmium | 607,853 | 583,033 | 1,190,886 | |
| Calcium | 11,930,946 | 152,848 | 12,083,794 | |
| Cerium, rare earths | 988 | ..... | 988 | |
| Chromite | 55,090 | ..... | 55,090 | |
| Cobalt | 112,470,858 | 5,511,436 | 117,982,294 | |
| Copper | 2,149,229,183 | 161,665,138 | 2,310,894,321 | |
| Gold | 3,229,086,608 | 73,420,747 | 3,302,507,355 | |
| Iron Ore | 694,487,853 | 94,209,236 | 788,697,089 | |
| Lead | 8,979,018 | 602,518 | 9,581,536 | |
| Magnesium | 62,366,669 | 6,067,057 | 68,433,726 | |
| Molybdenum | 243,136 | ..... | 243,136 | |
| Nickel | 4,520,528,337 | 316,332,366 | 4,836,860,703 | |
| Pig iron, from domestic ore | 98,257,508 | ..... | 98,257,508 | |
| Platinum metals | 547,954,048 | 36,109,799 | 584,063,847 | |
| Pyrrhotite | 3,495,154 | ..... | 3,495,154 | |
| Selenium | 13,399,379 | 597,399 | 13,996,778 | |
| Silver | 404,339,196 | 15,151,098 | 419,490,294 | |
| Tellurium | 541,432 | 60,548 | 601,980 | |
| Thorium | 105,676 | ..... | 105,676 | |
| Tungsten | 808,338 | ..... | 808,338 | |
| Uranium oxide (U ₃ O ₈) | 1,219,354,691 | 47,234,892 | 1,266,589,583 | |
| Zinc in ore and concentrate | 103,755,708 | 18,323,817 | 122,079,525 | |
| Total | \$13,182,423,850 | \$776,031,532 | \$13,958,455,382 | |

DIVIDENDS

DIVIDENDS PAID BY METAL MINING COMPANIES TO 31 DECEMBER 1965

| INDUSTRY | TO | | TO | |
|---------------|---------------------|---------------|---------------------|------|
| | 31 DECEMBER 1964 | 1965 | 31 DECEMBER 1965 | 1965 |
| Base Metal | \$1,431,235,395 | \$118,102,247 | \$1,549,337,642 | |
| Gold | 805,538,505 | 23,113,471 | 828,651,976 | |
| Silver-cobalt | 108,191,962 | 811,000 | 109,002,962 | |
| Uranium | 90,538,786 | 9,838,232 | 100,377,018 | |
| Total | \$2,435,504,648 | \$151,864,950 | \$2,587,369,598 | |

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METAL PRICES AND EXCHANGE

METAL PRICES AND EXCHANGE, 1964 AND 1965

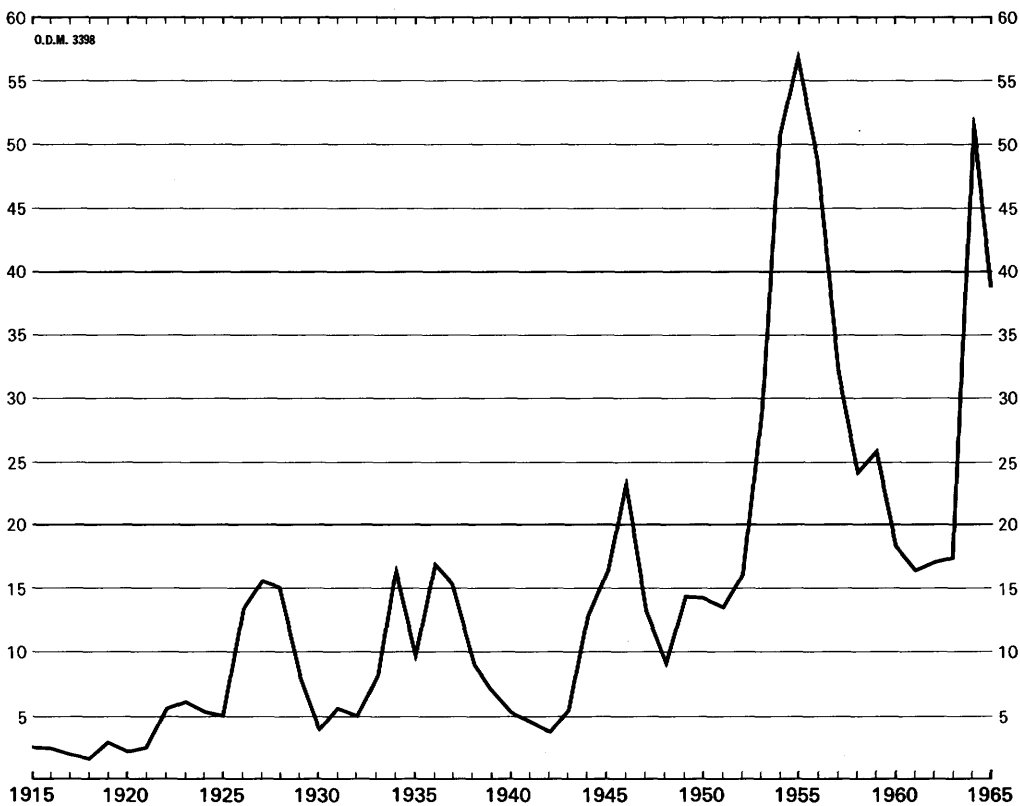
| MONTH | AVERAGE EXCHANGE RATE, U.S. DOLLAR IN CANADIAN DOLLARS | POUND STERLING IN CANADIAN DOLLARS | SILVER CENTS PER OUNCE | | COPPER CENTS PER POUND NEW YORK EXPORT, U.S. FUNDS | GOLD IN CANADIAN DOLLARS PER OUNCE |
|-------------|---|--|-----------------------------------|-------------------------------|---|--|
| | | | NEW YORK MARKET, U.S. FUNDS | MONTREAL CANADIAN FUNDS | | |
| 1964 | | | | | | |
| January | 1.0802 | 3.0230 | 129.300 | 140.22 | 28.566 | 37.809 |
| February | 1.0800 | 3.0209 | 129.300 | 140.20 | 28.629 | 37.800 |
| March | 1.0805 | 3.0234 | 129.300 | 140.28 | 29.127 | 37.817 |
| April | 1.0809 | 3.0256 | 129.300 | 140.32 | 29.636 | 37.831 |
| May | 1.0809 | 3.0260 | 129.300 | 140.27 | 29.670 | 37.830 |
| June | 1.0809 | 3.0204 | 129.300 | 140.32 | 29.830 | 37.813 |
| July | 1.0813 | 3.0165 | 129.300 | 140.35 | 29.960 | 37.844 |
| August | 1.0787 | 3.0061 | 129.300 | 140.06 | 30.977 | 37.755 |
| September | 1.0761 | 2.9954 | 129.300 | 139.25 | 32.694 | 37.664 |
| October | 1.0753 | 2.9931 | 129.300 | 139.55 | 34.141 | 37.634 |
| November | 1.0739 | 2.9914 | 129.300 | 139.50 | 34.192 | 37.591 |
| December | 1.0746 | 2.9991 | 129.300 | 139.55 | 34.392 | 37.608 |
| Average | 1.0786 ¹ | 3.0118 ¹ | 129.300 | 139.99 | 30.985 | 37.750 |
| 1965 | | | | | | |
| January | 1.0738 | 2.9977 | 129.300 | 139.38 | 33.376 | 37.584 |
| February | 1.0758 | 3.0070 | 129.300 | 139.60 | 32.994 | 37.652 |
| March | 1.0811 | 3.0192 | 129.300 | 140.32 | 33.191 | 37.840 |
| April | 1.0792 | 3.0177 | 129.300 | 140.03 | 33.223 | 37.770 |
| May | 1.0795 | 3.0194 | 129.300 | 140.12 | 35.921 | 37.778 |
| June | 1.0823 | 3.0222 | 129.300 | 140.48 | 36.107 | 37.878 |
| July | 1.0835 | 3.0241 | 129.300 | 140.68 | 36.052 | 37.922 |
| August | 1.0784 | 3.0099 | 129.300 | 139.96 | 35.688 | 37.744 |
| September | 1.0764 | 3.0106 | 129.300 | 139.75 | 35.605 | 37.675 |
| October | 1.0751 | 3.0136 | 129.300 | 139.58 | 38.083 | 37.628 |
| November | 1.0749 | 3.0140 | 129.300 | 139.50 | 38.460 | 37.623 |
| December | 1.0758 | 3.0148 | 129.300 | 139.68 | 38.549 | 37.653 |
| Average | 1.0780 ¹ | 3.0143 ¹ | 129.300 | 139.92 | 35.604 | 37.728 |

¹Computed from daily quotations.

PROSPECTING

There was a decrease in prospecting activity during 1965; a total of 38,757 claims was recorded as compared with 51,547 in 1964. Although this represents a drop of 12,790 from the total established in 1964, it is not surprising, in view of the fact that the rush following the Texas Gulf discovery near Timmins in 1964 resulted in the staking of 20,823 claims in the Porcupine division alone. Port Arthur was the most active division in the province with 7,755 claims being recorded there, almost double the total in 1964. Increases, some of them very substantial, were recorded in seven other mining divisions; in the six remaining mining divisions the totals of staking were down somewhat, but the reductions were not great. The number of miners' licenses issued and renewed during 1965 totalled 7,935, down from the total of 8,290 for 1964.

MINING CLAIMS RECORDED 1915-1965



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MINERS' LICENCES AND MINING CLAIMS, 1965

| MINING DIVISION | MINERS' LICENCES | | MINING CLAIMS | |
|----------------------|------------------|---------|---------------|-----------|
| | ISSUED | RENEWED | RECORDED | CANCELLED |
| Eastern Ontario | .... | .... | 981 | 353 |
| Fort Frances | 34 | 61 | 918 | 299 |
| Kenora | 150 | 87 | 2,019 | 395 |
| Kowkash ¹ | .... | .... | 358 | 273 |
| Larder Lake | 230 | 457 | 6,079 | 4,027 |
| Montreal River | 58 | 122 | 1,762 | 1,899 |
| Parry Sound | .... | .... | 160 | 150 |
| Patricia | 57 | 87 | 1,703 | 686 |
| Porcupine | 369 | 731 | 4,790 | 9,922 |
| Port Arthur | 559 | 565 | 7,755 | 2,583 |
| Red Lake | 82 | 98 | 1,214 | 739 |
| Sault Ste. Marie | 292 | 247 | 5,084 | 2,214 |
| Sudbury | 323 | 288 | 4,444 | 3,980 |
| Timiskaming | 113 | 221 | 1,490 | 980 |
| Toronto Office | 658 | 2,046 | .... | .... |
| Total | 2,925 | 5,010 | 38,757 | 28,500 |

¹Handled by the office of the Patricia Mining Division since 1 April 1956.

MINING CLAIMS RECORDED IN THE ONTARIO MINING DIVISIONS

| MINING DIVISION | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 |
|------------------|--------|--------|--------|--------|--------|--------|--------|
| Eastern Ontario | 993 | 507 | 806 | 504 | 383 | 461 | 981 |
| Fort Frances | 422 | 402 | 199 | 444 | 699 | 261 | 918 |
| Kenora | 1,146 | 1,162 | 961 | 856 | 347 | 525 | 2,019 |
| Kowkash | 1,368 | 774 | 1,043 | 1,362 | 388 | 446 | 358 |
| Larder Lake | 3,540 | 1,430 | 1,421 | 1,701 | 1,505 | 8,143 | 6,079 |
| Montreal River | 1,579 | 1,670 | 1,211 | 1,705 | 1,871 | 3,530 | 1,762 |
| Parry Sound | 182 | 186 | 136 | 58 | 152 | 142 | 160 |
| Patricia | 2,628 | 1,912 | 1,612 | 1,272 | 739 | 1,184 | 1,703 |
| Porcupine | 2,247 | 1,321 | 1,443 | 1,440 | 1,971 | 20,823 | 4,790 |
| Port Arthur | 3,479 | 3,095 | 2,064 | 2,088 | 3,678 | 3,993 | 7,755 |
| Red Lake | 2,554 | 1,227 | 1,076 | 1,055 | 423 | 1,219 | 1,214 |
| Sault Ste. Marie | 1,112 | 943 | 1,436 | 2,055 | 2,472 | 3,270 | 5,084 |
| Sudbury | 3,481 | 1,921 | 2,098 | 1,348 | 1,445 | 6,383 | 4,444 |
| Timiskaming | 1,300 | 1,924 | 1,117 | 1,269 | 1,334 | 1,167 | 1,490 |
| Total | 26,031 | 18,474 | 16,623 | 17,157 | 17,407 | 51,547 | 38,757 |

MINING CLAIMS CANCELLED IN THE ONTARIO MINING DIVISIONS

| MINING DIVISION | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 |
|------------------|--------|--------|--------|--------|--------|--------|--------|
| Eastern Ontario | 1,701 | 1,629 | 728 | 658 | 729 | 441 | 353 |
| Fort Frances | 630 | 619 | 356 | 305 | 333 | 612 | 299 |
| Kenora | 1,697 | 1,368 | 1,133 | 1,195 | 957 | 546 | 395 |
| Kowkash | 1,228 | 1,975 | 1,412 | 1,805 | 1,139 | 875 | 273 |
| Larder Lake | 1,604 | 3,667 | 1,450 | 1,452 | 1,631 | 967 | 4,027 |
| Montreal River | 1,858 | 1,986 | 1,494 | 999 | 1,125 | 1,651 | 1,899 |
| Parry Sound | 122 | 196 | 281 | 60 | 134 | 162 | 150 |
| Patricia | 1,273 | 2,560 | 3,089 | 2,043 | 1,780 | 1,024 | 686 |
| Porcupine | 1,803 | 2,296 | 1,578 | 1,425 | 1,326 | 931 | 9,922 |
| Port Arthur | 4,265 | 3,833 | 3,549 | 2,823 | 2,382 | 3,230 | 2,583 |
| Red Lake | 1,843 | 3,081 | 1,859 | 1,342 | 1,041 | 667 | 739 |
| Sault Ste. Marie | 2,203 | 2,004 | 1,020 | 1,284 | 1,789 | 1,876 | 2,214 |
| Sudbury | 4,036 | 4,409 | 2,245 | 1,949 | 1,742 | 1,297 | 3,980 |
| Timiskaming | 2,132 | 1,094 | 1,507 | 1,577 | 1,139 | 1,266 | 980 |
| Total | 26,395 | 30,717 | 21,701 | 18,917 | 17,247 | 15,545 | 28,500 |

STATISTICS AND MINING OPERATIONS

METALLICS

BISMUTH

The production of bismuth in Ontario in 1965 amounted to 3,883 pounds, valued at \$9,600; it was recovered from the smelting of the silver-cobalt ores from the Cobalt-Gowganda area.

CADMIUM

The production of cadmium in 1965 consisted of 209,724 pounds valued at \$583,033. This was recovered from the treatment of the ores from the Manitouwadge area.

CALCIUM—*see* MAGNESIUM AND CALCIUM

COBALT—*see* NICKEL AND COPPER, *and* SILVER AND COBALT

COPPER—*see* NICKEL AND COPPER

GOLD

In 1965 there were 31 gold mines operating in Ontario; four mines ceased operations during the year (Broulan Reef, Hugh-Pam, Leitch, and Wright-Hargreaves). Lake Shore discontinued mining but continued the milling of tailings. Ancco, Upper Beaver, and Stairs commenced production. The mines reported milling 6,794,750 tons of ore, from which were recovered 1,880,615 ounces of gold and 370,153 ounces of silver for a total value of \$71,471,937. The average recovery value per ton of ore milled was \$10.52. In the operations of the nickel-copper mines there was a recovery of 54,271 ounces of gold; the base-metal mines recovered a further 11,117 ounces of gold. The total production of gold was 1,946,003 ounces valued at \$73,420,747, a decrease of 9.71 percent in quantity and 9.76 percent in value from the 2,155,370 ounces produced in 1964 valued at \$81,365,217.

The gold mines paid \$7,902,287 to 1,343 salaried employees and \$32,879,958 to 7,954 wage-earners; fuel and electricity cost \$4,126,450, and process supplies cost \$17,102,654.

DIVIDENDS AND BONUSES PAID BY GOLD-MINING COMPANIES, BY AREAS

| YEAR | PORCUPINE | KIRKLAND LAKE | NORTHWESTERN ONTARIO | TOTAL |
|-----------|---------------|----------------------------|-------------------------|---------------|
| | | LARDER LAKE AND SUDBURY | | |
| 1912—1960 | \$358,827,376 | \$299,795,263 | \$67,011,440 | \$725,634,079 |
| 1961 | 7,540,668 | 4,950,034 | 3,347,096 | 15,837,798 |
| 1962 | 8,192,173 | 5,451,358 | 3,586,588 | 17,230,119 |
| 1963 | 16,354,446 | 3,543,946 | 3,947,095 | 23,845,487 |
| 1964 | 15,055,602 | 3,836,730 | 4,098,690 | 22,991,022 |
| 1965 | 15,607,781 | 3,842,603 | 3,663,087 | 23,113,471 |
| Total | \$421,578,046 | \$321,419,934 | \$85,653,996 | \$828,651,976 |

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GOLD PRODUCTION

| AREAS AND MINES | RATED DAILY MILL OPERATING CAPACITY | | DAILY OPERATING AVERAGE | | ORE MILLED | | BULLION RECOVERED | | TOTAL VALUE OF BULLION IN CANADIAN DOLLARS | |
|----------------------|-------------------------------------|---------------|-------------------------|----------------|---------------------|----------------|-------------------|---------------------|--|---------|
| | tons | tons | tons | tons | tons | ounces | value | ounces | value | DOLLARS |
| For 1965 | | | | | | | | | | |
| PORCUPINE | | | | | | | | | | |
| Aunor | 750 | 728 | 265,687 | 78,601 | \$ 2,965,538 | 5,505 | \$ 7,707 | \$ 2,973,245 | | |
| Broulan Reef | 750 | 548 | 116,259 | 16,739 | 631,546 | 1,117 | 1,564 | 633,110 | | |
| Dome | 1,985 | 1,986 | 713,000 | 177,984 | 6,715,158 | 41,479 | 58,071 | 6,773,229 | | |
| Hallnor | 400 | 371 | 131,375 | 53,128 | 2,004,466 | 2,856 | 3,998 | 2,008,464 | | |
| Hollinger | 3,900 | 3,334 | 936,876 | 251,110 | 9,474,129 | 58,920 | 82,488 | 9,556,617 | | |
| Hugh-Pam | Milled at Broulan Reef | | 21,909 | 3,071 | 115,866 | | | 115,866 | | |
| McIntyre | 1,500 | 1,499 | 512,545 | 157,323 | 5,935,639 | 74,207 | 103,890 | 6,039,529 | | |
| Pamour | 1,750 | 1,601 | 584,454 | 64,343 | 2,427,597 | 8,323 | 11,652 | 2,439,249 | | |
| Porcupine | 750 | 468 | 170,845 | 37,254 | 1,405,556 | 8,736 | 12,230 | 1,417,786 | | |
| Preston | 800 | 495 | 180,810 | 33,993 | 1,282,522 | 3,989 | 5,585 | 1,288,107 | | |
| Ross | 450 | 417 | 142,140 | 25,984 | 980,350 | 39,622 | 55,471 | 1,035,821 | | |
| Total | 13,035 | 11,447 | 3,775,900 | 899,530 | \$33,938,367 | 244,754 | \$342,656 | \$34,281,023 | | |
| KIRKLAND LAKE | | | | | | | | | | |
| Lake Shore | 1,200 | 239 | 74,565 | 37,579 | 1,417,818 | 12,909 | 18,073 | 1,435,891 | | |
| Macassa | 500 | 375 | 136,791 | 58,240 | 2,197,337 | 9,475 | 13,265 | 2,210,602 | | |
| Teck-Hughes Div. | 650 | 232 | 84,510 | 21,857 | 824,643 | 3,500 | 4,900 | 829,543 | | |
| Upper Beaver | Milled at Upper Canada | | 42,134 | 15,096 | 569,557 | 2,979 | 4,170 | 573,727 | | |
| Upper Canada | 600 | 548 | 153,282 | 48,868 | 1,843,741 | 17,199 | 24,079 | 1,867,820 | | |
| Wright-Hargreaves | Milled at Lake Shore | | 12,666 | 5,627 | 212,301 | 1,903 | 2,664 | 214,965 | | |
| Total | 2,950 | 1,394 | 503,948 | 187,267 | \$ 7,065,397 | 47,965 | \$ 67,151 | \$ 7,132,548 | | |
| LARDER LAKE | | | | | | | | | | |
| Kerr-Addison | 3,000 | 1,791 | 653,757 | 222,896 | 8,409,643 | 13,764 | 19,270 | 8,428,913 | | |
| SUDBURY | | | | | | | | | | |
| Renabie | 550 | 452 | 165,018 | 36,642 | 1,382,466 | 12,734 | 17,827 | 1,400,293 | | |

| | | | | | | | | | |
|------------------------------------|-----------------------|------------------|------------------|---------------------|----------------|------------------|---------------------|--|--|
| PATRICIA PORTION | | | | | | | | | |
| Ancco | Milled at Cochenour | 10,053 | 5,016 | \$ 189,249 | 253 | \$ 354 | \$ 189,603 | | |
| Campbell | 700 | 257,406 | 168,077 | 6,341,377 | 12,237 | 17,132 | 6,358,509 | | |
| Cochenour | 275 | 93,617 | 39,720 | 1,498,596 | 2,135 | 2,989 | 1,501,585 | | |
| Dickenson | 490 | 177,353 | 96,653 | 3,646,621 | 6,942 | 9,719 | 3,656,340 | | |
| Madsen | 850 | 292,681 | 87,291 | 3,293,402 | 14,323 | 20,052 | 3,313,454 | | |
| McKenzie | 300 | 76,388 | 21,367 | 806,156 | 3,097 | 4,336 | 810,492 | | |
| Pickle Crow | 400 | 105,854 | 32,864 | 1,239,926 | 2,440 | 3,416 | 1,243,342 | | |
| Total | 3,015 | 1,013,352 | 450,988 | \$17,015,327 | 41,427 | \$ 57,998 | \$17,073,325 | | |
| THUNDER BAY | | | | | | | | | |
| Consolidated Mosher | Milled at M-Cockshutt | 544,393 | 59,059 | \$ 2,228,237 | 6,326 | \$ 8,856 | \$ 2,237,093 | | |
| Leitch | 120 | 6,696 | 8,380 | 316,169 | 357 | 500 | 316,669 | | |
| MacLeod-Cockshutt | 1,900 | 119,963 | 13,473 | 508,323 | 1,470 | 2,058 | 510,381 | | |
| Total | 2,020 | 671,052 | 80,912 | \$ 3,052,729 | 8,153 | \$ 11,414 | \$ 3,064,143 | | |
| MATACHEWAN | | | | | | | | | |
| Stairs | 75 | 10,722 | 1,511 | \$ 57,008 | 728 | \$ 1,019 | \$ 58,027 | | |
| RAINY RIVER | | | | | | | | | |
| Sapawe | 100 | 1,001 | 289 | \$ 10,904 | 58 | \$ 81 | \$ 10,985 | | |
| SUNDRIES | ..... | ..... | 580 | 21,882 | 570 | 798 | 22,680 | | |
| TOTAL FOR GOLD MINES | 24,745 | 18,294 | 1,880,615 | \$70,953,723 | 370,153 | \$518,214 | \$71,471,937 | | |
| OTHER | | | | | | | | | |
| Nickel-Copper refining | | | 54,271 | \$ 2,047,591 | | | | | |
| Base metal mines | | | 11,117 | 419,433 | | | | | |
| TOTAL GOLD PRODUCTION, 1965 | | | 1,946,003 | \$73,420,747 | | | | | |
| For 1964 | | | | | | | | | |
| Porcupine | ..... | 4,245,227 | 981,195 | \$37,040,161 | 221,876 | \$310,626 | \$37,356,787 | | |
| Kirkland Lake | ..... | 683,857 | 238,966 | 9,032,302 | 65,600 | 91,840 | 9,124,142 | | |
| Larder Lake | ..... | 779,174 | 267,976 | 10,116,094 | 15,924 | 22,294 | 10,138,388 | | |
| Rainy River | ..... | 17,412 | 2,671 | 100,830 | 694 | 971 | 101,801 | | |
| Sudbury | ..... | 171,830 | 32,035 | 1,209,321 | 9,328 | 13,059 | 1,222,380 | | |
| Patricia Portion of Kenora | ..... | 1,020,747 | 447,375 | 16,888,423 | 41,168 | 57,635 | 16,946,058 | | |
| Thunder Bay | ..... | 730,721 | 127,280 | 4,804,820 | 11,258 | 15,761 | 4,820,581 | | |
| Sundries | ..... | ..... | 94 | 3,549 | 8 | 11 | 3,560 | | |
| TOTAL FOR GOLD MINES, 1964 | | 7,648,968 | 2,097,592 | \$79,195,500 | 365,856 | \$512,197 | \$79,707,697 | | |
| Nickel-Copper refining | ..... | ..... | 47,226 | 1,771,379 | | | | | |
| Base metal mines | | | 10,552 | 398,338 | | | | | |
| TOTAL GOLD PRODUCTION, 1964 | | | 2,155,370 | \$81,365,217 | | | | | |

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Annco Mines Limited

Annco Mines Limited was incorporated in July 1963, with an authorized capitalization of 3,000,000 shares of \$1 par value, of which 2,425,488 shares have been issued. The directors and officers were: E. C. Cochenour, president and director; J. R. Mooney, vice-president and director; J. E. J. Fahlgren, general manager and director; J. B. McLellan, G. C. McCartney, and C. E. Mooney, directors; C. V. Maltby, secretary-treasurer. The head office is at Suite 1203, 2200 Yonge Street, Toronto; the mine address is Cochenour.

The property comprises 173 acres lying south of and adjoining the central part of the Cochenour property in Dome and Balmer townships, Red Lake area, District of Kenora. The company was formed to acquire the five-claim property from Wilmar Mines Limited and is controlled by Cochenour Willans Gold Mines Limited.

Operations took place from 1 June to 31 December.

Development work, carried out from the 15th, 16th, 18th, 19th, and 20th levels of Cochenour, consisted of 1,702 feet of drifting, 800 feet of crosscutting, and 2,253 feet of raising. Total development footage to 31 December 1965 was as follows: 4,223 feet of drifts; 1,643 feet of crosscuts; 3,336 feet of raises. Altogether, 174 diamond-drillholes, totalling 26,580 feet, were completed from underground.

In the Cochenour mill, 10,053 tons of ore were hoisted and milled at an average of 47 tons per working day.

(See page 20 for "The Annco Exploration".)

Employment and Management

J. E. Fahlgren was the general manager, and the operation was carried on by the Cochenour Willans organization.

Aunor Gold Mines Limited

Aunor Gold Mines Limited was incorporated in May 1939, with an authorized capitalization of 2,000,000 shares of \$1 par value; all shares have been issued. The directors and officers were: R. V. Porritt, president and director; W. S. Row, vice-president and director; D. E. G. Schmitt, general manager and director; N. C. Urquhart, and K. C. Gray, directors; R. C. Ashenurst, secretary; and E. K. Cork, treasurer. The head office is at 1700 Bank of Nova Scotia Building, 44 King Street West, Toronto 1. The mine address is Box 2001, Timmins.

The company's property consists of 11 claims in Deloro township, Porcupine area, District of Cochrane.

Mining and milling continued throughout 1965.

SHAFTS, AUNOR MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|-------|------------------|-------------|------------------------|-----------------|------------------------------|
| A1 | HS850 | Vertical | 3 | feet surface | feet 3,082 |
| A2 | TRS828 HR1246 | 62° | 2 | 2,110 | 2,907 |
| D2 | TRS825 | Vertical | 3 | surface | 3,030 |
| D3 | TRS825 | Vertical | 4 | 2,888 | 5,395 |

Development work in 1965 consisted of 134 feet of drifting, and 42 feet of raising. Total development footage to 31 December 1965 was as follows: 76,902 feet of drifts; 13,470 feet of crosscuts; 33,030 feet of raises. Diamond-drilling in 1965 consisted of 11 holes totalling 2,255 feet from underground, and one hole totalling 351 feet from surface.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

Ore broken in stopes amounted to 260,200 tons and ore drawn off was 259,200 tons. The broken ore remaining in stopes was 6,100 tons at year end.

Sand backfill placed in stopes amounted to 130,800 tons.

Development

In order to test the feasibility of hydraulic placement of backfill in stopes, and the effects on the schistose footwall rock, a system of some 2,500 feet of diamond-drillholes were drilled and reamed to 2 $\frac{3}{8}$ -inch diameter to convey classified mill tailings to several stopping areas. The tests appear satisfactory and it is expected hydraulic backfilling will be adopted.

Ore Reserves

At 1 January 1966, ore reserves were estimated at 798,000 tons averaging 0.31 ounces of gold per ton, compared to 1,064,000 averaging 0.34 ounces of gold per ton at the beginning of 1965. Mining above the 2,900-foot level did not expose any ore extensions. The ore reserve figures do not allow for dilution or ore below the 2,900-foot level and the grade of reserves was recalculated on the basis of recent experience.

Mill

The following tabulation provides production and performance figures for the year as compared with 1964 and the period since production commenced in January 1940.

| | | 1965 | 1964 | TOTAL TO DATE |
|---------------------------|------------|-----------|-----------|------------------|
| Milled | ton | 265,700 | 271,800 | 5,121,500 |
| Milled per calendar day | ton | 728 | 743 | 539 |
| Average gold content | oz per ton | 0.309 | 0.322 | 0.347 |
| Average tailings loss | oz per ton | 0.013 | 0.015 | 0.012 |
| Total recovery | percent | 95.7 | 95.3 | 96.6 |
| Total production | oz | 78,600 | 83,340 | 1,718,300 |
| Value of total production | \$ | 2,973,600 | 3,153,700 | 62,156,300 |
| Recovery per ton | \$ | 11.19 | 11.60 | 12.14 |

The lower milled tonnage was due to the mining department being unable to supply the required ore because of high labour turnover and inexperienced replacements.

A short power transmission line was erected from the Aunor plant to the acquired Delnite facility to integrate the electric power supply.

Employment and Management

The average number of employees was 412: 285 underground and 127 on surface. J. M. Gordon was appointed manager when R. E. Findlay retired.

Broulan Reef Mines Limited

Broulan Reef Mines Limited was incorporated in June 1951, with an authorized capitalization of 6,000,000 shares of \$1 par value, of which 5,961,142 shares have been issued. The directors and officers were: H. F. Brownbill, president and director; W. H. Maedel, vice-president, secretary-treasurer and director; F. G. Lawson, vice-president and director; L. B. Harder and D. G. Lawson, directors;

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W. F. Atkins, vice-president and manager of mining operations. The head office is at 7th Floor, 105 Adelaide Street West, Toronto 1; the mine address is Pamour.

The company owns the Broulan Reef mine and the old Bonetal and Bonwhit mines, consisting of eighty-one claims, in Whitney, Murphy and Tisdale townships, Porcupine area, District of Cochrane. It also operates the property of Hugh-Pam Porcupine Mines Limited in the same group, and further reported on in this report under that heading. No work has been done for a number of years in the Broulan, or Banner sections of the property.

Work in the Reef section and the Hugh-Pam property continued from 1 January to 7 September; the mill operated from 1 January to 9 September 1965.

SHAFTS, BROULAN REEF MINE

| NAME OR NO. | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|-------------|-----------|-------------|------------------------|--------------|------------------------------|
| 1 | 13091 | Vertical | 3 | feet | feet |
| A | 13091 | Vertical | .. | surface | 2,556 |
| 1A | 13092 | Vertical | 2 | 2,500 | 35 |
| | | | | | 2,673 |

The following table gives the development footage in 1965, and the accumulated footage to the time of closure, 7 September 1965.

| LEVEL | DRIFTS | | CROSSCUTS | | RAISES | |
|-------|--------|--------|-----------|--------|--------|--------|
| | 1965 | TOTAL | 1965 | TOTAL | 1965 | TOTAL |
| | feet | feet | feet | feet | feet | feet |
| 200 | | 1,216 | .... | 1,223 | .... | 657 |
| 275 | | | 26 | 581 | .... | ..... |
| 350 | 79 | 3,063 | 77 | 907 | 95 | 3,378 |
| 400 | | | | | 196 | 1,372 |
| 500 | 105 | 3,599 | 43 | 1,601 | 114 | 2,169 |
| 650 | | 2,760 | .... | 949 | 208 | 2,268 |
| 800 | | 2,640 | 25 | 709 | 261 | 2,244 |
| 970 | | 4,112 | .... | 789 | 182 | 2,669 |
| 1120 | | 1,776 | .... | 496 | .... | 1,352 |
| 1270 | | 1,787 | .... | 441 | .... | 1,226 |
| 1420 | | 1,758 | .... | 590 | .... | 883 |
| 1570 | | 1,495 | .... | 510 | .... | 1,133 |
| 1720 | | 1,745 | .... | 727 | .... | 810 |
| 1870 | | 5,103 | .... | 1,631 | .... | 824 |
| 2050 | | 1,501 | .... | 677 | .... | 398 |
| 2200 | | 31 | .... | 534 | .... | 184 |
| 2350 | | 1,824 | .... | 577 | .... | 1,649 |
| 2500 | | 6,485 | .... | 2,245 | .... | 1,397 |
| 2540 | | 117 | .... | ..... | .... | ..... |
| 2650 | | 576 | .... | 74 | .... | ..... |
| Total | 184 | 41,588 | 171 | 15,261 | 1,056 | 24,613 |

Diamond-drilling during the year consisted of 54 holes totalling 3,914 feet from underground.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

At last year's annual meeting it was pointed out that under present circumstances the company is unable to predict the operating life of the mine and a further decline in grade of the mill feed would bring about an abrupt termination. In August the grade of ore available to the mill

fell sharply, forcing an immediate decision to put mining operations on a salvage basis. The last of the ore was hoisted in September 1965, following which the underground equipment and salvable materials were brought to surface and the shaft was capped. At the same time the clean-up of gold from the milling plant was proceeded with and this work was completed during November. By the end of the year, \$229,000 had been realized from sales of equipment, materials and supplies and further substantial sales are continuing.

In January 1966, an agreement was entered into with Texas Gulf Sulphur Company whereby Broulan would process in its mill, lead-zinc ores from Texas Gulf's Kidd Creek Mine. The term of the agreement, subject to termination by either party before that date, is until 31 March 1965, and may be extended.

The necessary modifications to the original cyanide milling plant, including an addition to the main building and the installation of a flotation circuit, were completed and processing of the Texas Gulf ores commenced in April. It is expected that the milling plant will be fully capable of handling at least 10,000 tons of lead-zinc ores per month as contemplated.

Employment and Management

The average number of employees for Broulan Reef Mines Limited and Hugh-Pam Porcupine Mines Limited was 121: 52 underground and 69 on surface. W. F. Atkins, vice-president, was manager of mining operations, while C. A. McLeish was mine manager.

Campbell Red Lake Mines Limited

Campbell Red Lake Mines Limited was incorporated in August 1944, with an authorized capitalization of 4,000,000 shares of \$1 par value of which 3,999,500 shares have been issued. The company is controlled by Dome Mines Limited. The directors and officers were: C. W. Michel, chairman of the board; J. B. Redpath, president and director; B. R. MacKenzie, secretary and director; W. F. James and J. K. McCausland, directors; and E. J. Andrecheck, treasurer. The head office is at Suite 702, 360 Bay Street, Toronto 1. The mine address is Balmertown.

The company owns 27 claims, about 1,175 acres, in Balmer township, Red Lake area, District of Kenora.

Mining and milling continued throughout 1965.

The vertical four-compartment No. 1 shaft, on claim KRL20071, is 3,281 feet in depth below the collar.

Development work in 1965 involved 8,992 feet of drifting, 370 feet of cross-cutting, and 3,589 feet of raising. Total development to 31 December 1965 consisted of 153,387 feet of drifts, 27,070 feet of crosscuts, and 46,700 feet of raises. Diamond-drilling in 1965 consisted of 339 holes totalling 50,278 feet from underground.

New construction in 1965 consisted of additions to the electric shop, 24×24 feet, and the roaster switch room, 12×20 feet, both steel frame, asbestos hard-board siding and roofing.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Mining

Broken ore totalling 207,200 tons remains in the stopes, a decrease of 38,300 tons from the previous year. As the use of the cut-and-fill method of mining increases there is a corresponding decrease in the amount of broken ore remaining in the stopes.

The main stoping operations were above the 11th level or 1,600-foot horizon. At the end of the year 15 percent of mining was by cut-and-fill stoping with preparations for a steadily increasing use of this method of mining.

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Ore Production

The mine produced 257,406 tons of ore during the year which averaged 13.96 dwt. The stopes produced 211,467 tons averaging 13.72 dwt. and development work produced 45,939 tons averaging 15.03 dwt.

Ore Reserves

The ore reserves are estimated at 1,176,300 tons, an increase of 3,200 tons over last year. The ore reserves include 207,200 tons of broken ore.

A summary of the distribution of ore in place, broken ore and total ore extracted from stopes to the end of 1965 is as follows:

SUMMARY OF ORE RESERVES AND EXTRACTION BY LEVELS

| LEVEL | TONS ORE IN PLACE | AVERAGE GRADE (DWT. PER TON) | TONS BROKEN ORE | TOTAL TONS ORE EXTRACTED FROM STOPES TO END OF 1965 |
|----------------|-------------------------|---------------------------------|--------------------|--|
| Surface to 1st | 8,100 | 12.08 | ..... | 245,845 |
| 1st to 2nd | 16,800 | 12.00 | ..... | 310,832 |
| 2nd to 3rd | 29,100 | 11.00 | 11,300 | 304,041 |
| 3rd to 4th | 28,700 | 9.82 | 9,200 | 409,948 |
| 4th to 5th | 37,600 | 11.90 | 34,900 | 394,469 |
| 5th to 6th | 68,800 | 15.13 | 29,800 | 387,660 |
| 6th to 7th | 137,400 | 13.40 | 39,000 | 325,740 |
| 7th to 8th | 72,800 | 12.01 | 14,300 | 271,823 |
| 8th to 9th | 69,700 | 14.21 | 31,500 | 182,330 |
| 9th to 10th | 74,100 | 15.74 | 27,000 | 117,824 |
| 10th to 11th | 66,800 | 12.56 | ..... | 23,218 |
| 11th to 12th | 78,300 | 12.02 | ..... | 19,551 |
| 12th to 13th | 98,900 | 14.73 | 10,200 | 16,684 |
| 13th to 14th | 149,200 | 15.25 | ..... | 30,408 |
| 14th to 15th | 32,800 | 10.78 | ..... | ..... |
| Total | 969,100 | 13.55 | 207,200 | 3,040,373 |

Milling

| | | |
|------------------------------|--------------|---------|
| Ore treated | ton | 257,406 |
| Average per calendar day | ton | 705 |
| Average grade of ore treated | dwt. per ton | 13.96 |
| Recovery | dwt. per ton | 12.99 |
| Recovery | percent | 93.05 |

Costs

The expenditure on mining was \$900,980 or \$3.50 per ton milled. The expenditure on development was \$630,953 or \$2.45 per ton milled. Operating costs (including Mint handling charges) were \$9.77 per ton milled.

Employment and Management

The average number of employees was 276: 145 underground and 131 on surface. Joseph Chisholm was general manager.

Cochenour Willans Gold Mines Limited

Cochenour Willans Gold Mines Limited was incorporated in April 1936; in 1965 the authorized capitalization was increased to 4,000,000 shares of \$1 par value, of which 3,574,655 shares have been issued. The directors and officers were: E. C. Cochenour, chairman of the board and director; J. E. J. Fahlgren, president, general manager and director; S. J. Zacks, vice-president and director; F. J. Mills, secretary-treasurer and director; M. C. Mosher, and R. E. Shibley, directors; C. V. Maltby, assistant secretary. The head office is at Suite 1203, 2200 Yonge Street, Toronto 12; the mine address is Cochenour.

The property consists of 49 claims in Dome township, Red Lake area, District of Kenora.

Mining and milling continued throughout 1965.

SHAFTS, COCHENOUR WILLANS MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | SINKING 1965 | VERTICAL DEPTH BELOW SURFACE |
|-------|-----------|-------------|------------------------|--------------|------------------------------|
| No. 1 | KRL322 | Vertical | 3 | 522 feet | 2,768 feet |
| No. 2 | KRL462 | Vertical | 3 | .... | 446 |

The vertical three-compartment No. 1 shaft, on claim KRL322, was sunk 522 feet in 1965, to a vertical depth of 2,768 feet below surface. The 23rd, 24th, and 26th levels were established at 2,348 feet, 2,476 feet, and 2,614 feet respectively, below the collar.

Development work in 1965 consisted of 4,179 feet of drifting, 2,670 feet of crosscutting, and 4,751 feet of raising. Development footage on the Cochenour property to 31 December 1965 consisted of 109,807 feet of drifts, 69,577 feet of crosscuts, and 73,781 feet of raises. Diamond-drilling consisted of 530 holes, totalling 57,463 feet from underground; and 12 holes totalling 7,531 feet from surface.

New construction in 1965 consisted of a mill addition, 48×138.6 feet.

Major equipment added was in connection with the mill expansion and consisted chiefly of flotation cells, thickeners, agitators, repulpers, pumps, transformers, and motors.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production and Costs

During the year 180,483 tons were hoisted, of which 93,617 tons were ore from Cochenour and 10,053 tons were ore from Ancco. The balance of 76,813 tons were waste rock excavated in the course of mining, development and shaft sinking on Cochenour proper, Ancco and Wilmar.

While the Cochenour development cost was down due to a reduced development advance, operating costs were basically affected by a further increase in Federal Sales Tax, and hourly wage rates were increased by 5 cents per hour to all hourly rated employees effective 16 April 1965. Some skilled trade rates were also adjusted. Other items were higher costs for many mining and milling supplies.

| | 1965 | | | 1964 | |
|----------------------------|-------------|----------------|-----------|----------------|-----------|
| | TOTAL | PER TON MILLED | PER OUNCE | PER TON MILLED | PER OUNCE |
| Development | \$ 333,834 | \$ 3.566 | \$ 8.567 | \$ 4.031 | \$ 7.212 |
| Mining | 597,651 | 6.384 | 15.337 | 6.357 | 11.374 |
| Milling | 280,748 | 2.999 | 7.205 | 3.085 | 5.522 |
| General and administrative | 256,648 | 2.741 | 6.586 | 2.447 | 4.378 |
| Marketing | 10,831 | .116 | .278 | .151 | .271 |
| Total Operating Costs | 1,479,712 | 15.806 | 37.973 | 16.071 | 28.757 |
| Deduct Est. E.G.M.A. | 400,383 | 4.277 | 10.275 | 1.827 | 3.269 |
| Net Operating Costs | \$1,079,329 | \$11.529 | \$27.698 | \$14.244 | \$25.488 |

Mining

The mill feed was supplied from the mining of 83 stopes which produced 84,401 tons of ore averaging 0.47 ounces of gold per ton and from 75 development headings which produced 9,216 tons of ore averaging 0.34 ounces of gold per ton.

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It will be noted that average production per stope on the Cochenour is roughly 1,000 tons, which continues to illustrate the limited size of individual mining blocks due to severe faulting movement. These factors continue to preclude any accurate estimation of ore reserves.

There was also mill feed supplied by the Annco from the mining in 14 stopes which produced 7,864 tons of ore averaging 0.61 ounces of gold per ton and from 12 development headings which produced 2,189 tons of ore averaging 0.43 ounces of gold per ton.

Milling and Metallurgy

There was no major change in the milling practice during the past year. Provisions for future change were undertaken.

Last year the reported results of laboratory test work which indicated better extraction could be attained if all ore milled was treated by cyanidation following flotation. On the basis of these findings and commencing in August 1965, construction to extend the mill was commenced and has continued throughout the year. This enlarged mill, coupled with basic changes in the grinding circuit, will accommodate an increase in tonnage to 400 tons and provide treatment of all of the ore milled by cyanidation. Essentially all construction and equipment installations are completed. The new mill unit will be ready for increased tonnage in May 1966. Backfill tank and equipment to provide classified mill tailings for mining operations was also completed.

Throughout the year, ore alteration has continued with the sulphide ore becoming more a source of values. This type of ore is, of its nature refractory, and is less amenable to extraction. This fact coupled with a lower grade of ore has reduced the percentage recovery.

Results of milling operations are set out below with comparative figures of the preceding year.

| | | 1965 | 1964 |
|-----------------------------|---------|---------|---------|
| Milled | ton | 103,670 | 101,910 |
| Operating time | percent | 98.69 | 98.32 |
| Average milled daily | ton | 284 | 278.4 |
| Average gold assay of heads | oz. | 0.472 | 0.600 |
| Average gold assay of tails | oz. | 0.047 | 0.041 |
| Extraction | percent | 90.19 | 93.16 |

The Annco Exploration

The underground exploration and development of this property commenced in 1963 and a zone of gold bearing ore structures has been established from the 1,550-foot horizon to the 2,050-foot horizon.

Essentially all the ore blocks above the 2,050-foot horizon have been developed for mining. The original tonnage estimated to be 150,000 tons of ore above the 2,050-foot horizon is now considered proven. An additional 50,000 tons of ore is considered probable above the 2,050 horizon.

On 1 June 1965 the Annco mine commenced shipping ore to the Cochenour mill on a limited break-in basis. From 1 June to 31 December 1965, development and experimental mining muck taken for ore to be milled averaged 0.57 ounces gold per ton for 10,053 tons.

Ground conditions in the highly talcose ore zones caused considerable dilution and therefore shrinkage mining methods were deemed unsuitable. To assure safe mining practice, grade control and overall cost control, the need for change to a cut-and-fill method of mining using classified mill tailings became apparent. The decision having been made it was necessary to revise previously projected production tonnages until facilities to provide hydraulic backfill could be installed and ground conditions were stabilized. The fill system will be operating in May 1966.

With the introduction of cut-and-fill mining, which provides for better grade control, the grade of Annco ore is expected to mine out between 0.60 to 0.70 ounces gold per ton.

Recent exploration below the 2,050-foot horizon has been successful in locating an estimated 50,000 tons of probable ore down to the 2,200-foot horizon, 35,000 tons of which is within one stoping block. Additional depth extensions are considered likely, but at the present time there is not sufficient information to predict major extensions. It is still unknown whether the peridotite dyke located to the south of the southwest dipping ore zones will adversely affect major depth extensions. Exploration on lower horizons will be conducted from crosscuts to be advanced from the Cochenour No. 1 shaft.

In 1965 an exploration crosscut was driven through the peridotite dyke on the 2,050-foot horizon. Exploration drilling from this crosscut has, so far, failed to locate any ore zones. This depth drilling program will continue.

Employment and Management

The average number of employees at the Cochenour, Wilmar, Marcus and Annco operations was 231: 115 underground and 116 on surface. J. D. Jeffries was the mine manager.

Russell C. Cone

Russell C. Cone and one assistant mined approximately 20 tons of gold ore from a vein on claim FF5152 near Mine Centre in the District of Rainy River. The ore was milled in a two-stamp mill.

Consolidated Marcus Gold Mines Limited

Consolidated Marcus Gold Mines Limited was incorporated in September 1954, with an authorized capitalization of 4,000,000 shares of \$1 par value, of which 3,000,000 shares have been issued. The directors and officers were: E. C. Cochenour, president and director; R. M. Elliot, F. J. Mills, and J. M. Philp, directors; C. V. Maltby, secretary-treasurer. The head office is at Suite 1203, 2200 Yonge Street, Toronto; the mine address is Cochenour.

The property comprises 857 acres in Dome township, Red Lake area, District of Kenora; it is controlled by Cochenour Willans Gold Mines Limited.

No development work was carried out in 1965; total development footage completed to 31 December 1965 was as follows: 9,542 feet of crosscuts, and 40 feet of raises, all from the Cochenour 1,300-foot horizon. Exploration by underground diamond-drilling continued throughout the year from the long Consolidated Marcus drive to the east on the Cochenour Willans 1,300-foot level. The drive starts at the Cochenour No. 1 shaft and runs eastward across the Marcus property, then northeast paralleling the Consolidated Marcus and Campbell Red Lake boundary for a total distance of 14,523 feet. Altogether, 6 diamond-drillholes, totalling 9,496 feet, were completed in 1965 from underground.

Employment and Management

J. E. J. Fahlgren was general manager, and the operation was carried on by the Cochenour Willans organization.

Consolidated Mosher Mines Limited

New Mosher Longlac Mines Limited was incorporated in June 1950, to succeed Mosher Long Lac Gold Mines Limited. In February 1954 the name was changed to Consolidated Mosher Mines Limited. At the same time the authorized capitalization was changed from 5,000,000 shares of \$1 par value to 5,000,000 shares of \$2 par value; 3,264,810 shares have been issued. The directors and officers were: J. G. Boeckh, president and director; P. K. Hanley, vice-president and director; J. C. L. Allen, executive vice-president and director; Miss B. A. Argo, secretary and director; R. C. Stanley Jr., director. The head office is at Suite 400, 112 King Street West, Toronto 1. The mine address is Geraldton.

The main property comprises 20 claims west of the MacLeod-Cockshutt mine in Errington township, District of Thunder Bay.

SHAFTS, CONSOLIDATED MOSHER MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH FROM SURFACE |
|-------|-----------|-------------|------------------------|--------------|-----------------------------|
| | | | | feet | feet |
| No. 1 | TB10046 | Vertical | 3 | Surface | 2,530 |
| No. 2 | TB10065 | Vertical | 4 | Surface | 52 |
| No. 3 | | Vertical | 3 | 2,022 | 3,173 |

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Development work in 1965 consisted of 3,637 feet of drifting, 1,107 feet of crosscutting, and 939 feet of raising. Total development footage to 31 December 1965 consisted of 16,826 feet of drifts, 9,822 feet of crosscuts, and 6,768 feet of raises. Diamond-drilling in 1965 consisted of 166 holes totalling 20,733 feet from underground.

Major equipment added included the following:

- 2 cage crossheads
- 1 cage combination
- 2 pumps and motors.

A water line to Mosher Lake was completed.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

During 1965 the mine produced 544,393 tons of ore which was milled at MacLeod-Cockshutt Gold Mines Limited yielding 58,914 ounces of gold and 6,281 ounces of silver, an average of 0.108 ounces of gold recovered per ton. Revenue from this production amounted to \$2,232,615 or \$4.10 per ton. Additional income from E.G.M.A. is estimated to be \$636,000, increasing total revenue to \$2,868,615 or \$5.27 per ton.

Underground development and detailed diamond-drilling were continued on the 14th, 15th, and 16th levels at 2,190, 2,337, and 2,484 feet below surface. A change in the shape of the main porphyry mass has been accompanied by a more irregular outline of the "F" zone on these levels. Other small ore lenses are being found south of the porphyry nose. Development of the "B" zone, which is one of the new lenses on the 16th level produced 4,661 tons averaging 0.235 ounces per ton. These zones will be checked by diamond-drilling on the 17th level when the main west drive has reached the proper location.

Ore reserves at the year end were estimated to be 1,083,000 tons averaging 0.130 ounces per ton with an additional 630,000 tons of probable ore.

Part of next year's production will come from the new levels of No. 3 shaft. The ore pass system has been completed, and the shaft has been equipped with loading pockets and cage-skip combinations. A 36×48 inch jaw crusher has been purchased and will be installed below the 19th level.

Employment and Management

H. E. Rudd was the vice-president and general manager, and the operation was carried on by the MacLeod-Cockshutt organization.

Dickenson Mines Limited

Dickenson Red Lake Mines Limited was incorporated in November 1944; in June 1947 the capitalization was increased; in June 1949 the company was reorganized, and the name changed to New Dickenson Mines Limited. In October 1960 the name was changed to Dickenson Mines Limited on amalgamation of New Dickenson Mines Limited and Lake Cinch Mines Limited. The authorized capitalization was 3,750,000 shares of \$1 par value of which 3,514,340 shares have been issued. The directors and officers were: A. W. White, president and director; C. R. Diebold, vice-president and director; F. A. Fell, general manager and director; R. A. Jodrey, S. C. Smith, M. L. Urquhart and R. F. Rock, directors; H. R. Heard, secretary-treasurer; J. Geddes, assistant secretary; and L. V. Barbisan, assistant-treasurer. The head office is at Suite 416, 25 Adelaide Street West, Toronto 1. The mine address is Balmertown.

The property comprises 31 claims in Balmer township, Red Lake area, District of Kenora.

Mining and milling continued throughout 1965.

SHAFTS, DICKENSON MINE

| CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | SINKING 1965 | TOTAL DEPTH BELOW SURFACE |
|-------------|-------------|------------------------|------------------|--------------|---------------------------|
| | | | feet | feet | feet |
| Detta shaft | KRL19502 | Vertical | 3 (inactive) | .... | 280 |
| No. 1 shaft | KRL19497 | Vertical | (3 to 8th level) | .. | |
| | | | (4 to bottom) | .... | 3,589 |
| No. 2 shaft | KRL19503 | Vertical | 4 | 3,365 | 3,383 |

The vertical four-compartment No. 2 internal shaft was collared at a depth of 3,365 feet and sunk 18 feet to a total depth of 3,383 feet below surface.

A total of 5,300 feet of drifting, 2,035 feet of crosscutting and 1,726 feet of raising was completed. Total development footage to 31 December 1965 consisted of 81,903 feet of drifts, 62,791 feet of crosscuts, and 47,900 feet of raises. Diamond-drilling in 1965 consisted of 271 holes totalling 42,780 feet from underground, and one hole totalling 415 feet from surface.

New construction in 1965 consisted of a compressor house, 32×60 feet, steel frame, galvanized sheeting.

Major equipment added was as follows:

Surface:

- 1 transformer, 1500kva, 44,000/4160V
- 1 46kv sub station and tower
- 1 borehole surveying instrument
- 1 theodolite
- 1 welder.

Underground:

- 1 double-drum, 100×60 in. hoist with motor, 700 hp, 600rpm, 2200V, three-phase 60-cycle with all controls
- 2 transformers, 750kva, 4160/2400V
- 1 transformer, 500kva, 4160/600V
- 3 head sheaves, 100in., bicycle type
- 1 fan, 25,000cfm
- 6 tugger hoists
- 3 double-drum slushers
- 1 18-man transit car
- 3 chargers, 550V
- 5 rock drills.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

A total of 177,353 tons of ore was milled yielding 92,095.721 fine ounces of gold and 6,880.47 fine ounces of silver. The total value of this bullion was \$3,484,000 or a recovery of \$19.65 per ton milled. In addition, benefit received under the Emergency Gold Mining Assistance Act is estimated to be \$231,390 or \$2.512 per ounce of gold.

The Company qualified for Emergency Gold Mining Assistance for the year and gold produced was sold to the Royal Canadian Mint. The average value received from the Mint was \$37.73 per ounce for gold, and \$1.39 per ounce for silver.

To date the mine has produced 1,177,248.043 ounces of gold and 100,504.10 ounces of silver with a total value of \$41,900,504 for an average value received from the Mint and the Bank of Nova Scotia of \$35.51 per ounce of gold and \$1.01 per ounce of silver; total tons milled amount to 2,393,612 for a recovery of 0.49 ounces of gold per ton.

Annual Report for 1965

Operating Costs

| | 1965 | | | 1964 |
|-----------------------------|--------------------|-------------------|----------------|----------------|
| | TOTAL | PER TON MILLED | PER OUNCE | PER OUNCE |
| Shaft sinking (No. 2 shaft) | \$ 190,760 | \$ 1.08 | \$ 2.07 | \$ 0.74 |
| Exploration and development | 363,385 | 2.05 | 3.94 | 4.83 |
| Mining | 1,042,827 | 5.88 | 11.32 | 11.56 |
| Milling | 475,954 | 2.68 | 5.17 | 5.31 |
| Mine general expense | 371,223 | 2.09 | 4.03 | 3.86 |
| Head office expense | 175,622 | 0.99 | 1.91 | 1.74 |
| Marketing charges | 25,176 | 0.14 | 0.27 | 0.27 |
| | \$2,644,947 | \$14.91 | \$28.71 | \$28.31 |

Mining

Broken ore totalling 88,474 tons remained in the stopes, a decrease of 14,621 tons from the previous year. Also 1,942 tons remained in ore bins and ore passes at year end.

Of the 177,648 tons of ore hoisted 18,636 tons grading 0.582 ounces per ton were obtained from development and 159,012 tons grading 0.559 ounces per ton were obtained from stoping and stope preparation.

Stoping operations were carried on in the North "C", South "C", East South "C", "D", "E", "F", and "H" zones on the upper nineteen levels. Of the total ore hoisted, the percentages from the zones were, North "C" 6.6, South "C" 12.3, East South "C" 48.0, "D" 2.8, "F" 17.1, "H" 8.2, miscellaneous ("E", "I", "J", and Robin) 5.0.

At year end fifteen stopes were operating as cut and fill stopes and four were shrinkage. Most new stopes are being prepared for cut and fill. Tons broken per rock drill shift in stopes and back stopes were 43.6 compared to 41.1 in 1964. The average stope width was 7.2 feet compared to 6.1 feet the previous year.

Ore Reserves

At 31 December 1965, positive ore reserves, broken and in place, were calculated to be 586,777 tons having an average grade of 0.546 ounces of gold per ton. This compares with 589,230 tons grading 0.538 ounces per ton at 31 December 1964.

Milling

Summary of mill operations with the previous year given as comparison.

| | | 1965 | 1964 |
|--------------------|------------|---------|---------|
| Treated | tons | 177,353 | 177,874 |
| Operating time | percent | 99.48 | 98.92 |
| Treated per day | tons | 485.9 | 486.0 |
| Average mill heads | oz per ton | 0.562 | 0.560 |
| Mill tails | oz per ton | 0.043 | 0.047 |
| Recovery | oz per ton | 0.519 | 0.513 |
| Recovery | percent | 92.4 | 91.7 |

Robin Red Lake Mines Limited

The property owned by Robin Red Lake Mines Limited adjoining Dickenson mine to the east is being developed by the Dickenson mine organization from the 17, 19 and 23 levels of the Dickenson mine. In 1965 development work consisted of 628 feet of drifting and 170 feet of crosscutting. The total development footage to 31 December 1965 was 3,114 feet of drifts, and 874 feet of crosscuts. Diamond-drilling in 1965 consisted of 30 holes, totalling 9,440 feet from underground.

Employment and Management

The average number of employees was 290: 156 underground and 134 on surface. J. Gillis was the mine manager.

Dome Mines Limited

Dome Mines Limited was incorporated in July 1923, to succeed Dome Mines Company Limited. The authorized capitalization was 2,000,000 shares of no par value, of which 1,946,668 shares have been issued. The directors and

officers were: C. W. Michel, chairman, treasurer and director; J. B. Redpath, president and director; B. R. MacKenzie, secretary and director; W. R. Biggs, F. W. Pershing, A. L. Lambert, H. C. Brunie, A. B. Mathews and W. F. James, directors; C. P. Girdwood, vice-president and general manager. The head office and mine office address is South Porcupine. The secretary's office is at 36 Toronto Street, Toronto.

The company owns 62 claims and parts of the beds of Porcupine Lake and Simpson Lake, in the townships of Tisdale, Whitney, Bond, and Shaw, in the Porcupine area, District of Cochrane.

Mining and milling continued throughout 1965.

SHAFTS, DOME MINES

| NAME OR NO. | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR | SINKING | VERTICAL |
|---------------------|---------------------------|-------------|------------------------|---------|---------|---------------------|
| | | | | DEPTH | 1965 | DEPTH BELOW SURFACE |
| | | | | feet | feet | feet |
| No. 1 | 12866 | Vertical | 3 (inactive) | Surface | .... | 105 |
| No. 1 | 12864 | Vertical | 3 (inactive) | Surface | .... | 805 |
| No. 3 | 12864 | Vertical | 4 to 10th level | | | |
| | | | 6 to bottom | Surface | .... | 2,456 |
| No. 4 | ..... | Vertical | inactive | 1,587 | .... | 2,053 |
| No. 5 | ..... | Vertical | 3 | 2,026 | .... | 3,137 |
| No. 6 | ..... | Vertical | 5 | 2,000 | .... | 4,062 |
| No. 7 | ..... | Vertical | 3 | 3,950 | 148 | 5,068 |
| No. 1 Dome Ext. | 13191 | Vertical | inactive | Surface | .... | 222 |
| No. 1 Foley-O'Brien | 13403 | Vertical | inactive | Surface | .... | 70 |
| No. 2 Foley-O'Brien | 13403 | Vertical | inactive | Surface | .... | 160 |
| No. 3 Foley-O'Brien | Lot 2, Con. 2, Tisdale | Vertical | inactive | Surface | .... | 240 |
| Foley-O'Brien winze | ..... | 70° | inactive | 160 | .... | 250 |
| No. 1 Temiskaming | Lot 3, Con. 2, Tisdale | Vertical | inactive | Surface | .... | 260 |
| No. 2 Temiskaming | Lot 3, Con. 2, Tisdale | Vertical | inactive | Surface | .... | 60 |

In 1965, the no. 7 winze was sunk 148 feet to a vertical depth of 5,068 feet below surface. The 36th level was established at 1,060 feet below the collar.

Development work in 1965 consisted of 15,364 feet of drifting, 5,066 feet of crosscutting, and 3,798 feet of raising. Total development footage to 31 December 1965 was 454,187 feet of drifts; 203,018 feet of crosscuts; and 246,304 feet of raises. Diamond-drilling in 1965 consisted of 659 holes totalling 117,077 feet from underground and one hole totalling 239 feet from surface.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Costs

The expenditure on development was \$1,374,201 or \$1.93 per ton as compared with \$1,289,201 or \$1.80 per ton milled in 1964.

The above figures for development in 1965 include \$43,769 or \$0.06 per ton for shaft sinking while no expenditures for sinking were incurred in 1964.

The expenditure on mining was \$3,769,863 or \$5.28 per ton as compared with \$3,561,752 or \$4.99 per ton milled in 1964.

The total operating charges for the year were \$6,480,298 or \$9.09 per ton as compared with \$6,157,702 or \$8.62 per ton milled in 1964.

The operating cost per ounce of gold produced was \$36.29 as compared with \$34.67 in 1964.

Annual Report for 1965

Mining

The 713,000 tons of ore milled during the year were produced as follows:

| | TONS | AVERAGE GRADE DWT. PER TON |
|------------------|---------|-------------------------------|
| From stopes | 596,300 | 5.56 |
| From development | 116,700 | 3.04 |
| Total | 713,000 | 5.15 |

Ore Reserves

Ore reserves at the close of the year were estimated at 2,285,000 tons with an average grade of 5.34 dwt. as compared with 2,350,000 tons with an average grade of 5.33 dwt. for 1964.

| | TONS 1965 | TONS 1964 |
|--------------|--------------|--------------|
| Unbroken ore | 2,065,000 | 2,124,000 |
| Broken ore | 220,000 | 226,000 |
| | 2,285,000 | 2,350,000 |

Ankerite ore comprises 43 percent of the reserves. This ore is more refractory to the milling process than the normal ore in the mine.

Mill

Following are the milling results:

| | | |
|------------------------------|--------------|---------|
| Ore treated | ton | 713,000 |
| Average per day worked | ton | 1,986 |
| Average grade of ore treated | dwt. per ton | 5.15 |
| Recovery | dwt. per ton | 5.01 |
| Recovery | percent | 97.30 |

Employment and Management

The average number of employees was 907: 623 underground and 284 on surface. C. P. Girdwood was the general manager.

Golsil Mines Limited

Golsil Mines Limited was incorporated in June 1959, with an authorized capitalization of 5,000,000 shares of no par value, of which 2,201,909 shares have been issued to April 1965. The officers and directors were: W. C. Arrowsmith, president and director; A. J. Lewis, vice-president, secretary-treasurer and director; J. Murphy, J. Gilbert, and L. Pancer, directors. The head office is at 1212, 55 York Street, Toronto 1, the mine address is care of Ontario Central Airlines, Red Lake, Ontario.

This gold-silver-lead-zinc property is at Favourable Lake, approximately 125 miles north of Red Lake. The mine was formerly operated by Berens River Mines Limited which produced \$8,801,845 from 560,607 tons of ore milled between 1939 to 1948.

There was no development work in 1965. Total development footage by Berens River Mines at the time of closure in 1948 was as follows: 22,487 feet of drifts, 15,666 feet of crosscuts, 10,154 feet of raises. Golsil Mines Limited has been carrying on surface exploration and diamond-drilling since 1960.

During the winter of 1965 mining equipment was brought in by tractor train from Red Lake, (Ontario) and from Riverton (Manitoba), some of the buildings in the old townsite were rehabilitated, and a headframe was constructed. At the

present time the No. 2 shaft is being pumped out in preparation for underground diamond-drilling.

New construction in 1965 included the following:

- 1 power house (28×56 ft.)
- 1 hoist house (28×16 ft.)
- 1 shafthouse (18×42 ft.)
- 1 headframe 40 ft. to sheave
- 1 garage and shop (24×48 ft.)
- 1 warehouse (14×36 ft.)
- 1 wooden water tank, 7,000 gal, capacity.

Added equipment consisted of the following:

- 1 hoist, double-drum electric, 42×42 in.
- 1 boiler, 40 hp
- 2 diesels, one size 6, and one size 5
- 2 generators, one 125kva, one 156kva
- 2 compressors, one 600cfm, one 700cfm
- 1 dynamo and motor, 100 hp
- 3 transformers, 10kva
- various pumps and tools.

Employment and Management

W. L. Sebolt was the mine manager, and eight men were employed, all on surface.

Hallnor Mines Limited

Hallnor Mines Limited was incorporated in April 1936, with an authorized capitalization of 2,000,000 shares of \$1 par value; all shares have been issued. The directors and officers were: R. V. Porritt, president and director; W. S. Row, vice-president and director; D. E. G. Schmitt, general manager and director; W. G. Brissenden and J. H. Stovel, directors; R. C. Ashenhurst, secretary; E. K. Cork, treasurer. The head office is at 1700 Bank of Nova Scotia Building, 44 King Street West, Toronto 1; the mine address is Pamour.

The property comprises eight claims in Whitney township, Porcupine area, District of Cochrane, adjoining the west boundary of the Pamour Porcupine mine.

Mining and milling continued throughout 1965.

SHAFTS, HALLNOR MINE

| | CLAIM NUMBER | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH FROM SURFACE |
|-------------|--------------------|-------------|------------------------|--------------|-----------------------------|
| | | | | feet | feet |
| Main shaft | N. ½ lot 7, con. V | Vertical | 3 | Surface | 3,477 |
| 2230 winze | Whitney twp. | 45° | 2 | 3,354 | 3,742 |
| No. 3 shaft | Whitney twp. | Vertical | 3 | 3,198 | 4,455 |

Development work in 1965 consisted of 3,300 feet of drifting, 366 feet of crosscutting, and 865 feet of raising. Total development footage to 31 December 1965 was: 70,677 feet of drifts; 20,855 feet of crosscuts; 25,206 feet of raises. Diamond-drilling consisted of 152 holes, totalling 32,279 feet from underground.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Annual Report for 1965

Underground

On the 23rd (3,500-foot) level two drifts were extended 1,220 feet in the east part of the mine to permit further investigation of a low grade zone indicated by diamond-drilling from the 22nd (3,350-foot) level. On the 25th (3,850-foot) and 26th (4,000-foot) levels crosscuts were extended to open up the north limb of 19 vein and to provide a base for diamond-drilling an indicated flat extension of this structure to the north. On the 28th (4,300-foot) level lateral headings were advanced 1,370 feet to provide drilling stations for exploration at depth.

Stopping

Ore broken in stopes amounted to 122,600 tons and 121,000 tons were trammed. The broken ore reserve at the year end was 8,100 tons. Tonnage hoisted from below the 22nd level amounted to 68 percent of the total.

The hydraulic fill system provided some 28,550 tons of classified mill tailings to the lower section of the mine. In addition, 9,520 tons of sand backfill was placed in the upper level stopes.

A tabulation of ore production by levels for the year 1965, and since production commenced in June 1936, follows:

| LEVEL | BELOW SURFACE FEET | 1965 TONS | TOTAL 1936 TO 1965 |
|----------------|-----------------------|--------------|-----------------------|
| 1st to 8th | 1,400 | 20,580 | 2,545,120 |
| 18th | 2,750 | 455 | 25,635 |
| 19th | 2,900 | 15,870 | 222,535 |
| 20th | 3,050 | ..... | 128,090 |
| 21st | 3,200 | 1,915 | 40,605 |
| 22nd | 3,350 | ..... | 11,260 |
| 23rd | 3,500 | 7,550 | 33,115 |
| 24th | 3,700 | 31,350 | 58,580 |
| 25th | 3,850 | 16,720 | 29,990 |
| 26th | 4,000 | 26,580 | 38,290 |
| Stopping Total | | 121,020 | 3,133,220 |
| Development | | 12,180 | 226,255 |
| Total | | 133,200 | 3,359,475 |

Mill

The mill was in continuous operation throughout the year. The primary ball mill operated 97.3 percent of the possible running time and averaged 360 tons per day compared to 333 tons per day in 1964.

Ore treated was 131,375 tons averaging 0.41 ounce of gold per ton and recovery was 97.9 percent. Production amounted to 53,130 ounces of gold and 2,860 ounces of silver.

To 31 December 1965, the mill had treated 3,355,000 tons of ore yielding 1,321,000 fine ounces of gold and 99,000 fine ounces of silver, having a combined value of \$48,217,100.

Ore Reserves

| AT 1 JANUARY | 1965 | | 1966 | |
|--------------------|---------|-------------|---------|-------------|
| | ORE | GOLD | ORE | GOLD |
| | tons | oz. per ton | tons | oz. per ton |
| Above 8th level | 19,900 | 0.22 | 16,800 | 0.20 |
| 18th to 22nd level | 33,600 | 0.32 | 26,000 | 0.32 |
| Below 22nd level | 240,000 | 0.43 | 191,100 | 0.44 |
| Total | 293,500 | 0.40 | 233,900 | 0.41 |

Employment and Management

The average number of employees was 212: 139 underground and 73 on surface. W. J. Marshall was the manager.

Hollinger Consolidated Gold Mines Limited

Hollinger Consolidated Gold Mines Limited was incorporated in May 1916. The authorized capitalization was 5,000,000 shares of \$5 par value, of which 4,920,000 shares have been issued. The directors and officers were: J. R. Timmins,

honorary chairman of the board and director; A. A. McMartin, chairman of the board and director; A. L. Fairley Jr., president and director; N. A. Timmins, vice-president and director; P. C. Finlay, vice-president, treasurer and director; Hon. Edouard Asselin, Duncan McMartin, J. A. McDougald, M. C. G. Meighen and D. M. Dunlap, directors; C. G. Cowan, secretary; C. B. Ross, general manager of Hollinger and Ross mines. The mine office and head office is at Timmins. The general office is at 44 King Street West, Toronto 1.

The Timmins property operated by the company, consists of 26 claims in Tisdale township, Porcupine area, District of Cochrane, and includes part of the ground underlying the town of Timmins. The company has numerous holdings and interests. It owns and operates the Ross mine in Hislop township, District of Cochrane.

HOLLINGER MINE

Mining and milling operations continued throughout 1965.

SHAFTS, HOLLINGER MINE

| | CLAIM NUMBER | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|---------|------------------------|-------------|--|--------------|------------------------------|
| | | | | feet | feet |
| Main | P.13156 | Vertical | 3 | Surface | 2,770 |
| Central | P.13157 | Vertical | 6 | Surface | 3,194 |
| No. 26 | P.13156 | Vertical | 5 | Surface | 3,063 |
| No. 11 | P.13144 | Vertical | 2 | Surface | 2,755 |
| No. 19 | Schumacher Veteran Lot | Vertical | 3 | Surface | 3,954 |
| No. 6 | P.13218 | Vertical | 2 (0-200 ft. filled; 200-425 ft. travel) | Surface | 425 |
| No. 21 | ..... | Vertical | 2 (1,550-2,750 ft. filled; 2,750-3,950 ft. travel) | 1,550 | 3,950 |
| No. 25 | ..... | Vertical | 3 | 3,950 | 5,438 |
| No. 27 | ..... | Vertical | 4 | 2,750 | 5,293 |

Note: No. 25 shaft: Hoist is on 3,800-foot level
 No. 27 shaft: Hoist is on 2,450-foot level
 All other shafts have been stoped, filled, etc.
 Inactive shafts from surface have been bulkheaded.

Development work in 1965 consisted of 1,834 feet of drifting, 2,985 feet of crosscutting, and 20,049 feet of rock passes, development and stope raising. Total development footage from 1931 to 31 December 1965 consisted of 1,313,292 feet of drifts, 694,474 feet of crosscuts, and 989,815 feet of raises. Diamond-drilling in 1965 consisted of 613 holes totalling 59,007 feet from underground, and 7 holes totalling 1,740 feet from surface.

Added equipment included the following:

- 1 jet aircraft
- 1 truck
- 1 car
- 3 typewriters.

Altogether 934,846 tons of ore were hoisted, and 936,876 tons were milled at a daily average of 3,337 tons per operating day.

Employment and Management

The average number of employees was 1,268: 791 underground and 477 on surface. C. B. Ross was the general manager.

Annual Report for 1965

ROSS MINE

The Ross property comprises 456 acres in Hislop township, District of Cochrane. The mine address is Holtyre.

Mining and milling continued throughout 1965.

SHAFTS, ROSS MINE

| | LOCATION | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|--------------|----------------------------------|-------------|------------------------|--------------|------------------------------|
| | | | | feet | feet |
| No. 1. shaft | N. ½ lot 1, con. 11, Hislop twp. | Vertical | 3 | Surface | 2,646 |
| No. 2 winze | N. ½ lot 1, con. 11, Hislop twp. | Vertical | 2 | 291 | 1,526 |

Development work in 1965 consisted of 2,010 feet of drifting, 1,679 feet of crosscutting, and 1,660 feet of raising. Total development footage to 31 December 1965 was: 46,673 feet of drifts; 46,027 feet of crosscuts; 34,999 feet of raises. Diamond-drilling consisted of 194 holes, totalling 20,641 feet, from underground.

Altogether, 142,062 tons of ore were hoisted, and 142,140 tons were milled at a daily average of 416 tons per operating day.

The average number of employees was 109: 58 underground and 51 on surface. C. B. Ross was general manager, and J. J. Caty was resident manager.

Company Annual Report

The following, pertaining to the Hollinger and Ross mines, was taken from the company annual report for the year ending 31 December 1965.

It is pleasing to report that the 56-year-old Hollinger mine at Timmins, succeeded in operating throughout 1965 and also returned a higher profit than in 1964. Prospects are favourable for the operation of this mine during 1966 but, as has been reported for several years, the remaining reserves are being depleted rapidly.

Bullion production at Hollinger in 1965 amounted to \$9,479,120 as compared to \$10,108,708 in 1964, but operating costs, before taxes and depreciation, were reduced from their 1964 level of \$9,603,794 to \$8,779,977. Operating profit, before taxes and depreciation and excluding assistance from The Emergency Gold Mining Assistance Act, was \$699,143. On a unit basis, lower mining costs were largely offset by higher milling charges as a result of decreased production and lower utilization of the Hollinger mill. Bullion production at the Ross totalled \$1,042,072 in 1965, up from \$830,771 in 1964, but the cost per ton rose from \$6.84 in 1964 to \$7.34 in 1965.

The salutary effects of The Emergency Gold Mining Assistance Act in providing economic support to communities depending essentially on gold mining operations are readily visible in the operations of the Hollinger and the Ross. Both mines have a long history of providing employment and revenues in their areas. Without the assistance received under EGMA both would have been closed long ago. During the year, these gold mines qualified for assistance estimated at \$1,366,264, approximately \$250,000 less than the 1964 figure as a result of decreases in production and output at Hollinger.

Hugh-Pam Porcupine Mines Limited

Hugh-Pam Porcupine Mines Limited was incorporated in December 1935, with an authorized capitalization of 4,000,000 shares of \$1 par value; in 1964 the capitalization was increased to 6,000,000 shares, of which 4,790,601 shares have been issued. The directors and officers were: H. F. Brownbill, president and director; W. H. Maedel, vice-president, secretary-treasurer, and director; F. G. Lawson, vice-president and director; D. G. Lawson and L. B. Harder, directors. The head office is at 7th Floor, 105 Adelaide Street West, Toronto 1. The mine address is Pamour.

The company owns 15 claims in Whitney township, Porcupine area, District of Cochrane. The mine is operated under the management of Broulan Reef Mines Limited, and the ore is treated in the Broulan mill.

Mining operations took place from 1 January to 7 September 1965.

SHAFTS, HUGH-PAM MINE

| CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|-------------|-------------|------------------------|--------------|------------------------------|
| | | | feet | feet |
| Mulholland | 12708 | 2(inactive) | 0 | 200 |
| Hughes | 13096 | 2(inactive) | 0 | 200 |
| No. 1 winze | ..... | 2(inactive) | 200 | 318 |
| No. 2 winze | ..... | 2 | 2,500 | 2,628 |

The following table gives the development footage in 1965 and the accumulated footage to the time of closure, 7 September 1965.

| LEVEL | DRIFTS | | CROSSCUTS | | RAISES | |
|-------|--------|--------|-----------|-------|--------|-------|
| | 1965 | TOTAL | 1965 | TOTAL | 1965 | TOTAL |
| 200 | | 454 | .... | 49 | .... | 393 |
| 350 | | 1,433 | .... | 1,072 | 31 | 381 |
| 500 | | 889 | .... | 46 | .... | 462 |
| 650 | | 2,174 | 16 | 149 | 131 | 780 |
| 800 | | 915 | .... | 57 | 14 | 655 |
| 970 | | 2,054 | .... | 525 | .... | 706 |
| 1120 | | 893 | .... | .... | .... | 516 |
| 1270 | | 487 | .... | .... | .... | .... |
| 1420 | | 199 | .... | .... | .... | 46 |
| 1570 | | 184 | .... | .... | .... | 173 |
| 1720 | | 1,661 | .... | .... | .... | 150 |
| 1870 | | 1,978 | .... | 30 | .... | 945 |
| 2050 | | 1,742 | .... | 49 | .... | 1,118 |
| 2200 | | 1,192 | .... | 74 | .... | 811 |
| 2350 | | 1,473 | .... | 868 | .... | 458 |
| 2500 | | 2,064 | .... | 243 | .... | 274 |
| 2600 | | 386 | .... | 27 | .... | 177 |
| Total | | 20,178 | 16 | 3,189 | 176 | 8,045 |

Diamond-drilling in 1965 consisted of 36 holes totalling 2,879 feet, from underground.

All work on the Hugh-Pam property is done through extensions of the Reef workings of Broulan Reef mine; surface hoisting is through the Reef shaft.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

During 1965, 2,987 ounces of gold were recovered from 23,954 tons milled, for a recovered grade of 0.127 ounces of gold per ton. Following the suspension of underground exploration, as stated in last year's annual report, the remainder of the ore reserves was mined out and all operations terminated in September 1965, coincident with the shut down of the Broulan Reef mine, through which shaft and workings the Hugh-Pam mine was operated.

Employment and Management

W. F. Atkins was manager of mining operations, C. A. McLeish was the mine manager, and the operation was carried on by the Broulan Reef organization.

Annual Report for 1965

Kenilworth Mines Limited

Kenilworth Mines Limited was incorporated in January 1962 with an authorized capitalization of 5,000,000 shares of \$1 par value, of which 4,216,303 shares have been issued. The directors and officers were: V. E. Irons, president, treasurer and director; P. H. Clarke, vice-president and director; John Hotson, secretary and director; Herb Johnson, James Barnett, and D. A. Stevenson, directors. The head office and mine address is Box 945, Timmins.

The property, formerly known as the Naybob Gold Mine, consists of 17 claims in Ogden and Deloro townships, Porcupine area, District of Cochrane. In 1963 Kenilworth Mines Limited leased the adjoining New Hope Porcupine Gold Mines Limited property, comprising 35 claims in Ogden township, Porcupine area, District of Cochrane.

The mine and mill were inactive during 1965.

The vertical three compartment No. 1 shaft located on the Kenilworth property in claim HR938 (TRS1021) has a depth of 1,347 feet below surface. There were two shafts on the New Hope property: No. 1 shaft on claim HS805 (TRP421) was 200 feet deep with levels at 90 and 200 feet and had been used for ventilation purposes; the vertical, three compartment No. 2 shaft collared on claim HS961 (TRP492) was 1,244 feet deep and serviced the mine. There was no development work in 1965. The two shafts were maintained in operating condition and the workings were kept pumped out. Total development footage on the Kenilworth property to 31 December 1965 (including Naybob to the end of 1947) was 25,326 feet of drifts, 8,905 feet of crosscuts, and 9,800 feet of raises. Total development footage on the New Hope property to 31 December 1965 (including the development footage by De Santis Porcupine) was 11,046 feet of drifts, 5,716 feet of crosscuts, and 7,118 feet of raises.

Employment and Management

The average number of employees was 9: 3 underground and 6 on surface. R. A. Lauzon was manager.

Kerr Addison Mines Limited

Kerr-Addison Gold Mines Limited was incorporated in April 1936; in November 1963 on amalgamation of Kerr-Addison Gold Mines Limited, Anglo-Huronian Limited, Bouzan Mines Limited and Prospectors Airways Company Limited, the name was changed to Kerr Addison Mines Limited. The authorized capitalization was increased to 10,000,000 shares of no par value, of which 7,039,919 shares have been issued. The directors and officers were: W. S. Row, president and director; J. H. Stovel, executive vice-president and director; K. C. Gray, M. S. Fotheringham, J. R. Bradfield, H. E. Langford, R. V. Porritt, W. H. Rea, H. H. Leather, and W. D. Smith, directors; B. C. Bone, treasurer; R. D. Stewart, secretary; and J. B. Sage, assistant secretary. The head office is at Suite 1600, 44 King Street West, Toronto 1. The mine address is Virginiatown.

The company's main property comprises 53 claims, which includes 19 claims acquired from Chesterville Mines Limited, in McGarry township, Larder Lake area, District of Timiskaming. Operations at the Chesterville property terminated in December 1952.

Mining and milling continued throughout 1965.

SHAFTS, KERR-ADDISON MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | TOTAL DEPTH FROM SURFACE |
|-------|-----------|-------------|------------------------|-----------------|--------------------------|
| No. 3 | T1751 | Vertical | 5 | feet Surface | feet 3,995 |
| No. 4 | T2018 | Vertical | 3 | 3,850 | 6,022 |

Development work in 1965 consisted of 72 feet of drifting, 13 feet of cross-cutting, and 1,350 feet of raising. Total development footage to 31 December 1965 consisted of 216,914 feet of drifts, 85,598 feet of crosscuts, and 165,804 feet of raises. The total footage includes some development work on Chesterville and Arjon properties. Diamond-drilling in 1965 consisted of 36 holes, totalling 2,461 feet, from underground.

Equipment added in 1965 included the following:

- 1 scraper, 42 inch
- 1 standard sedan
- 1 truck, ½ ton capacity.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

| | | 1965 | 1964 |
|--|---------|--------------|---------------|
| Milled | ton | 653,757 | 779,174 |
| Average milled per day | ton | 1,791.1 | 2,128.9 |
| Total gold recovered | oz. | 223,252.31 | 266,970.40 |
| Total silver recovered | oz. | 13,755.38 | 16,361.80 |
| Average mill-head value per ton (bullion plus tails) | oz./ton | .3500 | .3502 |
| Gold at \$35.00 | \$ | 12,2483 | 12,2579 |
| Recovery | percent | 97.6 | 97.8 |
| Total realized value of bullion (Canadian funds) | \$ | 8,444,944.94 | 10,099,818.65 |
| Total realized value of bullion per ounce of gold | \$ | 37.83 | 37.83 |
| Total realized value of bullion per ton milled | \$ | 12.918 | 12.962 |

Cost of Production

| | 1965 | | 1964 | |
|------------------------------|----------------|---------|----------------|---------|
| | TOTAL | PER TON | TOTAL | PER TON |
| Development | \$ 53,651.94 | \$.082 | \$ 123,545.06 | \$.159 |
| Stope development | 43,460.56 | .066 | 130,809.77 | .168 |
| Mining | 2,414,735.86 | 3.694 | 2,745,273.02 | 3.523 |
| Haulage | 297,176.73 | .455 | 325,302.70 | .418 |
| Hoisting | 269,143.44 | .412 | 294,556.87 | .378 |
| General mine charges | 1,335,287.75 | 2.042 | 1,690,422.35 | 2.169 |
| Crushing and conveying | 138,916.66 | .212 | 172,636.77 | .221 |
| Milling | 858,167.76 | 1.313 | 943,329.00 | 1.199 |
| General expense | 606,943.00 | .929 | 625,780.33 | .803 |
| Bullion marketing | 56,908.44 | .087 | 70,797.71 | .091 |
| Total operating cost at mine | \$6,074,392.14 | \$9.292 | \$7,113,453.63 | \$9.129 |

The retreatment of the cyanidation tailing by flotation and roasting increased the recovery by 6.31 percent.

The total operating cost per ton of ore mined and milled increased by 16¢ despite a reduction of 18¢ per ton in development costs. This was due largely to a 4.2 percent increase in hourly wage rates which became effective 1 April 1965, and a 10 percent increase on 3 October 1965. Although the prices of timber, explosives, cyanide, fuel oil and lubricants remained steady, there was an increase of from 5 to 15 percent in the price of some chemicals, crusher liners, rock drill parts, cement and general hardware.

Annual Report for 1965

Mine Development and Mining

No major development was carried out in 1965. Lateral drives and raising was confined to known ore zones above the 4,400-foot level.

Stoping continued in the No. 6, 14, 16 and 21 orebodies with stoping operations extending from the 300-foot level to the 4,400-foot level, due regard being had for the mining sequence. Work above the 1,750-foot level was confined to small ore zones. Ore mined by square-set methods accounted for 66.2 percent of all ore broken as compared with 67.7 percent in 1964.

Pillar recovery continued largely between the 3,700-foot level and the 1,300-foot level and accounted for 23.7 percent of all ore broken in 1965.

The distribution of ore production from the mine is shown in the following table:

| SOURCE OF ORE | 1965 | | 1964 | |
|-----------------------------|---------|---------|---------|---------|
| | tons | percent | tons | percent |
| Surface to 1,900-foot level | 190,572 | 29.2 | 176,560 | 22.6 |
| 1,900- to 2,500-foot level | 147,888 | 22.6 | 190,662 | 24.5 |
| 2,500- to 3,100-foot level | 144,262 | 22.1 | 179,352 | 23.0 |
| 3,100- to 3,700-foot level | 78,362 | 12.0 | 135,298 | 17.4 |
| Below 3,700-foot level | 92,413 | 14.1 | 97,288 | 12.5 |
| Total ore produced | 653,497 | 100.0 | 779,160 | 100.0 |

A summary of the tonnages of ore broken by the different mining methods follows:

| MINING METHOD | 1965 | | 1964 | |
|--|-------------|---------|-------------|---------|
| | tons broken | percent | tons broken | percent |
| Cut-and-fill stoping | 201,901 | 32.4 | 225,079 | 29.8 |
| Cut-and-fill pillar recovery | ..... | .... | 3,258 | 0.4 |
| Total cut-and-fill mining | 201,901 | 32.4 | 228,337 | 30.2 |
| Square-set stoping | 264,817 | 42.5 | 348,017 | 46.1 |
| Square-set pillar recovery | 147,734 | 23.7 | 162,656 | 21.6 |
| Total square-set mining | 412,551 | 66.2 | 510,673 | 67.7 |
| Total cut-and-fill and square-set mining | 614,452 | 98.6 | 739,010 | 97.9 |
| Shrinkage stoping | 1,328 | 0.2 | 642 | 0.1 |
| Total mining | 615,780 | 98.8 | 739,652 | 98.0 |
| Development ore | 7,291 | 1.2 | 14,721 | 2.0 |
| Total ore broken | 623,071 | 100.0 | 754,373 | 100.0 |
| Percentage of tons milled | | 95.3 | | 96.8 |

A total of 313,159 cubic yards of backfill was placed in the mine. Of this, 284,087 cubic yards or 90.7 percent was obtained from mill tailings.

Ore Reserves

At the end of 1965, proven ore reserves including allowances for dilution were as follows:

| | OUNCES OF GOLD | |
|----------------------------------|----------------|---------|
| | TONS | PER TON |
| Surface to 1,600-foot level | 341,570 | 0.2942 |
| 1,600- to 2,500-foot level | 1,074,694 | 0.3201 |
| 2,500- to 3,700-foot level | 1,099,254 | 0.4009 |
| 3,700- to 4,550-foot horizon | 2,310,025 | 0.5205 |
| Total reserve at the end of 1965 | 4,825,543 | 0.4326 |
| Total reserve at the end of 1964 | 5,396,219 | 0.4283 |

The total ore reserves at the end of 1965 includes 6,108 tons of broken ore reserves with an average grade of 0.3946 ounces per ton. During the year, in addition to the 653,757 tons milled, 34,975 tons were removed from the reserves for economic reasons, for a total reduction in ore reserves of 688,732 tons. The difference between this and the actual reduction represents a gain of 118,056 tons through slashing and sub-drifting in stopes.

Employment and Management

The average number of employees was 838: 521 underground and 317 on surface. S. C. Yule was the manager.

Kostynuk Brothers Limited

Kostynuk Brothers Limited was incorporated in September 1964, with an authorized capitalization of 40,000 shares of \$1 par value. No shares have been issued. The officers of the company were: A. Kostynuk, president; M. Kostynuk, vice-president; Wm. Kostynuk, treasurer; S. Kostynuk, secretary. The head office and mine address is Box 25, Red Lake.

The property comprises 15 claims on the north shore of Richardson Lake, in the Brownstone area, District of Kenora; it is about 60 miles northeast of the town of Red Lake, and 3 miles north of the old Jason mine at Casummit Lake.

Mining operations progressed from 20 July to 15 October, 1965, and the mill operated from 27 July to 8 October.

Development work in 1965 consisted of 31 feet of drifting, and 10 feet of raising. The total development footage to 31 December 1965 was: 111 feet of drifts; 35 feet of crosscuts; and 10 feet of raises. One diamond-drillhole, totalling 125 feet, was completed from underground.

New construction in 1965 included a roof over ore bins and mill, and a water tank.

Major equipment consisted of a ball mill, capacity 25 tons.

Altogether, 220 tons of ore were hoisted and milled at an average of 5 tons daily during the period of operation.

Employment and Management

The average number of employees was 2: 1 underground and 1 on surface. A. Kostynuk, president, was in charge.

Lake Shore Mines Limited

Lake Shore Mines Limited was incorporated in February 1914, with an authorized capitalization of 2,000,000 shares of \$1 par value. All shares have been issued. The directors and officers were: R. C. Stanley, Jr., president and director; J. G. Boeckh, executive vice-president, treasurer and director; J. C. Adamson, P. K. Hanley, J. C. L. Allen, and J. D. Bryce, directors; Miss B. A. Argo, secretary; and H. W. Wright, comptroller. The head office and mine office is at Kirkland Lake. The executive office is at Suite 400, 112 King Street West, Toronto 1.

The company's main property consisting of about 287 acres, is in Teck township, Kirkland Lake area, District of Timiskaming.

The mine operated from 1 January to 6 July. The mill operated on mine ore from 1 January to 18 July, after which the retreatment of tailings commenced.

SHAFTS, LAKE SHORE MINE

| | CLAIM NUMBER | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|-----------------------|--------------|-------------|------------------------|--------------|------------------------------|
| | | | | feet | feet |
| No. 1 shaft | L1557 | Vertical | 3 (inactive) | Surface | 2,250 |
| No. 1 shaft extension | ..... | Vertical | 3 (inactive) | 2,000 | 4,507 |
| No. 2 shaft | L2243 | 19° | 1 | Surface | 200 |
| No. 3 shaft | L2506 | Vertical | 5 | Surface | 3,995 |
| No. 4 shaft | ..... | Vertical | 3 | 4,325 | 8,176 |
| No. 5 shaft | L2506 | Vertical | 5 | Surface | 3,995 |
| No. 6 shaft | ..... | Vertical | 5 | 3,575 | 6,124 |

Annual Report for 1965

The following table gives the development footage in 1965, and the accumulated footage to the time of closure, July 1965.

| LEVEL | DRIFTS | | CROSSCUTS | | RAISES | |
|-------|--------|---------|-----------|---------|--------|---------|
| | 1965 | TOTAL | 1965 | TOTAL | 1965 | TOTAL |
| | feet | feet | feet | feet | feet | feet |
| 100 | — | 582 | — | 14 | — | — |
| 200 | — | 5,396 | — | 2,001 | — | 879 |
| 300 | — | 851 | — | 181 | — | 91 |
| 400 | — | 7,814 | — | 2,727 | — | 9,104 |
| 600 | — | 9,732 | — | 3,146 | — | 8,540 |
| 800 | — | 10,307 | — | 3,304 | — | 12,339 |
| 1,000 | — | 10,197 | — | 4,013 | — | 16,575 |
| 1,200 | — | 8,431 | — | 2,394 | — | 8,715 |
| 1,400 | — | 5,546 | — | 2,875 | — | 10,091 |
| 1,600 | — | 6,948 | — | 2,736 | — | 6,486 |
| 1,800 | — | 5,872 | — | 2,057 | — | 5,796 |
| 2,000 | — | 6,776 | — | 4,070 | — | 4,763 |
| 2,200 | — | 7,217 | — | 2,073 | — | 6,542 |
| 2,325 | — | 6,814 | — | 1,845 | — | 3,843 |
| 2,450 | — | 6,647 | — | 1,557 | — | 3,049 |
| 2,575 | — | 7,035 | — | 2,360 | — | 3,849 |
| 2,700 | — | 7,118 | — | 2,576 | — | 3,941 |
| 2,825 | — | 7,678 | — | 1,597 | — | 2,295 |
| 2,950 | — | 7,418 | — | 1,689 | — | 2,316 |
| 3,075 | — | 9,210 | — | 3,274 | — | 2,405 |
| 3,200 | — | 7,801 | — | 1,526 | — | 2,334 |
| 3,325 | — | 5,575 | — | 1,901 | 29 | 1,825 |
| 3,450 | — | 5,888 | — | 1,862 | — | 1,414 |
| 3,575 | — | 5,172 | — | 2,867 | — | 1,322 |
| 3,700 | — | 6,521 | — | 3,158 | — | 1,986 |
| 3,825 | — | 4,217 | — | 2,368 | — | 1,260 |
| 3,950 | — | 4,705 | — | 2,427 | — | 1,399 |
| 4,075 | — | 4,466 | — | 1,653 | — | 1,130 |
| 4,200 | — | 4,762 | — | 2,030 | 31 | 1,920 |
| 4,325 | — | 4,952 | — | 2,019 | — | 1,749 |
| 4,450 | — | 5,411 | — | 2,394 | — | 1,787 |
| 4,575 | — | 4,896 | — | 1,997 | — | 1,888 |
| 4,700 | — | 4,199 | — | 881 | — | 1,213 |
| 4,825 | — | 4,727 | — | 846 | — | 1,211 |
| 4,950 | — | 4,386 | — | 992 | — | 959 |
| 5,075 | — | 4,726 | — | 2,159 | — | 1,107 |
| 5,200 | — | 5,034 | — | 1,844 | — | 1,248 |
| 5,325 | — | 5,303 | — | 2,360 | — | 1,448 |
| 5,450 | — | 6,418 | — | 3,720 | — | 1,860 |
| 5,575 | — | 4,890 | — | 1,778 | — | 1,317 |
| 5,700 | — | 4,264 | — | 1,518 | — | 932 |
| 5,825 | — | 3,205 | — | 1,551 | — | 1,435 |
| 5,950 | — | 4,479 | — | 1,613 | — | 1,078 |
| 6,075 | — | 2,669 | — | 949 | — | 1,008 |
| 6,200 | — | 1,205 | — | 601 | — | 369 |
| 6,325 | — | 2,048 | — | 417 | — | 479 |
| 6,450 | — | 138 | — | 567 | — | 247 |
| 6,575 | — | 1,563 | — | 1,461 | — | 163 |
| 6,700 | — | — | — | 297 | — | 155 |
| 6,825 | — | 1,230 | — | 849 | — | 221 |
| 7,075 | — | — | — | 531 | — | 333 |
| 7,325 | — | 2,242 | — | 1,783 | — | 548 |
| 7,575 | — | 2,117 | — | 1,845 | — | 1,236 |
| 7,700 | — | 2,470 | — | 972 | — | 740 |
| 7,825 | — | 4,272 | — | 2,009 | — | 1,465 |
| 7,950 | — | 3,073 | — | 1,551 | — | 1,511 |
| 8,075 | — | 2,625 | — | 2,532 | — | 631 |
| Total | — | 279,238 | — | 108,317 | 60 | 154,547 |

Diamond-drilling in 1965 consisted of 11 holes, totalling 727 feet, from underground.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

In the last annual report it was forecast that progressive deterioration in both output and grade of Lake Shore ore, cessation of ore deliveries from Wright-Hargreaves mine, and inflow of large volumes of water to Lake Shore from neighbouring closed-down mines would force termination of mining operations in 1965. The impact of these factors, plus the occurrence of a rockburst of medium intensity in June resulting in damage to six stopes in a region which was providing approximately 50 percent of Lake Shore ore production, dictated cessation of mining operations at the end of June. The last ore was hoisted on 6 July, and by 17 July all ore in the mill circuits had been treated.

Ore hoisted and treated in the year amounted to 74,565 dry tons from which were recovered 28,579.61 ounces of gold and 10,011 ounces of silver. An additional 6,072.22 ounces of gold and 1,505 ounces of silver were recovered from clean-up work in the mill and from the experimental retreatment of approximately 30,000 dry tons of tailings from the Kirkland Lake slimes disposal basin.

From commencement of milling operations in March 1918, until mining terminated in July 1965, the mine produced and the mill treated 16,630,766 tons of ore from which bullion to a total value of \$271,164,534 or \$16.30 per ton was recovered.

Retreatment of Mill Tailings

Following lengthy investigations of the tonnage and grade of old mill tailings on Lake Shore Mines Limited, claims in the main Kirkland Lake basin, including study of methods of excavating and retreating the material, preparations were made in the spring to make an experimental production run. It had been decided that the most economical and practicable method of excavation would be dredging and pumping, and a small experimental floating pumping plant was built and required modifications made in the mill circuits. As anticipated, many minor changes in equipment and operating techniques were required, but late in August a production run to the mill commenced.

The operation continued until the end of October when unseasonably severe cold weather forced suspension. Approximately 30,000 dry tons of slimes were pumped to and treated in the mill, and analysis of the overall results (recoveries, losses, costs, etc.) indicated that exploitation of the tailings deposit at a daily rate of 1,500 to 2,000 tons would be profitable.

At year end the decision was reached to retreat the old tailings deposit which contains approximately 4 million tons of recoverable material, to design and equip a floating pumping plant based on experience gained from the experimental work, and to make alterations and additions to equipment required in the mill. It is anticipated that operations will commence in June 1966.

Employment and Management

The average number of employees was 201: 86 underground and 115 on surface. F. Buckle was the general manager.

Leitch Gold Mines Limited

Leitch Gold Mines Limited was incorporated in July 1935, with an authorized capitalization of 3,000,000 shares of \$1 par value, of which 2,912,505 shares have been issued. The directors and officers were: K. J. Springer, chairman of the board and director; F. E. Hall, president and director; J. H. C. McClelland, vice-president and director; S. H. Robinson, G. F. MacDonnell and J. R. Cryderman, directors; and D. R. McEwen, secretary-treasurer. The head office is at Suite 225, 12 Richmond Street East, Toronto 1. The mine address is Beardmore.

The property, comprising 51 claims, is in Eva and Summers townships, District of Thunder Bay, about 5 miles from Beardmore by motor-road.

The mine operated from 1 January to 28 February; the mill from 1 January to 15 May 1965.

Annual Report for 1965

SHAFTS, LEITCH MINE

| CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|-----------|-------------|------------------------|--------------|------------------------------|
| No. 1 | H.F.I. | Vertical | 3 | feet Surface 3,006 |
| No. 2 | ..... | Vertical | 3 | 2,870 4,612 |

The following table gives the accumulated footage to the time of closure, 28 February 1965.

| LEVEL | DRIFTS | CROSSCUTS | RAISES |
|-----------|----------|-----------|----------|
| | feet | feet | feet |
| 1st | 2,239.5 | 755.5 | 484.5 |
| 2nd | 2,500.0 | 625.0 | 592.5 |
| 3rd | 2,432.5 | 389.5 | 1,335.5 |
| 4th | 2,671.5 | 115.5 | 1,133.5 |
| 5th | 4,879.0 | 238.5 | 1,236.5 |
| 6th | 2,514.0 | 350.0 | 992.5 |
| 7th | 2,772.0 | 387.0 | 1,093.0 |
| 8th | 4,791.0 | 7,161.0 | 1,435.5 |
| 9th | 2,703.0 | 627.5 | 1,584.0 |
| 10th | 2,280.5 | 601.0 | 1,689.0 |
| 11th | 2,632.0 | 623.0 | 1,404.5 |
| 12th | 1,930.5 | 623.0 | 965.0 |
| 13th | 2,004.5 | 593.0 | 1,035.5 |
| 14th | 2,071.0 | 1,062.5 | 1,115.5 |
| 15th | 1,669.5 | 1,028.0 | 1,153.0 |
| 16th | ..... | 65.5 | 462.5 |
| 17th | 1,480.0 | 1,034.0 | 472.5 |
| 18th | 1,817.5 | 585.0 | 1,154.5 |
| 19th | 2,736.0 | 1,288.0 | 1,451.0 |
| 19th S.L. | ..... | ..... | 165.0 |
| 20th | 1,653.0 | 491.0 | 1,041.0 |
| 21st | 1,592.5 | 308.0 | 983.0 |
| 22nd | 1,827.0 | 586.5 | 891.0 |
| 23rd | 1,533.5 | 243.5 | 933.0 |
| 24th | 1,895.5 | 479.0 | 880.0 |
| 25th | 1,562.0 | 805.5 | 729.5 |
| 26th | 2,319.0 | 543.0 | 801.5 |
| 27th S.L. | 645.0 | ..... | 400.0 |
| 28th | 2,220.0 | 1,028.5 | 479.0 |
| 29th S.L. | 1,189.0 | ..... | 674.0 |
| 30th | 1,435.0 | 1,929.5 | 998.0 |
| Total | 63,995.5 | 24,567.0 | 29,765.5 |

A total of 7,875 tons of ore was hoisted, and 6,696 tons were milled at an average of 7.1 tons per working day.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

The year 1965 was an eventful one for the company. Thirty years of continuous gold production from the Beardmore, Ontario mine came to an end. Mining operations ceased in February and mill clean-up was completed on 15 June. The plant and equipment was disposed of under an arrangement which provides that the company will receive 25 percent of the net mint returns from any further gold recovered by the purchasers. Company-owned houses were sold separately to individuals in the area and are being removed from the property.

From the beginning of the year to 15 June, 8,380 fine ounces of gold and 357 ounces of silver were recovered. This includes 2,393 ounces of gold realized from the mill clean-up.

Employment and Management

The average number of employees was 24: 10 underground and 14 on surface. W. R. Sinclair was the manager.

Louanna Gold Mines Limited

Louanna Gold Mines Limited was incorporated in January 1963, with an authorized capitalization of 5,000,000 shares of \$1 par value, of which 2,750,005 shares have been issued. The directors and officers were: G. E. Buchanan, president and director; A. J. Fortens, vice-president and director; Frank Cadesky, secretary-treasurer and director; and R. J. Juby, and R. J. Murphy, directors. The head office is at Room 503, 365 Bay Street, Toronto 1. The mine address is Nakina.

The property comprises a 36 claim gold prospect on O'Sullivan Lake about 20 miles north of Nakina, in the Kowkash Mining Division, District of Thunder Bay. The property was formerly operated by Osulake Mines Limited and Lake Osu Mines Limited, with operations terminating in October 1950. A three-compartment vertical shaft had been sunk on claim KK3204 by former operators to a depth of 347 feet below surface, with two levels at 144 and 299 feet below the shaft collar.

Louanna Gold Mines Limited operated from 1 January to 12 April 1966, at which time the underground workings were allowed to flood.

Total development footage to 31 December 1965 was: at the first level; 1,180 feet of drifts, and 141 feet of raises; and at the second level; 635 feet of drifts, and 556 feet of raises. Diamond-drilling in 1965 totalled 5,847 feet, from underground.

Employment and Management

W. A. Carter, consulting engineer, announced that a feasibility study was being carried out. R. F. Fry and Associates Limited, who held a contract for development work, employed 3 men: 2 underground and 1 on surface.

Macassa Gold Mines Limited

(Macassa Division)

Macassa Mines Limited was incorporated in April 1926 and Bicroft Uranium Mines Limited was incorporated in April 1955. In November 1961, the two companies were amalgamated under the name of Macassa Gold Mines Limited with an authorized capitalization of 4,000,000 shares of \$1 par value of which 3,043,665 shares have been issued. The directors and officers were: J. D. Bryce, president and director; J. G. Boeckh, vice-president and director; J. C. L. Allen, P. K. Hanley, T. D. Carlson, C. C. Huston, and R. C. Stanley Jr., directors; and Miss B. A. Argo, secretary-treasurer. The head office is at Suite 400, 112 King Street West, Toronto 1. The mine address of the Macassa Division is Box 550, Kirkland Lake.

MACASSA DIVISION

The Macassa Division property comprises 11 claims in Teck township, Kirkland Lake area, District of Timiskaming.

Mining and milling operations continued throughout 1965.

Annual Report for 1965

SHAFTS, MACASSA DIVISION

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|--------------|-----------|-------------|------------------------|--------------|------------------------------|
| Elliot shaft | L1617 | Vertical | 2 (inactive) | feet | feet |
| No. 1 shaft | L2837 | Vertical | 3 | Surface | 523 |
| No. 1 winze | L2837 | Vertical | 3 | Surface | 3,043 |
| No. 2 shaft | L4186 | Vertical | 3 | 3,000 | 4,824 |
| No. 2 winze | L4185 | Vertical | 3 | Surface | 4,633 |
| | | | | 4,625 | 6,353 |

Development work during the year consisted of 7,939 feet of drifting, 649 feet of crosscutting, and 1,333 feet of raising. Development footage to 31 December 1965 totaled 166,919 feet of drifts, 53,243 feet of crosscuts, and 35,282 feet of raises. Macassa Gold Mines Limited is doing development work on Tegren Goldfields' property on contract. Altogether, 88 feet of drifting was done at three levels on the Macassa side of the boundary. Diamond-drilling in 1965 consisted of 72 holes totalling 14,155 feet from underground.

Added equipment installed included the following:

- 4 motors 2/500hp and 2/800hp
- 4 pumps
- 2 rockdrills.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

| | | 1965 | 1964 | 1963 |
|------------------|-----|--------------|--------------|--------------|
| Gross | \$ | 2,192,785.13 | 2,402,229.52 | 2,437,830.60 |
| Milled | ton | 129,536 | 141,408 | 140,800 |
| Recovery per ton | \$ | 16.93 | 16.99 | 17.31 |

Note: 7,255 tons milled for Tegren Goldfields Limited excluded on 1965 figures.

In Canadian funds, average prices received per ounce for gold and silver were \$37.72 and \$1.39. The previous year these were \$37.75 and \$1.39.

Estimated assistance under The Gold Mining Assistance Act is \$176,070.50.

Milling

For 1965 a total of 136,791 tons of ore was milled. This includes 7,255 tons milled on a customs basis for Tegren mines. This gave a calendar day average of 374.8 tons.

Total recovery was 93.8 percent. For 1964 these figures were 386.4 and 94 percent.

Bullion recovered comprised 59,120.288 ounces of gold and 9,566.42 ounces of silver. From the start of milling operations in 1933 a total of 3,945,768 tons of ore have been milled. Extraction has amounted to 1,653,717.00 ounces of gold and 263,949.35 ounces of silver. Total recovered value amounts to \$59,823,457.16, excluding cost aid, and is equivalent to \$15.16 per ton.

Ore Reserves

The technical estimate of the ore reserves, based on sampling from development faces, diamond-drilling, and extension of known veins from stoping operations, is as of 31 December 1965.

| | TONS | OUNCES OF GOLD PER TON | VALUE AT \$35.00 PER OUNCE |
|---------------|---------|------------------------|----------------------------|
| Unbroken ore | 676,300 | .43 | \$15.05 |
| Broken ore | 29,972 | .37 | 12.95 |
| Total reserve | 706,272 | 0.425 | \$14.88 |

Notes: Dilution factor of 10 percent applied to grade only.

11,600 tons grading 0.45 oz per ton classed as inaccessible and not included in the above figures.

Of total reserves, unbroken ore is down 69,000 tons and broken ore is down 5,720 tons; therefore total reserves are down 74,720 tons from 31 December 1964. However, reserves are up 67,183 tons from 31 December 1963.

Mining

During the year normal stoping operations were continued with 83 percent of the stope break being obtained from filled and (or) timbered working places. Total ore break from these operations was 121,517 tons and 34,158 tons of backfill was placed; of this, 16,342 tons were from development headings and 17,816 tons from waste sources.

Costs

| PRODUCTION OF GOLD BULLION | | 1965 | 1964 | |
|----------------------------|--|---------|------|------------|
| Tons Milled | | 129,536 | | 141,408 |
| Ounces Produced | | 59,120 | | 62,876.256 |

| COMPARISON OF COSTS | | 1965 | | 1964 | |
|---------------------------------------|-----------------|-----------------|-----------------|-----------------|--|
| | COST PER TON | COST PER OUNCE | COST PER TON | COST PER OUNCE | |
| Development | \$ 2.014 | \$ 4.413 | \$ 2.565 | \$ 5.769 | |
| Mining | 8.406 | 18.418 | 8.088 | 18.191 | |
| Milling | 2.655 | 5.816 | 2.484 | 5.585 | |
| Undistributed mine operating expenses | 0.616 | 1.351 | 0.578 | 1.299 | |
| | <u>\$13.691</u> | <u>\$29.998</u> | <u>\$13.715</u> | <u>\$30.844</u> | |
| Add: | | | | | |
| Depreciation | \$ 0.304 | \$ 0.667 | \$ 0.201 | \$ 0.452 | |
| Ontario Mining Tax | 0.209 | 0.457 | 0.191 | 0.429 | |
| Head office administration | 0.760 | 1.665 | 0.720 | 1.620 | |
| Total | <u>\$14.964</u> | <u>\$32.787</u> | <u>\$14.827</u> | <u>\$33.345</u> | |

Employment and Management

The average number of employees was 303: 208 underground and 95 on surface. M. R. MacPherson was the mine manager.

McIntyre Porcupine Mines Limited

McIntyre Porcupine Mines Limited was incorporated in March 1911; in December 1959 the authorized capitalization was increased to 3,000,000 shares without par value, of which 2,388,382 shares have been issued. The directors and officers were: J. D. Barrington, president and managing director; W. B. Dix, vice-president, treasurer and director; M. A. Cooper, H. J. Fraser, J. C. Fraser, Norman D'Arcy, J. G. Glassco, J. O. Hambro, and S. M. Wedd, directors; M. L. Urquhart, vice-president (operations); J. K. Godin, general manager; and F. T. McKinney, secretary. The address of the head office and the mine office is Schumacher. The executive office is at Suite 1500, 25 King Street West, Toronto.

The company has numerous holdings in Ontario, the chief of which is the McIntyre mine, comprising 3,542 acres in Tisdale township, Porcupine area, District of Cochrane. In 1960, Castle-Trethewey Mines Limited was purchased by McIntyre and became the Castle Division of McIntyre. It is reported on in the silver-cobalt section of this report.

Mining and milling at the McIntyre mine continued throughout 1965.

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SHAFTS, MCINTYRE MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH FROM SURFACE |
|----------------|-----------|-------------|---|--------------|-----------------------------|
| | | | | feet | feet |
| No. 1 | 13307 | Vertical | 3 (inactive) | Surface | 307 |
| No. 2 | 13307 | Vertical | 2 (inactive) | Surface | 183 |
| No. 3 | 13307 | Vertical | 2 (inactive) | Surface | 183 |
| No. 4 | 13307 | Vertical | 2 (inactive) | Surface | 998 |
| No. 5 | 13307 | Vertical | { 2 to 1,375 ft. 4 below 1,375 ft. } | Surface | 2,389 |
| No. 6 | 13710 | Vertical | { 3 to 1,000 ft. 4 below 1,000 ft. } | Surface | 3,015 |
| No. 7 | 13318 | Vertical | 2 & 3 (inactive) | Surface | 989 |
| No. 8 | 13318 | Vertical | 2 (inactive) | Surface | 288 |
| No. 9 | 13068 | Vertical | 2 (inactive) | Surface | 204 |
| No. 10 | 13068 | Vertical | 2 (inactive) | Surface | 185 |
| No. 11 or Main | 13318 | Vertical | 5 | Surface | 4,131 |
| No. 12 | ..... | Vertical | 4 | 3,875 | 7,111 |
| No. 14 | ..... | Vertical | 4 | 3,750 | 7,336 |
| No. 15 | ..... | Vertical | 4 | 6,825 | 8,094 |
| No. 16 | ..... | Vertical | 4 | 5,500 | 6,848 |

Development for gold ore during the year consisted of 3,211 feet of drifting, 2,260 feet of crosscutting, and 335 feet of raising. Total development footage for gold ore to 31 December 1965 was 669,407 feet of drifts, 308,115 feet of crosscuts, and 61,274 feet of raises. Development for copper ore in 1965 consisted of 14,453 feet of drifts and crosscuts, and 3,426 feet of raises. Total development for copper ore to 31 December 1965 was 49,322 feet of drifts and crosscuts, and 16,783 feet of raises. Diamond-drilling in 1965 consisted of 896 holes totalling 95,967 feet from underground and 3 holes totalling 1,423 feet from surface.

Added equipment in 1965 included the following:

- 2 autoloaders, T-2GH
- 3 scrapers, 72-in., Mk. IV
- 1 scraper, 60-in., Mk. II
- 1 slusher, heavy-duty, double-drum
- 3 heaters
- 1 air filter.

A total of 512,093 tons of gold ore was hoisted, and 512,545 tons were milled; and 549,310 tons of copper ore were hoisted and milled. The average of gold and copper ore milled per day was 3,105 tons.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

During the year 512,545 tons of gold ore were milled for a production of 147,719 ounces of gold and 14,187 ounces of silver. Copper ore milled totalled 549,310 tons and produced 9,142,150 pounds of copper and 9,154 ounces of gold. Revenue for all metals sold was \$10,307,894 resulting in an operating profit of \$2,447,109 including emergency gold mining assistance.

Capital expenditures were \$135,195, mostly for equipment in the copper zone, and improved dust control in the crushing plant.

Gold Development

Development work totalled 5,806 feet; 3,211 feet of drifting, 2,260 feet of crosscutting, and 335 feet of raising. In the drifting, 912 feet of ore was developed averaging .34 ounce per ton over a width of 12.9 feet. The most important discovery was made on the Hollinger lease, on the 5,525-foot level, where 239 feet of ore, 22.8 feet wide averaging .322 ounce per ton, was developed.

On the level above, this orebody is shorter but of similar width. Development on 5,675-foot level, below this area, is not yet completed but no ore has been found to date.

Work below 6,825-foot level was interrupted by the fire in No. 15 shaft in February, and was not resumed on a full-time basis until December.

In common with most Canadian mines, the operation suffered from the lack of experienced miners and no relief appears in sight.

Copper Development

Development totalled 14,453 feet of lateral work and 3,426 feet of raising of which 11,343 feet of lateral work and 2,412 feet of raising was for stope preparation. Diamond-drilling totalled 34,885 feet. Initial definition diamond-drilling, which has been completed on all levels except the 2,625-foot, indicates that it is unlikely that any mineable ore exists above the 1,125 or below the 3,375-foot levels.

Long hole drilling in stopes amounted to 291,700 feet and 251,000 tons were drilled off but not blasted. The average daily mining rate in 1965 was 1,578 tons and stope preparation is well in hand for a production rate of 1,900 tons a day expected in 1966.

Gold Ore Reserves

| | 1965 | | 1964 | |
|-----------------------|------------------|------------------|------------------|------------------|
| | TONS | FINE OUNCES GOLD | TONS | FINE OUNCES GOLD |
| Estimated in place | 1,036,000 | 333,592 | 1,166,670 | 370,194 |
| Broken ore | 57,000 | 14,478 | 66,919 | 17,491 |
| | <u>1,093,000</u> | <u>348,070</u> | <u>1,233,589</u> | <u>387,685</u> |
| Average grade per ton | | .318 | | .314 |

Copper Ore Reserves

| | 1965 | | | 1964 | | |
|---------------------|------------------|---------------|-------------|------------------|---------------|-------------|
| | TONS | COPPER TONS | PERCENT | TONS | COPPER TONS | PERCENT |
| Defined by drilling | 3,426,000 | 34,348 | 1.00 | 3,034,000 | 30,340 | 1.00 |
| Broken | 297,430 | 2,916 | 0.98 | 183,000 | 2,013 | 1.10 |
| | <u>3,723,430</u> | <u>37,264</u> | <u>1.00</u> | <u>3,217,000</u> | <u>32,353</u> | <u>1.00</u> |

Employment and Management

The average number of employees was 915: 557 underground and 358 on surface. P. B. McCrodan was the mine manager.

McKenzie Red Lake Gold Mines Limited

McKenzie Red Lake Gold Mines Limited was incorporated in February 1933, with an authorized capitalization of 3,000,000 shares of \$1 par value; in 1956 the capitalization was increased to 5,000,000 shares; in 1962 to 7,500,000 shares of \$1 par value of which 5,400,000 shares have been issued. The directors and officers were: J. C. L. Allen, president and director; J. G. Boeckh, vice-president and director; Miss B. A. Argo, secretary-treasurer and director; and P. K. Hanley and R. C. Stanley, Jr., directors. The head office is at 4th Floor, 112 King Street West, Toronto 1. The mine address is McKenzie Island.

The property consists of 12 claims at the north end of McKenzie Island in Red Lake, Dome township, District of Kenora.

Mining and milling operations continued throughout 1965.

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SHAFTS, MCKENZIE RED LAKE MINE

| | CLAIM NUMBER | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|-------------|--------------|-------------|------------------------|--------------|------------------------------|
| | | | | feet | feet |
| No. 1 shaft | KRL87 | Vertical | 3 (inactive) | 0 | 456 |
| No. 5 shaft | KRL87 | -47½° | 3 | 0 | 2,480 |
| No. 2 winze | ..... | -36° | 3 | 250 | 1,252 |
| No. 4 winze | ..... | Vertical | 3 | 1,250 | 1,670 |

Development work in 1965 consisted of 828 feet of drifting, 296 feet of crosscutting, and 2,123 feet of raising. Total development footage to 31 December 1965 consisted of 101,701 feet of drifts; 32,921 feet of crosscuts; and 70,287 feet of raises. Diamond-drilling from underground consisted of 103 holes totalling 11,219 feet.

During the year a total of 80,483 tons of ore was hoisted, while 76,388 tons were milled at a daily average of 209 tons.

Employment and Management

The average number of employees was 78: 45 underground and 33 on surface. Alex Watt was the manager.

MacLeod-Cockshutt Gold Mines Limited

MacLeod-Cockshutt Gold Mines Limited was incorporated in September 1933, with an authorized capitalization of 3,000,000 shares of \$1 par value, of which 2,862,490 shares have been issued. Late in 1958, control of the company was acquired by the Little Long Lac Gold Mines Limited interests. The directors and officers were: J. C. L. Allen, president and director; J. G. Boeckh, vice-president and director; Miss B. A. Argo, secretary and director; J. C. Adamson, R. C. Stanley Jr., and P. K. Hanley, directors. The head office is at Suite 400, 112 King Street West, Toronto 1. The mine address is Geraldton.

The property comprises 24 claims in Ashmore and Errington townships, District of Thunder Bay.

Mining and milling continued throughout 1965.

SHAFTS, MACLEOD-COCKSHUTT MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | TOTAL DEPTH FROM SURFACE |
|-------|-----------|-------------|------------------------|--------------|--------------------------|
| | | | | feet | feet |
| No. 1 | TB10040 | Vertical | 3 | Surface | 2,250 |
| No. 2 | TB10038 | Vertical | 4 | Surface | 1,921 |
| No. 3 | ..... | 45° | 3 | 1,571 | 2,001 |

Development work during the year consisted of 198 feet of crosscutting. Total development footage to 31 December 1965 was 107,273 feet of drifts; 29,387 feet of crosscuts; and 34,743 feet of raises. Diamond drilling in 1965 consisted of 11 holes totalling 1,256 feet from underground.

New construction in 1965 consisted of a water tank, 30×25 ft., 100,000 gal. capacity, steel construction.

New added equipment included the following:

- 1 welder, 600amp.
- 1 cutoff machine
- 1 electric siren
- 1 boiler water cooler
- 1 vacuum pump
- 7 rock drills
- 1 locomotive, 3 ton
- 2 sets locomotive batteries
- 3 Scott air packs
- 1 grid system for No.2 hoist.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

During 1965 the mine produced 12,860 ounces of gold and 1,399 ounces of silver from 119,963 tons of ore averaging 0.107 ounces of gold recovered per ton. Revenue from this production amounted to \$487,215.00 or \$4.06 per ton.

The mill operated at an average rate of 1,820 tons per calendar day, treating 329 tons per day from MacLeod-Cockshutt and 1,491 tons per day from Consolidated Mosher Mines Limited.

Production was from the upper and lower portions of the "F" zone and from the 5th, 6th, 7th and 8th levels of the porphyry zone. Development and diamond-drilling in these areas continued to outline additional ore and at the year end reserves were estimated to be 144,220 tons averaging 0.143 ounces of gold per ton.

The group of 45 claims held by the company and the second group of 30 claims held jointly with Consolidated Mosher Mines in Houck township have had sufficient assessment work recorded to be retained in good standing. Fifteen diamond-drillholes were completed, and several mineralized zones intersected all of which were below ore grade. Other areas of merit will be examined in 1966.

Employment and Management

The average number of employees at the MacLeod and Consolidated Mosher operations was 383: 194 underground and 189 on surface. H. E. Rudd was the vice-president and general manager.

Madsen Red Lake Gold Mines Limited

Madsen Red Lake Gold Mines Limited was incorporated in March 1935; in June 1940, the capitalization was reduced to 3,500,000 shares of \$1 par value of which 3,499,528 shares have been issued. The directors and officers were: M. K. Madsen, president and director; F. R. Marshall, vice-president and director; Miss Margaret Masterson, secretary-treasurer and director; and H. H. Mackay and P. H. McCloskey, directors. The head office is at Room 1109, 55 Yonge Street, Toronto 1. The mine address is Madsen.

The company's main property (comprising 58 claims, or about 2,732 acres) is in Baird and Heyson townships, Red Lake area, District of Kenora. It is about 7½ miles southwest of the town of Red Lake.

Mining and milling operations continued throughout 1965.

SHAFTS, MADSEN RED LAKE GOLD MINE

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | DEPTH FROM SURFACE |
|-------------|-----------|-------------|------------------------|--------------------|
| No. 1 shaft | KRL11505 | Vertical | 2 (inactive) | feet 573 |
| No. 2 shaft | KRL12528 | Vertical | 5 | 4,176 |

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Development work in 1965 consisted of 2,456 feet of drifting; 1,389 feet of crosscutting, and 811 feet of raising. Total development footage to 31 December 1965 was 165,315 feet of drifts; 32,203 feet of crosscuts; and 66,074 feet of raises. Diamond-drilling in 1965 consisted of 374 holes totalling 80,210 feet from underground, and 39 holes totalling 20,554 feet from surface.

New construction in 1965 consisted of a replacement water storage tank, of 75,000 gallons capacity.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

The following figures show the production for 1965 and comparable figures for 1964:

| | | 1965 | 1964 |
|-----------------------------|----|--------------|--------------|
| Gold | oz | 87,632.198 | 94,868.822 |
| Silver | oz | 14,335.83 | 15,861.83 |
| Gross value of bullion | \$ | 3,326,452.29 | 3,603,396.77 |
| Average price gold per oz | \$ | 37.73 | 37.75 |
| Average price silver per oz | \$ | 1.39 | 1.39 |

Operating Costs

| | 1965 | | 1964 | |
|--------------------------------|----------------|-----------|----------------|-----------|
| | Total Cost | Per Ounce | Total Cost | Per Ounce |
| Development and exploration | \$ 402,374.07 | \$ 4.592 | \$ 762,970.78 | \$ 8.041 |
| Stope and stope preparation | 1,008,568.19 | 11.508 | 907,975.47 | 9.571 |
| Tramming, hoisting and pumping | 464,334.52 | 5.299 | 503,747.49 | 5.310 |
| Crushing and conveying | 90,050.52 | 1.028 | 76,038.40 | 0.802 |
| Milling | 352,200.19 | 4.019 | 365,584.49 | 3.854 |
| Mine general | 259,127.86 | 2.956 | 295,820.66 | 3.118 |
| Employee benefits | 296,169.22 | 3.380 | 363,702.46 | 3.834 |
| Administration expenses | 82,518.58 | 0.942 | 84,203.91 | 0.888 |
| Marketing charges | 25,983.23 | 0.297 | 28,542.81 | 0.301 |
| Total | \$2,981,326.38 | \$34.021 | \$3,388,586.47 | \$35.719 |
| Deduct: estimated E.G.M.A. | 585,000.00 | 6.676 | 695,000.00 | 7.326 |
| Net operating cost | \$2,396,326.38 | \$27.345 | \$2,693,586.47 | \$28.393 |

Mining

Stoping operations were carried out from the third to the twenty-third level, inclusive, with 47 percent of the mill feed coming from above the 2,650-foot horizon, or 17th level.

An additional storage space for deslimed mill tailings was constructed on the sixth level.

At year end, all production was being provided from cut-and-fill stopes.

The deslimed mill tailings placed as backfill amounted to 125,077 tons for a total of 1,455,679 tons to date.

Ore Reserves

The estimated ore reserve for 1965 and comparable figures for 1964 are shown in the following table:

| | 31 DECEMBER 1965 | | 31 DECEMBER 1964 | |
|----------------------|------------------|-------|------------------|-------|
| | Tons | Grade | Tons | Grade |
| Surface to 7th level | 20,380 | 0.260 | 22,000 | 0.267 |
| 7th to 11th level | 15,000 | 0.304 | 26,500 | 0.305 |
| 11th to 17th level | 156,690 | 0.272 | 193,000 | 0.276 |
| 17th to 23rd level | 472,930 | 0.311 | 545,500 | 0.321 |
| Broken reserve | ..... | ..... | 13,000 | 0.290 |
| Total reserves | 665,000 | 0.300 | 800,000 | 0.308 |

The broken ore in cut-and-fill stopes is not included.
 Packsack diamond-drilling and test hole drilling of the walls of active stopes resulted in the locating and mining of 112,000 tons of additional ore in parallel lenses or extensions of known ore.

Milling

The milling data for the current year, the previous year, and the total since the commencement of milling operations are shown in the following table:

| | | 1965 | 1964 | 11 AUGUST 1938 TO 31 DECEMBER 1965 |
|-------------------------|---------|---------|---------|--|
| Milled | ton | 292,681 | 305,823 | 6,427,282 |
| Operating time | percent | 95.75 | 98.01 | 96.31 |
| Milled per calendar day | ton | 801.87 | 835.58 | 642.41 |
| Average gold mill heads | oz | 0.32268 | 0.33415 | 0.31770 |
| Average gold mill tails | oz | 0.02327 | 0.02321 | 0.01949 |
| Recovery | percent | 92.79 | 93.04 | 93.86 |

Employment and Management

The average number of employees was 345: 183 underground and 162 on surface. K. R. North was the manager.

Pamour Porcupine Mines Limited

Pamour Porcupine Mines Limited was incorporated in March 1934 with an authorized capitalization of 5,000,000 shares of no par value; all shares have been issued. The directors and officers were: R. V. Porritt, president and director; W. S. Row, vice-president and director; D. E. G. Schmitt, general manager and director; J. R. Timmins, P. D. P. Hamilton, J. H. Stovel, and K. C. Gray, directors; R. C. Ashenhurst, secretary; and E. K. Cork, treasurer. The executive office is at 1700 Bank of Nova Scotia Building, 44 King Street West, Toronto 1. The head office and mine office is at Pamour.

The company's main property, totalling 33 claims is in Whitney and Murphy townships, Porcupine area, District of Cochrane. It includes the former LaPalme Porcupine, Three Nations, and Porcupine Grande properties.

Mining and milling continued throughout 1965.

SHAFTS, PAMOUR MINE

| | CLAIM NUMBER | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | TOTAL DEPTH FROM SURFACE |
|-------------|--------------|-------------|------------------------|-----------------|--------------------------|
| No. 1 shaft | P13793 | Vertical | 2 (inactive) | feet Surface | feet 220 |
| No. 2 shaft | P13793 | Vertical | 2 (inactive) | Surface | 110 |
| No. 3 shaft | P13783 | Vertical | 5 | Surface | 3,144 |
| No. 4 shaft | | Vertical | 3 | 600 | 2,437 |

Development work during the year consisted of 5,116 feet of drifting, 1,767 feet of crosscutting, and 4,840 feet of raising. Total development footage to 31 December 1965 was as follows: 183,140 feet of drifts; 43,203 feet of crosscuts; 125,352 feet of raises. Diamond-drilling consisted of 320 holes, totalling 59,312 feet from underground.

Added equipment in 1965 consisted of a double deck cage for No.3 shaft.

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Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Development

Lateral development consisted of 4,705 feet in lava exploration, 1,160 feet in east greywacke, 185 feet in west greywacke and 30 feet in conglomerate.

In the east end of the mine, 1,075 feet of drifting was in ore with an average grade of 0.21 ounces of gold per ton over drift width. In the west end of the mine, 730 feet of drifting was in ore with an average grade of 0.28 ounces of gold per ton over drift width.

Stopping

Stopping was carried on in both the east and west sections of the mine. Twenty-one percent of the ore produced was from lava stopes. The east end provided 67 percent of the tonnage broken and 70 percent of the tonnage drawn from stopes. Cut-and-fill stopes provided 4 percent of the ore broken, slusher stopes 8 percent, blast hole stopes 25 percent and shrinkage the remainder.

Ore Reserves (at 31 December 1965).

| | ORE | GRADE |
|---------------------|-----------|------------|
| | tons | oz per ton |
| ORE BROKEN | | |
| East end | 555,320 | 0.101 |
| West end | 217,860 | 0.102 |
| Total | 773,180 | 0.101 |
| ORE IN-PLACE | | |
| East end | 707,780 | 0.107 |
| West end | 220,690 | 0.136 |
| Total | 928,470 | 0.114 |
| TOTAL ORE | | |
| Total east ore | 1,263,100 | 0.104 |
| Total west ore | 438,550 | 0.119 |
| Grand Total | 1,701,650 | 0.108 |

Allowance for normal dilution has been made in calculating the tonnage and grade of ore reserves.

After milling 584,500 tons, total ore reserves were increased by 69,500 tons, and the grade increased slightly.

Mill

| | | 1965 | 1964 |
|---------------------------|------------|-----------|-----------|
| Milled | ton | 584,500 | 601,800 |
| Milled per calendar day | ton | 1,601 | 1,644 |
| Average gold content | oz per ton | 0.118 | 0.128 |
| Average tailings loss | oz per ton | 0.009 | 0.010 |
| Total recovery | percent | 92.2 | 91.9 |
| Total production | oz | 63,565 | 70,685 |
| Value of total production | \$ | 2,409,200 | 2,681,800 |

Employment and Management

The average number of employees was 368: 207 underground and 161 on surface. W. J. Marshall was the manager.

Pick Mines Limited

Pick Mines Limited was incorporated in July 1959, with an authorized capitalization of 5,000,000 shares of \$1 par value, of which 3,498,750 shares have

been issued. The directors and officers were: George Sherman, president and director; P. R. Aslin and C. A. Walton, directors; J. A. Sherman, secretary; Irwin Dubros, treasurer; Edgar McLean, assistant secretary. The head office is at Suite 800, 100 Adelaide Street West, Toronto 1. The mine address is Lochalsh.

The company acquired the Cline and Pick groups of 16 claims, comprising approximately 693 acres in Township 48, District of Algoma about 12 miles east of Goudreau, from Cline Lake Gold Mines Limited in 1960. Between 1938 and 14 October 1942 Cline Lake had milled 331,842 tons of ore and had recovered 62,328 ounces of gold and 10,598 ounces of silver having a total value of \$2,369,053. During 1960-1961 Pick Mines completed a limited amount of development and construction after which the property was idle.

Mining operations took place from 1 September to 15 December 1965.

SHAFTS, PICK MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|-------|-----------|-------------|--|--------------|------------------------------|
| | | | | feet | feet |
| 1 | SSM2186 | Vertical | ..... | Surface | 140 |
| 2 | SSM2185 | —70° | ..... | Surface | 202 |
| 3 | SSM2185 | Vertical | ..... | Surface | 115 |
| 4 | SSM2171 | Vertical | (3—surf. to 625ft) (4—625ft bottom) | Surface | 1,196 |

Development work in 1965 from No. 3 shaft consisted of 478 feet of drifting and 156 feet of crosscutting. Total development footage by Cline Lake and previous operators from shafts 1, 2, 3, and 4 involved 12,319 feet of drifting, 6,340 feet of crosscutting, 1,900 feet of raising. Total development footage to 31 December 1965 was: 12,707 feet of drifts, 6,496 feet of crosscuts and 1,900 feet of raises. Altogether, 25 diamond-drillholes, totalling 1,152 feet were completed from underground; while 35 tons of ore were hoisted and stockpiled.

Employment and Management

R. Last was in charge; the company and contractor employing a total of 12 men during the period of operation.

Pickle Crow Gold Mines Limited

Pickle Crow Gold Mines Limited was incorporated in January 1934; in April 1959, the capitalization was increased to 5,000,000 shares of \$1 par value, of which 3,554,818 shares have been issued. The directors and officers were: N. B. Keevil, president and director; C. G. MacIntosh, and J. B. Anderson, vice-presidents and directors; Sir Michael Butler, Bt., secretary and director; J. H. Westell, director; and D. S. Brown, treasurer. The head office is at Suite 1000, 11 Adelaide Street West, Toronto 1. The mine address is Pickle Crow.

The property consists of 110 claims in Connell and McCullagh townships, Pickle Lake area, District of Kenora.

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SHAFTS, PICKLE CROW MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|-------|-----------|-------------|--|-----------------|------------------------------|
| No. 1 | 747 | Vertical | 3 (0—1200 foot) 4 (1200—2450 foot) 3 (2450 to bottom) | feet Surface | feet 3,042 |
| No. 3 | 2062 | Vertical | 3 (0—1554 foot) 4 (1554—2600 foot) 3 (2600 to bottom) | Surface | 3,025 |
| No. 2 | .... | Vertical | 3 (inactive) | 721 | 1,518 |
| No. 4 | .... | Vertical | 3 (2900—3707 foot) 4 (3707—3835 foot) 3 (3835 to bottom) | 2,900 | 4,038 |

Development work during the year consisted of 140 feet of drifting, 500 feet of crosscutting, and 1,037 feet of raising. Total development to 31 December 1965 consisted of 75,639 feet of drifts, 58,528 feet of crosscuts, and 47,108 feet of raises. Diamond-drilling in 1965 consisted of 38 holes totalling 6,878 feet from underground.

New construction consisted of an addition to the boiler house, 20×12 ft.

New equipment installed consisted of a boiler, 100 hp 3,350,000btu, 14psi.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

During the year a total of 105,854 tons of ore was milled producing 33,304.87 fine ounces of gold and 2,474.39 fine ounces of silver. Total production amounted to \$1,260,073, or a recovery of \$11.90 per ton milled. A comparison of milling results to that of the previous year is as follows:

| | | 1965 | 1964 |
|------------------------|---------|-----------|-----------|
| Milled | ton | 105,854 | 84,739 |
| Gold recovered | oz | 33,304.87 | 27,440.98 |
| Silver recovered | oz | 2,474.39 | 2,274.41 |
| Gold recovered per ton | oz | 0.3146 | 0.3238 |
| Recovery | percent | 98.55 | 98.40 |

Operating Costs

Total operating costs amounted to \$1,668,180. This figure was reduced by \$342,208 cost aid to \$1,325,972 or \$12.53 per ton, leaving an operating loss of \$65,899. A comparative analysis of operating costs for 1965 and 1964 follows:

| | TOTAL | | PER TON ORE TREATED | | PER OUNCE GOLD RECOVERED | |
|------------------------|-------------|-------------|---------------------|---------|--------------------------|---------|
| | 1965 | 1964 | 1965 | 1964 | 1965 | 1964 |
| Development | \$ 155,351 | \$ 148,203 | \$ 1.47 | \$ 1.75 | \$ 4.66 | \$ 5.40 |
| Mining | 874,592 | 722,578 | 8.26 | 8.53 | 26.26 | 26.33 |
| Milling | 233,432 | 199,341 | 2.20 | 2.35 | 7.01 | 7.26 |
| General mine expense | 348,682 | 296,846 | 3.30 | 3.50 | 10.47 | 10.82 |
| Administration expense | 56,123 | 58,890 | .53 | .69 | 1.69 | 2.15 |
| Total | \$1,668,180 | \$1,425,858 | \$15.76 | \$16.82 | \$50.09 | \$51.96 |

Ore Reserves

At the start of the year 1965 estimated ore reserves totalled 333,300 tons with a grade of 0.329 ounces per ton. Mining operations during 1965 have demonstrated that a large percentage of this tonnage can no longer be mined at a profit.

Future mining on a salvage basis will be concentrated on higher grade sections of these reserves.

No new ore was developed during the year.

It is estimated there remain approximately 85,000 tons of this high grade ore which will be treated during the current year. Milling of this should result in a small operating profit.

| | 1 JANUARY 1966 | | 1 JANUARY 1965 | |
|---------------------------|----------------|------------------------|----------------|------------------------|
| | ORE | GOLD AT \$35 PER OZ | ORE | GOLD AT \$35 PER OZ |
| | tons | | tons | |
| Broken ore | 22,492 | \$11.94 | 10,650 | \$11.86 |
| Recoverable ore | 56,530 | 11.62 | 322,650 | 11.50 |
| Shaft and surface pillars | 49,700 | 14.60 | ..... | ..... |
| Remnant and sill pillars | 86,198 | 10.57 | ..... | ..... |
| Total | 214,920 | \$11.90 | 333,300 | \$11.51 |

Mining

In spite of the industry wide shortage of trained miners, a 25 percent increase in tonnage over the previous year was achieved.

Stopping production amounted to 101,107 tons or 96 percent of the total tonnage mined. The remaining 4,747 tons were obtained from development raises.

The No. 3 shaft area was re-opened and two stopes brought into production on the 3,000-foot level.

Development and Exploration

Lateral development was confined to 140 feet of drifting in iron formation on the 2,750-foot level, a 366-foot drive on the 3,800-foot level and 134.5 feet of drive to intersect the bottom of No. 1 shaft on the 3,000-foot level.

Two exploration raises, 147 feet in 701 W and 233.5 feet in 2901 E were driven but did not develop any ore.

Ore raises totalling 657 feet on the 5, 9, 6 and 7 veins were driven to provide access and ventilation.

Employment and Management

The average number of employees was 192: 100 underground and 92 on surface. G. A. Vary was the mine manager.

Porcupine Paymaster Limited

Paymaster Consolidated Mines Limited was incorporated in February 1930, with an authorized capitalization of 9,000,000 shares of \$1 par value, of which 8,629,090 shares were issued. In April 1964, the name was changed to Porcupine Paymaster Limited, and the authorized capitalization was reduced to 5,000,000 shares of no par value, of which 2,876,370 shares have been issued. Shareholders received one share of Porcupine Paymaster for three shares of Paymaster Consolidated. The directors and officers were: W. C. Ringsleben, president and managing director; H. D. Rothwell, vice-president and director; L. G. Sams, Marshal Stearns, S. A. Caldbeck, and C. A. Burns, directors; and A. C. Buckley, secretary-treasurer. The head office and mine office are at P.O. Box 100, South Porcupine.

The main property, comprising 751.6 acres, is in Deloro and Tisdale townships, Porcupine area, District of Cochrane.

Mining and milling continued throughout 1965.

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SHAFTS, PORCUPINE PAYMASTER MINE

| | CLAIM NUMBER | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | SINKING 1965 | VERTICAL DEPTH FROM SURFACE |
|---------|--------------|-------------|------------------------|--------------|--------------|-----------------------------|
| | | | | feet | feet | feet |
| Shaft 1 | TRS776 | Vertical | 2 (inactive) | Surface | .. | 80 |
| Shaft 2 | TRS776 | Vertical | 2 (inactive) | Surface | .. | 814 |
| Shaft 3 | TRS776 | Vertical | 4 (inactive) | Surface | .. | 400 |
| Shaft 4 | HS747 | Vertical | 2 (inactive) | Surface | .. | 253 |
| Shaft 5 | 14115 | Vertical | 3 | Surface | .. | 4,462 |
| Shaft 6 | 13128 | 60° | 2 (inactive) | Surface | .. | 482 |
| Shaft 7 | 14114 | Vertical | 2 (filled) | Surface | .. | 75 |
| Shaft 8 | 14115 | Vertical | 2 (filled) | Surface | .. | 185 |
| Shaft 9 | 14115 | Vertical | 1 (inactive) | Surface | .. | 185 |
| Winze 1 | ..... | 75° | 2 (inactive) | 1,040 | .. | 1,202 |
| Winze 2 | ..... | Vertical | 2 (inactive) | 1,033 | .. | 1,615 |
| Winze 3 | ..... | Vertical | 2 (inactive) | 1,023 | .. | 2,093 |
| Winze 4 | ..... | Vertical | 2 (inactive) | 428 | .. | 1,043 |
| Winze 5 | ..... | Vertical | 3 | 2,046 | .. | 4,202 |
| Winze 6 | ..... | Vertical | 3 | 4,059 | 82 | 6,157 |

The No. 6 winze was sunk a further 82 feet to a depth of 2,098 feet below the collar or 6,157 feet below surface.

Development work during the year consisted of 1,867 feet of drifting, 896 feet of crosscutting, and 1,612 feet of raising. Development footage to 31 December 1965, totaled 197,170 feet of drifts, 82,577 feet of crosscuts, and 68,246 feet of raises. Diamond-drilling consisted of 65 holes from underground, totalling 3,543 feet, and one hole from surface, totalling 328 feet.

In all, 172,408 tons of ore were hoisted, of which 170,845 tons were milled at a daily average of 468.1 tons in 1965.

Company Annual Report

The following is taken from the company annual report for the year ending 30 June 1965.

New ore developed above the 4,375-foot level during the year amounted to only 157 feet and ore reserves on the upper levels have been depleted to 150,000 tons. However, development between the 4,525- and 6,025-foot levels indicates a reserve in 36 vein at the end of the fiscal year of approximately 297,500 tons containing a cut grade of 0.252 ounces per ton. Development of this vein on the 6,025-foot level shows at 6 November a continuous ore length of 830 feet and a width of 8 feet. The 36 vein has recently been cut in the crosscut on the 5,725-foot level where it shows width and grade similar to the levels above and below.

Ore Reserves

| | AMOUNT OF ORE | GRADE OF ORE |
|---|---------------|--------------|
| | tons | oz. per ton |
| Above 4,375-foot level (including broken ore) | 151,218 | .220 |
| Below 4,375-foot level (not completely blocked out) | 297,500 | .252 |
| | 448,718 | .241 |

Milling

| | | 1965 | 1964 |
|-------------------------|-------------|----------|----------|
| Milled | ton | 193,713 | 185,925 |
| Average per day | ton | 531 | 508 |
| Gold produced | oz. | 37,575.1 | 30,077.8 |
| Average mill head grade | oz. per ton | 0.205 | 0.173 |
| Average recovery | percent | 94.73 | 93.42 |

Costs

| | TOTAL COST | COST PER TON MILLED |
|--------------------|-----------------------|---------------------|
| Diamond-drilling | \$ 14,429.63 | \$.07 |
| Drifting | 153,299.32 | .79 |
| Crosscutting | 1,411.19 | .01 |
| Raising | 44,110.72 | .23 |
| Mining | 1,158,553.89 | 5.98 |
| Ore transportation | 20,940.04 | .11 |
| Crushing | 44,139.69 | .23 |
| Milling | 248,307.22 | 1.28 |
| General expense | 126,806.96 | .65 |
| | \$1,811,998.66 | \$9.35 |

Employment and Management

The average number of employees was 241: 168 underground and 73 on surface. W. C. Ringsleben was the president and general manager.

Preston Mines Limited

Preston East Dome Mines Limited was incorporated in January 1911, and reorganized in February 1936 and in September 1957. In August 1960, the name was changed to Preston Mines Limited (the amalgamation of Preston East Dome Mines with Stanleigh Uranium Mining Corporation Limited) with an authorized capitalization of 10,000,000 shares of no par value, of which 6,728,000 have been issued. The company is controlled by Rio Tinto Mining Company of Canada Limited. The directors and officers were: W. B. Malone, president and director; W. P. Arnold and G. Baker, vice-presidents and directors; R. D. Lord, director and general manager of operations; Ian Crookston, H. L. Roper, G. B. Langford, W. C. Pitfield, and G. R. Albino, directors; E. S. W. Hunt, vice-president; G. R. Devey, secretary; and D. G. Scott, treasurer. The head office is at Suite 1100, 335 Bay Street, Toronto 1. The mine address is South Porcupine.

The property comprising 16 claims, immediately south and east of the Dome mine, is in Tisdale and Deloro townships, Porcupine area, District of Cochrane.

Mining and milling operations continued throughout 1965.

SHAFTS, PRESTON MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | TOTAL DEPTH FROM SURFACE |
|-------|-----------|-------------|---|--------------|--------------------------|
| | | | | feet | feet |
| No. 1 | P13151 | 63° | 2 (escape) | surface | 95 |
| No. 2 | P13151 | Vertical | 5 | surface | 2,388 |
| No. 3 | ..... | Vertical | 3 to 69 feet above 28th; 4 to bottom | 2,166 | 4,170 |
| No. 4 | P12971 | Vertical | 3 (inactive) | surface | 400 |

Development work during the year consisted of 4,754 feet of drifting, 1,319 feet of crosscutting, and 1,754 feet of raising. The total development footage to 31 December 1965 was 136,265 feet of drifts, 164,268 feet of crosscuts, and 69,717 feet of raises. Diamond-drilling in 1965 consisted of 190 holes, totalling 19,649 feet from underground.

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Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

| | | 1965 | 1964 |
|--------------------------|-------------|---------|---------|
| Milled | ton | 180,810 | 188,500 |
| Average per milling day | ton | 613 | 639 |
| Gold produced (est.) | oz. | 33,995 | 38,092 |
| Silver produced (est.) | oz. | 3,989 | 4,235 |
| Average mill heads | oz. per ton | 0.196 | 0.211 |
| Average net recovery | oz. per ton | 0.188 | 0.202 |
| Average gold in tailings | oz. per ton | 0.0084 | 0.0085 |
| Average recovery | percent | 96.0 | 96.0 |

Tons milled were 5 percent less than for the previous year and the grade of mill feed was 7 percent below that in 1964. The mill produced 48,000 tons of hydraulic fill for the mine.

Costs

| COSTS PER TON OF ORE MILLED | 1965 | 1964 |
|----------------------------------|--------|--------|
| Development and diamond-drilling | \$1.48 | \$1.91 |
| Mining | 5.88 | 6.09 |
| Milling | 1.32 | 1.25 |
| Total | \$8.68 | \$9.25 |

Operating costs were 6 percent lower than for the previous year. The principal factor contributing to the lower operating costs was a curtailed development programme from which was eliminated work of a highly exploratory nature in the mine. Stoping costs also were slightly lower than the previous year.

Development

Of the new ore disclosed, 79 percent is in the Midcamp zone, and 21 percent in the area leased from Dome Mines.

The disposition of the sulphide veins in the Midcamp zone is generally known from previous exploratory work on the 12th to 20th levels. This permitted a much less extensive diamond-drilling programme and, with development concentrated in the favourable areas, approximately double the new ore-footage was obtained compared to the previous year. Development ore comprised 10.9 percent of the mill feed during 1965 and, at year end, broken reserves remained unchanged at 12,900 tons.

Ore Reserves

Ore reserves at 31 December 1965 were estimated at 237,673 tons, with an indicated grade of 0.20 ounces per ton. Although the ore reserve grade, allowing for 10 percent dilution, is calculated at 0.20 ounces per ton, mining experience in 1965 was of a lower actual grade of 0.196 ounces per ton.

Employment and Management

The average number of employees was 262: 180 underground and 82 on surface. G. F. Greenacre was the mine manager.

Renabie Mines Limited

Renabie Mines Limited was incorporated in January 1941, with an authorized capitalization of 1,500,000 shares of \$1 par value, of which 1,050,005 shares have been issued. The company is a subsidiary of Macassa Mines Limited. The officers and directors were: John D. Bryce, president and director; J. G. Boeckh, vice-president and director; Miss B. A. Argo, secretary-treasurer and director; and P. K. Hanley, J. C. L. Allen, R. C. Stanley Jr., and C. C. Huston, directors. The head office is at Suite 400, 112 King Street West, Toronto 1. The mine address is Renabie.

The property comprises 33 claims, about 886 acres, in Rennie, Leeson, Brackin and Stover townships, District of Sudbury.
Mining and milling continued throughout 1965.

SHAFTS, RENABIE MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | SINKING 1965 | TOTAL DEPTH BELOW SURFACE |
|-------|-------------------------|-------------|------------------------|--------------|---------------------------|
| No. 1 | S34314 (Leeson twp.) | Vertical | 3 | feet | feet 281 |
| No. 2 | S34317 (Leeson twp.) | Vertical | 3 | 441 | 3,300 |

The 2,955-foot, 3,105-foot, and 3,255-foot levels were established at these depths, below the collar.

Development work during the year consisted of 3,042 feet of drifting, 457 feet of crosscutting, and 1,828 feet of raising. Total development footage to 31 December 1965 involved 41,250 feet of drifts, 20,431 feet of crosscuts, and 26,437 feet of raises. Diamond-drilling in 1965 consisted of 118 holes, totalling 20,004 feet, from underground.

New construction in 1965 consisted of a bunkhouse, 93.7×32 ft., a cap and fuse house, 12×20 ft., and an addition of one storey to the dry.

Added equipment in 1965 included one wood tailings line, mill and underground pumps, mine cars, and locomotive batteries.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

| | 1965 | 1964 | 1963 |
|------------------|-----------------|--------------|--------------|
| Gross recovery | \$ 1,430,817.42 | 1,222,728.05 | 1,313,018.18 |
| Milled | ton 165,018 | 171,830 | 182,552 |
| Recovery per ton | \$ 8.671 | 7.116 | 7.19 |

Milling

The average tons milled per day in 1965 was 452.1 as compared to 469.6 in 1964. Bullion recovery comprised 37,421.44 ounces of gold, and 13,163.22 ounces of silver.

From the commencement of milling operations (July 1947) 2,989,085 tons of ore have been milled, from which has been recovered 620,041.09 ounces of gold and 194,368.66 ounces of silver, having a gross recovered value of \$22,516,076.78 equivalent to \$7.53 per ton milled, exclusive of cost aid.

There were no changes in the mill circuit during the year. The recovery decreased from 95.5 percent in 1964 to 93.8 percent in 1965. Part of the trouble was due to the difficulty of obtaining a consistently fine grind, when constantly breaking in new grinding operators. It is hoped that some controls will be installed in 1966 to ensure a more uniform grinding product.

The over-all milling cost per ton increased to \$2.08 from \$1.97 in 1964.

Development

During the year, all the ore on the 2,325-foot level and some of the ore on the 2,475-foot level was developed and prepared for mining. The main crosscut on the 2,625-foot level was started to the south toward the ore.

The grade and volume of ore on the lower levels continues to improve. The mill heads in January 1965 were 0.19 ounces of gold per ton and in December were 0.30 ounces per ton, as more ore was taken from the 2,325 and 2,475-foot levels. A total of 222,000 tons of ore was prepared for mining in 1965, compared to 127,000 tons in 1964.

In August, shaft contractors started to deepen the main shaft from the 2,805- to the 3,455-foot level, to permit the development of four new levels.

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A new ventilation system together with a larger fan was put into operation during the year. This system doubled the amount of fresh air being brought to the lower levels and improved working conditions everywhere underground.

Ore Reserves

The total ore reserves increased to 282,376 tons with a grade of 0.26 ounces of gold per ton, as compared to 245,324 tons of 0.28 ounces per ton in 1964.

| | AMOUNT OF ORE | GRADE OF ORE | TOTAL GOLD VALUE @ \$35.00 PER OZ |
|--------------|------------------|-----------------|---|
| | tons | per ton | |
| Unbroken ore | 222,308 | 0.25 | \$ 8.75 |
| Broken ore | 60,068 | 0.29 | 10.15 |
| Total | 282,376 | 0.26 | 9.10 |

Operating Costs

| | 1965 | 1964 |
|-------------------|-----------|-----------|
| Ore Milled ton | 165,018 | 171,830 |
| Gold Recovered oz | 37,421.44 | 32,034.85 |

| | 1965 | | 1964 | |
|--|-------------------------------|-------------------------------------|-------------------------------|-------------------------------------|
| | COST PER TON OF ORE MILLED | COST PER OZ OF GOLD RECOVERED | COST PER TON OF ORE MILLED | COST PER OZ OF GOLD RECOVERED |
| Development and exploration | \$2.33 | \$10.27 | \$2.35 | \$12.61 |
| Mining | 3.34 | 14.74 | 3.49 | 18.73 |
| Milling | 2.08 | 9.18 | 1.97 | 10.58 |
| Undistributed operating charges including Adminis- tration and head office | .82 | 3.60 | .79 | 4.21 |
| Operating costs | \$8.57 | \$37.79 | \$8.60 | \$46.13 |
| Depreciation | .60 | 2.62 | .52 | 2.81 |
| Provision for all taxes | .06 | .27 | .01 | .04 |
| | \$9.23 | \$40.68 | \$9.13 | \$48.98 |

Employment and Management

The average number of employees was 184: 97 underground and 87 on surface. W. A. Moore was the mine manager.

Sapawe Gold Mines Limited

Lindsay Explorations Limited was incorporated in February 1955; in January 1963 the name was changed to Sapawe Gold Mines Limited; in 1965 the authorized capitalization was increased to 10,000,000 shares of \$1 par value, of which 8,292,376 shares have been issued. The directors and officers were: W. J. La Morte, president and director; J. A. Moss, W. M. Zilbersher, J. C. D. Bouchard, S. W. Erickson, and R. B. Krize, directors; Eileen McBain, secretary; W. H. Connolly, treasurer; and Elizabeth Dillon, assistant secretary-treasurer. The head office and mine address is Box 759, Atikokan.

The property comprises 52 claims in McCaul and Hutchinson townships, Fort Frances district, located about 15 miles east of Atikokan, and connected to the Atikokan highway by road.

Mining operations continued from 1 January to 31 December; milling from 2 to 15 January 1965.

The vertical, three compartment No. 1 shaft collared in claim No.FF3417 was sunk 665 feet in 1965 to a total depth of 1,016 feet below the collar. The 520-foot, 720-foot, and 920-foot levels were established at vertical depths of 521.5 feet, 721.5 feet, and 921.5 feet respectively, below the collar. Development footage in 1965 consisted of 550 feet of drifting, and 1,371 feet of crosscutting. Total development footage to 31 December 1965 consisted of 1,807 feet of drifts; 2,145 feet of crosscuts; and 861 feet of raises. Two diamond-drillholes totalling 188 feet were completed from underground in 1965.

New construction in 1965 included a garage, 62×43 feet and a waste bin, 12×16 feet.

Added equipment in 1965 was as follows:

- 1 double drum air slusher
- 2 sinking ropes
- 3 motor pumps: one 270gpm @ 360 feet head; one 290gpm @ 360 feet head; one 100gpm @ 375 feet head.
- 8 rock drills
- 2 trammers
- 2 loaders
- 3 mine timber trucks
- 1 double charger, 17.5kw, 60V, 300amp, 25 hp
- 2 tuggers
- 10 dump mine cars, 1½ ton capacity
- 1 truck—3 ton capacity
- 2 stopers
- 1 locomotive battery.

Altogether 1,064 tons of ore were hoisted; and 1,001 tons were milled.

Employment and Management

The average number of employees was 26; 10 underground and 16 on surface.

A. F. Heather, vice-president and mine manager, was in charge.

Stairs Exploration & Mining Company Limited

Stairs Exploration and Mining Company Limited was incorporated in March 1962 with an authorized capitalization of 5,000,000 shares of \$1 par value, of which 2,600,005 shares have been issued. The directors and officers were: I. C. Stairs, president and director; G. P. Stairs, vice-president and director; E. G. Byrne, and E. F. Stairs, directors; Miss M. A. Calnan, secretary-treasurer. The head office is at P.O. Box 520, 920 Bridge Street, Bathurst, New Brunswick. The mine address is P.O. Box 189, Matachewan.

The property is a gold prospect consisting of 189 claims located in Midlothian, Halliday and Montrose townships, District of Timiskaming.

The mine operated from 5 January to 22 December; the mill from 2 June to 22 December 1965.

SHAFTS, STAIRS MINE

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|---------------------|-----------|-------------|------------------------|-----------------|------------------------------|
| No. 1 inclined adit | MR26662 | -20° | 1 | feet Surface | feet 100 |
| No. 1 shaft | MR26662 | Vertical | 3 | Surface | 683 |

The 650-foot level was established at a vertical depth of 641 feet below the collar.

Development footage in 1965 consisted of 1,209 feet of drifting, 707 feet of crosscutting, and 770 feet of raising. Total development footage to 31 December

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1965 consisted of 3,191 feet of drifts; 2,947 feet of crosscuts; 1,145 feet of raises. Altogether 22 diamond-drillholes, totalling 4,419 feet, were completed from underground, and 10 holes, totalling 3,673 feet, were completed from surface in 1965. A total of 1,200 feet of surface trenching averaging 4 feet in depth was also completed.

New construction consisted of a cold storage warehouse, 35×20 feet, and an assay office, 32×25 feet.

Employment and Management

The average number of employees was 45: 19 underground and 26 on surface. R. J. Roach was the mine manager, K. G. Hope was the superintendent.

Teck Corporation Limited Teck-Hughes Mining Division

Teck-Hughes Gold Mines Limited was incorporated in March 1923. In July 1963 the consolidation of Teck-Hughes Gold Mines Limited, Lamaque Gold Mines Limited, Howey Consolidated Mines Limited, and Canadian Devonian Petroleum Limited was completed. The name was changed to Teck Corporation Limited, with an authorized capitalization of 5,000,000 shares of no par value, of which 4,619,375 shares have been issued. The officers and directors were: N. B. Keevil, president, chairman of the board, and director; J. H. Westell, executive vice-president, treasurer, and director; J. A. Downing and N. B. Keevil Jr., vice-presidents and directors; Sir Michael Butler, Bt., secretary and director; R. P. Koenig, L. N. Watt, G. L. Jennison, J. D. Leishman, and D. A. Perigoe, directors; J. W. Stephenson and B. Middleton, assistant secretaries; and D. S. Brown, assistant treasurer. The executive office is at Suite 1000, 11 Adelaide Street West, Toronto 1. The Teck-Hughes Mining Division of Lamaque Mining Company Limited address is Kirkland Lake.

Teck-Hughes Gold Mines Limited acquired, in 1960, the adjoining Kirkland Minerals Corporation Limited property. The Teck property now comprises 44 claims in Teck township, Kirkland Lake area, District of Timiskaming. The reported total development footage completed by Kirkland Minerals up to the time of mine closure, 27 August 1960, was transferred and is now included in Teck-Hughes totals.

Mining and milling continued throughout 1965.

SHAFTS, TECK-HUGHES MINING DIVISION

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH FROM SURFACE |
|-------------------------|-----------|-------------|------------------------|-----------------|-----------------------------|
| South shaft | 16625 | Vertical | 4 | feet Surface | feet 3,690 |
| South shaft extension | 16625 | Vertical | 4 | 3,639 | 5,553 |
| No. 3 winze | 16625 | 60° | 3 | 4,887 | 6,148 |
| No. 4 winze | 16625 | Vertical | 3 | 3,638 | 4,572 |
| Central shaft | 16626 | Vertical | 4 | Surface | 3,014 |
| 10th level winze | 16626 | Vertical | 3 (inactive) | 1,098 | 1,985 |
| No. 2 winze | 16625 | | | | |
| | 16626 | 60° | 3 (inactive) | 3,639 | 4,900 |
| Central shaft extension | 16626 | Vertical | 3 (inactive) | 2,997 | 3,631 |
| No. 1 shaft | 1238 | Vertical | 2 (inactive) | Surface | 490 |
| No. 1 winze | ..... | Vertical | 2 (inactive) | 475 | 1,129 |

The south shaft extension is caved between the 33rd and 36th levels, and inactive between the 30th and 33rd levels at present. A double-drum air hoist was installed on the 36th level to service the levels to the bottom, or 45th level.

During the year, 422 feet of drifting, 497 feet of crosscutting, and 1,101 feet of raising was completed. Total development footage to 31 December 1965 was 261,221 feet of drifts; 97,695 feet of crosscuts; 120,166 feet of raises. Altogether 49 diamond-drillholes, totalling 2,037 feet, were completed during 1965 from underground. Altogether, 84,354 tons of ore were hoisted, and the mill treated 84,510 tons, averaging 231.5 tons daily.

Company Annual Report

The following is taken from the company annual report for the year ending 30 September 1965.

The old Teck-Hughes mine is approaching the end of its operations. During the past year exploration and development for new sources of ore were curtailed and early in the new calendar year preparations for the final ore draws will get underway. The blocks of ore presently tied up in shaft pillars and other working places will provide many months of mill feed.

Production

During the period 87,315 tons of ore were milled. Recovery of bullion amounted to 21,979.122 ounces of gold and 3,565.560 ounces of silver, valued at \$834,286 or \$9.56 per ton.

Operating Costs

A comparison of costs for the fiscal years 1965 and 1964 follows:

| | TOTAL COST | | COST PER TON OF ORE TREATED | |
|-----------------|--------------------|--------------------|-----------------------------|---------------|
| | 1965 | 1964 | 1965 | 1964 |
| Development | \$125,343 | \$155,504 | \$1.44 | \$1.28 |
| Mining | 682,066 | 695,170 | 7.81 | 5.70 |
| Milling | 202,534 | 214,756 | 2.32 | 1.76 |
| General expense | 36,070 | 42,289 | .41 | .35 |
| Depreciation | 35,690 | 29,742 | .41 | .24 |
| | <u>\$1,081,703</u> | <u>\$1,137,461</u> | <u>\$12.39</u> | <u>\$9.33</u> |

Amount of ore treated was 87,315 tons in 1965 as compared with 121,885 tons in 1964.

Employment and Management

The average number of employees was 191: 111 underground and 80 on surface. G. G. Gilchrist was the mine manager.

Tegren Goldfields Limited

Tegren Goldfields Limited was incorporated in February 1965, with an authorized capitalization of 5,000,000 preferred shares of \$1 par value and 3,000,000 common shares of no par value of which 2,000,000 common shares have been issued. The officers and directors were: N. B. Keevil, president and director; Sir Michael Butler, Bt., secretary and director; J. B. Anderson, vice-president and director; H. F. Ditchburn, J. E. Parsons, J. T. Garrow, and H. P. Oakes, directors; J. H. Westel, treasurer; and D. S. Brown, assistant secretary and assistant treasurer. The head office is at Suite 1000, 11 Adelaide Street West, Toronto 1. The mine address is Kirkland Lake.

The property consists of 782 acres in Teck township, Kirkland Lake area, District of Timiskaming. It is adjacent to the west boundary of Macassa Gold Mines Limited. Tegren Goldfields Limited is a subsidiary of Teck Corporation.

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The mine operated from 1 March to 31 December 1965.

Development work during the time of operation was done by Macassa on a contract basis. Altogether, 3,365 feet of drifting, and 10 feet of crosscutting was done on four levels on the Tegren property. Diamond-drilling in 1965 consisted of 61 holes totalling 9,693 feet from underground, and 9 holes totalling 8,864 feet from surface.

Altogether 7,179 tons of ore were hoisted and milled at Macassa.

Employment and Management

C. M. Armstrong, geologist, was in charge for Tegren at the property, and the operation was carried on by the Macassa organization.

Upper Beaver Mines Limited

Upper Beaver Mines Limited was incorporated in May 1964, with an authorized capitalization of 60,000 preferred and 40,000 common shares each of \$1 par value; 60,000 preferred and 3 common shares have been issued; it is a subsidiary company of Upper Canada Mines Limited. The directors and officers were: T. J. Day, president and director; J. W. McBean, vice-president and director; G. F. Day, director; K. H. Larkin, secretary-treasurer; and E. S. Chard, assistant secretary-treasurer. The head office is at Room 600, 250 University Avenue, Toronto. The mine address is Dobie.

The property consists of 37 claims in Gauthier township and 16 claims in McVittie township, Kirkland-Larder Lake area, District of Timiskaming, about six miles northeast of the Upper Canada mine site.

The mine operated from February to 31 December 1965.

SHAFTS, UPPER BEAVER MINE

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | SINKING 1965 | VERTICAL DEPTH FROM SURFACE |
|-------|-----------|-------------|------------------------|-----------------|--------------|-----------------------------|
| No. 1 | 2586 | Vertical | 2 | feet Surface | feet .. | feet 102 |
| No. 3 | 2587 | Vertical | 2 | Surface | 29 | 549 |
| Winze | 2587 | Vertical | 2 | 500 | .. | 1,290 |

Development work during the year consisted of 2,076 feet of drifting, 771 feet of crosscutting, and 217 feet of raising. Total development footage to 31 December 1965 was as follows: 17,501 feet of drifts; 12,888 feet of crosscuts; 217 feet of raises. Diamond-drilling in 1965 consisted of 104 holes, totalling 17,126 feet, from underground and 2 holes, totalling 315 feet from surface.

Equipment added in 1965 included the following:

- 1 skip, 2 ton end dump
- 1 pump, 500-foot head, 120 gpm
- 1 motor, 50 hp.

(See page 62 for "Upper Beaver Mine.")

Employment and Management

The work has been carried out by employees of Upper Canada Mines Limited. J. H. Botsford was the general manager.

Upper Canada Mines Limited

Upper Canada Mines Limited was incorporated in April 1929, with an authorized capitalization of 3,500,000 shares of \$1 par value, of which 3,499,827 shares have been issued. The directors and officers were: T. J. Day, president and director; J. W. McBean, vice-president and director; J. H. Botsford, general manager and director; K. H. Larkin, secretary-treasurer and director; E. T. Donaldson, J. A. W. Brown, and G. F. Day, directors; and E. S. Chard, assistant secretary-treasurer. The head office is at Room 600, 250 University Avenue, Toronto. The mine address is Dobie.

The company's property comprising 51 claims is in Gauthier township, Kirkland Lake area, District of Timiskaming.

Mining and Milling continued throughout 1965.

SHAFTS, UPPER CANADA MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | VERTICAL DEPTH BELOW SURFACE |
|-------|-----------|-------------|------------------------------|------------------------------|
| No. 1 | L6314 | Vertical | 3 and 4 (1,750-3,625 ft.) | feet 6,296 |
| No. 2 | L6321 | Vertical | 3 | 1,877 |

During the year 5,284 feet of drifting, 1,783 feet of crosscutting, and 1,664 feet of raising were completed. Total development footage to 31 December 1965 was: 155,222 feet of drifts; 37,456 feet of crosscuts; and 42,261 feet of raises. Altogether, 206 diamond-drillholes totalling 28,921 feet were drilled from underground.

New construction in 1965 consisted of a cyanide unloading and mixing installation, 25 ton capacity, steel construction.

Added equipment was as follows:

- 1 flotation circuit in the mill, 160tpd capacity
- 1 lathe, 20×80 in.
- 1 pump, 600 ft. head, with 25 hp motor.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

A total of 195,416 tons was handled, of which 153,282 tons grading \$12.12 gold came from the Upper Canada mine, and 42,134 tons grading \$12.80 gold and .647 percent copper came from Upper Beaver mine.

| | GOLD | SILVER | COPPER |
|-------------------|-----------|-----------|---------|
| | oz. | oz. | lb. |
| Upper Canada mine | 49,126.29 | 17,176.37 | ..... |
| Upper Beaver mine | 14,150.92 | 1,886.16 | 482,382 |
| Total | 63,277.22 | 19,062.53 | 482,382 |

Ore reserves were maintained throughout the year.

Upper Canada Mine

The exploration heading driven west on the 2,750-foot level to check the deep drilling below the "C" zone has reached the downward projection of the zone, and first results of diamond-drilling from the drift are favourable. This zone lies some 4,000 feet to the west and south of the "L" zone on this level.

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Development of the "L" zone below the 4,800-foot level was continued throughout the year, and considerable exploration drifting was done on levels above. Crosscuts to the zone were started on the 5,250-, 5,550-, and 6,150-foot levels. An ore pass system from the 5,100-foot level to the 5,700-foot level was completed early this year.

No stoping has been done below the 5,800-foot level.

Production

| | L ZONE | | B ZONE | | TOTAL | | |
|----------------|---------|---------------|--------|---------------|---------|---------------|-------------|
| | ORE | GRADE | ORE | GRADE | ORE | GRADE | VALUE |
| | ton | Value per ton | ton | Value per ton | ton | Value per ton | |
| 1750-2750-foot | 1,653 | \$ 7.79 | 9,474 | \$6.35 | 11,127 | \$ 6.56 | \$ 72,995 |
| 2750-3625-foot | 43,960 | 10.66 | .... | .... | 43,960 | 10.66 | 468,438 |
| 3625-4800-foot | 92,015 | 13.43 | .... | .... | 92,015 | 13.43 | 1,235,574 |
| 4800-6150-foot | 6,180 | 13.10 | .... | .... | 6,180 | 13.10 | 80,951 |
| Total | 143,808 | \$12.50 | 9,474 | \$6.35 | 153,282 | \$12.12 | \$1,857,958 |

Upper Beaver Mine

The mine has responded well to close exploration and development. Approximately 2,000 feet of drifting above the 500-foot horizon has developed 1,522 feet of ore grading \$10.85 gold and 1.01 percent copper. Some excellent grade copper ore over narrow widths is currently being opened on the 500-foot level.

As a result of the favourable development results above the 500-foot level, preparations are now being made to install a hoisting plant for the winze to permit exploration and mining of the lower levels.

The shaft was deepened 29 feet to permit use of a two ton skip-cage combination, which has greatly increased hoisting capacity.

Production

| LEVEL | TONS OF ORE | GRADE OF ORE | |
|-----------|-------------|------------------------|-------------|
| | | AU. (VALUE PER TON) | PERCENT CU. |
| 80-foot | 16,713 | \$14.15 | 0.80 |
| 200-foot | 12,330 | 13.45 | 0.52 |
| 350-foot | 11,173 | 11.05 | 0.56 |
| 500-foot | 1,365 | 6.60 | 0.33 |
| Stockpile | 553 | 9.70 | 0.76 |
| | 42,134 | \$12.80 | 0.64 |

Milling

The Upper Canada circuit averaged 419.9 tons per day. Heads were \$12.12, tails were \$0.74, and recovery at 93.84 percent is the highest in many years. The improvement in recovery is partially a result of the lower tonnage handled.

The Upper Beaver flotation circuit averaged 128.1 tons per day, and produced 1,090.97 dry tons of concentrate grading 11.71 ounces per ton in gold, 2.73 ounces per ton silver, and 23.19 percent copper. The flotation tailings were cyanided in the Upper Canada circuit and yielded 1,945.12 ounces of gold. The recovery on Upper Beaver ore was 96.36 percent of the gold and 93.63 percent of the copper.

Employment and Management

The average number of employees was 319: 216 underground and 103 on surface. J. H. Botsford was the general manager.

Wilmar Mines Limited

Wilmar Mines Limited was incorporated in September 1958 with an authorized capitalization of 3,000,000 shares of 95 cents par value, of which 2,578,923 shares have been issued. The directors and officers were: E. C. Cochenour,

president and director; G. C. MacDonnell, vice-president and director; M. C. Mosher, J. B. McLellan, and C. E. Mooney, directors; and C. V. Maltby, secretary-treasurer. The head office is at Suite 1203, 2200 Yonge Street, Toronto. The mine address is Cochenour.

The property comprises 675 acres in Dome township, Red Lake area, District of Kenora, adjoining south of Cochenour Willans main property. Wilmar Mines Limited was formed to acquire the property from Martin-McNeeley Mines Limited. Development work on the property continues to be carried out by Cochenour Willans on agreement.

Development work continued throughout 1965.

The vertical four-compartment Wilmar winze, collared 1,265 feet below Cochenour No. 1 shaft, was sunk 386 feet in 1965 to a total depth of 816 feet below collar, or 2,081 feet below surface. The 2,050-foot level was established at a depth of 751 feet below collar.

Development work in 1965 consisted of 2,479 feet of drifting, 433 feet of cross-cutting, and 592 feet of raising. Total development footage to 31 December 1965 was 5,557 feet of drifts, 5,767 feet of crosscuts, and 592 feet of raises. In all, 96 diamond-drillholes, totalling 18,871 feet were completed in 1965, from underground.

Employment and Management

J. E. J. Fahlgren was the general manager, and the operation was carried on by the Cochenour Willans organization.

Wright-Hargreaves Mines Limited

Wright-Hargreaves Mines Limited was incorporated in June 1916, with an authorized capitalization of 5,500,000 shares of 40 cents par value; all shares have been issued. The directors and officers were: R. C. Stanley, Jr., president and director; J. G. Boeckh, executive vice-president, treasurer and director; Miss B. A. Argo, secretary and director; and J. C. L. Allen, J. D. Bryce, and P. K. Hanley, directors. The head office is at 4th Floor, 112 King Street West, Toronto 1. The mine address is Kirkland Lake.

The company's main property, comprising four claims, is in Teck township, Kirkland Lake area, District of Timiskaming.

Mining operations ceased 23 March 1965.

SHAFTS, WRIGHT-HARGREAVES MINE

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH FROM SURFACE |
|-------------|-----------|-------------|--|----------------|-----------------------------|
| No. 1 shaft | L1829 | Vertical | 2 to 2,000 ft. 3 to bottom (ventilation) | feet | feet |
| No. 2 shaft | L1830 | Vertical | 2 (sandpass) | Surface | 2,285 |
| No. 3 shaft | L1829 | Vertical | 3 to 1,200 ft. 4 to bottom | Surface | 319 |
| No. 4 shaft | L1829 | Vertical | 3 | Surface | 4,089 |
| No. 5 winze | L1829 | Vertical | 4 to 6,450 ft. 3 to bottom | Surface | 4,000 |
| No. 6 winze | L1829 | Vertical | 2 | 3,600 7,050 | 7,272 8,222 |

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The following table gives the accumulated footage from 1 January 1930 to the time of closure, 23 March 1965.

| LEVEL | DRIFTS | CROSSCUTS | RAISES |
|--------|-----------|-----------|--------|
| | feet | feet | feet |
| 100 | 542 | 263 | 58 |
| 200 | 3,498 | 868 | 16 |
| 300 | 2,534 | 824 | 525 |
| 400 | 4,494.5 | 1,626.5 | 1,189 |
| 550 | 6,344 | 1,856.5 | 2,522 |
| 700 | 4,535.5 | 1,490 | 1,309 |
| 850 | 6,215 | 2,055 | 1,641 |
| 1000 | 4,753 | 1,826 | 1,484 |
| 1125 | 6,701.5 | 2,210.5 | 657 |
| 1250 | 4,077 | 1,518.5 | 369 |
| 1375 | 7,666.5 | 2,616.5 | 1,122 |
| 1500 | 7,177.5 | 1,668 | 1,107 |
| 1625 | 9,069 | 3,562.5 | 2,724 |
| 1750 | 6,577 | 1,428 | 1,846 |
| 1875 | 10,848 | 2,938 | 2,280 |
| 2000 | 8,612.5 | 2,845 | 2,134 |
| 2125 | 10,382.5 | 2,780.5 | 2,283 |
| 2250 | 11,809 | 3,413 | 1,733 |
| 2400 | 9,793 | 3,119 | 1,926 |
| 2550 | 6,745 | 2,894.5 | 2,662 |
| 2700 | 8,896 | 2,598.5 | 2,115 |
| 2850 | 2,942.5 | 2,642.5 | 2,407 |
| 3000 | 4,523.5 | 3,092 | 3,078 |
| 3150 | 6,862 | 1,896 | 2,878 |
| 3300 | 7,004 | 1,690 | 3,889 |
| 3450 | 6,080 | 1,817 | 3,482 |
| 3600 | 3,004 | 1,961 | 2,018 |
| 3750 | 4,307 | 1,483 | 1,458 |
| 3900 | 4,697 | 1,435 | 1,262 |
| 4050 | 5,627 | 2,415 | 2,462 |
| 4200 | 5,238 | 1,893 | 1,974 |
| 4350 | 6,330 | 1,783 | 3,326 |
| 4500 | 5,875 | 2,328 | 3,033 |
| 4650 | 6,097 | 1,570 | 1,812 |
| 4800 | 4,718 | 1,648 | 2,194 |
| 4950 | 3,349 | 2,071 | 2,165 |
| 5100 | 5,441 | 1,425 | 2,253 |
| 5250 | 2,167 | 1,101 | 1,394 |
| 5400 | 1,721 | 1,028 | 1,512 |
| 5550 | 2,554 | 734 | 1,050 |
| 5700 | 1,392 | 1,065 | 643 |
| 5850 | 2,340 | 1,011 | 689 |
| 6000 | 991 | 580 | 414 |
| 6150 | 3,258 | 846 | 528 |
| 6300 | 711 | 812 | 184 |
| 6450 | ..... | 154 | ..... |
| 6600 | 962 | 733 | 92 |
| 6750 | 1,547 | 650 | 521 |
| 6900 | 929 | 565 | 446 |
| 7050 | 2,022 | 976 | 931 |
| 7200 | 2,772 | 1,579 | 1,235 |
| 7350 | 1,375 | 916 | 189 |
| 7500 | 823 | 1,124 | 225 |
| 7650 | 1,066 | 457 | 108 |
| 7800 | 2,220 | 888 | 332 |
| 7950 | 2,403 | 443 | 449 |
| 8100 | 3,004 | 987 | 334 |
| Totals | 257,622.5 | 92,200 | 82,669 |

The total amount of development work prior to 1 January 1930 was 61,459 feet of drifts, 12,300 feet of crosscuts, and 942 feet of raises.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

The last annual report recorded the occurrence of heavy ground movements in August 1964, which resulted in damage on such a scale that mining the remaining relatively small reserve of unbroken ore was abandoned and subsequent underground operations were confined to recovering broken ore and salvaging equipment.

In 1965, 12,666 dry tons of broken ore were drawn from undamaged stopes and milled. From this ore 5,627.33 ounces of gold and 2,159 ounces of silver were recovered, with a gross value of \$215,369.

The last ore was hoisted from the mine on 23 March 1965 and the final ore shipment to Lake Shore mill was made on 12 April 1965.

From commencement of mining in 1921 to termination of operations in 1965, the mine produced 9,934,427 dry tons of ore from which gold and silver with a total value of \$160,634,103 was recovered, or an average of \$16.17 per ton of ore treated.

Costs

The customary table showing production and cost data compared with those of the preceding year is omitted, since no meaningful comparison can be made.

The salvaging of mine equipment and shut down work was virtually completed at the year end, and in January 1966, power and services were cut off.

Retreatment of Mill Tailings

Further studies and testing were conducted jointly by Wright-Hargreaves and Lake Shore Mines into the commercial feasibility of retreating old mill tailings in the main Kirkland Lake basin. Following an experimental run during which approximately 30,000 tons of tailings were pumped to and treated in the Lake Shore mill, it was concluded that an operation designed to treat 1,500 or more tons per day would be profitable and, at the end of the year the decision was reached to prepare facilities for treating up to 2,000 tons daily.

There are approximately 500,000 tons of tailings on Wright-Hargreaves claims that should be recoverable; however, initial operations will be on Lake Shore claims and it is not planned to treat any Wright-Hargreaves tailings during the first two to three years of the operation.

Employment and Management

The average number of employees was 62: 18 underground and 44 on surface. Frank Buckle was the general manager.

IRON ORE AND IRON

Total shipments of iron ore from mines in Ontario in 1965 increased 5.32 percent in quantity from 8,046,769 tons in 1964 to 8,475,218 tons in 1965. The value of shipments increased 10.04 percent, from \$85,613,354 in 1964 to \$94,209,236 in 1965. The production, value, and general statistics for iron ore production by the nickel-copper mines appears under Nickel and Copper, on pages 219, and 220.

The industry paid \$4,446,509 to 479 salaried employees, and \$13,863,148 to 2,447 wage-earners. Fuel and electricity cost \$4,504,035, and process supplies cost \$19,715,487.

Three companies with four plants in Ontario operated a total of 12 blast furnaces in 1965, treating 9,623,136 net tons of iron ore, which included small amounts of mill scale and scrap, to produce 6,112,514 net tons of pig iron. In 1964 these three companies treated 10,008,160 net tons of iron ore to produce 5,554,777 net tons of pig iron. The companies include The Algoma Steel Corporation Limited with the Steelworks Division at Sault Ste. Marie, and the Canadian Furnace Division at Port Colborne; as well as The Steel Company of Canada Limited and Dominion Foundries and Steel Limited, both located at Hamilton. Further details for each company are given in this section.

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The Algoma Steel Corporation Limited

In October 1960, Algoma Ore Properties Limited, Algoma Steel Corporation Limited, and Canadian Furnace Company Limited, were amalgamated under the name of The Algoma Steel Corporation Limited. The authorized capitalization is 15,099,880 shares of no par value, of which 5,798,217 shares have been issued. The directors and officers were: D. S. Holbrook, president, chairman and director; Douglas Joyce, vice-president (operations) and director; J. B. Barber, vice-president (finance) and director; W. R. Binch, Hon. T. A. Crerar, Sir Philip Dunn, H. S. Hamilton, W. H. Howard, G. W. Humphrey, T. R. McLagan, W. E. McLaughlin, E. G. McMillan, M. C. G. Meighen, Egon Overbeck, J. D. Barrington, Ulrich Petersen, Gerhard Wagner, and Wilhelm Zangen, directors; D. A. Machum, secretary; and C. E. McClurg, treasurer. The head office is at 503 Queen Street East, Sault Ste. Marie.

ALGOMA ORE PROPERTIES DIVISION

The Algoma Ore Properties Division holds various iron properties in the Algoma district, including the formerly operated Helen mine, the George W. MacLeod mine and the Sir James mine, three miles east of the Helen, and the Goudreau Pyrite property. The mines (excluding the Goudreau Pyrite property) and the sintering plant, are at Wawa.

George W. MacLeod Mine

This property consists of 14 claims in ranges 23 and 24, Township 29, District of Algoma. Mining operations continued from 1 January to 31 December 1965.

SHAFTS, GEORGE W. MACLEOD MINE

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | VERTICAL DEPTH FROM SURFACE |
|--------------------------|------------------|-------------|------------------------|-----------------------------|
| No. 4 (below 2nd. level) | DJ22 | Vertical | 2 (inactive) | feet 1,778 |
| No. 5 | DJ24 | Vertical | 3 | 2,066 |
| Ropeway | DJ24, 25, 30, 31 | -22° | 1 | 1,827 |

During 1965, 18,582 feet of drifting, 5,515 feet of crosscutting, and 6,050 feet of raising was completed. Total development footage to 31 December 1965 was 119,415 feet of drifts, 36,975 feet of crosscuts, and 47,144 feet of raises. Altogether 88 diamond-drillholes from underground totalling 31,718 feet were completed in 1965.

New construction in 1965 included an extension to the sinter plant, 157×44 feet, a shop extension 101×88 feet and a maintenance office extension, 50×30 feet.

Added and replacement equipment included the installation of a new sinter machine, 105×12 feet to be completed in 1966; a slusher hoist, a mucking machine, a trackmobile, a tractor and ripper and a welding cable.

Altogether 2,327,763 tons of ore were hoisted and conveyed.

Sir James Mine

This property consists of two claims and two mining locations in range 24, Township 29, District of Algoma. A spur railway line was built from the Helen mine to provide service to the operation and for the transportation of ore to the

treatment plant. A conveyor tunnel, 610 feet long, was driven at an angle of -14.5 degrees to house the conveyor carrying ore from the underground crusher to the railway loading point. The crusher room was cut at a point 124 feet vertically below surface.

Mining operations continued from 1 January to 31 December 1965.

In all, 690,045 tons of ore were hoisted and conveyed.

Goudreau Pyrite

The property consists of 16 claims, located in Township 27, range 26, in the Sault Ste. Marie mining division and includes the Rand No. 1 and Bear "A" and "C" groups of claims.

There was no operation in 1965.

The total ore production from the George W. MacLeod and Sir James mines was 3,017,808 tons.

The average number of employees at the mines was 762: 287 underground and 475 on surface.

J. E. Worley was the general superintendent.

STEELWORKS DIVISION

The blast furnace section of the Division is located at Sault Ste. Marie. Operations continued throughout 1965.

PRODUCTION OF IRON, STEELWORKS DIVISION

| Furnace | 1965 | | 1964 | |
|---------|-------------------|------------|-------------------|------------|
| | DAYS OF OPERATION | PRODUCTION | DAYS OF OPERATION | PRODUCTION |
| No. 3 | 363 | 372,575 | 314 | 307,097 |
| No. 4 | 362 | 260,987 | 363 | 225,002 |
| No. 5 | 322 | 671,492 | 366 | 704,255 |
| No. 6 | 362 | 748,346 | 359 | 784,222 |
| Total | | 2,053,400 | | 2,020,576 |

The sintering plant of the Division, located at Wawa, operated a total of 352 days during 1965, producing 747,759 tons of sinter.

The average number of employees in the blast furnace was 487; while in the sintering plant it was 216. W. P. Dowhaniuk was the superintendent.

CANADIAN FURNACE DIVISION

The Canadian Furnace Division, comprising a blast furnace and the accessory equipment necessary to produce pig iron, is located at Port Colborne.

The blast furnace division operated at capacity continuously throughout 1965. Ore ratios in the burden were virtually unchanged, consisting mainly of sized hematitic ore, sinter from the Sault Ste. Marie division, and good grade pellets.

Results of the natural gas injection system installed November 1964 to supplement coke as a fuel will be evaluated.

The blast furnace operated from 1 January to 31 December 1965, a total of 365 days, and produced 235,724 tons of pig iron from the treatment of 403,549 tons of ore, at a daily average of 1,106 tons.

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Employment and Management

The average number of employees was 159. Thomas C. Corder was the general superintendent.

Company Annual Report

The following is taken from the corporation annual report for the year ending 31 December 1965.

Sales

Steel shipments reached an all-time record 1,768,000 tons and exceeded shipments in 1964 by almost 6 percent. The order backlog at the end of the year remained high and was about the same as at the end of 1964.

Exports of steel products, which were 11 percent of total steel shipments in 1964, increased to 14 percent in 1965. In the latter part of the year ingots were shipped to mills in the United States for conversion into hot rolled strip to be returned to the Steelworks for rolling into cold rolled strip and sheet on the wide cold strip mill.

Two new products introduced to the market—welded wide flange beams in sizes from 27 to 48 inches and wide cold rolled strip—were enthusiastically received and up to expected quality levels. Entry into the market for the latter appears to have relieved a chronic shortage in Canada.

The average realization at Sault Ste. Marie on sales of steel products was \$121.88 per ton compared to \$118.66 in 1964. The higher return reflected the sale of an increased tonnage of more highly finished products and modest price increases.

Pig iron shipments, largely from the Canadian Furnace Division at Port Colborne, increased 16 percent from 292,000 tons in 1964 to 338,000 tons. As a result of the sustained high operating rate in the automotive industry, the tonnage exported to the United States increased.

Operations

Increased production of iron was achieved, although one of the large blast furnaces at the Steelworks was out of service for forty-five days early in the year for relining and enlargement. Production of iron for sale was concentrated on the blast furnace at Port Colborne to release as much iron as possible at the Steelworks for steelmaking. Overall blast furnace performance was improved by increased injection of fuels in the form of tar and coke oven gas at the Steelworks and natural gas at Port Colborne and by use of a greater proportion of higher grade iron bearing materials; this resulted in further reductions in the quantity of coke required to produce a ton of iron, thus increasing the capacity of the blast furnaces.

The increase of about 8 percent in steel ingot production resulted from the first full year's operation of the three L-D Oxygen Steel furnaces and 60 percent of total steel was produced in these furnaces.

Improved methods which permitted faster sinter machine speeds, together with steadier operation of the screening plant, were responsible for the higher output of Algoma Sinter. Approximately 90 percent of the sinter produced was used in Algoma's blast furnaces. Of the raw ore sintered, 78 percent was mined from the George W. MacLeod underground mine and 22 percent from the Sir James open pit mine, compared to 73 percent and 27 percent in 1964, reflecting a gradual shift to dependence on the former as the latter mine nears exhaustion.

Improvements, Additions and Alterations

A lease for a minimum of twenty-two years and a joint venture agreement were entered into with Steep Rock Iron Mines Limited. Algoma acquired title to open pit hematite ore to a depth of 350 feet above sea level in the Roberts and Hogarth mines at Steep Rock Lake, and will take delivery of at least 22,000,000 gross tons of pellets at a minimum annual rate of 1,100,000 gross tons. Steep Rock Iron Mines Limited will install a pellet plant at Steep Rock Lake, mine the ore and produce pellets for Algoma averaging 64 percent iron content. Profits of the joint venture will be shared by Algoma and Steep Rock Iron Mines Limited on a formula basis. The pellet plant is expected to be completed early in 1967, and red ore will be mined for Algoma from the leased property under a profit sharing arrangement, prior to production of pellets, at a rate of 600,000 gross tons per year. Under these agreements, Algoma also acquires an interest in substantial magnetite iron ore reserves at Lake St. Joseph, approximately 170 miles north of Steep Rock Lake.

An option was exercised for \$1,300,000 and a ninety-nine year lease entered into with Can-Fer Mines Limited covering a magnetite iron ore property. This property is in the Onaman Iron Range, approximately 100 miles north of Nipigon, on the north shore of Lake Superior. The property was closely drilled and explored and independently estimated to contain a minimum of sufficient open pit ore to produce annually over 1,000,000 gross tons of pellets of slightly over 64 percent iron content for more than twenty years. The royalties per ton of pellets produced are reasonable. It is the intention to hold the Can-Fer and Goulais iron ore properties in reserve.

Caland Ore Company Limited

Caland Ore Company Limited was incorporated in November 1957, with an authorized capitalization of 100,000 shares of \$50 par value, all of which have been issued. It is a wholly-owned subsidiary of the Inland Steel Company of Chicago. The directors and officers were: P. D. Block Jr., chairman and director; C. B. Jacobs, president and director; R. D. Satterley and H. M. Graff, vice-presidents and directors; W. H. Lowe, assistant treasurer, assistant secretary, and director; J. L. Block, L. B. Hunter, J. F. Smith Jr., F. G. Jaicks, and G. A. Ranney Jr., directors; P. P. Ribotto, vice-president; W. B. Cummings, treasurer and assistant secretary; and J. C. Carter, secretary. The head office is at 30 West Monroe Street, Chicago 3, Illinois 60603. The mine address is Atikokan.

The property consists of 66 claims, in Schwenger and Freeborn townships, District of Rainy River, of which 35 are held on a 99-year lease from Steep Rock Iron Mines Limited. The lease covers a section of the C orebody at the east end of Steep Rock Lake.

Normal operations continued throughout 1965.

The Falls Point mine is serviced by the vertical eight-compartment shaft 1,333 feet deep located on claim FF3513.

All underground work was suspended in December 1961. The total development footage at that time was: 205 feet of drifts; 5,171 feet of crosscuts; and 976 feet of raises on the 800-foot, 1,000-foot, and 1,200-foot levels. Nine diamond-drillholes totalling 1,333 feet were drilled from surface in 1965.

The construction of the ore improvement plant and installation of the plant equipment described in the 1964 report, was completed in 1965 and full production commenced.

All production in 1965 was from the open pit and consisted of 2,478,655 tons, of which 1,680,087 tons were processed at a daily average of 11,200 tons.

Employment and Management

The average number of employees was 302: 91 in the open pit and 211 on surface. P. P. Ribotto, vice-president, was in charge at the property.

Cliffs of Canada Limited

Sherman Mine

Cliffs of Canada Limited was incorporated in March 1957, with an authorized capitalization of 20,000 shares of \$10 par value, of which 13,500 shares have been issued. The officers and directors were: H. S. Harrison, president and director; J. S. Wilbur and J. S. Westwater, vice-presidents and directors; R. M. Kimmel, secretary; J. P. Long, treasurer; and J. C. Vickery, comptroller. The head office is at Port Arthur. The Sherman mine address is P.O. Box 217, Timagami.

The Sherman mine is a joint project of Dominion Foundries and Steel Limited of Hamilton and Cleveland Cliffs Iron Company of Cleveland, Ohio, U.S.A. The Cleveland Cliffs organization is in charge of all mining and pelletizing operations. The initial plant capacity is scheduled for a million tons of 64 percent iron pellets with production to commence in 1968.

The property, comprising 112 claims, is in Strathy, Strathcona, Briggs and Chambers townships, Timagami area, District of Nipissing.

Annual Report for 1965

In 1965 work was commenced on road and rail spur construction, construction of the main office and service building, stripping of one of the orebodies and rock work to prepare the concentrator site. One diamond-drillhole, 104 feet in depth, was completed from surface. New equipment included one diesel shovel, 71-B; two air-trac drills; and three crawler tractors, two D-8, one C-6.

Employment and Management

The average number of employees was 17. Dr. M. W. Bartley was the general manager. B. H. Boyum was the mine manager. Two contractors, Carter Construction and Frid Construction, together employed 32 men.

Dominion Foundries and Steel Limited

Dominion Foundries and Steel Limited was incorporated in May 1917; the authorized capitalization was increased to 25,000,000 common shares of no par value, and 500,000 preferred shares of \$100 par value; 15,387,348 common and 250,000 preferred shares have been issued. The officers of the company were: F. H. Sherman, president and managing director; R. R. Craig, executive vice-president (commercial); J. G. Sheppard, executive vice-president (financial) and secretary; D. F. Hassel, vice-president (industrial relations); D. O. Davis, vice-president (engineering); D. A. Lindsey, vice-president (purchasing); W. C. Hassel, vice-president (works manager); F. J. McMulkin, vice-president (research); and W. R. Weir, vice-president. The head office and plant address is Hamilton, P.O. Box 460.

PRODUCTION OF IRON, DOMINION FOUNDRIES AND STEEL

| FURNACE | 1964 | | 1965 | |
|---------|----------|------------|----------|------------|
| | OPERATED | PRODUCTION | OPERATED | PRODUCTION |
| | days | tons | days | tons |
| No. 1 | 366 | 455,454 | 365 | 483,127 |
| No. 2 | 366 | 493,279 | 365 | 538,724 |
| No. 3 | 335 | 405,119 | 365 | 562,222 |
| Total | | 1,353,852 | | 1,584,073 |

The blast furnaces treated 2,417,518 net tons of ore, averaging 6,623 tons per operating day, to produce 1,584,073 net tons of pig iron.

The company's three blast furnaces operated continuously during 1965 and substantially surpassed established records for pig iron production. The improvement was attributed to almost 100 percent usage of pellets with their high iron content, uniformly high blast temperatures, and increased blowing rates.

The main change in operating practice planned for 1966 is the use of pellets made at the Pointe Noire plant from Wabush concentrates. Dofasco has an undivided interest in both the pellet plant and Wabush Mines.

The new coke oven battery of 53 ovens will be completed in 1966 and will eliminate the need for purchased coke. It is expected that construction of No. 4 blast furnace and its ancillary equipment will start in 1966.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Iron Ore Properties

Preliminary work at the Sherman mine site near Timagami in Northern Ontario is proceeding and construction of the service facilities is under way. It is anticipated that this mine will come into production in 1968.

Research

The company's research staff and facilities have been actively developed in recent years and directed towards the following principal areas:

The pre-reducing of iron bearing material to improve blast furnace production rates and costs which is now being pilot plant tested.

A method for reclaiming all the waste iron oxide fines, which has been brought to the point of engineering and costing.

A new method of desiliconizing hot metal, now being tested.

Development of a new surface finish for galvanized steel now being tried on the production line.

Testing of continuous cast steel on which a feasibility study is under way.

The development of steels having superior electrical properties, including very high grade random oriented and grain oriented steels.

Investigations into the development of high strength steels for containers and other products.

Basic research in this field is being sponsored at the University of Windsor.

Research in the area of tin conservation in tin mill products.

Medical Centre

The company's personnel, safety and medical buildings have become inadequate. A new two-storey building, incorporating many of the features of the main office building, is planned to fill this need. This building will contain a medical centre to provide examination, treatment and first-aid facilities and will be named the D. F. Hassel Centre in honour of the vice-president, industrial relations. D. F. Hassel has the longest service of any employee, having joined the company in November 1912.

Employment and Management

The average number of employees in the blast furnace division was 161: W. R. Rombough was the general superintendent, and Lloyd Thomas was the superintendent.

Ferrox Iron Limited

Ferrox Iron Limited, a subsidiary of Quebec Smelting and Refining Limited, has operated a research and pilot plant in Prescott, for the past two years. Work to date has been on Quebec Cartier hematite concentrate which is reduced from 64 to about 99 percent iron oxide. Various ferrites are also being produced.

Employment and Management

The average number of employees was 14. P. D. Maltby was the plant manager.

Geo-Met Reactors Limited

Geo-Met Reactors Limited was incorporated in 1961 and located in the former plant of Quebec Metallurgical Industries situated in south Ottawa, off Albion Road.

Although this company is basically engaged in metallurgical research, it does produce some alloys for the steel industry. The main products are ferro-alloys of vanadium, molybdenum, columbium, and tungsten.

Employment and Management

The average number of employees was 45. S. J. Pettigrew was the general manager.

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Jones & Laughlin Steel Corporation

Adams Mine

Jones & Laughlin Steel Corporation was incorporated in December 1922, with an authorized capitalization of 293,568 preferred shares of \$100 par value and 10,000,000 common shares of \$10 par value; all preferred shares and 7,911,598 common shares have been issued. The officers of the company were: C. M. Beeghly, chairman of the board; W. J. Stephens, president; H. J. Haughton, treasurer; E. C. Ford, secretary. The head office is at 3 Gateway Center, Pittsburgh, Pennsylvania 15230, U.S.A. The address of the Adams mine is Box 547, Kirkland Lake.

The property, known as the Adams mine, comprises 131 claims in Boston township, District of Timiskaming. It is about six miles southeast of Kirkland Lake; the distance by road is approximately 15 miles. The ore is a banded magnetic iron formation containing an average of 25 percent iron. It is mined in open pits, crushed, ground and concentrated magnetically. The concentrate is pelletized and loaded in railroad cars for direct year round shipment to Jones and Laughlin plants.

Operations took place from 1 January to 31 December.

Two diamond-drillholes, totalling 810 feet, were completed from surface.

Major construction in 1965 consisted of a flotation plant, 135×46 feet and a gate house, 16×10 feet.

Added equipment included 36 flotation cells having a capacity of 180 tons per hour, two $\frac{3}{4}$ ton trucks and one Pitman truck.

During 1965 a total of 3,050,470 tons of ore was mined in the open pit, 332,033 tons were rejected by the coarse cobber; and 2,718,437 tons were milled at a daily average of 8,313 tons. Altogether, 1,110,208 tons of waste rock was removed.

Employment and Management

The average number of employees was 291: 235 on surface and in the open pit, 56 in the concentrator. R. E. Durocher was the division superintendent.

Lowphos Ore Limited

Moose Mountain Mine

Lowphos Ore Limited, incorporated in July 1941, is a subsidiary of National Steel Corporation and operates under the direction of the Hanna Iron Ore Division of the corporation. The directors and officers were: W. A. Marting, president and director; R. F. Anderson, G. W. Humphrey and R. J. Linney, directors; S. L. Engel, secretary; and R. E. Beal, treasurer. The head office is at 1601 National Trust Building, 7 King Street East, Toronto 1. The mine address is Box 310, Capreol.

Lowphos Ore Limited has a lease on the Moose Mountain iron property, approximately 6,064 acres, about 35 miles north of Sudbury, in Hutton township, District of Sudbury. The No. 2 open pit produced throughout the year, No. 10 pit commenced production and No. 4 pit had been exhausted at year end. The magnetite ore is concentrated, then pelletized with production of pellets to average 1,750 tons daily to meet a yearly quota of 625,000 tons. The pellets are transported by Canadian National Railways from the property to Depot Harbour

on Georgian Bay where they are transferred to cargo ships for shipping to the National Steel Company at Detroit.

The open pit, concentrator and pelletizing plant operated from 1 January to 31 December 1965.

Altogether 22 diamond-drillholes, totalling 7,305 feet were drilled from surface, and 712,124 tons of ore were processed to produce 614,731 long tons of iron pellets for shipping.

Employment and Management

The average number of employees was 291: 88 in the open pit, 117 on surface, and 86 in the concentrator and pelletizing plant. D. K. Nelson was the superintendent.

Marmoraton Mining Company Limited

Marmoraton Mining Company Limited is a wholly-owned subsidiary of Bethlehem Steel Corporation. It was incorporated in the State of Delaware in November 1950. The authorized capitalization is 205,000 shares of \$100 each, of which 200,500 have been issued. The directors and officers were: E. P. Leach, president and director; A. M. Reed, vice-president, comptroller and director; R. D. Broeker, I. D. Sims and L. W. Foy, vice-presidents and directors; G. C. Vary, vice-president; R. C. Sonneman, secretary; H. Olsen, manager; and E. W. Morris, treasurer. The head office and mine offices are at Marmora. The executive office is at Wilmington, Delaware, U.S.A.

The Company owns an iron property in Marmora and Rawdon townships, County of Hastings, a short distance east of Marmora.

Mining and milling continued throughout 1965.

Major construction in 1965 consisted of a tailings pump house, 27.3×24 feet, concrete block construction, and a foreman's office, 40×20 feet, of prefabricated construction.

Major added equipment consisted of two trucks, 55-ton capacity, and a shovel, 11 cubic yards.

Altogether 1,545,454 tons was mined in the open pit. The mill treated 944,825 tons of ore, averaging 2,779 tons per working day and producing 512,054 tons of pellets.

Employment and Management

The average number of employees was 294: 83 in the open pit and 211 on surface. C. A. Lorenson, vice-president and general superintendent, was in charge.

The Steel Company of Canada Limited

Hilton Works

Blast Furnace Division

The Steel Company of Canada Limited was incorporated in June 1910. The authorized capitalization was increased in 1953, and in 1962 to 28,000,000 shares of no par value, of which 24,139,052 shares have been issued. The directors and officers were: H. G. Hilton, chairman and chief executive officer; V. W. T. Scully, president and director; L. T. Craig and H. M. Griffith, vice-presidents and

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directors; Allan Graydon, G. A. R. Hart, Frederick Johnson, R. A. Laidlaw, W. H. Browne, J. R. Gordon, H. Greville Smith, D. R. McMaster, L. G. Rolland, H. S. Foley, and J. D. Campbell, directors; R. B. Taylor, vice-president and treasurer; N. J. Brown, vice-president and comptroller; H. J. Clawson, vice-president; J. W. Younger, secretary, B. M. Kinnear, assistant treasurer; and R. E. Karr and W. C. Chick, assistant comptrollers. The head office and blast furnace division is at Wilcox Street, Hamilton.

PRODUCTION, THE STEEL COMPANY OF CANADA, 1964 AND 1965

| FURNACE | 1964 | | 1965 | |
|---------|----------|-------------------|----------|-------------------|
| | OPERATED | PIG IRON PRODUCED | OPERATED | PIG IRON PRODUCED |
| | days | tons | days | tons |
| A | 366 | 128,208 | 365 | 157,746 |
| B | 366 | 416,002 | 331 | 393,031 |
| C | 363 | 676,197 | 365 | 731,064 |
| D | 324 | 721,404 | 365 | 957,476 |
| Total | | 1,939,811 | | 2,239,317 |

The blast furnace treated 3,267,526 tons of ore, averaging 9,166 tons per working day, to produce 2,239,317 net tons of pig iron.

The sinter plant operated at capacity during 1965, supplying beneficiated material to two large blast furnaces.

The blast furnace division had a record year in pig iron production, due mainly to the improved burdens and the low slag volume practice. All four furnaces operated throughout the year with the exception of No. 2 which was off blast for 35 days for a reline. A successful test run was made on No. 2 furnace using Stelco Lurgi pre-reduced pellets. Pellets from the Wabush property were used during the latter part of the year and resulted in further production benefits.

The replacement ratio value of heavy fuel oil injection at No. 3 furnace as compared with coke is being determined.

Employment and Management

The average number of employees was 495. C. M. Birkett was works manager. J. A. Peart was superintendent in the blast furnace division.

Steep Rock Iron Mines Limited

Steep Rock Iron Mines Limited was incorporated in February 1939. Early in 1955 the authorized capitalization was changed to 10,000 shares of preferred stock of \$100 par value and 10,666,666 shares of common stock of \$1 par value, of which no preferred and 8,063,652 common shares have been issued. The directors and officers were: Cyrus S. Eaton, chairman of the board and director; M. S. Fotheringham, president, general manager and director; Neil Edmonstone, vice-president, secretary-treasurer and director; W. R. Daley, J. G. Cross, G. E. Allen, Mark McKee, John Paterson, F. H. Black, D. D. Hogarth, and Hon. C. J. Burchell, directors. The head office and mine offices are at Steep Rock Lake.

The property consists of about 7,000 acres in Freeborn and Schwenger townships, Steep Rock Lake area, District of Rainy River.

Operations continued throughout 1965. The amount of ore mined during the year is shown in the following table.

| QUANTITY OF ORE MINED | 1965 | 1964 |
|-----------------------------------|-----------|-----------|
| | tons | tons |
| B orebody (Errington underground) | 268,497 | 180,000 |
| G orebody (Roberts open pit) | 2,142,888 | 1,953,000 |
| Total | 2,411,385 | 2,133,000 |

Altogether, 1,264,538 tons of ore was sold in 1965, an increase over the 1,241,538 tons sold in 1964.

A (Hogarth) Orebody

Open-pit mining was completed on 16 March 1962. Preparations for underground mining of the Hogarth orebody had continued to 31 August 1961.

SHAFTS, A (HOGARTH) OREBODY

| CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | DEPTH FROM SURFACE |
|-----------|-------------|------------------------|--------------------|
| | | | feet |
| No. A-1 | FF3183 | 3 (inactive) | 845 |
| No. A-2 | FF3660 | 4 | 1,480 |

Total development footage when underground operations were discontinued was: 1,477 feet of drifts, 5,169 feet of crosscuts, and 1,040 feet of raises.

The mine was inactive during 1965.

B (Errington) Orebody

Underground mining on the B (Errington) orebody continued throughout 1965.

SHAFTS, B (ERRINGTON) OREBODY

| CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | DEPTH FROM SURFACE |
|---|-------------|------------------------|--------------------|
| | | | feet |
| No. B1 Errington (Float Ore Island) shaft | G629 | 3 | 1,263 |
| Mosher Point (Drainage Tunnel) shaft | FF3664 | 2 | 283 |

Development footage in 1965 consisted of 61 feet of drifting, 117 feet of crosscutting, and 394 feet of raising. Total development footage to 31 December 1965 was: 42,577 feet of drifts; 13,625 feet of crosscuts; 10,571 feet of raises. Diamond-drilling in 1965 consisted of six holes totalling 3,518 feet from underground. Altogether, 268,497 tons of ore were hoisted.

Roberts Open Pit Mine

The dredging of the "G" ore zone was completed in 1961. At that time 1,768,448 cubic yards of material had been removed from this portion of the "G" ore zone, which is now an open pit operation called the Roberts mine.

Normal operations in the open pit continued throughout 1965.

Major equipment added consisted of one jaw crusher (30×42 in.) and two cone crushers (41¼ft.) in the rock ballast plant, and one shovel (9 cu. yds.) in the open pit.

Altogether, 2,142,888 tons of ore was mined in the open pit in 1965.

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Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Algoma and Steep Rock recently signed a joint venture agreement for operation of Steep Rock's Roberts and Hogarth open pit mines to supply Algoma not only with 22,000,000 tons of pellets, but also with a total of 1,800,000 tons of direct shipping ore in the 1965-6-7 period during which the pellet plant is being brought into production. Negotiations are nearing completion with another important steel company for a contract covering 5,000,000 tons of pellets, to be taken at the annual rate of 250,000 tons for a 20-year period beginning in 1967. Discussions in progress with a third steel company look to a substantial addition to these tonnages.

Algoma has also acquired a large interest in the Company's Lake St. Joseph property, which is fully engineered and which contains the biggest open pit reserves of pelletizing ore in the Province of Ontario.

Operations

Shipments from the Steep Rock Range in 1965 totalled 3,709,888 tons of iron ore, in comparison with 3,242,360 tons in 1964.

This included 2,445,712 of royalty ore from the "C" orezone under lease to Caland Ore Company, wholly owned subsidiary of Inland Steel Company of Chicago. Caland's production a year earlier amounted to 2,000,822 tons.

The Company's production and sales plus shipments under the new joint venture with Algoma, totalled 1,264,176 tons from the Roberts open pit and Errington underground mine. This compared with 1,241,538 tons in 1964.

Caland's new 1,000,000 ton pellet plant was completed in 1965, and is scheduled for full capacity operation in 1966. Including the cost of the pellet plant, Caland's total investment at Steep Rock is estimated at \$75,000,000.

Employment and Management

The average number of employees was 546: 89 underground, and 457 on surface and in the open pit. M. S. Fotheringham was the president and general manager.

Strategic-Udy Metallurgy Limited

Strategic-Udy Metallurgical and Chemical Processes Limited, a subsidiary of Strategic Materials Corporation, was incorporated in October 1955. In December 1960, the name was changed to Strategic-Udy Metallurgy Limited. The authorized capitalization was 1,000 shares of no par value. All shares have been issued. The directors and officers were: R. O. Denman, vice-president and director; Irene A. Bryant, treasurer and director; Harold Kahen, secretary and director; and R. A. Maes and Oscar Lasdon, directors. The head office and plant is at 3527 Stanley Avenue, Niagara Falls.

The reduction process division and the custom pilot concentrating plant were maintained but were inoperative during 1965.

Repairs were completed to the 10,000kva smelting furnace, preparatory to another ferrochrome campaign, when market conditions for the metal improve.

Employment and Management

The average number of employees was 15. R. O. Denman, vice-president, was in charge.

LEAD AND ZINC

The production of lead decreased 4.13 percent in quantity from 4,054,865 pounds in 1964 to 3,887,218 pounds in 1965, while the value increased 10.56 percent from \$544,974 in 1964 to \$602,518 in 1965.

The production of zinc decreased 15.82 percent in quantity from 144,152,666 pounds in 1964 to 121,349,121 in 1965, and the value also decreased 10.29

percent from \$20,426,433 in 1964 to \$18,323,817 in 1965. There was some lead recovered in 1965 from the silver-cobalt ores of the Cobalt-Gowganda area; the major portion of the lead, and the major portion of the zinc production came from the Manitouwadge area; the balance of the zinc came from Kam-Kotia and Texas Gulf in the Porcupine area.

The mines of the Manitouwadge area paid \$1,275,950 to 174 salaried employees and \$4,132,279 to 754 wage-earners. Fuel and electricity cost \$371,287 and process supplies cost \$6,006,611.

The reports on the operations of mines that are in the Manitouwadge area appear under Nickel and Copper (p. 84-117).

Sherbrooke Metallurgical Company Limited

Sherbrooke Metallurgical Company Limited was incorporated in May 1959, with an authorized capitalization of 200,000 common shares of no par value, and 3,000 preferred shares of \$10 par value. All common shares have been issued. The officers were: H. D. Carus, president; C. R. MacBrayne, vice-president; and R. K. Thoman, secretary-treasurer. The head office and plant is at Port Maitland, P.O. Box 220, Dunnville.

The new ore unloading system and storage arrangement is near completion and has proven to be economical and an improvement in the pelletizing of zinc concentrates. In order to prevent freezing during the winter months, an enclosure over the storage bins is presently under construction.

Projects under way involving improvements to the pelletizing operation include a new dryer which will replace the present two dryers, and an automation program to improve the quality of pellets.

Roasting plant improvements have included water drum coolers to cool the roasted pellets and a crushing system for the purpose of crushing the calcine and providing a product amenable to a vertical retort and electrolytic plant operation.

A 40-foot addition to the roaster stack has been installed with automatic stacking valves to improve the start-up and shut-down of the roasting plant.

Automation of the sulphur burner boiler was accomplished during the annual shutdown and has aided in process control at maximum rates.

Major added equipment in 1965 was as follows:

- 1 crane, model 155 ATC, 15 ton
- 1 calcine cooler
- Assorted ore handling equipment.

A total of 75,890 tons of zinc sulphide concentrate was treated, at a daily average of 213 tons, to produce 36,238 tons of zinc oxide (calcine) in 1965.

Employment and Management

The average number of employees was 68. R. K. Thoman was the works manager.

Zenmac Metal Mines Limited

Zenmac Metal Mines Limited was incorporated in February 1952 with an authorized capitalization of 10,000,000 shares of \$1 par value, of which 6,415,755 shares have been issued. The directors and officers were: R. A. Halet, president and managing director; Patrick Harrison, vice-president and director; K. A. Davis, treasurer and director; E. R. Heald, and Wm. McKee, directors; and J. L. Noble, secretary. The head office is at Suite 505, 80 Richmond Street West, Toronto 1, and the mine address is P.O. Box 189, Schreiber.

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Zenmac's Zenith mine property, a zinc prospect comprises 69 claims in the Pays Plat area, Schreiber district about ten miles north of Lake Superior.

Mining operations took place from January to April and from October to 31 December 1965.

The vertical three-compartment main shaft, collared in claim TB42277, had been sunk 425 feet below the collar. Development footage in 1965 consisted of 1,504 feet of drifting, 130 feet of crosscutting, and 125 feet of raising. Total development footage to 31 December 1965 was: 1,749 feet of drifts; 342 feet of crosscuts; and 125 feet of raises. Some 132 diamond-drillholes, totalling 8,813 feet, were completed from underground; and 11 holes, totalling 2,356 feet, were completed from surface.

Major construction in 1965 included the following:

At Zenith Mine—Pays Plat Lake area:

- 1 service building, 100×32 ft., rigid frame, metal clad
- 1 bunkhouse, 53×30 ft.
- 1 ore bin, 16×14×14 ft.
- 1 loading bay, 26×16 ft.
- 1 headframe and shafthouse, metal sheeted.

At concentrator site—Township 85, District of Thunder Bay:

- 1 concentrator building, 64×60 ft., rigid frame, metal clad
- 1 crusher house, 28×28 ft., timber frame, metal clad
- 1 screen house, 24×16 ft., timber frame, metal clad
- 1 fine ore bin, 22×22 ft., laminated plank construction
- 1 coarse ore bin, 16×16 ft., laminated plank construction
- 4 conveyor ways, 2—46×8 ft., 1—49×8 ft., 1—142×8 ft., steel metal clad.

Major equipment added at concentrator site—Selim siding:

- 1 jaw crusher, 15×24 in., 25 tons per hour capacity
- 1 cone crusher, 3-ft. standard
- 1 ball mill, 7×6 ft.
- 4 pumps, 3×3 in., 250gpm
- 1 cyclone, D10B
- 1 conditioner, 6×6ft.
- 10 flotation cells, 18SP
- 1 thickener, 10×20 ft.
- 1 agitator, 16×20 ft.
- 1 filter, 6×4 ft.
- 1 screen, 8×4 ft.
- 1 conveyor, 30 in.
- 5 conveyors, 18 in.

Altogether, 3,976 tons of ore were hoisted and stockpiled.

Employment and Management

The average number of employees was 16: 3 underground and 13 on surface. P. S. Broadhurst was the general manager.

MAGNESIUM AND CALCIUM

These metals are produced in the Renfrew area of Ontario by Dominion Magnesium Limited. The production of magnesium increased 8.07 percent in quantity from 18,706,020 pounds in 1964 to 20,216,369 in 1965; the value of production increased 8.57 percent from \$5,587,909 in 1964 to \$6,067,057 in 1965. The production of calcium increased 15.23 percent in quantity from 138,357 pounds in 1964 to 159,434 in 1965; the value of production increased 0.76 percent from \$151,694 in 1964 to \$152,848 in 1965.

MAGNESIUM

Dominion Magnesium Limited

Dominion Magnesium Limited was incorporated in February 1941, with an authorized capitalization of 500,000 shares of no par value, of which 476,270 shares have been issued. The directors and officers were: H. J. Fraser, president and director; John Thomson, vice-president, general manager, and director; J. G. Weir, L. M. Pidgeon, F. H. Jowsey, G. T. N. Woodroffe, and J. M. Mortimer, directors; and M. B. Clearihue, secretary-treasurer. The head office is at 20th Floor, 7 King Street East, Toronto 1. The plant address is Haley.

Dominion Magnesium Limited holds exclusive patent rights to the Pidgeon magnesium production process. Operations continued throughout 1965 at the company's quarry and plant about 3 miles from Haley, comprising 383 acres in concessions V and VI, Ross township, Renfrew county.

A 21 percent magnesium dolomite is mined in two quarries in the plant area, at the rate of about 300 tons daily, as the source of both magnesium and calcium. Only the coarse clean rock, screened ahead of the primary crusher, is used in the magnesium-calcium process. The finer materials are further crushed, dried, and screened to produce special concrete aggregate, flux for the glass industries, and the fines for asphalt and other fillers.

New construction in 1965 consisted of the following:

- A furnace building extension (60×94 feet)
- A chipping building (30×12 feet)
- A guard house (10×10 feet)

New added equipment was as follows:

- 2 24 retort gas fired furnaces
- 1 vertical hydraulic press, 113 ton capacity
- 1 tensile testing machine.

Altogether, 175,531 tons of rock were quarried and milled at an average of 462 tons per working day.

Production of metals for 1964 and 1965 was as follows:

| METAL | | 1965 | 1964 |
|-------------------|----|------------|------------|
| Calcium crowns | lb | 238,013 | 161,731 |
| Magnesium, crowns | lb | 22,431,474 | 20,337,926 |
| Thorium | lb | 7,275 | 6,098 |
| Titanium | lb | 19,311 | 16,325 |
| Barium | lb | 275 | 211 |
| Strontium | lb | 112 | 208 |
| Zirconium | lb | 15,658 | 6,048 |

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

The increased cost of ferrosilicon was higher than anticipated and its effect during the year is reflected in the earnings for the last half of the year. Technical problems, a major overhaul of the 15,000 kw. furnace, a wildcat strike, and a transformer breakdown all contributed to higher costs. A change in operations was made in October and by the year end a considerable decrease in costs was achieved.

Production of magnesium crowns was an all time record of 22,431,474 pounds, an increase of 10.3 percent over 1964's production of 20,337,926 pounds. All reduction furnaces operated continuously and construction was started in March on two additional 24 retort, gas-fired reduction furnaces. Both furnaces were in production by mid-July.

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The Research Centre produced 6,752 pounds of zirconium powder which was used in the production of magnesium alloys.

Capital expenditures for the year amounted to \$603,054. The main items were building extensions, installation of two reduction furnaces, completion of a dust collection system in the crushing plant, and partial installation of a new stack, fan and multiclone for No. 1 kiln. Due to the hazards of late fall weather, the removal of the old stack and connection to the new installations was deferred until the spring of 1966.

An active research programme was continued with respect to improved furnace design, metal condensation, product improvement, die casting alloys and process efficiency. In this latter field, efforts were concentrated on the mechanization of the charging and dis-charging of the reduction furnaces.

Employment and Management

The average number of employees at the plant and quarry was 405. D. J. McPhail was the plant manager.

MOLYBDENUM

Pax International Mines Limited

Pax International Mines Limited was incorporated in October 1949; the capitalization was increased to 6,000,000 shares of \$1 par value of which 4,980,120 shares have been issued. The company is a consolidation of International Molybdenum Mines and Pax Athabasca Uranium Mines Limited. The directors and officers were: W. A. Morgan, chairman and director; W. A. Page, president and director; D. A. Pettigrew, treasurer and director; J. B. Goad, Maxwell Bruce, A. K. Stuart, A. J. Montminy, H. G. Hughes and J. E. Hayes, directors; J. E. Riddell, vice-president; and Miss Margaret Smith, secretary. The head office is at 1725 Bank Street, Ottawa. The mine address is Matachewan.

Pax International Mines Limited leased the property of Min-Ore Mines Limited, the name having been changed from New Ryan Lake Mines in October 1955. The copper-molybdenum prospect comprises approximately 513 acres in Powell township, District of Timiskaming, near the town of Matachewan.

In claim MR12548 there is a vertical two-compartment No. 1 shaft 459 feet deep, from which four levels had been established.

There was no development work completed at the property in 1965. Total development footage to 31 December 1965 was 6,777 feet of drifts; 2,593 feet of crosscuts; and 3,603 feet of raises. Three diamond-drillholes, totalling 1,880 feet were completed from surface during 1965.

Pax milled some old mill tailings during January and February. The concentrates produced were treated in a Harreshoff multiple hearth furnace which had been installed at the property and operated by Geo-Met Reactors Limited. During May and June the Pax mill was leased to Stancop Mines Limited. The underground workings are being kept unwatered.

Employment and Management

Eleven men were employed during the period the mill and furnace were in operation.

NICKEL AND COPPER

The production of nickel in Ontario increased 18.01 percent in quantity, from 324,187,190 pounds in 1964 to 382,566,712 in 1965. The value of production increased 18.14 percent from \$267,764,039 in 1964 to \$316,332,366 in 1965. The mines with predominant nickel production include Falconbridge Nickel Mines Limited and The International Nickel Company of Canada Limited in the

Sudbury area, and the Gordon Lake Division of Metal Mines Limited in the Werner Lake area of the Kenora District. These mines paid \$23,611,794 to 3,051 salaried employees and \$108,021,705 to 19,678 wage-earners. Fuel and electricity cost \$24,411,151 and process supplies cost \$67,253,891. Some nickel production resulted from the refining of the silver-cobalt ores of the Cobalt-Gowganda area which is given under Silver and Cobalt, (p. 117-141).

The production of copper in Ontario increased 9.27 percent in quantity, from 395,833,331 pounds in 1964 to 432,544,119 in 1965. The value of production increased 22.98 percent from \$131,458,795 in 1964 to \$161,665,138 in 1965. In addition to the copper production of the predominantly nickel-producing mines, there is also some copper production from the silver-cobalt and gold mines. The Manitouwadge area mines, Noranda (Geco Division), Willecho and Willroy are important producers of cadmium, copper, gold, lead, silver and zinc; the general statistics for these mines are given under Lead and Zinc (p. 76-78). The balance of the copper production comes from the following predominantly copper-producing mines: Copperfields, Kam-Kotia, North Coldstream, Rio-Algom (Pater), Stancop, Sheridan Geophysics, and Texas Gulf Sulphur. These mines paid \$1,092,686 to 169 salaried employees and \$3,775,189 to 765 wage-earners; fuel and electricity cost \$699,174, and process supplies cost \$5,288,396.

The nickel-copper mines in the Sudbury area milled 19,308,778 tons, or 82.93 percent of the total of 23,282,154 tons of nickel and copper ores milled. In addition to the significant production of nickel and copper, they account for the province's entire production of platinum metals, selenium and tellurium; the major portion of the cobalt production; also significant production of gold, silver, iron ore and sulphur. The accompanying statistical synopsis of the nickel-copper mines, giving the complete production by year for a five-year period, includes the production of Metal Mines Limited (Gordon Lake Division) and the two large producers of the Sudbury area, (Falconbridge Nickel Mines Limited and The International Nickel Company of Canada Limited).

NICKEL AND COPPER MINING AND SMELTING

| | 1961 | 1962 | 1963 | 1964 | 1965 |
|----------------------------------|------------|------------|---------------------|------------|------------|
| | ton | ton | ton | ton | ton |
| Ore treated | 18,896,447 | 15,724,683 | 16,699,767 | 19,936,712 | 19,493,142 |
| Nickel produced in Ontario | 111,174 | 91,222 | 73,818 ¹ | 97,290 | 111,788 |
| Copper produced in Ontario | 192,624 | 172,407 | 164,834 | 184,181 | 143,960 |
| Matte exported | 136,405 | 121,901 | 118,372 | 106,020 | 131,673 |
| Nickel content of matte exported | 85,478 | 77,227 | 75,271 | 64,804 | 79,487 |
| Copper content of matte exported | 19,022 | 16,678 | 14,126 | 13,736 | 17,298 |

¹Correction of 1963 reported figure.

PRECIOUS METALS RECOVERED

| | | 1961 | 1962 | 1963 | 1964 | 1965 |
|-----------------|----|------------|------------|------------|------------|------------|
| Platinum metals | oz | 418,278 | 470,782 | 357,649 | 376,238 | 463,127 |
| | \$ | 24,534,349 | 28,848,262 | 22,585,055 | 25,404,117 | 36,109,799 |
| Gold | oz | 58,769 | 55,922 | 52,557 | 47,226 | 54,271 |
| | \$ | 2,083,948 | 2,092,042 | 1,983,946 | 1,771,379 | 2,047,591 |
| Silver | oz | 1,785,643 | 1,757,848 | 1,373,044 | 1,459,455 | 1,766,248 |
| | \$ | 1,683,147 | 2,047,893 | 1,900,662 | 2,043,237 | 2,472,747 |
| Total | \$ | 28,301,444 | 32,988,197 | 26,469,663 | 29,218,733 | 40,630,137 |

STATISTICAL SYNOPSIS OF THE NICKEL-COPPER MINES IN ONTARIO

| YEAR | NUMBER OF PRODUCING COMPANIES | DIVIDENDS PAID | NUMBER OF SALARIED EMPLOYEES | | | WAGE EARNERS | | SELLING VALUE OF PRODUCTS | |
|------|-------------------------------|----------------|--|--|--------------------------|---|---|---|-------|
| | | | NUMBER | SALARIES | NUMBER | WAGES | KIND | VALUE | |
| 1961 | 3 | \$ 56,430,569 | 1,124 { 3 smelters 2 refineries | \$ 8,454,795 7,830,457 2,950,140 | 10,473 6,334 2,613 | \$ 54,191,874 31,302,063 12,410,680 | Nickel in matte Metallic nickel Nickel oxide and salts Copper in matte Converter copper Gold Silver Platinum metals Selenium and tellurium Cobalt Iron ore Sulphur | \$126,507,279 145,861,044 22,991,719 9,967,622 89,604,061 2,083,948 1,683,147 24,534,349 1,110,243 4,147,340 3,281,209 833,706 | |
| | | | | | | | | | Total | $ 56,430,569 | 2,724 | $ 19,235,392 | 19,420 | $ 97,904,617 |
| 1962 | 4 | \$ 70,979,901 | 1,105 { 3 smelters 2 refineries | \$ 8,573,659 8,213,374 3,047,569 | 9,904 5,773 2,355 | \$ 52,125,497 28,209,681 11,223,002 | Nickel in matte Metallic nickel Nickel oxide and salts Copper in matte Converter copper Gold Silver Platinum metals Selenium and tellurium Cobalt Iron ore Sulphur | \$122,084,245 134,169,676 17,955,541 9,455,058 76,285,695 2,092,042 2,047,893 28,848,262 883,827 4,707,066 4,505,093 952,877 | |
| | | | | | | | | | Total | $ 70,979,901 | 2,733 | $ 19,834,602 | 18,032 | $ 91,558,180 |
| 1963 | 3 | \$ 79,057,256 | 1,5 mines* { 3 smelters 2 refineries | \$ 19,497,580 | 16,798 | \$ 85,300,244 | Nickel in matte Metallic nickel Nickel oxide and salts Copper in matte Converter copper Gold Silver Platinum metals Selenium and tellurium Cobalt Iron ore Sulphur | \$121,838,817 96,777,996 27,635,675 8,842,887 68,689,585 1,801,670 1,900,662 22,585,055 511,317 4,295,732 7,982,796 1,397,959 | |
| | | | | | | | | | Total | $ 79,057,256 | 2,680 | $ 19,497,580 | 16,798 | $ 85,300,244 |

STATISTICAL SYNOPSIS OF THE NICKEL-COPPER MINES IN ONTARIO (concluded)

| YEAR | NUMBER OF PRODUCING COMPANIES | DIVIDENDS PAID | NUMBER OF SALARIED EMPLOYEES | | | WAGE EARNERS | | SELLING VALUE OF PRODUCTS | | |
|-------|-------------------------------|----------------|---|--------------|--------|---------------|---|--|--|--|
| | | | NUMBER | SALARIES | NUMBER | WAGES | KIND | VALUE | | |
| 1964 | 3 | \$101,726,177 | { 20 mines* 3 smelters 2 refineries | \$ 9,410,512 | 8,282 | \$49,765,140 | { Nickel in matte Metallic nickel Nickel oxide and salts Copper in matte Converter copper Gold Silver Platinum metals Selenium and tellurium Cobalt Iron ore Sulphur | { 97,886,844 106,011,487 63,859,817 7,595,310 87,143,571 1,771,379 2,043,237 25,404,117 560,139 4,121,535 12,180,732 1,676,727 | | |
| Total | | \$101,726,177 | 2,750 | \$21,256,512 | 15,640 | \$86,932,699 | | \$410,254,895 | | |
| 1965 | 3 | \$115,042,256 | { 22 mines* 3 smelters 2 refineries | \$10,005,531 | 11,046 | \$61,153,116 | { Nickel in matte Metallic nickel Nickel oxide and salts Copper in matte Converter copper Gold Silver Platinum metals Selenium and tellurium Cobalt Iron ore Sulphur | { 121,505,416 122,960,643 71,844,829 11,862,805 108,432,215 2,047,591 2,472,747 36,109,799 657,947 5,398,260 14,816,973 1,143,170 | | |
| Total | | \$115,042,256 | 3,051 | \$23,611,794 | 19,678 | \$108,021,705 | | \$499,252,395 | | |

*The figures for "mines" include the following that were active but non-producing:
 1961—Crean Hill, Copper Cliff North (International Nickel), Strathcona (Falconbridge), and Nickel Mining and Smelting Corporation.
 1962—Copper Cliff North, Crean Hill (International Nickel), Strathcona (Falconbridge).
 1963—Copper Cliff North, Coleman (International Nickel), Strathcona (Falconbridge).
 1964—Levack West, Coleman, MacLennan, and Totten (International Nickel), North mine (Falconbridge).
 1965—Coleman, Kirkwood, Levack West, Little Stobie, and Totten (International Nickel).

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Canadian Jamieson Mines Limited

Canadian Jamieson Mines Limited was incorporated in April 1964, with an authorized capitalization of 5,000,000 shares of \$1 par value, of which 2,206,000 shares have been issued. The directors and officers were: A. T. Griffis, president and director; N. G. Bragagnolo, vice-president and director; R. H. Pope, treasurer and director; R. C. Bragagnolo, secretary and director; and G. J. Killeen and R. D. Lawrence, directors. The executive office is at 251 Third Avenue, Timmins. The mine address is Box 1050, Timmins.

The property comprises 13 claims in Godfrey and Jamieson townships, District of Cochrane, readily accessible by road from Timmins.

The vertical three-compartment No. 1 shaft situated in lot 9, concession 6, Godfrey township, was collared and sunk to a depth of 639 feet below the collar in 1965. The 1st, 2nd, 3rd, and 4th levels were established at depths of 256, 354 feet, 466 feet, and 578 feet respectively below the collar. Total development footage to 31 December 1965 consisted of 973 feet of drifting, 1,147 feet of cross-cutting and 636 feet of raising, all completed during 1965. Altogether 30 diamond-drillholes, totalling 18,481 feet from surface; and 57 drillholes, totalling 3,566 feet from underground were completed.

Canadian Jamieson has purchased the complete plant of H. G. Young Mines Limited which it is moving and re-establishing on the company property in Godfrey township. Major construction in 1965 included a steam plant building (21×12 feet), a mine dry and machine shop building (82×28 feet), a hoist and compressor building (65×28 feet), bin housing building (36×26 feet), head-frame and building (43×35 feet), mill building (186.8×184.9 feet), and two cold storage warehouses. Some development ore was hoisted and stockpiled.

Employment and Management

The shaft contractor, F. A. McIntyre Limited, employed an average of 16 men underground. Canadian Jamieson employed an average of 14 on surface. H. R. Fowlie was the mine manager.

Centre Hill Mines Limited

Centre Hill Mines Limited was incorporated in February 1953. The capitalization was increased in January 1965, to 7,000,000 shares of \$1 par value, of which 5,193,281 shares have been issued. The directors and officers were: R. S. Potter, president and director; Patrick Harrison, vice-president and director; John Harcourt, Steve Gabon, and Eric Craddock directors; and R. A. Cranston, secretary-treasurer. The head office is at 15th Floor, 50 King Street West, Toronto. The mine address is Box 604, Matheson.

The property is a copper prospect comprising 24 claims in Munro Township, District of Cochrane, about 22 miles east of Matheson.

Mining operations took place from 1 January to 31 December 1965.

The vertical three-compartment No. 1 shaft in the northeast quarter of the south half of lot 7, concession 5, (claim L53954) has a depth of 638 feet below the collar.

Development footage completed in 1965 comprised 655 feet of drifting and 252 feet of crosscutting. Total development footage to 31 December 1965 consisted of 1,729 feet of drifts and 613 feet of crosscuts. Altogether, 92 diamond-drillholes, totalling 22,373 feet were completed from underground.

Major construction in 1965 included the following:

- 1 Hoistroom (36×26×12 feet)
- 1 Compressor building (39.2×18×8.5 feet)
- 1 Power Plant building (36×26×10 feet)
- 1 Water Tank building (18×10×10 feet)

Employment and Management

The average number of employees was 14: 4 underground and 10 on surface. Don Sykes was the manager.

Copperfields Mining Corporation Limited

Temagami Mining Company Limited was incorporated in August 1954; it was an amalgamation of Temagami Mining Company and Derosier Nickel and Copper Mines. In December 1964 Temagami Mining Company Limited and Goldfields Mining Corporation Limited were consolidated into Copperfields Mining Corporation Limited. The authorized capitalization was increased to 7,500,000 shares of \$1 par value, of which 6,325,600 shares have been issued. The directors and officers were: N. B. Keevil, president and director; Sir Michael Butler, Bt., secretary and director; J. H. Westell, treasurer and director; Hon. J. B. Aird, J. B. Goad, D. A. Perigoe and C. G. MacIntosh, directors; N. B. Keevil Jr., vice-president exploration; J. B. Anderson, operations manager; and D. S. Brown, assistant treasurer. The head office is at Suite 1000, 11 Adelaide Street West, Toronto 1. The mine address is Temagami.

The company's holdings comprising about 7,223 acres, consist of a mineral lease on part of Timagami Island, leases on 11 other islands and 185 claims in Phyllis, Briggs, Joan, Yates and Scholes townships, Timagami area, District of Nipissing.

Mining and milling operations continued throughout 1965.

The vertical four-compartment No. 1 shaft located in Phyllis township on mining lease No. 11446 was sunk 466 feet in 1965 to a depth of 1,672 feet below the collar. The 1275-foot, 1425-foot, and 1575-foot levels were established at depths of 1,285 feet, 1,426 feet, and 1,579 feet respectively below the collar.

Development footage in 1965 consisted of 5,841 feet of drifting, 621 feet of crosscutting and 863 feet of raising. Total development footage to 31 December 1965 was as follows: 31,936 feet of drifts; 4,808 feet of crosscuts; and 7,027 feet of raises. Diamond-drilling in 1965 consisted of 420 holes totalling 66,994 feet from underground, and 15 holes totalling 5,772 feet from surface.

New construction in 1965 included a new B.C. fir timber headframe 95 feet high, an addition to the hoistroom (49×24feet), and a new diamond drill core rack (22×12feet).

Added equipment included the following:

- 1 1.5ton locomotive trammer
- 1 mucking machine
- 1 transformer, 600kva, 2300/575V
- 1 air compressor (6×3.5×4 in.) with 10 hp motor, 550V and air receiver
- 1 hoist motor and controls, 350 hp, 600rpm, 2,200V, 3 phase, 60 cycle
- 1 hoist (72×60 in.) 15,000lb rp with controls
- 2 cages and skips, 40 cu ft capacity
- 1 motor, 75 hp, 550V
- 1 pump, 120 gpm at 675 feet head and 50 hp motor
- 4 rock drills.

A total of 55,767 tons of ore was hoisted; the mill treated 55,922 tons averaging 196 tons daily.

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Company Annual Report

The following is taken from the company annual report for the year ending 30 June 1965.

Ore Reserves

| | TONS | PERCENT COPPER |
|--------------|--------|----------------|
| Ore in place | 56,000 | 6.8 |
| Broken ore | 39,348 | 6.9 |
| Total | 95,348 | 6.9 |

An additional 16,700 tons of inferred ore grading 5 percent copper is also in place.

Milling

The mill treated 56,813 tons of ore grading 6.67 percent copper and 98.89 percent of the copper was recovered.

The metals contained in 12,545 tons of concentrates were:

| | | |
|--------|----|-----------|
| Copper | lb | 7,494,745 |
| Gold | oz | 1,149,795 |
| Silver | oz | 22,228.62 |

Copper Concentrate Shipments

| | DRY TONS | COPPER | GOLD | SILVER |
|-------------------------|----------|---------|------------|------------|
| | | percent | oz per ton | oz per ton |
| Year ended 30 June 1965 | 12,545 | 29.87 | 0.092 | 1.77 |
| Total to date..... | 72,001 | 29.24 | 0.085 | 1.75 |

Employment and Management

The average number of employees was 108: 55 underground and 53 onsurface. M. F. Leavens was the mine manager.

Crownbridge Copper Mines Limited

Crownbridge Copper Mines Limited was incorporated in October 1963, with an authorized capitalization of 5,000,000 shares of \$1 par value, of which 2,203,005 shares have been issued. The directors and officers were: R. D. Bawden, president, treasurer, and director; G. K. Masters, vice-president and director; R. W. Christoph, general manager and director; and G. D. Pettison and L. Moreau, directors. The head office and mine address is Suite 2510, 44 King Street West, Toronto 1.

The property, comprising 101 claims, is a copper prospect situated in Townships 168 and 175 in the District of Algoma.

Exploration work in 1965 consisted of the completion of 21 diamond-drill-holes totalling 13,064 feet from surface.

Employment and Management

The work was completed under the direction of R. W. Christoph, P.Eng., the general manager, and two employees.

Falconbridge Nickel Mines Limited

Falconbridge Nickel Mines Limited was incorporated in August 1928, with an authorized capitalization of 5,000,000 shares of no par value, of which 4,891,807 shares have been issued. The directors and officers were: H. J. Fraser, president

and managing director; R. Campbell, executive vice-president and director; C. F. H. Carson, O. D. Cowan, W. F. James, Thayer Lindsley, J. D. Barrington, James Stewart, L. J. McGowan, S. M. Wedd, and R. B. West, directors; R. C. Mott, vice-president (operations); G. S. Jewett, vice-president (corporate affairs); G. T. N. Woodroffe, vice-president (finance) and secretary; W. G. Dahl, vice-president (marketing); E. L. Healy, vice-president (nickel division); P. N. Pitcher, vice-president (minerals division); G. P. Mitchell, director of exploration and geology; F. R. Archibald, director of metallurgy and research, A. W. Coome, controller; J. T. McWhirter, treasurer; J. L. Matthews, assistant secretary; J. R. McKeeman, assistant treasurer; R. M. Oliver, general manager (nickel division); D. R. Lochhead, manager (nickel division, Sudbury operations); J. H. Fraser, general superintendent (Falconbridge area); and A. R. Baker, general superintendent (Onaping area). The head office is at the 21st Floor, 7 King Street East, Toronto 1.

The company has numerous interests and holdings, principally in mining companies, through a merger with Ventures Limited in 1962. The nickel-copper mines, concentrating and smelting operations in the Sudbury area, research laboratories at Richvale and Lakefield, and refinery at Kristiansand, Norway, are the operations principally connected with nickel production.

Employment and Management

The company employed in Ontario in 1965, excluding employees of contractors doing work for the company, a total of 3,065 employees: 1,716 at the mines; 1,209 underground; 507 on surface; and 1,349 in the mills, smelter, pyrrhotite plant and research laboratories operated by the company. Six mines were operated since the Hardy, Boundary and Onaping operations were combined; total ore production was 2,341,661 tons.

SHAFTS, FALCONBRIDGE NICKEL COMPANY'S MINES IN THE SUDBURY AREA

| MINE | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | SINKING DEPTH 1965 | VERTICAL DEPTH FROM SURFACE |
|------------------------|--|-------------|-------------------------|--------------|--------------------|-----------------------------|
| | | | | feet | feet | feet |
| Falconbridge | | | | | | |
| No. 1 | 3035 SES | Vertical | 3 | Surface | .... | 2,848 |
| No. 5 | 3040 SES | Vertical | 6 | Surface | .... | 4,347 |
| No. 7 | 3040 SES | Vertical | 3 (stripped for airway) | 2,631 | .... | 4,323 |
| No. 9 | 3040 SES | Vertical | 6 | 4,023 | .... | 6,562 |
| East Mine | | | | | | |
| No. 1 | 3036 SES | Vertical | 3 | Surface | .... | 3,942 |
| No. 2 | .... | Vertical | 3 | 3,872 | 532 | 4,787 |
| Hardy-Boundary-Onaping | | | | | | |
| Hardy | 5822 | Vertical | 3 | Surface | .... | 1,427 |
| 1125 Incline | .... | 36½° | 1 (inactive) | 986 | .... | 1,138 |
| Boundary | 5821 | Vertical | 3 | 998 | .... | 1,951 |
| Onaping | S.E. ¼ S ½, lot 8, Con. 1, Levack twp. | Vertical | 5 | Surface | .... | 3,148 |
| Fecunis Lake | | | | | | |
| No. 1 | N.W. ¼ N ½, lot 5, Con. 2, Levack twp. | Vertical | 6 | Surface | .... | 4,183 |
| No. 2 | “ | Vertical | 4 | Surface | .... | 3,243 |
| Strathcona | | | | | | |
| No. 1 | S. ½, lot 4, Con. 4, Levack twp. | Vertical | 4 | Surface | | 3,205 |
| No. 2 | “ | Vertical | 5 | Surface | 1,908 | 1,960 |

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FALCONBRIDGE MINE

The Falconbridge property comprises 24 claims in Falconbridge township, Sudbury district. The mine address is Falconbridge.

Operations continued from 1 January to 31 December 1965.

A total of 8,454 feet of drifting, 651 feet of crosscutting, and 1,861 feet of raising was completed. Total development footage to 31 December 1965 was as follows: 217,422 feet of drifts; 46,839 feet of crosscuts; and 108,472 feet of raises. A total of 345 diamond-drillholes from underground totalling 35,540 feet were completed in 1965.

Major construction consisted of a reinforced concrete cable tunnel below ground with insulated wood roof above ground.

New equipment added was as follows:

- 2 pumps, 600 U.S. gpm. at 2,275- and 3,150-foot levels (Sulzer)
- 2 loaders, MR250, model 12B-55 (Eimco)
- 15 mine cars, 93 cu. ft. (Wabi)
- 1 raise borer (Robbins)
- 1 auto loader T4G (Atlas Copco).

A total of 842,233 tons of ore was hoisted and milled.

Employment and Management

The average number of employees was 836: 631 underground and 205 on surface. A. G. Slade was mine superintendent.

EAST MINE

The property comprises 12 claims in Falconbridge township, Sudbury district. The mine address is Falconbridge.

Operations took place from 1 January to 31 December 1965.

The vertical three-compartment No. 2 internal shaft, collared on the 4,025-foot level 3,872 feet below surface, was sunk a further 532 feet in 1965 to a vertical depth of 4,787 feet below surface.

During the year, 328 feet of drifting and 174 feet of crosscutting was completed. Total development footage to 31 December 1965 was: 39,858 feet of drifts; 7,453 feet of crosscuts; and 15,896 feet of raises. Altogether, 81 diamond-drillholes, totalling 4,871 feet, were drilled from underground in 1965. The ore was trammed over to Falconbridge mine orepass on three levels. The stoping method in use is overhand slice-and-fill using mill tailing.

In all, 270,167 tons of ore were hoisted and milled.

Employment and Management

The average number of employees was 152: 141 underground and 11 on surface. M. J. Chesser was the mine superintendent.

HARDY, BOUNDARY AND ONAPING MINES

The Hardy property comprises two claims, the Boundary property one claim, the Onaping property 1.5 claims; a total of 4.5 claims all in Levack township, Sudbury district. The mine address is Onaping.

Operations took place from 1 January to 31 December 1965.

Development footage in 1965 comprised 410 feet of crosscutting at the Hardy property, 394 feet of raising at the Boundary property, and 1,541 feet of drifting and 536 feet of raising at the Onaping property. Total development footage at the three properties to 31 December 1965 was: 14,893 feet of drifts, 18,533 feet of crosscuts, and 12,912 feet of raises on the Hardy property; 11,413

feet of drifts, 3,916 feet of crosscuts, and 3,059 feet of raises on the Boundary property; and 9,194 feet of drifts, 10,208 feet of crosscuts, and 6,707 feet of raises on the Onaping property; the accumulated total on the three properties was 35,500 feet of drifts, 32,657 feet of crosscuts, and 22,678 feet of raises. Diamond-drilling consisted of 105 holes, totalling 33,244 feet, in 1965.

Added equipment consisted of:

- 1 slusher, KMM2G (C.I.R.)
- 1 dust collector 9000cfm (Wheelabrator)
- 2 supply cars, Zimmerman 10-ft. (Dorr-Oliver-Long).

In all, 552,685 tons of ore were hoisted and milled.

Employment and Management

The average number of employees at the Hardy, Boundary and Onaping properties was 475: 272 underground and 203 on surface. P. W. MacMillan was the mine superintendent.

FECUNIS LAKE MINE

The property comprises two claims in Levack township, Sudbury district. The mine address is Onaping.

Operations progressed from 1 January to 31 December 1965.

During the year 255 feet of drifting, 96 feet of crosscutting, and 338 feet of raising was completed. Total development footage to 31 December 1965 was: 17,505 feet of drifts; 13,776 feet of crosscuts; and 14,001 feet of raises. Altogether, 12 diamond-drillholes, totalling 1,394 feet, were drilled from underground in 1965.

New underground equipment included eight tigger hoists, 30hp (C.I.R.).

In all, 549,367 tons of ore were hoisted and milled.

The International Nickel Company of Canada Limited mines the Fecunis ore, and delivers it underground to the Fecunis shaft for hoisting and subsequent treatment.

Employment and Management

The average number of employees was 133: 58 underground and 75 on surface. E. N. Gilje was the mine superintendent.

STRATHCONA MINE

The property comprises five claims in Levack township, Sudbury district. The mine address is Onaping.

Operations proceeded from 1 January to 31 December 1965.

The vertical five-compartment No. 2 shaft in the S.½, lot 4, concession 4, Levack township was sunk 1,908 feet in 1965 to a depth of 1,960 feet below surface. The 300-foot, 600-foot, 900-foot, 1,225-foot, 1,350-foot, 1,475-foot, 1,600-foot, 1,750-foot, and 1,875-foot levels were established at vertical depths of 297, 617, 921, 1,225, 1,353, 1,481, 1,609, 1,737 and 1,865 feet respectively, below the collar.

Development work consisted of 7,219 feet of drifting, 6,515 feet of cross-cutting, and 2,256 feet of raising. Total development footage to 31 December 1965 consisted of 25,400 feet of drifts, 21,188 feet of crosscuts; and 8,597 feet of raises. Diamond-drilling consisted of 289 holes totalling 78,485 feet from underground and one 100-foot hole from surface.

New construction consisted of a combined service building, (unit 1—146×86×30 feet, unit 2—228×123×52 feet), with a concrete foundation, and of

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steel and tile construction; a service tunnel 128×8×8 feet of reinforced concrete; a heating plant building, 42×40×22 feet with a concrete foundation, a steel frame, and tile walls.

New equipment installed included the following:

- 2 raise climbers, STH5, (Alimak)
- 3 mine locomotives 4½ton (Clayton)
- 2 loaders, 24B (Eimco)
- 1 scooptram ST4 (Wagner)
- 2 boilers, capacity 25 million BTU per hour each (Dominion Bridge)
- skip hoisting facilities for No. 1 shaft (Dorr-Oliver-Long and Wabi Iron Works).

A total of 21,039 tons of ore was hoisted.

Employment and Management

The average number of employees was 120: 107 underground and 13 on surface. G. M. Proudfoot, mine project superintendent, was in charge.

NORTH MINE

The mine is in the northern quarter of lot 5, concession II, of Levack township and lies east of the shaft and workings of Fecunis Lake mine which are used to service the operation. The mine address is Onaping.

Operations took place from 1 January to 31 December 1965.

Development work in 1965 consisted of 2,798 feet of drifting, 2,273 feet of crosscutting, and 629 feet of raising. The total to 31 December 1965 was 3,551 feet of drifts; 2,342 feet of crosscuts; and 781 feet of raises completed from the 3,450-foot, 3,600-foot, and 3,775-foot levels of Fecunis Lake mine. In all, 82 diamond-drillholes totalling 18,048 feet were completed from underground.

New added equipment in 1965 included the following:

- 1 mine track scale (Phyllips)
- 2 mine pumps at 3,700-foot level, 400 U.S. gpm (C.I.R.)
- 19 mine cars, 60 cu. ft. (Granby).

Altogether 106,170 tons of ore were hoisted.

Employment and Management

E. N. Gilje was the superintendent. The number of employees in North Mine is included in the Fecunis Lake total.

OUTSIDE EXPLORATION

Outside exploration completed in 1965 on Sudbury Basin properties consisted of 72 diamond-drillholes, totalling 66,997 feet from surface, and 5 holes totalling 4,616 feet from underground, of which one hole totalling 1,074 feet was International Nickel-Falconbridge joint drilling. To complete this diamond-drilling, 673 feet of drifting were required on the 2,650-foot level of International Nickel's Levack mine.

Management

The work was carried out under the direction of A. M. Clarke, chief geologist for Falconbridge.

CONCENTRATORS

Falconbridge Mill

The plant address is Falconbridge.

Operations took place from 1 January to 31 December 1965.

Equipment installed in the mill building consisted of two flotation machines, 4-cell No. 30 (Denver).

During the year a total of 1,020,277 tons of ore were milled, at an average of 2,901 tons daily, producing 137,042 tons of copper-nickel concentrates and 112,236 tons of pyrrhotite concentrate.

Employment and Management

W. R. Lyford was the superintendent of plants; F. Petkovich was the mill superintendent. The number of employees at Falconbridge Mill is included in the smelter total below.

Hardy-Boundary-Onaping Mill

The plant address is Onaping.

Operations proceeded from 1 January to 31 December 1965.

New construction consisted of an oil storage building, (18×17×10 feet), a concrete foundation and roof, and tile walls.

Added equipment was:

- 1 flotation machine, free flow, 6-cell No. 24 (Denver)
- 1 mixer, 40hp lightning (Greey Mixing Equipment Ltd.)

During the year 530,785 tons of ore were milled, at an average of 1,598 tons daily; and 100,484 tons of nickel-copper concentrate were produced.

Employment and Management

The average number of employees was 74. Stan McQuitty was the mill superintendent.

Fecunis Mill

The plant address is Onaping.

Operations proceeded from 1 January to 31 December 1965.

New equipment installed was as follows:

- 2 flotation machines, 4-cell Agitair (Canadian Locomotive Company Limited)
- 2 pumps, one 8×6 in., one 6×6 in. SRL (Canadian Allis Chalmers)
- 5 cyclones, four D10B, one D20B (Krebs)
- 1 scalping screen, Tyrock, 10×5 ft. (W. S. Tyler)
- 1 crusher main frame, symons 5½ ft. (Nordberg Manufacturing Company).

During the year 695,856 tons of ore were milled, at a daily average of 2,400 tons, and 121,829 tons of nickel-copper concentrate were produced.

Employment and Management

The average number of employees was 78. K. C. Mott was the mill superintendent.

SMELTER AND PYRRHOTITE PLANT

The smelter and plants address is Falconbridge.

Operations proceeded from 1 January to 31 December 1965.

New construction in 1965 consisted of an extension for No. 1 sintering machine, 23×18×47 feet, and a pyrrhotite plant fan building 17×14×12 feet, each with concrete foundation, steel frame, and tile walls.

New equipment added included the following:

- 1 blower in pyrrhotite plant, 20,800cfm (C.I.R.)
- 2 slag cars (Hawker Siddley Canada Limited)
- 1 quenching drum installation and ancillary equipment for sinter fines.

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The smelter treated concentrates from the Falconbridge, Hardy and Fecunis mills totalling 512,332 tons at an average of 1,464 tons daily and produced 68,630 tons of nickel-copper matte. The pyrrhotite plant treated 112,379 tons of pyrrhotite concentrate, and produced 91,917 short tons of iron ore.

Employment and Management

The average number of employees was 1,090 in the concentrator, smelter, and pyrrhotite plant. W. R. Lyford was the superintendent of plants; J. K. Weglo was the smelter superintendent; and R. R. Hoffman was the pyrrhotite plant superintendent.

FALCONBRIDGE RESEARCH LABORATORY

The metallurgical laboratories of Falconbridge Nickel Mines Limited, are at Thornhill in the Toronto area. Research carried out here deals with such widely varied subjects as : mineralogical investigation of materials from exploration, development, mining, and extractive metallurgy; development of chemical and instrumental analytical procedures for use in the company's research, production, and quality control laboratories; development and testing of new production methods; and investigation of the physical nature of the metals produced.

Employment and Management

C. L. Lewis is the manager. There are 77 persons employed.

LAKEFIELD RESEARCH OF CANADA LIMITED

Lakefield Research, a subsidiary of Falconbridge Nickel Mines Limited, is at Lakefield, seven miles north of Peterborough. Capacity operations during 1965 at this mineral processing research plant indicated the high level of mineral exploration and development work in progress. Ores from major discoveries in Ontario and other parts of Canada were investigated with most interest in iron, copper, zinc and lead.

Expansion of the technical staff and a new building were required to cope with the heavy demand for services. Thirty engineers and technicians are employed under the direction of A. G. Scobie.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Metal Deliveries

| | 1965 | 1964 |
|--------|------------|------------|
| | lb. | lb. |
| Nickel | 72,984,000 | 78,485,000 |
| Copper | 33,813,000 | 25,102,000 |

Heavy deliveries in 1964 depleted the company's excess stocks of finished and unfinished nickel existing at the beginning of that year. Accordingly, deliveries in 1965 which were largely determined by refinery production were less than in 1964 by 5,501,000 pounds. The company held no excess inventory of copper at the beginning of 1964, and deliveries of that metal in each year were limited by refinery production. There was a sharp rise in income from increased sales of precious metals and sundry by-products at higher prices during 1965.

In September the United States Government suspended until 30 June 1967, the import duty of 1¼ cents per pound of refined nickel. The base price of electrolytic nickel to U.S. purchasers was accordingly reduced by this amount to 77¾ cents U.S. per pound. Otherwise the nickel price remained steady throughout 1965, unchanged from the level established in 1962.

Metal Prices

World copper continued in short supply throughout the year and was sold at two general price levels: the "producers' price", at which most copper sales were made, and the substantially higher "London Metal Exchange" (L.M.E.) price. The producers' price moved from £260 per long ton at the beginning of 1965 to £336 by year-end. L.M.E. prices for cash wirebars rose from £400 in early January to £568 at year-end.

Demand for cobalt was strong throughout the year. An increase of U.S. 15 cents per pound was put into effect on 1 March. A similar situation prevailed in respect of precious metals—steady demand and firm, or increasing, prices. A slight weakness occurred in the "free market" price for platinum late in the year, but nevertheless a highly favourable price was maintained.

Mines

| | 1965 | 1964 |
|--|-----------|-----------|
| | ton | ton |
| Ore delivered to treatment plants from company mines | 2,344,000 | 1,960,000 |

Full production was maintained throughout the year from six producing mines including the North mine, which was brought into production during the year. This orebody of limited size is located to the north-east of the Fecunis Lake mine and is serviced from the Fecunis shaft.

The extensive development program was continued at Strathcona mine. Following completion of the pilot raise, the second shaft is being enlarged to its full size and by year-end was at a depth of 1,960 feet. Three levels below the 4,025-foot level in the Falconbridge mine were prepared for production with stoping operations in progress on two levels by year-end. The underground shaft at East mine was deepened to 915 feet below the 4,025-foot level.

Treatment Plants and Refinery

Following "blowing-in" of a new furnace on 27 January, two blast furnaces were operated for the remainder of the year. A record production of nickel in matte was realized. Continued improvement was experienced in the operations of the pyrrhotite plant both with respect to production and costs. The new 450-foot sinter plant chimney was put into service, and being 275 feet higher than the old chimney, it has improved the dispersion of sulphur gases.

Nickel production at the refinery in Kristiansand, Norway, was the second highest in the company's history. Production costs were somewhat higher than in 1964. Continued high specification standards were maintained for quality of metals produced.

Ore Reserves

As a result of the year's exploration and mine development program in the Sudbury district, the company was able to prove up sufficient additional ore reserves to more than offset the tonnage delivered to the treatment plant of 2,344,000 tons. Reserves of proven ore at year end, were calculated at 55,260,000 tons with a combined nickel-copper content of 1,162,000 tons as compared to 52,236,000 tons and a combined nickel-copper content of 1,144,000 tons for the previous year.

In addition to this proven ore, the estimates for the company's probable ore reserves remained essentially the same as the previous year at 17,900,000 tons containing 304,000 tons of nickel-copper metal, but will undoubtedly increase when the surface diamond-drilling program at Lockerby is completed.

Research

On the research side, increasing attention is being given to instrumentation and process control. Activity in Physical Metallurgy continued in broadening the base of the company's product technology and technical service to customers.

Research laboratories are maintained at Thornhill, Lakefield and Falconbridge, Ontario, and at Kristiansand in Norway.

Genex Mines Limited

Genex Mines Limited was incorporated in March 1949 with an authorized capitalization of 6,000,000 shares of \$1 par value, of which 4,862,001 shares have been issued. The directors and officers were: W. J. Lawson, president and director; E. D. Hinch, vice-president and director; A. B. Whitelaw, A. H. Blackburn, and W. G. Chipp, directors; W. M. MacIntosh, secretary-treasurer; S. H. Warren, assistant secretary-treasurer. The head office is at Suite 906, 357 Bay Street, Toronto 1; the mine address is Box 877, Timmins.

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The property comprises 7 claims in Godfrey township, District of Cochrane, in the Timmins area.

Mining operations continued from 1 January to 31 December.

The vertical two-compartment No. 1 shaft located in claim P27215 was collared and sunk 238 feet in 1965, to a depth of 277 feet below the collar. The first and second levels were established at depths of 125 and 250 feet below the collar. Total development footage to 31 December 1965 consisted of 1,722 feet of drifts, and 310 feet of crosscuts, all completed during the year. Altogether, 35 diamond-drillholes totalling 3,633 feet were completed from underground and one hole totalling 200 feet was completed from surface.

Major construction in 1965 consisted of a cement block hoistroom (26×22 feet), a crusher house (64×20 feet), a mill building (105×45 feet), and foundations poured for an addition to the machine shop and power house (50×30 feet).

Major added equipment comprised two generator sets model 671; one air compressor, 1000cfm; and an electric hoist, (4-foot, single drum with 125hp motor).

Employment and Management

The average number of employees was 13: 5 underground and 8 on surface. J. P. Jewell was the manager.

The International Nickel Company of Canada Limited

The International Nickel Company of Canada Limited was incorporated in July 1916 under Dominion of Canada charter. In 1957 all issued preferred shares of stock were redeemed for cash, and all authorized but unissued preferred shares were cancelled. In April 1960 the authorized capitalization was increased to 36,000,000 shares of no par value, of which 29,639,975 shares have been issued.

The officers of the company in 1965 were as follows: H. S. Wingate, chairman and chief officer; J. R. Gordon president; J. C. Parlee, executive vice-president; T. M. Gaetz, assistant vice-president; W. A. McCadden, comptroller; W. F. Kennedy, secretary; F. M. A. Noblet, treasurer; J. A. Pigott, division general manager (Ontario); Alex Godfrey, W. Curlook, N. H. Wadge, D. A. Fraser and G. O. Machum, assistants to general manager (Ontario); J. McCreedy, manager of mines; R. R. Saddington, manager of reduction plants; G. A. Dick, manager (copper refining division, Sudbury); W. R. Koth, manager (nickel refining division, Port Colborne); and E. G. Stoneman, manager (iron ore recovery plant, Copper Cliff).

The executive office is at 67 Wall Street, New York 5, N.Y., U.S.A., and the general offices are at Copper Cliff. The Toronto office is at 55 Yonge Street, Toronto 1.

The company and its subsidiary companies operate: hydro-electric plants, and nickel-copper mines in the Sudbury district; a smelter, refinery, and iron ore recovery plant at Copper Cliff; and a refinery at Port Colborne. Operations outside the province include: refineries at Acton, England, and Clydach, Wales; rolling mills at Birmingham, England, Huntington, West Virginia, U.S.A., and Glasgow, Scotland; and a foundry at Bayonne, New Jersey, U.S.A. In 1961 the company's new nickel mining, smelting, and refining project at Thompson, Manitoba was completed and brought into full operation.

The International Nickel Company of Canada Limited employed for its Ontario operations, and excluding work completed by contractors for the com-

pany, an average of 19,467 employees: there were 9,399 employed in the mines, 7,481 underground and 1,918 on surface; 7,039 were employed in the concentrators, smelters and iron ore recovery plant; 3,029 were employed in two refineries. Nine mines and open pits, two of which did not operate for the full year, supplied a total of 17,966,367 tons of ore of which 17,061,860 tons was processed.

SHAFTS, INTERNATIONAL NICKEL COMPANY'S MINES, SUDBURY AREA

| | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | SINKING IN 1965 | VERTICAL DEPTH FROM SURFACE |
|-----------------------|--------------------------------------|---|--------------|-----------------|-----------------------------|
| Coleman | | | feet | feet | feet |
| No. 1 | Vertical | 5 | Surface | 46 | 56 |
| Crean Hill | | | | | |
| No. 1 | (57° to 305 ft.) 71° to bottom) | 3 (inactive) | Surface | .. | 797 |
| No. 2 | Vertical | 5 | Surface | .. | 2,115 |
| Creighton | | | | | |
| No. 2.0 | 65° | 2 (inactive) | Surface | .. | 314 |
| No. 3 | 55° | 5 | Surface | .. | 1,946 |
| No. 4 | 50° | 5 (inactive) | 1,477 | .. | 2,702 |
| No. 5 | Vertical | 6 | Surface | .. | 4,074 |
| No. 6 | Vertical | 5 | 3,822 | .. | 5,562 |
| No. 7 | Vertical | 3 | Surface | .. | 2,056 |
| No. 65 | 65° | 3 (inactive) | 3,819 | .. | 4,320 |
| No. 8 | Vertical | 3 | 5,017 | .. | 6,746 |
| No. 9 | Vertical | 6 | Surface | 83 | 88 |
| Frood Stobie | | | | | |
| No. 1 | (77° to 1,300 ft.) 61° to bottom) | 2 (inactive) | Surface | .. | 3,097 |
| No. 3 | Vertical | 6 | Surface | .. | 3,042 |
| No. 4 | Vertical | 3 | 2,783 | .. | 3,928 |
| No. 6 | Vertical | 4 | 2,782 | .. | 3,391 |
| No. 7 | Vertical | 5 | Surface | .. | 3,105 |
| No. 8 | Vertical | 3 | Surface | .. | 2,624 |
| No. 9 | Vertical | 3 | Surface | 33 | 43 |
| Garson | | | | | |
| No. 1 | Vertical | 3 (inactive) | Surface | .. | 1,457 |
| No. 2 | Vertical | 5 | Surface | .. | 4,242 |
| No. 3 | Vertical | 2 | 4,000 | .. | 5,126 |
| Levack | | | | | |
| No. 1 | 65° | 3 (inactive) | Surface | .. | 983 |
| No. 2 | Vertical | (6 to 2,910 ft.) (5 to 2,973 ft.) (4 to bottom) | Surface | .. | 3,915 |
| No. 3 | Vertical | 3 | 1,594 | .. | 3,716 |
| MacLennan | | | | | |
| No. 1 | Vertical | 3 | Surface | 908 | 925 |
| Kirkwood | | | | | |
| No. 1 | Vertical | 3 | Surface | 48 | 49 |
| Murray | | | | | |
| No. 1 | 36° | 3 (inactive) | Surface | .. | 593 |
| No. 1 winze | 36° | 1 (inactive) | 470 | .. | 775 |
| No. 2 | Vertical | 5 | Surface | .. | 3,298 |
| No. 3 | Vertical | 2 | 2,994 | .. | 4,163 |
| Victor | | | | | |
| No. 1 | Vertical | 3 | Surface | .. | 362 |
| Clarabelle C.C. North | | | | | |
| No. 1 | Vertical | 5 | Surface | .. | 4,134 |
| Totten | | | | | |
| No. 1 | Vertical | 3 | Surface | 781 | 824 |
| No. 2 | Vertical | 3 | Surface | 43 | 48 |

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CREAN HILL MINE

Normal operations continued throughout the year.

The vertical five compartment No. 2 shaft 2,115 feet in depth was used to service the mine. The No. 1 inclined shaft was abandoned for hoisting purposes.

Development footage in 1965 consisted of 1,468 feet of drifting and cross-cutting and 550 feet of raising. Total development footage to 31 December 1965 was: 51,942 feet of drifts and crosscuts; 13,368 feet of raises. Some 16 diamond-drillholes, totalling 2,736 feet, were completed from underground.

Added equipment in 1965 consisted of a lathe, an electric 3 ton hoist, and two slusher hoists.

A total of 776,590 tons of ore was hoisted, 782,078 tons were shipped at an average of 3,020 tons per working day.

Employment and Management

The average number of employees was 302: 223 underground and 79 on surface. R. H. Brown was superintendent.

CREIGHTON MINE

Operations continued throughout the year.

The vertical, six compartment No. 9 shaft was collared and had reached a depth of 88 feet below surface at year end; the planned depth is 7,150 feet.

Development work in 1965 consisted of 13,465 feet of drifting and cross-cutting and 5,301 feet of raising. Total development footage to 31 December 1965 was 475,057 feet of drifts and crosscuts and 218,930 feet of raises. A total of 369 diamond-drillholes totalling 134,875 feet were completed from underground.

Major construction in 1965 included a headframe (55×31×178 feet) and a collar house (64.5×62.5×12 feet) at No. 9 shaft.

Considerable new and replacement equipment was added, which included storage batteries, mine cars, diamond drills, slusher and tugger hoists, locomotives, loaders, fans, pumps and electrical equipment.

Altogether 4,770,378 tons of ore, averaging 17,706 tons daily, were hoisted and shipped for treatment.

Employment and Management

The average number of employees was 2,129: 1,732 underground and 397 on surface. E. E. Mumford was the superintendent.

FROOD STOBIE MINE

Normal operations continued throughout the year.

Site preparation and collaring of the vertical, three compartment No. 9 shaft to a depth of 43 feet below surface had been completed at year end. This shaft will be used to service future operations at the Little Stobie mine as well as additional tonnage to be produced from the Stobie section of the Frood Stobie mine.

Development work consisted of 25,536 feet of drifting and crosscutting and 4,716 feet of raising. Total development footage to 31 December 1965 was 571,828 feet of drifts and crosscuts and 221,033 feet of raises. Some 20 diamond-drillholes, totalling 2,017 feet, were drilled from underground in 1965.

Two new buildings, one (65×50×21 feet) the second (50.5×37.5×21 feet) were constructed, the first for the Frood sewage treatment plant, the second for the Stobie sewage treatment plant.

Considerable new and replacement equipment was added both underground and on surface.

A total of 6,020,460 tons of ore at a daily average of 23,096 tons was hoisted and shipped for further treatment.

Employment and Management

The average number of employees was 2,897: 2,292 underground and 605 on surface. S. J. Sheehan was the superintendent.

GARSON MINE

Normal operations continued throughout the year.

Development work consisted of 8,151 feet of drifting and crosscutting and 5,621 feet of raising. Total development footage to 31 December 1965 was 244,324 feet of drifts and crosscuts and 110,380 feet of raises. Some 89 diamond-drillholes, totalling 52,853 feet, were drilled from underground.

New construction consisted of a sand fill plant building (32×18×108 feet) and a sand bin (101 feet high, 40-foot diameter).

Added equipment includes rock drills, diamond drills, mine cars, pumps, slusher hoists, locomotives, winches, and electrical equipment.

Altogether, 1,133,861 tons of ore, (at a daily average of 4,353 tons) were hoisted and shipped for further treatment.

Employment and Management

The average number of employees was 1,125: 937 underground and 188 on surface. B. T. King was the superintendent.

LEVACK MINE

Normal operations continued throughout the year.

Development work in 1965 consisted of 4,583 feet of drifting and crosscutting and 1,924 feet of raising. Total development footage to 31 December 1965 was as follows: 257,860 feet of drifts and crosscuts after 1,324 feet had been transferred to the Levack West mine; 84,832 feet of raises. Altogether, 92 diamond-drillholes totalling 65,344 feet were drilled from underground. Some drilling was done for Falconbridge and some was done jointly with Falconbridge.

New and replacement equipment added in 1965 included mine cars, batteries, drills, hoists, loaders, locomotives, pumps, scrapers, winches and rectifiers.

A total of 1,671,515 tons of ore was hoisted and shipped at an average of 6,417 tons per working day.

Employment and Management

The average number of employees was 2,053: 1,703 underground and 350 on surface. V. H. Ritzel was the superintendent.

LEVACK WEST MINE

A limited amount of development work was carried out at the Levack West mine by Falconbridge for International Nickel. Some 690 feet of drifting and crosscutting and 32 feet of raising was completed in 1965; drifts and crosscuts totalling 1,324 feet were transferred from the Levack mine footages, resulting in a total of 2,183 feet of drifts and crosscuts and 32 feet of raises for the Levack West mine to 31 December 1965. Thirty diamond-drillholes, totalling 7,086 feet were completed from underground.

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Management

The work was under the direction of J. McCreedy, manager of mines.

MURRAY MINE

Normal operations continued throughout the year.

Development work in 1965 included 9,459 feet of drifting and crosscutting and 1,712 feet of raising. Total development footage to 31 December 1965 was: 183,568 feet of drifts and crosscuts and 41,038 feet of raises. Some 16 diamond-drillholes, totalling 15,210 feet, were completed from underground.

New construction consisted of a sewage treatment plant (19×12.6×9 feet) and a concrete tank (51×19×19 feet).

Added equipment consisted of mine cars, pumps, diamond drills, loaders, weighers, a compressor 450-L, 4-AX-1, 3,600cfm and a motor.

A total of 1,937,605 tons of ore at a daily average of 7,284 tons was hoisted and shipped for further treatment.

Employment and Management

The average number of employees was 623: 494 underground and 129 on surface. H. W. Smith was the superintendent.

CLARABELLE—COPPER CLIFF NORTH MINE

These two operations, formerly reported separately, are now combined since the Clarabelle is an open pit operation, Copper Cliff North is an underground operation, both on the same orebody. They are located between Copper Cliff and the Murray mine.

Development footage in 1965 consisted of 20,115 feet of drifting and crosscutting, and 5,164 feet of raising. Total development footage to 31 December 1965 was 28,919 feet of drifts and crosscuts, and 6,785 feet of raises. In all, 188 diamond-drillholes, totalling 96,637 feet, were completed from underground. As well, 1,317 rotary drill-blastholes, totalling 78,086 feet, were completed in the open pit.

Added equipment comprised:

- 3 locomotives
- 6 batteries
- 25 mine cars
- 1 pump
- 8 transformers
- 2 electric motors
- 1 fan, Axivane, H-84-50, high pressure vertical.

A total of 1,146,311 tons of ore was mined in the open pit and trucked to the rockhouse at an average of 4,426 tons daily.

Employment and Management

The average number of employees was 253: 100 underground and 153 on surface. N. A. Creet was the superintendent.

MACLENNAN MINE

Operations proceeded from 1 May to 31 December 1965 on the MacleNNan property located in MacleNNan township.

The vertical, three-compartment No. 1 shaft was collared and sunk 908 feet to a depth of 925 feet below the collar by MacIsaac Mining and Tunnelling Company on contract during 1965. The 150-foot, 300-foot, 450-foot, 600-foot,

750-foot, and 900-foot levels were established at depths of 182, 343, 476, 623, 770 and 917 feet respectively below the collar. A skip-cage change station was also located 860 feet below the collar. A total of 369 feet of drifting and cross-cutting was completed. Altogether, 24 diamond-drillholes, totalling 6,625 feet were drilled from surface.

A total of 180,895 tons of ore was mined and delivered at a daily rate of 914 tons during the operating period, by Carman Construction on contract.

Management

J. McCreedy, the manager of the mine for International Nickel, was in charge.

KIRKWOOD MINE

Operations commenced at the Kirkwood property located in Garson township.

The vertical, three-compartment No. 1 shaft was collared and sunk 48 feet to a depth of 49 feet below the collar by Dravo of Canada Limited on contract in 1965.

A pre-engineered steel building (24×10×10 feet) was erected by Neil Smith Construction Limited of Sudbury.

Management

J. McCreedy, manager of mines for International Nickel, was in charge.

COLEMAN MINE

The contract for sinking the vertical, five-compartment No. 1 shaft was commenced by Dravo of Canada Limited; 46 feet had been completed to a depth of 56 feet below the collar at year end.

Falconbridge Nickel Mines Limited did 208 feet of drifting and crosscutting and 11 feet of raising for International Nickel at the Coleman mine. Total development footage to 31 December 1965 consisted of 3,277 feet of drifts and crosscuts and 11 feet of raises. Altogether 32 diamond-drillholes, totalling 20,725 feet were completed from underground, while 4,154 feet was Inco-Falconbridge joint drilling.

Management

J. McCreedy, manager of mines for International Nickel was in charge.

ELLEN OPEN PIT

Operations in the Ellen open pit were continued from 1 January to 31 December on the Pioneer Construction contract.

In all, 323,264 tons of ore were produced and shipped from the Crean Hill rockhouse at an average of 1,111 tons daily.

Management

The work was under the direction of R. H. Brown, superintendent of Crean Hill mine.

TOTTEN MINE

Shaft sinking was commenced by MacIsaac Mining and Tunnelling Company, on contract, at the Totten mine, in Drury township. The mine address is Worthington.

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The vertical, three-compartment No. 1 shaft was sunk a further 781 feet to a depth of 824 feet below the collar in 1965. The 425 foot and 650 foot levels were established at depths of 428 feet and 659 feet below the collar. The collaring and sinking of the vertical three-compartment No. 2 shaft was commenced and was sunk 43 feet to a depth of 48 feet below the collar. A total of 2,595 feet of drifts and crosscuts, and 1,276 feet of raises had been completed on the two levels at year end. Altogether, 32 diamond-drillholes, totalling 8,124 feet, were completed in 1965.

Management

The work is under the direction of J. McCreedy, manager of mines.

LAWSON QUARRY

The quarry is operated to supply quartzite rock used as a flux in Sudbury smelting operations. The quarry address is Willisville.

Operations continued throughout the year.

In 1965, 102 churn-drillholes, totalling 7,278 feet were drilled for quartzite production.

Altogether, 368,449 tons of quartzite was mined and delivered to the rock-house, and 365,724 tons were shipped at a daily average of 1,440 tons.

Management

The average number of employees was 17. W. G. Tilston was the superintendent.

CREIGHTON MILL (CONCENTRATOR)

Normal operations continued throughout the year.

The Creighton mill treated 4,350,717 tons of ore, averaging 11,920 tons per working day to produce concentrates, which were pumped to the Copper Cliff smelter.

Employment and Management

The average number of employees was 109. E. McMullen was the superintendent.

COPPER CLIFF CONCENTRATOR

Normal operations continued throughout the year.

Added equipment included a mobile crane, a tractor and four oil circuit breakers.

The Copper Cliff concentrator treated 10,614,138 tons of ore, averaging 29,090 tons daily, to produce concentrates.

Employment and Management

The number of men employed is added into the Copper Cliff smelter totals. J. Lee was the superintendent.

LEVACK MILL

Normal operations continued throughout the year.

A total of 2,097,005 tons of ore was milled at an average of 5,745 tons per working day.

Employment and Management

The average number of employees was 86. G. H. Morrison was the superintendent.

CONISTON SMELTER

Normal operations continued throughout the year. Added equipment consisted of two cast steel slag pots.

The Coniston smelter treated 512,455 tons of concentrate averaging 1,404 tons per working day and produced 45,936 tons of bessemer matte, shipped to Copper Cliff for further processing.

Employment and Management

The average number of employees was 496. R. L. Snitch was the superintendent.

COPPER CLIFF SMELTER

Normal operations continued throughout the year. Major construction in 1965 comprised the following:

- 1 power house (92×27×20.5 ft.)
- 1 cooling water pumphouse (32×20.5×16 ft.)
- Addition to nickel converter building (130×50.5×16 ft.) with basement (40×50×10 ft.)
- Addition to coal and silica bins building, two storeys, high roof addition (30×17×27 ft.); low roof addition (44×20×32 ft.)
- 1 copper converter building (273×26×96 ft.) with five conveyor galleries (25×23×16 ft.)
- Addition to separation building, two storeys, (62×30×63 ft.)
- Addition to oxygen generating plant, two storeys, (100×75×47 feet).
- An oil storage building at Oxyton plant, (20×12×8.5 feet).

A considerable amount of new and replacement equipment was added.

The smelter treated 357,388 tons of concentrate averaging 979 tons per working day and produced 169,191 tons of nickel matte, 44,544 tons of nickel oxide sinter, and 162,408 tons of converter copper.

Employment and Management

The average number of employees at the Copper Cliff concentrator and smelter was 5,616. J. R. Feick was the superintendent of smelters.

IRON ORE RECOVERY PLANT

Normal operations continued throughout the year at the plant located in Waters township.

Major construction in 1965 included the following:

- Addition to recovery building, two storeys, (123×73.5×36 feet).
- A salvage warehouse (170×80×15 feet) under eaves.

Major equipment added consisted of a 75hp gas booster, a ball mill (8.5×9 feet) a mobile crane, a bucket elevator, an industrial exhauster, a vacuum cleaning unit, a turbo mixer, five heaters, an electric cable hoist, 16 pumps of various sizes, a condenser scrubber (34×66 inches) a thickener (45 ft. diam.×19.2 ft.), five distillation tanks (12 ft. diam.×8 ft.), an automatic fork lift truck and four electric welders.

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The iron ore recovery plant produced 854,369 gross tons of iron ore and 8,404 net tons of nickel oxide.

Employment and Management

The average number of employees was 732. E. G. Stoneman was the manager.

COPPER CLIFF REFINERY

Normal operations continued throughout the year.

The Copper Cliff refinery produces copper cathodes and shapes, nickel sulphate, gold, silver, tellurium, selenium, and semi-refined platinum metals.

Altogether, 162,408 tons of converter copper, and 5,928 tons of scrap secondary copper were refined at an average of 473 tons per working day; thus 155,376 tons of refined copper were produced from the primary converter copper and 5,670 tons from the secondary scrap copper, and 4,249 tons of cathodes were converted to shapes. No. 1 furnace was in operation for 333 days, No. 2 furnace for 344 days.

Employment and Management

The average number of employees was 915. G. A. Dick was the manager.

PORT COLBORNE REFINERY

Operations continued throughout the year.

The Port Colborne refinery produces nickel metal, cobalt metal, and elemental sulphur.

The high production rate of pure metallic nickel at Port Colborne continued efficiently during 1965 despite the increasing use by the steel industry of nickel oxide sinter products which are produced at Copper Cliff.

Research and development to improve productivity in the field of direct production of refined nickel from intermediate products and the extraction of nickel from the various types of ores was continued at the No. 1 and No. 2 research stations.

Employment and Management

The average number of employees was 2,114. W. R. Koth was the manager.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Mines

The mines produced at record levels in 1965. Total ore production from the Ontario and Manitoba mines amounted to 19,750,000 short tons, compared with 16,439,000 tons in 1964 and 13,566,000 tons in 1963.

At the end of 1965, underground development in the operating mines had reached a cumulative total of 3,105,000 feet, or about 588 miles.

In Ontario, at the Creighton mine a new shaft was started which will be the deepest continuous mine shaft from surface in the Western Hemisphere. This shaft will be sunk 7,150 feet, or nearly a mile and a half, and will permit the mining of important ore bodies which were located by drilling from underground exploration stations. Also in Ontario, the new MacLennan open pit mine was put into operation during the year.

Of the seven new mines being developed in Canada, five are located in the Sudbury district of Ontario. The Totten mine came into production early in 1966. The four other new mines, Copper Cliff North, Kirkwood, Coleman, and Little Stobie, are still in the development stage and are scheduled to start producing in 1967 and 1968.

Process Research and Plant Improvements

In addition to the mine expansion program, the company continued a major capital program involving plant expansion and plant and process improvements. The research programs have contributed directly to these improvements.

International Nickel pioneered the commercial use of oxygen in non-ferrous smelting. The new oxygen plant, one of the largest such units in operation in the world, went on stream in November, bringing the total oxygen capacity at Copper Cliff to over 1,100 tons per day. The increased output of oxygen will permit important modifications in the company's nickel and copper smelting operations which will result in higher efficiency and increased throughput rates.

Also at the Copper Cliff smelter, a program is being initiated to replace multi-hearth roasters with more efficient fluid bed roasters. In addition a program of improvement and expansion of the matte separation facilities is underway.

The new Nickel Oxide Sinter 90 facility at Copper Cliff commenced operation in the latter part of the year and rapidly achieved design capacity.

Process improvements at the iron ore recovery plant provided increased throughput and improved nickel recoveries.

The company's research laboratories continued their work on process improvements, with emphasis on the economic recovery of metals from marginal ores.

At the company's research and pilot plant stations at Port Colborne, Ontario, significant success has been achieved in new process development for the economic recovery of nickel from oxide nickel ores.

Work continued on the new research laboratory in the Sheridan Park Ontario Research Community near Toronto. This laboratory will open in 1966 and will be devoted principally to developing new and improved methods in extractive metallurgy. This laboratory will also be used to conduct geophysical and geological research, as well as product research aimed at developing new applications for nickel.

A research achievement of the past year was the development, to the pilot plant stage, of a process for continuously coating steel with nickel. The nickel is applied in the form of a slurry containing nickel powder and is dried and sintered to the surface of steel sheet or strip. The new process will provide manufacturers with a coated steel product having corrosion resistance and other advantages. The development could open an entirely new market for nickel in powder form.

Ore Reserves

The proven ore reserves of the company's Sudbury district and Manitoba mines were 306,203,000 short tons at 31 December 1965, with a nickel-copper content of 9,274,000 short tons. At the end of 1964 the proven ore reserves stood at 303,767,000 short tons, with a nickel-copper content of 9,196,000 short tons.

Kam-Kotia Porcupine Mines Limited

Kam-Kotia Porcupine Mines Limited was incorporated in August 1932, with an authorized capitalization of 4,000,000 shares of no par value, of which 800,000 shares have been issued. The directors and officers were: A. W. White, president and director; G. W. Walkey, vice-president, general manager and director; D. F. Burt and A. W. McDonald, directors, and H. R. Heard, secretary-treasurer. The head office is at Suite 416, 25 Adelaide Street West, Toronto 1. The mine address is P.O. Box 290, Timmins.

The property comprises 10 claims located in Robb township, Porcupine area, District of Cochrane, about 12 miles northwest of Timmins.

Open pit and underground mining, and milling of ore continued throughout 1965.

The vertical, four-compartment No. 1 shaft collared on claim P-12341, has a depth of 1,035 feet below the collar.

Development footage completed in 1965 consisted of 15,747 feet of drifting, and 4,823 feet of raising. Total development footage to 31 December 1965 was: 26,350 feet of drifts; 2,625 feet of crosscuts; and 10,369 feet of raises. Diamond-drilling in 1965 consisted of 538 holes, from underground totalling 81,229 feet, and 7 holes from surface totalling 3,078 feet.

Major construction in 1965 consisted of an addition to the main office (40×20 feet).

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Major added equipment in 1965 included the following:

- 1 truck, ½ ton pickup
- 2 loaders
- 10 mine cars, 50 cu. ft. capacity
- 2 mine locomotives, one 1.5 ton, one 4.5 ton
- 1 diamond drill, Packsack
- 1 electric hoist, three-drum, 30 hp. motor.

A total of 513,350 tons of ore was hoisted, the open pit supplied a further 90,000 tons, while 597,513 tons were milled at a daily average of 1,640 tons.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Open pit operations were completed in April. Some low grade material remains in sections of the pit walls but metal content is too low to warrant recovering this material.

The pit supplied 30,008 tons in 1965, all from the "A" East zone. Balance of this zone will be mined from underground.

Final pit figures are as follows:

| | |
|---|--------------------------|
| Total tons ore broken | 3,221,714 |
| Total tons ore mined (includes low grade material stockpiled) | 1,863,745 |
| Total footage drilled | 706,675 ft. (3-in. hole) |
| Final waste to ore ratio | 0.73 ton (waste) |
| | 1.0 ton (ore) |

Milling was carried out continuously through the year at maximum capacity except for 26 days during which time the mill treated Texas Gulf Sulphur Company's ore from the Kidd Creek mine on a pilot plant basis. Operating time was about 96.0 percent of total time with balance of the time spent on maintenance and repairs. For the first nine months, monthly tonnage averaged 53,600 tons, and daily tonnage for the year averaged 1,765 tons. Copper (Cu) content of mill heads climbed steadily through the year as underground production increased and for the last quarter averaged 1.925 percent copper. The zinc (Zn) circuit operated for 85 percent of the time and zinc metallurgy continued to be extremely difficult.

There were no major changes made in the mill circuit during 1965.

Production Data

| | | |
|---|-----------------|-------------|
| Milled | ton | 597,623 |
| Average per calendar day | ton | 1,765 |
| Average per net operating day | ton | 1,855 |
| Average mill head copper | percent | 1.56 |
| Copper concentrate produced | dry ton | 41,239.9 |
| Average grade of concentrate | percent | 19.65 |
| Returnable copper | lb | 15,337,947 |
| Average copper recovery | milling percent | 86.8 |
| Smelter settlements outstanding at 31 December 1965 | lb. copper | 5,631,575.3 |
| Zinc concentrate produced | ton | 7,674.8 |
| Grade of zinc concentrate | percent | 48.1 |
| Silver | oz | 64,086.32 |
| Gold | oz | 580.70 |

Milling Data

| GRINDING STEEL CONSUMPTION | LB. PER TON MILLED |
|-------------------------------------|--------------------|
| (balls and rods) | 3.342 |
| REAGENT CONSUMPTION | LB. PER TON MILLED |
| Hydrated lime | 6.260 |
| Amyl xanthate | 0.402 |
| Sodium cyanide | 0.063 |
| Frothers | 0.031 |
| Zinc sulphate | 0.526 |
| Copper sulphate (zinc circuit only) | 0.417 |

Ore Reserves

Ore reserves at 31 December 1965, were as follows, including dilution factor.

| POSITIVE AND BROKEN ORE | |
|--|--|
| (1) | 2,339,000 tons grading 1.61 percent Cu and 1.80 percent Zn |
| (2) | 395,000 tons grading 0.34 percent Cu and 4.15 percent Zn |
| PROBABLE AND POSSIBLE ORE | |
| 1,525,000 tons grade similar to (1) above. | |

Employment and Management

The average number of employees was 264: 125 underground and 139 on surface. G. W. Walkey was the vice-president and general manager.

**Metal Mines Limited
(Werner Lake Division)**

Eastern Mining and Smelting Corporation Limited was incorporated in December 1955 on amalgamation of Eastern Smelting and Refining Company Limited and Quebec Nickel Corporation Limited. The name was later changed to Nickel Mining and Smelting Corporation, and in December 1963 the name was again changed to Metal Mines Limited to include Faraday Uranium Mines Limited and Nickel Mining and Smelting Corporation. The authorized capitalization is 8,500,000 shares of \$1 par value, of which 7,215,700 shares have been issued. The directors and officers were: A. W. Johnston, president and director; H. B. Hicks, vice-president, general manager and director; L. E. Wetmore, secretary and director; W. C. Campbell, Eliot Janeway, John Beattie, and A. B. Whitelaw, directors; and W. M. O'Shaughnessy, treasurer. The head office is at Suite 914, 1155 Dorchester Blvd. West, Montreal 2, Quebec. The executive office is at Suite 1600, 100 Adelaide Street West, Toronto 1. The mine address of the Metal Mines Limited, Bancroft Division, (formerly Faraday Uranium Mines Limited) is R.R. No. 3, Bancroft. The mine address of Metal Mines Limited, Werner Lake Division, (formerly Gordon Lake Division) is Werner Lake, Ontario.

The Werner Lake Division property comprises 182 claims in the Werner Lake area, District of Kenora.

Mining and milling continued throughout 1965.

SHAFTS, WERNER LAKE DIVISION MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|-------|-----------|-------------|------------------------|--------------|------------------------------|
| | | | | feet | feet |
| No. 1 | KRL19096 | Vertical | 3 | Surface | 360 |
| No. 2 | KRL31831 | Vertical | 3 | Surface | 1,817 |
| No. 3 | | Vertical | 2 | 1,204 | 1,687 |

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Development footage in 1965 consisted of 1,483 feet of drifting, 292 feet of crosscutting, and 1,320 feet of raising. Total footage to 31 December 1965 was: 21,870 feet of drifts; 10,203 feet of crosscuts; and 14,866 feet of raises. Diamond-drilling consisted of 203 holes, totalling 27,043 feet from underground.

Construction in 1965 included the following:

- Addition to general office, 70.5×12.3 feet, frame construction
- Addition to machine shop, 75×28 feet, frame construction
- Bunkhouse, 60 room, 110×30 feet, frame construction
- Union office building, 20×12 feet, frame construction.

Added equipment consisted of a mucking machine, an end loader, and a delivery van.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

The mine operated throughout the year at an average rate of 505 tons per day. Concentrate production totalled 19,094 tons with a recoverable metal content of 3,713,250 pounds of nickel, 1,930,617 pounds of copper, 875 ounces of platinum and 6,207 ounces of palladium. The concentrates are sold to The International Nickel Company of Canada at Sudbury, Ontario.

Mining

Tonnage mined shows a slight decrease from the figure for 1964. This is disappointing as, generally speaking, the mine is in excellent shape and capable of a higher rate of production. The main factor limiting tonnage has been the shortage of skilled miners and underground labour. Every effort is being made to adopt mining methods which will minimize labour requirements.

Milling

| | | 1965 | 1964 |
|----------------------|---------|---------|---------|
| Milled | ton | 184,364 | 192,874 |
| Heads, Nickel | percent | 1.36 | 1.22 |
| Copper | percent | 0.64 | 0.57 |
| Tails, Nickel | percent | 0.22 | 0.20 |
| Copper | percent | 0.06 | 0.06 |
| Recovery, Nickel | percent | 85.4 | 85.1 |
| Copper | percent | 91.8 | 89.9 |
| Concentrates, Nickel | percent | 11.15 | 10.74 |
| Copper | percent | 5.54 | 5.53 |

Ore Reserves

Reserves as at 31 December 1965 are tabulated below with the corresponding figures for the previous year.

| | 1965 | | | 1964 | | |
|---------------|-----------|----------------|----------------|-----------|----------------|----------------|
| | tons | Nickel percent | Copper percent | tons | Nickel percent | Copper percent |
| Proven ore | 670,397 | 1.42 | 0.57 | 740,995 | 1.43 | 0.57 |
| Probable ore | 303,658 | 1.27 | 0.59 | 175,711 | 1.28 | 0.40 |
| Indicated ore | 114,200 | 1.40 | 0.46 | 114,200 | 1.40 | 0.40 |
| Total | 1,088,255 | 1.38 | 0.56 | 1,030,906 | 1.40 | 0.53 |

The increase in the "probable" category reflects the new "D" ore which has not as yet been sufficiently well outlined to be placed in the "proven" category.

Costs

Operating costs per ton showed an upward trend, largely due to low productivity from the labour force. Comparative figures for the past three years follow:

| | 1965 | 1964 | 1963 |
|-------------|---------|---------|---------|
| Development | \$ 0.76 | \$ 0.77 | \$ 1.47 |
| Mining | 9.20 | 7.78 | 7.45 |
| Milling | 1.86 | 1.76 | 2.43 |
| Marketing | 1.76 | 1.59 | 1.53 |
| Total | \$13.58 | \$11.90 | \$12.88 |

Employment and Management

The average number of employees was 217: 130 underground and 87 on surface. G. R. Hjørleifson was the mine manager.

**Noranda Mines Limited
(Geco Division)**

Geco Mines Limited was incorporated in October 1953; in December 1964, Geco Mines Limited and Noranda Mines Limited were amalgamated under the name of Noranda Mines Limited and Geco became the Geco Division of the company. The authorized capitalization is 15,000,000 shares of no par value, of which 11,836,606 shares have been issued. The directors and officers were: J. R. Bradfield, chairman of the board and chief executive officer; R. V. Porritt, president and director; N. C. Urquhart, and W. S. Row, executive vice-presidents and directors; A. Powis, executive assistant to president and director; A. O. Dufresne, Hon. G. B. Foster, L. G. Lumbers, Hon. Jean Raymond, J. D. Simpson, J. R. Timmins and L. H. Timmins, directors; C. H. Windeler, secretary; and E. K. Cork, treasurer. The head office is at Suite 1700, 44 King Street West, Toronto 1. The Geco Division mine address is Manitouwadge.

The property comprises 77 claims in the Manitouwadge Lake area, Port Arthur Mining Division, District of Thunder Bay.

Mining and milling continued throughout 1965.

SHAFTS, GECO MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | SINKING 1965 | VERTICAL DEPTH FROM SURFACE |
|-------|-----------|-------------|------------------------|--------------|--------------|-----------------------------|
| | | | | feet | feet | feet |
| No. 1 | TB46849 | Vertical | 5 | Surface | .. | 2,459 |
| No. 2 | TB46849 | Vertical | 3 (inactive) | Surface | .. | 455 |
| No. 3 | ..... | Vertical | 3 | 1,250 | .. | 2,565 |
| No. 4 | TB46847 | Vertical | 7 | Surface | 854 | 4,334 |

No. 4 shaft was sunk a further 854 feet in 1965, to a total depth of 4,334 feet below the collar. The shaft is circular, 21.5 feet in diameter and concrete lined. The 3,250-foot, 3,450-foot, 3,650-foot, 3,850-foot, and 4,050-foot levels were established at depths of 3,480.5, 3,680.5, 3,880.5, 4,080.5, and 4,280.5 feet respectively below the collar.

During the year, development work consisted of 14,759 feet of drifting and crosscutting, and 6,951 feet of raising. The total development footage to 31

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December 1965 was as follows: 215,731 feet of drifts and crosscuts, and 70,580 feet of raises. Diamond-drilling consisted of 461 holes totalling 80,107 feet from underground, and 8 holes totalling 2,352 feet from surface.

New added equipment was as follows:

- 2 dump skips; one of 150 cu. ft., one of 360 cu. ft. capacity
- 1 loading pocket, 2 compartments, 360 cu. ft. capacity
- 2 cages, 4 guides complete with guide rollers
- 1 compressor, 31.5×19×14.5 in., 300 rpm.
- 1 exhaust fan, 48 in., three-stage
- 2 battery locomotives, 8.5 ton with two 20 hp. traction motors and changing stations
- 1 box car loader, normal duty
- 1 mobile crane
- 3 pumps, various types.

Altogether, 1,326,360 tons of ore was hoisted and milled at an average daily milling rate of 3,634 tons.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production was at the rate of 3,634 tons of ore per day, averaging 1.97 percent copper, 4.26 percent zinc and 2.17 ounces silver per ton. Ore reserves were increased by 956,000 tons.

A one million dollar recreation centre was built and donated to the municipality. Other construction included 46 dwellings, a cement plant for mine backfill and partial completion of the conveyor system from No. 4 shaft to the mill.

Ore Reserves

| 1 JANUARY 1965 ORE RESERVE | ORE RESERVE | 1 JANUARY 1966 | | | |
|-------------------------------|-------------|-------------------|--------------------|----------------------|-----------------|
| ton | ton | COPPER percent | GOLD oz per ton | SILVER oz per ton | ZINC percent |
| 23,821,000 | 24,777,000 | 2.17 | .... | 2.32 | 4.78 |

Production

| | | 1965 | 1964 | 1963 | TOTAL TO DATE |
|---|-----|-----------|-----------|-----------|------------------|
| Ore treated in concentrator | ton | 1,326,400 | 1,299,300 | 1,281,200 | 10,682,000 |
| Metal content of concentrates produced: | | | | | |
| Copper | ton | 24,790 | 25,620 | 22,950 | 199,910 |
| Zinc | ton | 42,880 | 56,640 | 59,530 | 325,740 |
| Lead | ton | 1,060 | 1,740 | 1,570 | 5,760 |
| Silver | oz | 2,214,600 | 2,468,800 | 2,437,000 | 15,405,100 |
| Gold | oz | 4,430 | 4,300 | 4,500 | 42,030 |

Employment and Management

The average number of employees was 570: 205 underground and 365 on surface. J. A. Graham was the mine manager.

North Coldstream Mines Limited

Coldstream Copper Mines Limited was incorporated in November 1951. In August 1959, the name was changed to North Coldstream Mines Limited on a one for four share basis. The authorized capitalization is 5,000,000 shares of

no par value, of which 4,438,696 shares have been issued. The directors and officers were: G. D. Pattison, president and director; P. S. Cross, vice-president and director; R. D. Bell, secretary-treasurer and director; and E. T. Donaldson, L. J. Moreaux, A. B. Lash, and K. A. Davis, directors. The head office is at Suite 509, 25 Adelaide Street West, Toronto 1. The mine address is Burchell Lake.

The property comprising 106 claims, includes the old Tip Top mine. It is located in the area east of Moss township and south of Ames township, District of Thunder Bay, about 90 miles west of Fort William, and about 8½ miles by road south of Kashabowie Station on the Canadian National Railway.

Mining and milling operations continued throughout 1965.

SHAFTS, NORTH COLDSTREAM MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | TOTAL DEPTH FROM SURFACE |
|-------|-----------|-------------|------------------------|--------------------------|
| | | | | feet |
| No. 1 | K65 | 80° | 2 (inactive) | 200 |
| No. 2 | K65 | Vertical | 1 (inactive) | 50 |
| No. 3 | K65 | Vertical | 1 (inactive) | 20 |
| No. 4 | K65 | Vertical | 3 | 1,596 |

Development footage in 1965 consisted of 56 feet of drifting, 149 feet of crosscutting, and 1,547 feet of raising. Total development footage to 31 December 1965 was 17,365 feet of drifts; 10,760 feet of crosscuts; and 18,951 feet of raises. Diamond-drilling consisted of 19 holes totalling 1,229 feet from underground and 7 holes totalling 1,687 feet from surface.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Summary of Production

| | | 1965 | 1964 |
|--------------------------------|------------|------------|------------|
| Milled ore | ton | 365,082 | 366,950 |
| Average milled daily | ton | 1,000 | 1,003 |
| Average grade, copper | percent | 1.86 | 2.06 |
| Copper recovery | percent | 95.27 | 95.64 |
| Operating time | percent | 96.61 | 93.59 |
| Concentrate grade | | | |
| Copper | percent | 26.44 | 27.50 |
| Gold | oz per ton | 0.125 | 0.136 |
| Silver | oz per ton | 2.31 | 2.29 |
| Concentrate shipped | ton | 24,605.93 | 25,824.14 |
| Content of concentrate shipped | | | |
| Copper | lb | 13,014,279 | 14,211,784 |
| Gold | oz | 3,104.90 | 3,559.50 |
| Silver | oz | 56,739 | 58,435 |

The average daily tonnage milled decreased slightly in spite of an increase in the operating time of the concentrator. This reduction is primarily due to the hard, lower-grade mill feed which was prevalent during the year and which is more difficult to grind.

Development and Mining

Development and stope preparation of the remaining orebodies and pillars were essentially completed during 1965.

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Ore broken by development, stope preparation, and stoping totalled 339,390 tons and 366,070 tons of ore were trammed.

Dilution by low grade wall rock caving into open stope areas has caused lower than ore reserve grade mill heads. As all mining has been by open stope methods it is expected that this condition will continue for the life of the mine. Nevertheless it is expected that the total weight of copper produced will exceed the amount shown in the ore reserves due to the low copper values in this wall rock.

Exploration

There was no underground exploration during 1965 as a very complete exploration program was completed with negative results in 1964.

The surface program in the local area consisting of property examinations, scouting and geophysical reconnaissance was continued. Five properties brought to our attention by local prospectors were also examined, but none warranted more than a preliminary examination.

Several conductors which were outlined by geophysical surveys in 1964 were further investigated by diamond-drilling and were found to result from pyrite and pyrrhotite mineralized together with banded graphite. Several additional electro-magnetic anomalies were outlined during 1965 and diamond-drilling of these zones will be carried out early in 1966.

Geophysical surveys were also carried out on the original patented claims in the mine area. No significant new information was obtained.

In all of this work 72.2 line miles of geophysical surveying was completed.

Ore Reserves

Ore reserves at 31 December 1965 after allowing for dilution, were estimated to be 349,000 tons with an average grade of 2.13 percent copper; this includes 74,460 tons of broken ore having an average grade of 2.21 percent copper.

Employment and Management

The average number of employees was 167: 77 underground and 90 on surface. G. H. Montgomery was the manager.

Rio Algom Mines Limited

Pronto Division, Pater Mine

In June 1960, Pronto Uranium Mines Limited, which comprised the Pater mine, was amalgamated under the name of Rio Algom Mines Limited. Further details are given in the Uranium section of this report under Rio Algom Mines Limited (p. 144).

PATER MINE

The company's property consists of approximately 1,576 acres known as the McFadden Option, in Spragge township, District of Algoma. The mine address is Algoma Mills. The No. 1 vertical shaft located on the southeast quarter of section 29, Spragge township, is 3,005 feet below the collar; there are three compartments from the collar to a depth of 1,024 feet, and four compartments from this point to the bottom. The vertical No. 2 shaft, collared on the 15th level at a depth of 2,705 feet, was raised 119 feet in preparation for sinking. During 1965 it was sunk 806 feet, three compartments from 2,705 to 3,505 feet and 4 compartments from 3,505 to the bottom at 3,511 feet.

Development work in 1965 consisted of 1,161 feet of drifting, 541 feet of crosscutting, and 1,244 feet of raising. Total development footage to 31 December 1965 consisted of the following: 25,531 feet of drifts; 6,953 feet of crosscuts; and 33,477 feet of raises. Diamond-drilling consisted of 59 holes totalling 2,727 feet from underground.

New added equipment included the following:

- 1 timber car, Zimmerman type
- 2 wagon drills, underground
- 1 auto loader, underground
- 2 pan feeders at conveyor 15 level (84×48 in.)
- 1 conveyor (600 ft. long, 42 in. wide) at 15 level
- 1 hoist, single clutch (60×48 in.) with 300 hp motor at 15 level.

A total of 248,366 tons of ore was hoisted, 248,613 tons were milled at a daily average of 716 tons.

Company Annual Report

The following, pertaining to the Pater operation, was taken from the Rio Algom annual report for the year ending 31 December 1965.

The Pronto mine produced concentrate containing 8,248,656 pounds of payable copper from 248,613 tons of ore milled. Mill grade averaged 1.83 percent copper and mill recovery was 96.4 percent with a concentrate grade of 26.4 percent. No exploratory drilling was carried on during the year while the capital programme of deepening the mine was in progress and ore reserves show a decrease approximately equal to the tonnage milled:

| RESERVES | ORE | COPPER | COPPER |
|---|-----------|---------|------------|
| | ton | percent | lb |
| Proven ore | 294,401 | 1.97 | 11,622,494 |
| Probable ore based on underground development | ..... | ..... | ..... |
| Probable ore based on diamond-drilling | 798,050 | 1.97 | 31,478,950 |
| Total estimated recoverable reserves | 1,092,451 | 1.97 | 43,101,444 |

Employment and Management

The average number of employees was 198: 110 underground and 88 on surface. The shaft contractor E. Ross and Associates Limited employed an additional 15 men underground. W. P. Arnold was the vice-president and general manager of the mining division; P. E. Young was the mine manager.

Sheridan Geophysics Limited

Coppercorp Property

Sheridan Geophysics Limited was incorporated in October 1962, with an authorized capitalization of 10,000 preferred shares of \$10 par value each and 2,000,000 common shares of no par value; 1,000 preferred and all common shares have been issued. The directors and officers were: J. P. Sheridan, president and director; G. H. Duff, secretary and director; D. C. Woolley, R. E. Dale and Maxwell Juby, directors. The head office is at Suite 1606, 4 King Street West, Toronto 1. The mine address is Batchewana.

The former Coppercorp Limited property comprises about 688 acres in Ryan township, Mamainse Point area, District of Algoma, about sixty miles north of Sault Ste. Marie and readily accessible from Highway 17 (see Coppercorp Limited in 1964 annual report).

Mining operations proceeded from 21 August to 31 December, while milling took place from 13 October to 31 December.

The vertical three-compartment No. 1 Ryan township shaft, sunk in the mid 1950's by former operators, was dewatered; the underground workings cleaned up and stope preparations commenced on the 250- and 375-foot levels. A raise was driven from the 250-foot level under the broken ore stockpile on surface, which will be used later in the escapeway system from underground.

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Development work in 1965 consisted of 412 feet of drifting, 74 feet of crosscutting, and 1,040 feet of raising. Total development footage completed to 31 December 1965 was as follows: 8,334 feet of drifts, 2,686 feet of crosscuts, and 1,980 feet of raises. Some 15 diamond-drillholes totalling 2,934 feet from underground, and 32 holes totalling 9,359 feet from surface were completed in 1965.

Major construction in 1965 included the following:

- 1 headframe (40×49×90 ft.)
- 1 primary crusher building (20×37.5 ft.)
- 1 secondary crusher building (38×46 ft.)
- 1 concentrator building (156×60 ft.)
- 1 coarse ore bin (25×20 ft.)
- 1 fine ore bin (60×22.8 ft.)
- 1 waste bin (17×16 ft.)
- 1 concentrate bin (14.5×14 ft.)
- 1 water tank (20×20 ft.)
- 1 service building (166×42 ft.)
- 1 cookery (44×24 ft.)
- 2 bunkhouses (52×30 ft.)
- 6 houses (42×24 ft.)
- 1 lodge building (52×25 ft.)
- 1 pumphouse (12×10 ft.)
- 1 powder magazine (30×16 ft.)
- 1 fuse house (12×8 ft.)
- 1 tailings line (240ft×6in diam.)
- 1 water supply pipe line (4,300ft×6in diam.)
- 1 transmission line (15.1 miles).

Major equipment added was as follows:

- 1 hoist (48×36 PE 1, electric)
- 1 compressor (1500/XVHE)
- 1 sub station (44,000V)
- 1 jaw crusher (28×36 in.)
- 1 cone crusher (SH, 5.5. ft.)
- 2 ball mills (1: 8×10 ft., 1: 4×8 ft.)
- 1 classifier (6×27 ft.)
- 1 conditioner (10×10 ft.)
- 2 thickeners (1: 24×10 ft., 1: 20×8 ft.)
- 1 screen (5×10 ft.)
- 28 flotation cells (No. 24)
- 1 filter (6 ft., and vacuum pump)
- 1 two-stage fan (19J2TK)
- 30 rock drills (20 jacklegs, 10 stopers)
- 1 skip
- 1 cage
- assorted pumps and conveyor belting.

A total of 14,882 tons of ore was hoisted, and 29,867 tons were milled at an average of 394 tons during the 76 days of operation.

Employment and Management

The average number of employees was 75: 29 underground and 46 on surface. William Griffin was the manager.

Stancop Mines Limited

Stancop Mines Limited was incorporated in March 1965, with an authorized capitalization of 5,000,000 shares of \$1 par value, of which four shares have been issued. The directors and officers were: W. A. Morgan, president and director; N. Axiotis and D. A. Pattigrew, vice-presidents and directors; G. S. Welsh, director; Mrs. R. N. George, secretary-treasurer. The head office is at 1725 Bank Street, Ottawa. The mine address is Matachewan.

The property, a copper prospect, leased from G. S. Welsh, comprises 16 claims in Baden and Powell townships, District of Timiskaming, about five miles west of the town of Matachewan.

Mining operations progressed from 27 April to 7 June 1965. An open pit some 50 feet long averaging 20 feet in depth was established on a surface showing. Approximately 1,000 tons of material was removed from the open pit and trucked for treatment at the Pax International mill, one mile to the north; the concentrate was shipped to Noranda.

Employment and Management

Harris Hanson was in charge of mining operations, G. S. Welsh was in charge of milling; there were 14 employees during the period of operation.

Texas Gulf Sulphur Company

Texas Gulf Sulphur Company was incorporated in December 1909 with an authorized capitalization of 15,000,000 shares of no par value of which 11,520,000 shares have been issued. The directors and officers were: C. O. Stephens, president and director; C. F. Fogarty, executive vice-president and director; L. M. Cassidy, F. G. Coates, W. S. Kirpatrick, T. S. Lamont, Allan Shivers, J. F. Thompson and L. C. Wadmond, directors. R. D. Mollison, T. P. Townsend, H. S. Caven, H. B. Kline, G. T. McBride Jr. and A. N. Myers, vice-presidents; D. M. Crawford, secretary and manager of public and government relations; G. N. McKee Jr., treasurer; and W. F. Meyer, comptroller. The head office is at 200 Park Avenue, New York, N.Y. 10017; the mine address is 155 Pine Street South, Timmins.

The property consists of 640 acres in Kidd township, Porcupine area, District of Cochrane, about 16 miles to the north, by road from Timmins.

Stripping of overburden over the orebody was performed during the first four months of the year but virtually stopped during the summer and fall; it was resumed with the coming of cold weather in November. Some rock excavation and road building was started around the future pit. Some 37 diamond-drillholes, totalling 12,720 feet, were completed from surface.

Major construction commenced in 1965 included the following:

- 1 mine office building (100×32 ft.)
- 1 warehouse, welding shop, mine dry, and truck garage (36,000 sq. ft.)
- 1 54 in. gyratory crushing plant
- 1 concentrator building (640×500 ft.)
- 1 mine warehouse (60×50 ft.)
- 1 concentrator office (120×30 ft.)
- 1 concentrator warehouse (220×40 ft.).

Major equipment added in 1965 consisted of the following:

- 6 50 ton trucks
- 1 shovel, diesel powered, 4 yd. capacity
- 1 shovel, electric powered, 6 yd.
- 1 drill, 6½ in. diam. hole
- 1 rotary drill, 9¾ in. diam. hole.

A total of 34,230 tons of ore was trucked to Kam-Kotia Porcupine Mines Limited for test milling.

Employment and Management

The average number of employees was 62. F. R. Jones was the manager.

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Tribag Mining Company Limited

Tribag Mining Company Limited was incorporated in December 1926. The authorized capitalization was increased to 7,500,000 shares of \$1 par value of which 3,252,000 shares have been issued. The directors and officers were: C. H. Franklin, president and director; E. R. Heald, vice-president and director; H. H. Huestis, director; and P. D. Hattie, secretary-treasurer. The head office is at Suite 2014, 44 King Street West, Toronto 1. The mine address is Batchawana Bay.

The property, a copper prospect, comprises 135 claims in Townships 27 and 28, range 13, District of Algoma, in the Batchawana area, about 50 miles north of Sault Ste. Marie.

Mining operations continued throughout the year.

The three-compartment vertical No. 1 shaft, located on claim SSM35137 was collared in 1963, and sunk 463 feet in 1965 to a depth of 1,251 feet below the collar. The 900-foot, 1,050-foot, and 1,200-foot levels were established at depths of 896 feet, 1,046 feet, and 1,196 feet respectively, below the collar.

Development footage completed in 1965 consisted of 4,120 feet of drifting, 1,808 feet of crosscutting, and 614 feet of raising. Total development footage to 31 December 1965 consisted of 5,957 feet of drifts, 1,808 feet of crosscuts, and 614 feet of raises. Surface trenching totalling 250 feet in length, averaging three feet in depth was also completed. In all, 293 diamond-drillholes from underground totalling 39,692 feet, and 39 holes from surface totalling 12,700 feet were completed.

New construction completed in 1965 consisted of:

- 1 cold storage building, 30×28 ft., frame construction
- 1 compressor room, 20×16 ft., frame construction.

A total of 16,563 tons of ore was hoisted and stockpiled.

Employment and Management

The average number of employees was 57: 22 underground and 35 on surface. L. E. Robinson was the manager.

Willecho Mines Limited

Willecho Mines Limited was incorporated in February 1964 with an authorized capitalization of 3,000,000 shares of \$1 par value. All shares have been issued. The directors and officers were: J. G. Boeckh, president and director; P. K. Hawley, vice-president and director; J. C. L. Allen, director; R. S. Hafidson, managing director; and D. M. Giachino, secretary-treasurer. The head office is at 100 University Avenue, Toronto 1, and the mine address is Manitouwadge. The company was formed as a jointly-owned operating company of Lun-Echo Gold Mines Limited and Willroy Mines Limited to operate the former Lun-Echo base metal property.

The property comprises 50 claims in Mapledoram township, Manitouwadge area, District of Thunder Bay.

The vertical three-compartment No. 1 shaft in claim TB47378 is 1,361 feet deep (below the collar).

Mining and milling operations continued throughout 1965.

Development work consisted of 2,410 feet of drifting, 148 feet of crosscutting and 7,411 feet of raising. Total development footage to 31 December 1965 was

3,104 feet of drifts, 1,988 feet of crosscuts and 8,748 feet of raises. Some 469 diamond-drillholes totalling 41,555 feet were completed from underground, and 12 holes totalling 14,790 feet were completed from surface.

Major added equipment was as follows:

- 1 air compressor (26×15.5×13 in.) with (17×6 ft.) air receiver
- 1 jaw crusher (24×36 in.) underground
- 3 pumps; 2 surface, 1 underground (320gpm at 1,384ft. head) with 200 hp motor
- 1 skip-cage combination (3.8 ton capacity)
- 1 skip (3.8 ton capacity)
- 1 heater, oil fired (10,000cfm, 1,000,000btu per hr)
- 1 fan (38in. 20,000cfm at 2.25in. W.G.)
- 33 rock drills, various types
- 9 slushers (2 two-drum 14 hp, 2 two-drum 30 hp, 5 three-drum 50 hp)
- 10 scraper blades (three 36 in., one 42 in., six 60 in.)
- 18 mine cars (two 33 cu. ft., twelve 40 cu. ft., four 140 cu. ft.)
- 4 electric trammers (three 1.5 ton, one 4½ ton)
- 4 mucking machines
- 1 theodolite
- 4 transformers (three 100 kva, one 300 kva).

During 1965 production was gradually increased to 1,000 tons daily and this ore was trucked to the Willroy concentrator for treatment.

A total of 290,561 tons of ore was hoisted; 289,739 tons were milled at a daily average of 766 tons.

Employment and Management

The operation continued under Willroy supervision and labour; Willecho supplied a further 3 employees, 1 underground and 2 on surface. J. Toivanen was the mine manager.

Willroy Mines Limited

Willroy Mines Limited was incorporated in January 1954, with an authorized capitalization of 4,000,000 shares of \$1 par value of which 3,999,905 shares have been issued. The directors and officers were: J. C. L. Allen, president and director; J. G. Boeckh, vice-president and director; J. D. Bryce, R. C. Stanley Jr., P. K. Hanley, directors; R. S. Hafidson, managing director; Miss B. A. Argo, secretary; and B. E. Martin, assistant-secretary. The head office is at Suite 400, 112 King Street West, Toronto 1. The mine address is Manitouwadge.

The property consists of 36 claims in Gemmell and Mapledoram townships, Manitouwadge Lake area, District of Thunder Bay, in the Port Arthur Mining Division adjoining the west boundary of the Geco property.

Operations continued throughout 1965.

SHAFTS, WILLROY MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | VERTICAL DEPTH BELOW SURFACE |
|-------|-----------|-------------|------------------------|------------------------------|
| No. 1 | TB46933 | Vertical | 4 | feet 2,855 |
| No. 2 | TB46938 | Vertical | 2 | 530 |

During the year development work consisted of: drifting, 4,500 feet; cross-cutting, 298 feet; and raising, 2,052 feet. The total development footage to 31 December 1965 was: 36,982 feet of drifts, 13,716 feet of crosscuts, and 27,875 feet of raises. Diamond-drilling consisted of 307 holes totalling 27,571 feet from underground.

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Major construction in 1965 consisted of an addition to the office, 31×29 feet, and an addition to the crusher house, 37×31 feet.

New added equipment was as follows:

- 2 mucking machines, model 24
- 13 rock drills (4 stopers, 9 drifters).

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

The tonnage treated in the concentrator was at an all-time high of 577,248 tons for an average milling rate of 1,581 tons per calendar day. Of this amount, 293,989 tons were obtained from the Willroy operation while the balance of 283,259 tons was custom milled for Willecho Mines Limited. Once again the No. 3 zone provided the main source of Willroy tonnage in combination with substantial reserves mined from the No. 1 and No. 4 zones. Percentages taken from all zones are shown in the following table:

| ORE ZONE | MILL FEED | |
|---------------|-----------|---------|
| | tons | percent |
| 1 | 83,535 | 14.5 |
| 2 | 4,720 | 0.8 |
| 3 | 124,101 | 21.5 |
| 4 | 75,153 | 13.0 |
| 6 | ..... | .... |
| Miscellaneous | 6,480 | 1.1 |
| Willecho | 283,259 | 49.1 |
| Total | 577,248 | 100.0 |

The grade of the Willroy tonnage milled ran 0.79 percent copper, 4.25 percent zinc, 0.29 percent lead and 1.84 ounces of silver. Concentrate production amounted to 435 cars made up of 117 cars of copper, 294 cars of zinc and 24 cars of lead. This yielded a gross value of \$4,828,971 and a net smelter return of \$3,098,123.

Contained metals, along with the returned values, are shown:

| | | METAL PRODUCTION | NET SMELTER RETURN |
|--------|----|------------------|--------------------|
| Zinc | lb | 22,328,975 | \$1,415,652 |
| Copper | lb | 3,898,841 | 1,115,402 |
| Lead | lb | 1,238,193 | 95,317 |
| Silver | oz | 365,575 | 457,188 |
| Gold | oz | 487 | 14,564 |
| | | | \$3,098,123 |

(\$10.54 per ton milled)

Costs

The total operating cost per ton was considerably higher than in recent years due to more difficult mining conditions in remnant pillars and narrow width stopes and because of the drop in the total tonnage being mined.

| COST PER TON MILLED | | |
|-----------------------------|---------------|---------------|
| | 1965 | 1964 |
| Exploration and development | \$0.21 | \$0.21 |
| Mining | 3.03 | 1.77 |
| Milling | 1.09 | 1.04 |
| Administration and general | 0.85 | 0.58 |
| | \$5.18 | \$3.60 |

Ore Reserves

As of 1 January 1966 the total of broken, proven and indicated reserves at Willroy mine stood at 760,477 tons, distributed as follows:

| ZONE | TONNAGE | COPPER | ZINC | LEAD | SILVER |
|-------------------|---------|---------|---------|---------|------------|
| | ton | percent | percent | percent | oz per ton |
| 1 | 254,809 | 1.39 | 0.45 | TR | 0.42 |
| 2 | 53,605 | 0.04 | 3.17 | 0.24 | 1.74 |
| 3 | 269,361 | 1.15 | 4.80 | 0.07 | 1.07 |
| 4 | 19,640 | 0.03 | 8.51 | 0.56 | 3.18 |
| 6 | 163,062 | 2.46 | 1.25 | TR | 0.89 |
| Total and Average | 760,477 | 1.40 | 2.56 | 0.06 | 0.92 |

Exploration and Development—Big Nama Creek Property

A geochemical soil survey of the property started in 1964 was completed in 1965. The only anomaly outlined, apart from that of the main orebody, was small and of doubtful origin. However, because the anomaly was located along the major structural horizon, a hole 296 feet, was drilled to test it. A narrow band of iron formation and two small streaks of sphalerite were intersected.

A hole 809 feet, was drilled 1,000 feet south of the junction of Big Nama Creek property with Slimlake and Willecho as part of a programme to explore the possible downward extension of the Willecho ore bearing horizons. A narrow band of iron formation containing iron sulphides only was intersected.

As part of the agreement with Willroy Mines Limited by which Willroy agreed to drive west on the 10th (1,600 feet) horizon to the Big Nama boundary, Willroy advanced this heading 1,388 feet during the year. In the meantime feasibility studies are being carried on to determine the most economic method of developing and mining the known ore on the Big Nama property, with a view to treatment in the Willroy mill.

Employment and Management

The average number of employees was 305: 162 underground and 143 on surface. J. I. Jarvis was the mine manager.

PLATINUM METALS—see NICKEL AND COPPER

SELENIUM—see NICKEL AND COPPER

SILVER AND COBALT

In 1965 the mines of the Cobalt and Gowganda area shipped 5,147 tons of concentrates to Noranda Mines Limited, 8,136 tons to the Cobalt Refinery Limited, 11 tons to Eldorado Mining and Refining Limited, and 292 tons to refineries in foreign countries. From the total of 13,586 tons of concentrates and 14 tons of bullion shipments 5,800,234 ounces of silver were recovered. The refining of concentrates from the various groups of mines resulted in the following silver recovery: from the base metal mines, 2,885,578 ounces; from the nickel-copper mines, 1,766,248 ounces; and from the gold mines, 370,153 ounces. The total silver production of 10,822,213 ounces in 1965 resulted in an increase in quantity of 8.99 percent over 1964 production of 9,929,858 ounces; the value of production increased 8.99 percent from \$13,901,801 in 1964 to \$15,151,098 in 1965. The average price of silver in 1964 and in 1965 was 140 cents per ounce.

The mines of the Cobalt and Gowganda area reported the recovery of 58,155 pounds of cobalt from ores and concentrates shipped. The refining of nickel-copper ores produced 2,562,655 pounds of cobalt. The total of 2,620,810 pounds of cobalt shows an increase of 18.48 percent from 1964 production of 2,212,016 pounds. The value of production increased 29.40 percent from \$4,259,215 in 1964 to \$5,511,436 in 1965.

The mines of the Cobalt and Gowganda area paid \$622,215 to 110 salaried employees and \$2,109,930 to 483 wage-earners. Fuel and electricity cost \$330,564 and process supplies cost \$1,492,824

SILVER PRODUCTION

| | SOURCE | | 1961 | 1962 | 1963 | 1964 | 1965 |
|--|--------|--|-----------|------------|------------|------------|------------|
| Sales of bullion by the reduction companies, smelters, and mines. Contained in silver-cobalt concentrates exported from Canada. Estimated as recovered from concentrates treated in other provinces. | oz. | | 4,680,763 | 4,707,590 | 5,053,534 | 5,310,506 | 5,800,234 |
| | \$ | | 4,412,087 | 5,484,342 | 6,994,091 | 7,434,710 | 8,120,328 |
| In crude gold bullion | oz. | | 404,693 | 397,200 | 344,867 | 365,856 | 370,153 |
| | \$ | | 381,463 | 462,738 | 477,296 | 512,197 | 518,214 |
| Recovery for nickel-copper refineries | oz. | | 1,785,643 | 1,757,848 | 1,320,777 | 1,459,455 | 1,766,248 |
| | \$ | | 1,683,147 | 2,047,893 | 1,827,955 | 2,043,237 | 2,472,747 |
| Base metal mines | oz. | | 1,999,303 | 2,520,807 | 2,882,443 | 2,794,041 | 2,885,578 |
| | \$ | | 1,884,543 | 2,936,740 | 3,989,301 | 3,911,657 | 4,039,809 |
| Total Production | oz. | | 8,870,402 | 9,383,445 | 9,601,621 | 9,929,858 | 10,822,213 |
| | \$ | | 8,361,240 | 10,931,713 | 13,288,643 | 13,901,801 | 15,151,098 |

SHIPMENTS FROM SILVER MINES, COBALT-GOWGANDA AREA

| | ARSENIC | COPPER | COBALT | LEAD | NICKEL | BISMUTH | SILVER | TOTAL |
|-----------|---------|-----------|------------|--------|-----------|---------|----------------|-------------|
| 1904-1960 | tons | 1,983 | 22,135 | 583 | 8,190 | 334,000 | 494,386,909 | |
| | \$ | 7,234,111 | 52,007,940 | 67,815 | 4,013,078 | 393,678 | \$ 309,150,731 | 373,793,166 |
| 1961 | tons | 210 | 48 | 27 | 44 | 20,000 | 4,680,763 | |
| | \$ | 16,772 | 162,572 | 5,445 | 63,107 | 22,388 | \$ 4,412,087 | 4,736,014 |
| 1962 | tons | 80 | 38 | ..... | 6 | ..... | 4,707,590 | |
| | \$ | 6,832 | 58,742 | ..... | 10,493 | ..... | \$ 5,484,342 | 5,584,149 |
| 1963 | tons | 94 | 63 | ..... | 14 | 65 | 5,053,534 | |
| | \$ | 7,498 | 39,268 | ..... | 23,603 | 146 | \$ 6,994,091 | 7,178,136 |
| 1964 | tons | 162 | 71 | 1 | 4 | 541 | 5,310,506 | |
| | \$ | 16,195 | 47,655 | 270 | 5,891 | 703 | \$ 7,434,710 | 7,643,104 |
| 1965 | tons | 202 | 50 | 2 | 13 | 3,883 | 5,800,234 | |
| | \$ | 13,150 | 37,870 | 663 | 21,478 | 9,600 | \$ 8,120,328 | 8,316,265 |
| Total | tons | 88,629 | 2,297 | 613 | 8,271 | 358,489 | 519,939,536 | |
| | \$ | 7,294,558 | 1,127,989 | 74,193 | 4,137,650 | 426,515 | \$ 341,596,289 | 407,250,834 |

Agnico Mines Limited

Cobalt Consolidated Mining Corporation Limited was incorporated in January 1953. In October 1957 the company was reorganized, and the name changed to Agnico Mines Limited. The capitalization was increased to 5,000,000 shares of \$1 par value, of which 3,434,327 shares have been issued. The directors and officers were: N.B. Sheriff, president and director; P. Penna, vice-president and managing director; B. Kraft secretary-treasurer and director; and J. Osheroff, Milton Klyman, and J. J. Vorback, directors. The head office is at Suite 1101, 365 Bay Street, Toronto 1; the mine address is Box 140, Cobalt.

The company acquired properties formerly held by Silanco Mining and Refining Company Limited; Cobalt Lode Silver Mines Limited; Penn-Cobalt Silver Mines Limited; Gilgreer Mines Limited; Keylode Cobalt Silver Mines Limited; Hellens Mining and Reduction Company Limited; and others in the Cobalt, South Lorrain, and Gowganda areas, District of Timiskaming. A group of mines in Coleman township, including the Beaver and Temiskaming mines, was acquired in 1955, and the O'Brien mine in 1958.

AGAUNICO PROPERTY

The Agaunico property located in Bucke township, District of Timiskaming, was last reported on in the Annual Report for 1961, Volume 71.

Work completed during 1965 consisted of surface diamond-drilling; eight diamond drillholes totalling 3,706 feet were completed.

CART LAKE PROPERTY

The Cart Lake property comprises claim RL406 (approximately 151 acres) and claim RL404 (168 acres) in Coleman township, District of Timiskaming.

Operations progressed from January to December 1965. The vertical two-compartment Gould No. 2 shaft, 200 feet deep, was rehabilitated to the 100-foot level. Development work in 1965 consisted of 565 feet of drifting and 156 feet of raising. Total development footage to 31 December 1965 on the 100-foot and 185-foot levels was 785 feet of drifts, 170 feet of crosscuts, and 165 feet of raises. In 1965, 18 diamond-drillholes totalling 7,666 feet were completed from surface.

The following construction was completed in 1965: a timber headframe (65 ft. high, using 8 in. × 8 in. timbers); the shaft house; and a hoist building (20 × 16 ft.). Equipment that was added consisted of an air hoist, three transformers (25kva), and a 27 hp pump.

Altogether, 1,302 tons of ore were hoisted, of which 844 tons were treated in the Penn mill.

LODE AND CHRISTOPHER PROPERTIES

The Christopher mine adjoins the south boundary of the Cobalt Lode mine, in lot 2, concession III, Coleman township and comprises claims 106, 1970, 9, 535 and 1523.

SHAFTS, CHRISTOPHER AND LODE MINES

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH FROM SURFACE |
|-------------|-----------|-------------|------------------------|--------------|-----------------------------|
| | | | | feet | feet |
| No. 1 shaft | 9 | Vertical | 2 | | 295 |
| No. 2 shaft | 106 | Vertical | 2 | | 415 |
| 650 winze | | Vertical | 2 | 556 | 622 |

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The Cobalt Lode and Christopher shafts are connected on the 400-foot level and the nearby Brady Lake No. 4 shaft, leased from Silver-Miller, connects with the Cobalt Lode shaft on the 600-foot level. Mining operations throughout 1965 were on the Christopher property with ore hoisted in both the Christopher and Lode shafts.

Development work during the year consisted of 450 feet of drifting, and 813 feet of raising. Total development footage to 31 December 1965 was 16,242 feet of drifts, 5,054 feet of crosscuts, 14,932 feet of raises. Diamond-drilling in 1965 consisted of 72 holes from underground, totalling 11,272 feet. Fire destroyed the repair shop at the Cobalt Lode mine. A temporary hoist building (16×12 ft.) of plywood construction was erected to house an air hoist.

Altogether, 26,760 tons of ore were hoisted and 25,271 tons were milled.

IBSEN LEASE

Ibsen lease comprised claims 321, 30 and T25715 in Coleman and Gillies townships, District of Timiskaming.

Operations progressed from January to April 1965.

All work on the Ibsen lease was carried out from the 600-foot level of the Christopher property. A total of 32 feet of drifting and 654 feet of crosscutting had been completed previously from which nine diamond-drillholes from underground totalling 1,845 feet were completed.

PROFESSOR LEASE

The Professor lease consisted of claims T949½ and T19473, about 38 acres, in Gillies township, District of Timiskaming.

Work completed in January 1965 on the Professor property by Agnico Mines Limited consisted of one hole totalling 549 feet drilled from the Christopher property, underground.

O'BRIEN PROPERTY

Nipissing-O'Brien Mines Limited was incorporated in January 1952. The company acquired the properties of M. J. O'Brien Limited, and Nipissing Mines Company Limited in concessions V and VI, Coleman township, District of Timiskaming.

Nipissing-O'Brien Mines Limited operated the property until June 1958, when claim RL403 comprising 152.6 acres was purchased by Agnico Mines Limited. Mining operations continued at the O'Brien mine throughout 1965.

SHAFTS, O'BRIEN MINE

| | LOCATION | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | DEPTH FROM SURFACE |
|---------------|----------|-------------|------------------------|--------------|--------------------|
| | | | | feet | feet |
| Main shaft | RL403 | Vertical | 3 | .... | 345 |
| No. 2 shaft | RL403 | Vertical | 2 | .... | 250 |
| No. 6 shaft | RL403 | Vertical | 2 | .... | 300 |
| No. 14 shaft | RL403 | Vertical | 2 | .... | 176 |
| No. 615 winze | ..... | Vertical | 2 | 340 | 456 |

Operations are carried on through the main shaft.

Development work in 1965 consisted of 975 feet of drifting, 422 feet of sub-drifting, 205 feet of crosscutting and 785 feet of raising. Total development footage to 31 December 1965 consisted of 11,120 feet of drifts; 5,649 feet of

sub-drifts; 2,314 feet of crosscuts; 11,939 feet of raises. Some 127 diamond-drill holes totalling 20,993 feet were completed in 1965, from underground.

Altogether, 19,741 tons of ore were hoisted and 19,013 tons were milled.

NIPISSING 407 PROPERTY

The property comprises claims RL407, RL408, RL92, and RL110 located in Coleman township, where the vertical two-compartment 407 shaft has a depth of 460 feet below the collar. The shaft, located in high ground, is north of the Silverfields property and about 500 feet from the highway passing the Glen Lake silver property. There is also the vertical two-compartment No. 150 shaft 325 feet deep located on claim RL407.

Operations continued throughout 1965.

Development footage in 1965 consisted of 2,559 feet of drifting, 119 feet of sub-drifting, 1,217 feet of crosscutting and 1,334 feet of raising. Total development footage to 31 December 1965 consisted of 3,144 feet of drifts; 119 feet of sub-drifts; 5,713 feet of crosscuts, and 1,559 feet of raises. Some 108 diamond-drillholes from underground totalling 18,877 feet were completed in 1965.

Major construction in 1965 consisted of a change house (36×24 ft.) with attached office (24×16 ft.), and a hoist room (32×24 ft.).

Three 50kva transformers and an electric hoist were moved from the Christopher property and installed.

In all, 26,330 tons of ore were hoisted and 25,847 tons were milled.

PENN MILL

The Penn mill operated from 3 January to 31 December.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

The Nipissing 407, Christopher, and O'Brien properties were the main sources of production during 1965. A small tonnage of development ore was derived from the Cart Lake property near the end of the year.

The average monthly production for 1965 was 91,827 ounces. This increase over previous years was the result of production of above average grade ore from Nipissing 407.

Custom milling was a source of revenue up until November.

The following is a comparative summary of the main production items:

| | | 1965 | 1964 |
|--------------------------------|------------|-----------|---------|
| Silver produced | oz | 1,101,932 | 730,709 |
| Cobalt produced | lb | 93,257 | 92,107 |
| Gross value of metals sold | \$ | 1,486,633 | 998,512 |
| Milled from company properties | ton | 70,975 | 71,489 |
| Custom ore milled | ton | 38,051 | 33,703 |
| Total ore milled | ton | 109,026 | 105,192 |
| Total ore hoisted | ton | 74,198 | 70,382 |
| Calculated head silver | oz per ton | 16.40 | 11.18 |
| Recovery silver | oz per ton | 15.53 | 10.21 |
| Extraction efficiency | percent | 94.64 | 91.32 |

Exploration and Development

Nipissing 407. The new 360-foot level has produced a large portion of the ore from this property. The six veins that have been developed at this horizon have all been found to contain large shoots of highgrade ore. Diamond-drilling on this level continues to locate new silver occurrences which are being developed as rapidly as possible.

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A highgrade vein, located 40 feet east of the shaft, is being opened up by a sub-drift along the Keewatin-cobalt sediment contact, 30 feet above the 360-foot level.

Drifting on the 300-foot level north of the shaft has exposed a strong vein containing high-grade silver. A raise driven on this vein contains highgrade silver in the face 60 feet above the level.

On the 445-foot level, a long crosscut is being pushed out to the south to develop a major ore zone indicated by former surface diamond-drilling and more recently by an underground drill hole from the 360-foot level which intersected a 2-inch highgrade vein.

Results to date suggest that many more silver producing veins will be found as current development opens up new ground for exploration.

O'Brien. Many small ore zones have been developed and mined providing a modest tonnage of ore. There are potential ore zones in the No. 2 shaft, No. 14 shaft and No. 16 shaft areas to be developed as soon as diamond-drilling has outlined their extent.

Cart Lake. Two veins were intersected by surface diamond-drilling about 500 feet south of the shaft. No. 1 vein, containing good leaf silver, is being developed in the Keewatin rocks just beneath the cobalt sediment contact. A raise on this vein reveals more intense silver mineralization in the sediments. No. 2 vein, located farther to the west, has been opened up by raising 40 feet to the cobalt sediment-Keewatin contact, where sub-drifting has exposed a faulted zone, containing heavy plates of silver.

Surface diamond-drilling has indicated a highgrade ore shoot 500 feet west of the shaft adjacent to old workings.

An underground diamond drill program is planned to explore ground near the old workings north of the shaft where surface diamond-drilling has given some encouraging results.

Cobalt Lode-Christopher. Several ore occurrences were developed and mined during the first part of the year, including highgrade pillars left from previous mining.

Since an intensive diamond-drill program failed to locate new veins of ore grade, it was decided to pull the broken ore from the stopes when mining had been completed, and to salvage material and equipment from underground preparatory to closing down the mine.

Agaunico. Surface diamond-drilling at the south end of the property exploring the cobalt sediments and the underlying Keewatin tuffs did not provide any encouraging results. The surface mining plant will be removed to eliminate the expense of maintaining this property.

Nipissing 150 Shaft. This shaft is located 2,000 feet west of 407 shaft. It has a depth of 309 feet with three levels at 100-foot intervals in cobalt sediments similar to those on the 407 property. The hoisting plant at the Christopher mine has been moved to this site. After the workings have been dewatered, an extensive diamond-drilling program will be undertaken to explore horizons known to be favourable to silver ore deposition in this area.

Ibsen Pond, Mayfair, Professor. Diamond-drilling of these claims met with little success and was discontinued early in the year.

Employment and Management

The average number of employees at all operations was 141: 79 underground and 62 on surface. G. W. Kirk was the mine manager.

Amerigo Silver Mines Limited

Amerigo Silver Mines Limited is a private company of which J. J. Gray is the president and director; C. L. Murray, the vice-president and director; and M. A. Sheridan, the secretary-treasurer and director. The head office is at Suite 1307, 330 Bay Street, Toronto 1. The mine address is Box 769, Cobalt.

SILVER BANNER PROPERTY

The company acquired the former Silver Banner property comprising three claims located in Coleman township, District of Timiskaming, about six miles southeast of Cobalt. The Silver Banner and Mayfair underground workings are connected.

Operations proceeded throughout 1965. The vertical two-compartment No. 3 shaft located on claim No. 2016 was used. It had been sunk by former operators to a depth of 618 feet below the collar. The plant operates on compressed air supplied from the Ragged Chutes installation. A full 25 feet of raising was completed in 1965. Total development footage to 31 December 1965 was 4,165

feet of drifts, 3,293 feet of crosscuts, and 336 feet of raises. In all, 16 diamond-drillholes from underground totalling 6,210 feet, were completed.

20TH CENTURY PROPERTY

A limited amount of rehabilitation work was completed on the 20th Century property, comprising approximately 120 acres in Coleman township, between 22 July and 11 November.

SHAFTS, 20TH CENTURY PROPERTY

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH FROM SURFACE |
|-------|-----------|-------------|------------------------|--------------|-----------------------------|
| | | | | feet | feet |
| 1 | 417 | Vertical | 2 | Surface | 175 |
| 2 | 59 | Vertical | 2 | Surface | 365 |
| 3 | 1770 | Vertical | 2 | Surface | 41 |

Former operators had completed a total of 300 feet of crosscutting from No. 1 shaft and 200 feet of drifting from No. 2 shaft.

Present operations were continued from 22 July to 11 November. A 45-foot headframe was erected over No. 1 shaft which was also retimbered for some 100 feet below the collar.

Employment and Management

The average number of employees at both operations was 6: 3 underground, and 3 on surface. Gordon Watts was the manager.

Benvan Mines Limited

Benvan Mines Limited was incorporated in April 1964 with an authorized capitalization of 5,000,000 shares of \$1 par value, of which 1,674,655 shares have been issued. The directors and officers were: G. Benedict, president and director; R. E. Vance, vice-president and director; W. R. Miller, J. M. Bolton, and D. R. Miller, directors; and L. V. Barbisan, secretary-treasurer. The head office is at Suite 1, 4th Floor, 392 Bay Street, Toronto 1. The mine address is Mosher Bay, Gowanda.

The property comprises 26 claims in Tyrrell township, District of Timiskaming.

The work at the property was done on contract by Milmount Engineering Company of Toronto. An adit was driven some eight feet above water level, from the southeast shore of Mosher Bay on the west side of claim MR30204, for a distance of 76 feet. 1,200 feet of surface trenching averaging six feet in depth was completed. Diamond-drilling consisted of 10 holes from surface, totalling 3,500 feet.

New construction consisted of: an office and cookhouse, (32×12 feet); a sleep camp (24×12 feet); a dryhouse, (20×12 feet); a warehouse and garage, (40×20 feet); a core shack (20×16 feet). An existing sleep camp was rehabilitated; and the office, cookhouse, and sleep camps were insulated for winter use.

Employment and Management

G. Trepanier was the superintendent, and the number of employees varied between 5 and 12.

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R. C. McAllister

Buffalo Lease

R. C. McAllister and his partner A. Nadeau are operating the Buffalo property by lease. The property comprises some 40 acres in Coleman township, District of Timiskaming. The address of the lessee is Box 283, Cobalt.

Work in 1965 was directed at locating the faulted extension of a previously mined vein. Some 100 feet of surface trenching averaging 6.5 feet in depth was completed. A total of eight diamond-drillholes from surface totalling 410 feet were completed.

Canadian Keeley Mines Limited

Keeley-Frontier Mines Limited was incorporated in September 1959. In February 1964 the name was changed to Canadian Keeley Mines Limited on a basis of one new share for two old. The authorized capitalization was increased to 7,000,000 shares of no par value, of which 6,274,270 shares have been issued. The directors and officers were: M. E. Watts, president, general manager and director; M. C. Mosher, vice-president and director; T. J. Day, Jack Kaplan, and F. H. Todd, directors; and R. C. Campbell, secretary-treasurer. The head office is at Suite 911, 159 Bay Street, Toronto 1. The mine address is Box 339, Cobalt.

The company acquired the adjoining Keeley and Frontier properties, comprising 12 claims (approximately 386 acres) at Silver Centre in South Lorrain township, District of Timiskaming, about 20 miles south of Cobalt.

Mining operations continued from 1 January to 30 November. The mill operated from 3 January to 22 December 1965.

SHAFTS, CANADIAN KEELEY MINE

| SHAFT | CLAIM | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH FROM SURFACE |
|-------------------------------|-------|-------------|------------------------|--------------|-----------------------------|
| | | | | feet | feet |
| FRONTIER PROPERTY | | | | | |
| F 1 | HR16 | Vertical | 2 | Surface | 376 |
| F 2 | HR16 | Vertical | 2 | Surface | 62 |
| F 3 | HR16 | Vertical | 3 | Surface | 641 |
| Crompton | HR25 | Vertical | 2 | Surface | 40 |
| F 8 | HR25 | Vertical | 2 | 540 | 1,360 |
| F 9 | HR25 | Vertical | 2 | 1,360 | 1,455 |
| KEELEY PROPERTY | | | | | |
| K 1 | HR19 | Vertical | 2 | Surface | 240 |
| K 2 | HR19 | Vertical | 2 | Surface | 100 |
| K 3 | HR19 | Vertical | 2 | Surface | 570 |
| K 4 | HR21 | 60° | 2 | Surface | 55 |
| K 828 | HR21 | Vertical | 3 and 2 | 560 | 910 |
| K 830 | HR19 | Vertical | 1 and 2 | 560 | 705 |
| K 826 | HR21 | Inclined | 2 | 560 | 620 |
| K 1162 | HR21 | Inclined | 2 | 822 | 930 |
| LITTLE KEELEY PROPERTY | | | | | |
| No. 2 | HS40 | Inclined | 2 | .... | 90 |

Development work in 1965 consisted of 1,293 feet of drifting, and 881 feet of raising. Total development footage to 31 December 1965 was 77,888 feet of

drifts, 10,781 feet of crosscuts and 3,391 feet of raises. 46 diamond-drillholes from underground totalling 10,216 feet were completed. The major portion of the development work was carried out in the Beaver Lake Fault area.

A total of 6,352 tons of ore was hoisted and milled along with 28,502 tons of tailings at an average of 167 tons daily during the period of operation.

Employment and Management

The average number of employees was 40: 22 underground and 18 on surface. H. A. Kenty was the mine manager.

Chitaroni Minerals Limited

Chitaroni Minerals Limited, a private company, was incorporated in September 1962 with Albert Chitaroni, president and director; Elio Chitaroni, vice-president and director; and Carlo Chitaroni, director. No shares have been issued. The head office and mine address is Box 271, 19 Prospect Avenue, Cobalt.

The four Chitaroni brothers leased the Old Nipissing property in Coleman township in 1964 from Agnico Mines Limited to mine out some old pillars.

The mining of the pillars was completed in early June 1965 after which some 1,260 tons of ore was custom milled at the Deer Horn mill.

In September the equipment was moved to the No. 1 shaft of the Little Nipissing property on the shore of Peterson Lake. A hoist room (21×14 feet) was constructed, and (9×12 inch) Jenckes air hoist with a 42-inch diameter drum was installed. Exploration work commenced after dewatering in October, and a mucking machine was purchased to facilitate in the handling of ore anticipated from pillar removal at this property.

Employment and Management

The average number of employees was 5: 2 underground and 3 on surface. A. Chitaroni was in charge.

Cobalt Refinery Limited

Cobalt Refinery Limited was incorporated in June 1962. In 1963 it became a wholly owned subsidiary of Violamac Mines Limited; the authorized capitalization was 50,000 preferred shares of \$100 par value and 5,000,000 common shares of no par value of which 600,007 common shares have been issued. The officers were: A. W. White, president; J. N. Cram, vice-president and general manager; H. R. Heard, secretary; and James Geddes, treasurer. The head office is at Suite 416, 25 Adelaide Street West, Toronto 1. The plant address is R.R. No. 1, Cobalt.

The treatment plant is located six miles south of Cobalt and one half mile east of Highway 11. It was formerly owned by Coballoy Mines and Refiners Limited and after being idle for several years was taken over by J. J. Gray in May 1961. Cobalt Refinery Limited purchased the plant 30 June 1962.

Operations continued throughout 1965.

The Company has obtained shipping contracts from most of the Cobalt-Gowganda silver mines.

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Added equipment in 1965 consisted of two dust collectors, one of 6,200cfm capacity in the silver refinery, the other of 10,000cfm capacity in the smelter building.

The No. 1 300kva furnace operated for 274 days in 1965 treating 1,940.8 tons of concentrate at an average of 6.86 tons per working day and produced the following:

| | | |
|---------------------------|-----|-----------|
| Refined silver | oz | 2,519,235 |
| Silver (in base bullion) | oz | 116,101 |
| Silver (in speiss) | oz | 721,000 |
| Silver (in slag) | oz | 121,990 |
| Gold (in base bullion) | oz | 15 |
| Bismuth (in base bullion) | lb | 3,883 |
| Lead (in base bullion) | lb | 4,278 |
| Cobalt (in speiss) | lb | 127,054 |
| Cobalt-nickel oxide | ton | 55.3 |

Employment and Management

The average number of employees was 66. J. N. Cram was the general manager.

Deer Horn Mines Limited

Deer Horn Mines Limited was incorporated in December 1950, with an authorized capitalization of 5,000,000 shares of \$1 par value, of which 4,535,005 shares have been issued. The directors and officers were: N.B. Sheriff, president and director; E. L. Baxter, vice-president and director; C. M. Hames, secretary-treasurer and director; and I. Dobbs and M. A. Klyman, directors. The head office is at Suite 711, 62 Richmond Street West, Toronto 1. The mine address is Box 739, Cobalt.

Deer Horn Mines Limited leased, then, in 1963, purchased the Cross Lake O'Brien property from Agnico Mines Limited. The property consists of 14 claims in Coleman township, District of Timiskaming, about 1½ miles east of Cobalt.

The mine and mill operated throughout 1965.

SHAFTS, DEER HORN MINE

| LOCATION | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|-------------|-------------|------------------------|-----------------|------------------------------|
| Main | Vertical | 2 | feet Surface | feet 923 |
| No. 1 winze | Vertical | 2 | 584 | 656 |
| No. 2 winze | Vertical | 3 | 584 | 800 |

A total of 1,585 feet of drifting, 755 feet of crosscutting and 2,607 feet of raising was completed in 1965. Total development footage to 31 December 1965 was 46,791 feet of drifts, 15,827 feet of crosscuts and, 16,710 feet of raises. Some 298 diamond-drillholes, totalling 37,752 feet, were drilled from underground, and three holes, totalling 1,791 feet were completed from surface.

A double drum electric hoist with 80hp motor was installed and became operational on 17 January.

Altogether 26,183 tons of ore were hoisted, while 25,092 tons were milled at an average of 91 tons per working day.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Summary

Development of the major new No. 40 vein system continued to the west and minor silver zones were located and mined near the existing workings.

Exploration and Development

A relatively heavy exploration and development program was maintained throughout the year. Although this work encountered many highgrade silver shoots, the dimensions of these zones were short and average grade of the development muck from this work was disappointingly low.

The main exploration and development headings were as follows:

No. 40 vein—This very powerful vein system was developed further west on the 800-foot level to the Cross Lake Fault and then northwest along the hanging wall side of the fault. A complete network of calcite veins at times fills the drift heading but silver occurrences in the veins remain very erratic. Veins No. 40B and No. 42 branch off this main structure for a total length of 330 feet so far and are of similar nature.

No. 35 and No. 44 veins—These two north-south trending veins were encountered near the Reinhardt boundary on the 800- and 900-foot levels. They carried some very nice silver and the development on No. 40 vein was delayed for a time in favour of exploiting these promising veins. Silver occurred in shoots over a 300-foot length but their average grade has been low.

No. 29, No. 36, and No. 39 veins—These veins were located in the No. 2 winze areas between the 850- and 700-foot horizons. The silver occurs here as flaky leaf in a slate wallrock centered on very narrow cobalt stringers.

No. 6B and No. 7 veins—To the east of the old workings, extensions of No. 6B and No. 7 veins were located downward to just above the 750-foot level. This chimney of ore provided some rich highgrade but the lateral dimension so far developed is short.

Production

Stoping was carried out in seven main zones on the O'Brien claims and two on the Reinhardt claim. The bulk of the ore came from the 525-foot, 650-foot, and 800-foot levels.

| | | |
|-----------------------|------------|-----------|
| Ore milled | ton | 25,092.0 |
| Silver recovered | oz | 319,533.0 |
| Calculated mill heads | oz per ton | 13.2 |
| Extraction efficiency | percent | 96.3 |

Considerable material, hoisted from development headings, was included in the mill feed.

The mill operated basically at 95 tons per day on a 40 hour work week for most of the year. In addition to Deer Horn ore a total of 1,236 tons of custom ore was treated.

Employment and Management

The average number of employees was 54: 36 underground and 18 on surface. J. E. Armstrong was the mine manager.

Glen Lake Silver Mines Limited

Glen Lake Silver Mines Limited was incorporated in June 1960 with an authorized capitalization of 5,000,000 shares of \$1 par value, of which 3,100,005 shares have been issued. The directors and officers were: G. E. Buchanan, president and director; R. J. Murphy, vice-president and director; Frank Cadesky, secretary-treasurer and director; and R. J. Juby and A. J. Fortens, directors. The head office is at Suite 503, 365 Bay Street, Toronto 1. The mine address is Box 590, Cobalt.

The property, comprising 2 claims in Coleman township, District of

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Timiskaming, was formerly known as the Bailey mine. It is located on the west side of Glen Lake, opposite the Foster mill, about three miles southeast of Cobalt.

Mining and milling operations proceeded from 4 January to 31 December 1965.

SHAFTS, GLEN LAKE SILVER

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | SINKING 1965 | VERTICAL DEPTH FROM SURFACE |
|-------|--|-------------|------------------------|-----------------|--------------|-----------------------------|
| 1 | Lot 4, S.W. ½ N. ½ Con. 4 Coleman | Vertical | 2 | feet Surface | feet | feet 283 |
| 1W | Lot 4, S.W. ½ N. ½ Con. 4 Coleman | Vertical | 2 | 283 | 69 | 352 |

The No. 1 winze was collared 283 feet below surface and sunk 69 feet in 1965 to a vertical depth of 352 feet below surface. The 606 level was established some 58 feet below the collar.

Development work consisted of 479 feet of drifting, 121 feet of crosscutting and 259 feet of raising. Total development footage to 31 December 1965 was 5,646 feet of drifts, 5,595 feet of crosscuts, and 1,837 feet of raises. Diamond-drilling in 1965 consisted of 57 holes, totalling 5,571 feet from underground, and 33 holes totalling 12,751 feet from surface.

A 6×8-foot ball mill having a capacity of approximately 150tpd replaced former (5×5-foot) ball mill in the milling plant.

A total of 7,793 tons of ore was hoisted, and 7,641 tons were milled. The mill averaged, including custom milling 84 tons per working day.

Company Annual Report

The following is taken from the company annual report for the period from 1 August to 31 December.

Production

Production has come from both Glen Lake Silver mine and Hiho Silver mine. The ore from each property is milled separately. Following are the production figures of silver for the first five months of the fiscal year and total to date:

| 1 AUGUST TO 31 DECEMBER 1965 | | GLEN LAKE-BAILEY MINE | |
|---|------------|-----------------------|-----------|
| Milled | ton | | 1,336 |
| Tails | oz | | 3,306 |
| Average mill heads | oz per ton | | 70.28 |
| Recovery | percent | | 96.4 |
| Production: | | | |
| September | oz | | 46,084.81 |
| October | oz | | 8,986.12 |
| December | oz | | 35,519.00 |
| Total silver | oz | | 90,589.93 |
| Total silver production 1 Aug./62 to 31 Dec./65 | oz | | 2,560,568 |

| 1 AUGUST TO 31 DECEMBER 1965 | | HIHO-CLEOPATRA MINE | |
|---|------------|---------------------|------------|
| Milled | ton | | 13,162 |
| Tails | oz | | 13,846 |
| Average mill heads | oz per ton | | 31.93 |
| Recovery | percent | | 96.8 |
| Production: | | | |
| August (½ month) | oz | | 65,309.81 |
| September | oz | | 68,979.00 |
| October | oz | | 118,751.15 |
| November | oz | | 103,749.19 |
| December | oz | | 71,562.00 |
| Total silver | oz | | 428,351.15 |
| Total silver production 1 Aug./64 to 31 Dec./65 | oz | | 1,277,205 |

| | | BAILEY AND CLEOPATRA MINES | |
|------------------------------------|----|----------------------------|-----------|
| 1 August to 31 December 1965 | oz | | 518,941 |
| Prior to 1 August 1965 | oz | | 3,318,833 |
| Total silver production both mines | oz | | 3,837,774 |

Glen Lake—Bailey Property

From the new winze a cross-cut was driven 120 feet to intersect the high-grade silver vein found by diamond-drilling below the 5th level. Three hundred and fifty-one feet of drifting on the vein showed highgrade silver ore for a length of 100 feet. One thousand three hundred and thirty-six tons of ore was milled from this heading with silver averaging 70.28 ounces silver per ton.

Diamond-drilling shows this ore to continue for 100 feet below the present 6th level. The winze is to be deepened 100 feet so that this highgrade ore can be mined.

A three foot hoist has been moved to the winze. The hoist is being installed and deepening of the winze will be underway the first week of January 1966.

Hiho Silver Property

The cross-cut from the No. 3 shaft driven 849 feet out under Giroux Lake has encountered the highgrade silver vein. The vein is from 1 to 3½ inches wide and assays from 1,500 to 4,500 ounces silver per ton with visible silver and ruby silver in the wall rock on both sides of the vein.

Diamond-drilling indicates other veins in the area with assays such as 52.9 ounces silver over 2.3 feet, 211.8 ounces silver in a 2-inch vein and 19.8 ounces silver in a 1-inch vein. These intersections are at the same general depth as the new cross-cut and within 200 to 300 feet of the present heading.

With parallel vein structures in the same area and assays similar to those cut by diamond-drilling when the Cleopatra mine was discovered, it appears there is a good possibility of a sizeable mine in this new area.

Employment and Management

The average number of employees was 48: 15 underground and 33 on surface. M. C. Halstead was the general manager.

Hiho Silver Mines Limited

Hiho Silver Mines Limited was incorporated in February 1963. It is a wholly owned subsidiary of Glen Lake Silver Mines Limited, with further details as to directors, officers and operations recorded under Glen Lake in this report. The head office is at Suite 503, 365 Bay Street, Toronto 1. The mine address is Box 590, Cobalt.

The property comprises 430 acres in Coleman and Gillies townships, District of Timiskaming.

Operations proceeded from 4 January to 31 December 1965.

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SHAFTS, HIHO SILVER MINE

| | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | SINKING 1965 | VERTICAL DEPTH FROM SURFACE |
|------------------|-------------|------------------------|--------------|--------------|-----------------------------|
| | | | feet | feet | feet |
| University No. 1 | Inclined | 2 | Surface | .... | 100 |
| University No. 3 | Vertical | 2 | Surface | 153 | 298 |
| Lawson No. 8 | Vertical | 2 | Surface | .... | 410 |
| Cleopatra Main | Vertical | 2 | Surface | .... | 243 |

The No. 3 University shaft was sunk 153 feet in 1965 to a depth of 298 feet below surface. The third level was established at a depth of 291 feet below the collar.

Development footage consisted of 1,623 feet of drifting and 2,052 feet of crosscutting. Total development footage to 31 December 1965 was 3,421 feet of drifts and 6,322 feet of crosscuts. Diamond-drilling consisted of 118 holes totalling 26,344 feet from underground and 9,448 feet from surface.

New construction in 1965 consisted of a compressor house (18×16 feet) in which an air compressor with 75hp motor was installed.

Altogether, 26,146 tons of ore were hoisted and 23,562 tons were custom milled at Glen Lake.

Employment and Management

The average number of employees was 44: 33 underground and 11 on surface. M. C. Halstead was the general manager.

Langis Silver and Cobalt Mining Company Limited

Langis Silver and Cobalt Mining Company Limited was incorporated in February 1953. In 1957 the capitalization was increased to 5,000,000 shares with par value of \$1 of which 3,800,015 shares have been issued. The directors and officers were: A. W. White, president and director; R. A. Halet, vice-president and director; K. J. Benner, D. F. Burt, and J. E. Armstrong, directors; and H. R. Heard, secretary-treasurer. The head office is at Suite 416, 25 Adelaide Street West, Toronto 1. The mine address is Box 870, New Liskeard.

The property consists of 25 claims in Casey and Harris townships, District of Timiskaming, and includes the former Casey Cobalt property.

Mining and milling operations continued throughout 1965.

SHAFTS, LANGIS SILVER PROPERTY

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | SINKING 1965 | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|-------------|-----------|-------------|------------------------|--------------|--------------|------------------------------|
| | | | | feet | feet | feet |
| No. 1 shaft | T354 | 75° | 2 (inactive) | .. | Surface | 270 |
| No. 3 shaft | T354 | Vertical | 2 | 66 | Surface | 438 |
| No. 4 shaft | T1474 | Vertical | 2 (inactive) | .. | Surface | 150 |
| No. 6 shaft | T1110 | Vertical | 2 | 77 | Surface | 488 |
| No. 4 winze | T1110 | Vertical | 2 | .. | 371 | 421 |

The No. 3 shaft was sunk 66 feet in 1965 to a depth of 438 feet below surface; the 390-foot and 425-foot levels were established. No. 6 shaft was sunk 88 feet to a depth of 488 feet below surface; the 435-foot and 470-foot levels were established.

Development work consisted of 2,401 feet of drifting, 1,798 feet of cross-cutting, and 1,051 feet of raising. Total development footage to 31 December 1965 was 26,134 feet of drifts, 20,638 feet of crosscuts, and 8,556 feet of raises. Diamond-drilling in 1965 consisted of 219 holes totalling 13,272 feet from underground.

New construction consisted of an addition to the crusher house, (16×12×22 ft.), to house dust control equipment.

Added equipment consisted of a multi bag, filter type dust collector, two mucking machines, and one 1.5 ton battery locomotive.

A total of 30,332 tons of ore was hoisted, while 34,992 tons were milled at a daily average of 99 tons.

DOLPHIN-MILLER PROPERTY

In 1963 Langis Silver and Cobalt Mining Company leased the adjoining Dolphin-Miller property from Dolphin-Miller Mines Limited which became a subsidiary company with operations under Langis' direction. The property comprises 10 claims in Harris township, District of Timiskaming.

The vertical two-compartment No. 5 shaft, (located in the SW.¼, N.½ of lot 5, concession VI, Harris township,) is 370 feet in depth.

Development footage in 1965 consisted of 168 feet of drifting, and 140 feet of crosscutting. Total development footage to 31 December 1965 was 591 feet of drifts, 867 feet of crosscuts, and 298 feet of raises. Four diamond-drillholes from underground, totalling 1,147 feet, were completed in 1965.

Altogether, 724 tons of ore were hoisted, while 1,334 tons were milled at the Langis property.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Production

Concentrates assaying over 500 ounces per ton were shipped to Cobalt Refinery for treatment, with lower grade material being sent to Noranda Mines Limited.

During sinking operations, it was necessary to augment the mill feed with stamp mill tailings. The gross estimated value of silver and other metals produced amounted to \$616,067. The net average smelter return per ounce of silver produced was unchanged at \$1.26.

Mine Operating Costs

| | PER TON ORE TREATED | |
|------------------------|---------------------|----------------|
| | 1965 | 1964 |
| Shaft sinking | \$ 1.32 | \$ |
| Development | 6.17 | 5.12 |
| Mining | 4.98 | 6.32 |
| Ore treatment | 3.10 | 3.16 |
| Mine office management | 0.85 | 0.83 |
| General account | 0.28 | 0.18 |
| | <u>\$16.70</u> | <u>\$15.61</u> |

Increased cost of \$1.09 per ton of ore milled results from absorption of shaft sinking and its inherent expenditures into current development expenses.

Ore Reserves

Development of the downward extension of known veins was underway on four new levels at the end of the year.

In addition to the above, there are three new areas to be explored, exclusive of the development on Murray Claim and Dolphin-Miller Mines leases.

The total footage of lateral development on all levels approximates nine miles.

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Milling

| | 1965 | 1964 |
|---------------------------|------------|-----------|
| Tons milled | 34,992 | 36,762 |
| Average tonnage per day | 99.28 | 102.2 |
| Mill heads | 12.98 | 18.95 |
| Ounces of silver produced | 438,336.40 | 713,593.5 |

The known production since the first stamp mill was built in 1907 amounts to 9,386,010 ounces of silver.

Dolphin-Miller Mines

Some 1,334 tons of ore, mostly from development, were processed in the Langis mill to yield 48.06 tons of concentrate containing 4,625 ounces of silver, and 12,925 pounds of cobalt. About one-fifth of these concentrates were sold to Eldorado Mining and Refining for test purposes.

Operations at Dolphin-Miller are currently limited to keeping the mine dry, pending the outcome of negotiations for the sale of cobalt concentrates overseas.

Murray Claim

A lease has been obtained on this adjoining property. Some 768 feet of diamond-drilling was completed, indicating good structural conditions near the east and west boundaries. No ore veins have yet been located.

Employment and Management

The average number of employees at Langis and Dolphin-Miller properties was 73: 59 underground and 14 on surface. J. E. Jerome was the manager at both operations.

McIntyre Porcupine Mines Limited (Castle Division)

Castle-Trethewey Mines Limited was incorporated in January 1922. In December 1959 all assets were purchased by McIntyre Porcupine Mines Limited, and it became the Castle Division of McIntyre. Names of directors and officers are mentioned on p.41 under McIntyre Porcupine Mines Limited. The McIntyre head office is at Suite 1500, 25 King Street West, Toronto 1. The mine address is O'Brien.

The Castle Division property, consisting of 42 claims is located in Haultain and Nicol townships, Gowganda area, District of Timiskaming. The property comprises the Castle and Capitol sections; all work in recent years has been in the Capitol section of the mine.

Mining operations continued throughout 1965; the mill did not operate.

SHAFTS, CASTLE AND CAPITOL MINES

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|----------------------|-----------|-------------|------------------------|--------------|------------------------------|
| | | | | feet | feet |
| CAPITOL MINE | | | | | |
| Capitol shaft | HS351 | Vertical | 2 | Surface | 819 |
| Capitol winze | HS351 | Vertical | 2 | 778 | 1,131 |
| Inclined haulageway | HS351 | 27° | 2 | 1,125 | 1,425 |
| Capitol Cobalt shaft | HS351 | Vertical | 1 (inactive) | Surface | 38 |
| CASTLE MINE | | | | | |
| No. 1 shaft | RSC106 | Vertical | (inactive) | Surface | 460 |
| No. 2 shaft | RSC101 | Vertical | (inactive) | Surface | 160 |
| No. 3 shaft | RSC101 | Vertical | 2 | Surface | 850 |

Development work in 1965 included 2,501 feet of drifting, 128 feet of cross-cutting, and 206 feet of raising. Total development footage to 31 December 1965 was 39,951 feet of drifts; 17,048 feet of crosscuts; and 9,260 feet of raises. Diamond-drilling consisted of 84 holes totalling 16,327 feet from underground, and three holes totalling 2,433 feet from surface.

Company Annual Report

The following is taken from the annual report of McIntyre Porcupine Mines Limited for the year ending 31 December 1965.

Results of on-property exploration work during 1965 were disappointing, but some areas remain to be investigated. It is possible that limited milling will be done this year to process broken ore on hand and test recoveries from low grade areas.

Employment and Management

The average number of employees was 38: 21 underground and 17 on surface. G. D. McLeod was the manager.

Otisse Property

The Otisse property, comprising 20 claims, is a silver prospect, located in Mickle township, District of Timiskaming, and is owned by G. S. Welsh of Matachewan. The property is about seven miles southwest of Elk Lake.

The vertical two-compartment Otisse shaft on claim 224 is 160 feet deep. Development work in 1965 consisted of 20 feet of crosscutting to connect with No. 7 vein. Total development footage to 31 December 1965 was 985 feet of drifts and 390 feet of crosscuts.

The mill building was partly closed in and a new roof installed. A mineral jig 10×12 in., was added to the mill equipment.

Approximately 50 tons of ore were hoisted from the 75-foot level and test-milled during a three week period in August.

Employment and Management

G. S. Welsh was in charge and there was one employee during the period of operation.

Pittsonto Mining Company Limited

Pittsonto Mining Company Limited was incorporated in November 1948, with an authorized capitalization of 5,000,000 shares of \$1 par value, of which 1,773,808 shares have been issued. The directors and officers of the company were: Benjamin Milrot, president, general manager and director; Jack Kaplan, vice-president and director; Harry Korson, director; M. R. Sherman, secretary-treasurer; and S. C. Wengle, assistant secretary. The head office is at Suite 400, 67 Richmond Street West, Toronto 1; the mine address is P.O. Box 159, North Cobalt.

The company acquired the Silvermaque Mining Company's holdings on termination of their operations in January 1964. The property, some 554 acres, includes the former Harrison-Hibbert, Red Rock, Ruby, Green Meehan, and Cob-Sil properties.

Operations proceeded from 1 January to 15 May 1965.

Annual Report for 1965

SHAFTS, PITTSONGO MINING CO. LTD.

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | TOTAL DEPTH FROM SURFACE |
|----------------|-----------|-------------|------------------------|--------------------------|
| | | | | feet |
| Harrison | Lot 13 | Vertical | 2 | 250 |
| Ruby | Lot 13 | Vertical | 2 | 161 |
| Cobalt Contact | Lot 14 | Vertical | 2 | 230 |
| Red Rock: | | | | |
| No. 1 | Lot 14 | Vertical | 2 | 110 |
| No. 2 | Lot 14 | Vertical | 2 | 75 |
| No. 3 | Lot 14 | Vertical | 2 | 75 |
| Green Meehan: | | | | |
| No. 1 | Lot 14 | Vertical | 2 | 200 |
| No. 2 | Lot 14 | Vertical | 2 | 85 |

Development work in 1965 was carried on through the Harrison shaft (situated in Bucke township, about one mile north of North Cobalt) until 15 May when the workings were allowed to flood. The following table gives the development work completed in 1965, and the total at the time of closure.

| LEVEL | DRIFTS | | CROSSCUTS | | RAISES | |
|---------------|--------|-------|-----------|-------|--------|-------|
| | 1965 | TOTAL | 1965 | TOTAL | 1965 | TOTAL |
| | feet | feet | feet | feet | feet | feet |
| 1 sub-level | .... | 92 | .. | 50 | .. | .... |
| 120 sub-level | .... | 567 | .. | 101 | .. | 122 |
| 140 level | .... | .... | .. | .... | .. | 25 |
| 150 level | .... | 1,399 | .. | 339 | .. | 507 |
| 170 level | .... | .... | .. | 15 | .. | .... |
| 190 level | 158 | 2,942 | .. | 722 | 35 | 1,052 |
| 240 level | 145 | 2,370 | 69 | 677 | 24 | 781 |
| Total | 303 | 7,370 | 69 | 1,904 | 59 | 2,487 |

One diamond-drillhole totalling 323 feet, was completed from underground, and 792 tons of ore were hoisted and custom milled.

Employment and Management

The average number of employees was 4: 3 underground and 1 on surface. F. G. Chitty was the manager.

Rusty Lake Mining Corporation

Rusty Lake Mining Corporation was incorporated in April 1959 with an authorized capitalization of 4,000,000 shares of \$1 par value, of which 2,852,279 shares have been issued. The directors and officers were: J. E. Harris, president and director; Bernard Marriott, vice-president and director; A. F. Heather, A. J. Hough, T. Y. Tozzi and W. M. Zilbersher, directors; Eileen McBain, secretary; and W. H. Connolly, treasurer. The head office is at Room 204, 1015 Beaver Hall Hill, Montreal, Quebec; the mine address is Box 159, Elk Lake.

The property, formerly known as The Hudson Bay Silver, comprises 31 claims in Leith township, District of Timiskaming.

Operations continued from 1 January to 31 December 1965.

SHAFTS, RUSTY LAKE MINING CORPORATION

| SHAFTS | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH FROM SURFACE |
|--------|-----------|-------------|------------------------|--------------|-----------------------------|
| | | | | feet | feet |
| No. 1 | HS696 | Vertical | 1 | Surface | 190 |
| No. 2 | HS716 | Vertical | 1 | Surface | 90 |
| No. 3 | HS716 | Vertical | 2 | Surface | 225 |
| No. 4 | MR30006 | Vertical | 1 | Surface | 100 |

Development footage in 1965 consisted of 822 feet of drifting, 17 feet of crosscutting, and 481 feet of raising; all from No. 3 shaft. Total development footage to 31 December 1965 was 3,891 feet of drifts; 132 feet of crosscuts; and 909 feet of raises. Some 157 diamond-drillholes totalling 20,472 feet were completed from underground, and five holes totalling 1,586 feet were completed from surface.

Major construction consisted of an office building 32×20 feet, a core room and storage house 30×20 feet, and widening of the core shack to 26×28 feet.

Added equipment consisted of a portable compressor, 600cfm capacity.

Altogether 1,426 tons of ore was hoisted and stockpiled.

Employment and Management

The average number of employees was 15: 8 underground and 7 on surface. E. N. Larabie was the superintendent.

Silverfields Mining Corporation Limited

Silverfields Mining Corporation Limited was incorporated in September 1962 with an authorized capitalization of 3,000,000 shares of \$1 par value of which 1,500,005 shares have been issued. The directors and officers were: N. B. Keevil, president and director; Stephen Kay, vice-president and director; Sir Michael Butler, Bt., J. H. Hirshhorn and D. A. Perigoe, directors; J. B. Anderson, general manager; and D. S. Brown, secretary-treasurer. The head office is at Suite 1000, 11 Adelaide Street West, Toronto 1. The mine address is Box 679, Cobalt.

The property consists of four claims comprising 67 acres in Coleman township, District of Timiskaming. This was formerly known as the Alexandra property; it is between Glen Lake Silver Mines and Silver Summit Mines on Diabase Mountain.

Mining operations continued throughout 1965; milling from 24 November to 31 December.

The vertical, two compartment Alexandra shaft has a depth of 436 feet below the collar. Development footage in 1965 consisted of 3,235 feet of drifting, 751 feet of crosscutting, and 288 feet of raising. Total development footage to 31 December 1965 was 7,024 feet of drifts; 4,859 feet of crosscuts; and 926 feet of raises. Altogether 179 diamond-drillholes from underground totalling 28,198 feet were completed.

New construction in 1965 included a mine ore bin, a corehouse, and a garage.

In all, 44,002 tons of ore were hoisted, and 42,974 tons were milled at a daily average of 135 tons.

Annual Report for 1965

Company Annual Report

The following is taken from the company annual report for the year ending 31 August 1965.

Exploration

A continuous exploration program was carried on to define and extend the known veins and also to explore for additional ones. This led to the discovery of several veins to the north. Other intermediate veins which were less continuous were also intersected.

Detailed drilling on known veins has led to the mining of considerably wider sections in some places than anticipated. In some instances veins were shown to have penetrated the quartzite at the 3rd level in areas previously considered unfavourable for silver.

Exploration of the southeast section of the property was begun from the neighbouring underground workings of Glen Lake Mines Limited, Hiho division. This area is presently not accessible from our underground workings. Initial results here have been encouraging.

Ore Reserves

Ore reserves in the central part of the property, where development has been carried out, were maintained at about 110,000 tons, including 14,700 tons of broken ore. In addition, a substantial increase in potential reserves is indicated by diamond-drill intersections to the north on the 3rd, 4th and 5th levels, and in the southeast part of the property at the 3rd level elevation.

Milling

Custom milling during the year totalled 37,041 tons for an average of 101 tons per calendar day.

| | | |
|------------------|------------|-----------|
| Ore milled | ton | 37,041 |
| Silver recovered | oz | 1,232,367 |
| Tailings | oz per ton | 0.69 |
| Calculated heads | oz per ton | 33.96 |
| Recovery | percent | 97.97 |

Additional to the silver 60,160 pounds of cobalt and 50,573 pounds of copper were recovered and paid for.

Employment and Management

The average number of employees was 54: 35 underground and 19 on surface. K. F. O'Flaherty was the mine manager.

Silver-Miller Mines Limited

Silver-Miller Mines Limited was incorporated in January 1946, with an authorized capitalization of 3,000,000 shares of \$1 par value; in 1952 the number of shares was increased to 4,000,000; in 1953 to 5,000,000 and in 1960 to 7,000,000 of which 6,646,181 shares have been issued. The directors and officers were: Murray Cooper, president and director; C. G. Gray, vice-president and director; J. M. Wainberg, secretary-treasurer and director; H. B. McLean, mine manager and director; and E. F. Griffith, E. F. Furniss and W. A. Carter, directors. The head office is at 715, 62 Richmond Street West, Toronto 1. The mine address is Drawer 230, Cobalt.

The property formerly known as Conisil Mines, consists of about 270 acres in Coleman township, District of Timiskaming and comprises: Conisil, 40 acres; Hargraves, 80 acres; Merger, 90 acres; Gem, 20 acres; Badger, 40 acres.

Mining operations progressed from 1 January to 31 December 1965. The mill was idle.

The vertical, two-compartment Conisil shaft located in claim JB27 has a depth of 625 feet below the collar. Development work in 1965 consisted of 69 feet of crosscutting and 424 feet of raising. Total development footage to 31 December 1965 was 3,742 feet of drifts, 1,279 feet of crosscuts, and 3,339 feet of

raises. In all, 18 diamond-drillholes totalling 9,166 feet were completed from underground.

Employment and Management

The average number of employees was 6: 2 underground and 4 on surface; H. B. McLean was the manager.

Silver Pack Mines Limited

Silver Pack Mines Limited was incorporated in October 1946 with an authorized capitalization of 3,000,000 shares of \$1 par value, of which 1,150,005 shares have been issued. The directors and officers were: S. L. Kay, president and director; D. C. Vickers, secretary, treasurer and director; and J. H. Hirshhorn, J. D. S. Bohme, and B. Attenborough, directors. The head office is at Suite 1601, 8 King Street East, Toronto 1; the mine address is Box 709, Haileybury.

The property, formerly known as the Hudson Bay south property, comprises three claims in Coleman township, District of Timiskaming.

Mining operations progressed from March to December 1965.

SHAFTS, SILVER PACK MINE

| SHAFT | LOCATION | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH FROM SURFACE |
|-------|-----------------------------------|-------------|------------------------|-----------------|-----------------------------|
| No. 1 | S.E. ¼, S. ½, lot 7, Coleman twp. | Vertical | 2 | feet Surface | feet 105 |
| No. 2 | S.E. ¼, S. ½, lot 7, Coleman twp. | 70° | 2 | Surface | 315 |

The underground workings were dewatered but no development work was carried out in 1965. Total development by previous operators consisted of 2,740 feet of drifting on the 125-foot, 230-foot and 330-foot levels. Altogether, 64 diamond-drillholes totalling 12,304 feet were completed from underground in 1965.

Major construction consisted of a 20-foot open headframe and a combined hoistroom, change-room, and core storage, 20×12 feet.

Equipment added included the following:

- 1 air hoist with sinking bucket
- 2 duplex air pumps
- 1 diamond-drill pump.

Employment and Management

The average number of employees was 2: 1 underground and 1 on surface. G. Shartner was the manager.

Silver Regent Mines Limited

Silver Regent Mines Limited was incorporated in January 1962 with an authorized capitalization of 5,000,000 shares of no par value, of which 3,125,005 shares have been issued. The directors and officers were: E. L. Baxter, president and director; N. B. Sheriff, vice-president and director; C. M. Hames, secretary-treasurer and director; and Irving Dobbs, and Milton Klyman, directors. The head office is at Suite 711, 62 Richmond Street West, Toronto 1. The mine address is Cobalt.

Annual Report for 1965

The property, formerly known as the Genesee comprises nine claims, about 400 acres, in Coleman township, District of Timiskaming.

Operations took place from 11 November to 31 December 1965.

The vertical two-compartment No. 1 shaft, having a depth of 572 feet below the collar, was dewatered and rehabilitated. The vertical two-compartment No. 2 winze, collared on the 350-foot level has a depth of 40 feet below the collar.

Development footage completed by previous operators consisted of 1,145 feet of drifts, 4,470 feet of crosscuts, and 390 feet of raises. Seven diamond-drillholes from underground totalling 1,473 feet were completed in 1965.

Major construction consisted of the following:

- 1 hoist house (30×16 ft.)
- 1 core shack (20×12 ft.)
- 1 shafthouse and headframe, 65 ft. high.

Added equipment was as follows:

- 1 air hoist, 10×12 in., 5,500 lb pull
- 1 pump, 280 gpm at 420 feet head with 30 hp motor
- 1 pump, 120 gpm at 100 feet head with 7 hp motor.

Employment and Management

The average number of employees was 3: 2 underground and 1 on surface. J. E. Armstrong, consulting engineer, was in charge.

Silver Summit Mines Limited

Silver Summit Mines Limited was incorporated in June 1962 with an authorized capitalization of 5,000,000 shares of \$1 par value, of which 4,300,005 shares have been issued. The directors and officers were: G. E. Buchanan, president and director; A. J. Fortens, vice-president and director; Frank Cadesky, secretary-treasurer and director; C. L. Murray, assistant secretary and director; and E. F. Furniss, director. The head office is at Suite 503, 365 Bay Street, Toronto 1. The mine address is care of Silverfields Mining Corporation Ltd., Box 679, Cobalt.

The company had purchased the privately owned Mensilvo mine consisting of 25 acres in lot 5, concession IV, Coleman township and combined it with their adjacent 40-acre Savage property, also in Coleman township. The Savage property lies to the north of the Mensilvo property about three miles southeast of Cobalt on the road leading to the Ragged Chute compressed air plant.

Mining operations continued from 7 October to 31 December 1965.

SHAFTS, SILVER SUMMIT MINE

| CLAIM | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR | VERTICAL DEPTH | |
|----------|-------------|------------------------|--------------|----------------|-----------|
| | | | DEPTH | BELOW SURFACE | |
| | | | feet | feet | |
| No. 1 | Savage | Vertical | 2 | Surface | 80 |
| No. 2 | Savage | Vertical | 2 | Surface | 290 |
| No. 3 | Savage | Vertical | 2 | Surface | 140 |
| No. 4 | Savage | Vertical | 2 | Surface | 230 |
| 8 others | Savage | Vertical | 1 (inactive) | Surface | No record |
| No. 1 | Mensilvo | Vertical | 2 | Surface | 100 |
| No. 2 | Mensilvo | Vertical | 2 | Surface | 140 |
| No. 3 | Mensilvo | Vertical | 1 | Surface | 40 |
| No. 4 | Mensilvo | Vertical | 1 | Surface | 70 |
| No. 7 | Mensilvo | Vertical | 2 | Surface | 200 |

The Savage property was being dewatered in November and a joint exploration programme was being carried out by Silverfields Mining Corporation Limited and Silver Summit Mines Limited. No underground development work was completed during 1965 and the total previously completed consisted of 7,549 feet of drifts; 2,505 feet of crosscuts; and 2,342 feet of raises. Six diamond-drillholes totalling 2,787 feet were completed from underground.

Management

The work was carried out by Silverfields Mining Corporation employees. K. F. O'Flaherty was in charge.

Siscoe Metals of Ontario Limited

Siscoe Metals of Ontario Limited is a wholly owned subsidiary of Siscoe Mines Limited, incorporated in September 1950. The directors and officers were: G. T. Smith, president and director; C. A. Robinson, vice-president and director; J. G. Ahern, H. Reimer, A. S. Fraser, R. E. Fasken, and J. P. Crete, directors; C. M. Masterman, secretary-treasurer; and R. M. P. Fisk, assistant secretary-treasurer. The head office and mine address is O'Brien.

The company owns and operates the Siscoe Metals property, formerly the Miller Lake O'Brien mine, comprising 14 claims in Nicol and Haultain townships, Gowganda area, District of Timiskaming.

Mining and milling continued throughout 1965. Work was carried on through No. 6 shaft, which was created in 1956 by raising No. 6 winze to surface.

SHAFTS, SISCOE MINE

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | SINKING 1965 | VERTICAL DEPTH BELOW SURFACE |
|---|-----------|-------------|------------------------|--------------|--------------|------------------------------|
| | | | | feet | feet | feet |
| No. 6 shaft | RSC91 | Vertical | 3 and 2 | Surface | .... | 1,542 |
| No. 2 shaft | RSC91 | 75½° | 2 (inactive) | Surface | .... | 438 |
| No. 20 shaft | RSC94 | 76° | 2 (inactive) | Surface | .... | 158 |
| No. 1 winze | ..... | 75° | 2 (inactive) | 350 | .... | 458 |
| No. 2 winze | ..... | 82° | 2 (inactive) | 350 | .... | 460 |
| No. 3 winze | ..... | 76° | 2 (inactive) | 350 | .... | 402 |
| No. 4 winze | ..... | 82° | 2 (inactive) | 350 | .... | 530 |
| No. 5 winze | ..... | Vertical | 2 (inactive) | 525 | .... | 640 |
| No. 7 winze | ..... | 75° | 2 (inactive) | 730 | .... | 902 |
| No. 8 winze | ..... | 68° | 2 (inactive) | 730 | .... | 788 |
| No. 9 winze | ..... | Vertical | 3 (inactive) | 730 | .... | 898 |
| No. 10 winze | ..... | 69° | 2 (inactive) | 900 | .... | 970 |
| No. 11 winze | ..... | Vertical | 2 | 850 | .... | 1,369 |
| SHAFTS AND WINZES NOT CONNECTED TO PRESENT WORKINGS | | | | | | |
| UPPER BONSAI | | | | | | |
| No. 1 shaft | RSC95 | Vertical | 2 (inactive) | Surface | .... | 85 |
| No. 2 shaft | RSC84 | 80° | 2 (inactive) | Surface | .... | 115 |
| No. 3 shaft | RSC84 | Vertical | 2 (inactive) | Surface | .... | 68 |
| LOWER BONSAI | | | | | | |
| No. 1 shaft | RSC83 | 76° | 2 (inactive) | Surface | .... | 132 |
| No. 2 shaft | RSC83 | Vertical | 3 | Surface | 139 | 139 |
| MILLERETT | | | | | | |
| No. 1 shaft | RSC95 | Vertical | 2 (inactive) | Surface | .... | 85 |
| No. 7 shaft | RSC95 | Vertical | 2 (inactive) | Surface | .... | 210 |
| No. 9 shaft | RSC95 | Vertical | 1 (inactive) | Surface | .... | 35 |
| No. 10 shaft | RSC95 | 77° | 2 (inactive) | Surface | .... | 127 |
| No. 1 winze | ..... | 65° | 2 (inactive) | 70 | .... | 136 |
| No. 2 winze | ..... | 79° | 2 (inactive) | 200 | .... | 303 |

Annual Report for 1965

Development work in 1965 consisted of 1,935 feet of drifting, 194 feet of crosscutting, and 1,183 feet of raising. Total development footage by present operators to 31 December 1965 was 76,868 feet of drifts; 21,911 feet of crosscuts; and 9,988 feet of raises. Diamond-drilling in 1965 consisted of 160 holes, totalling 24,359 feet, from underground and 20 holes, totalling 11,592 feet, from surface.

Major construction in 1965 included the following:

- 1 headframe, 60 ft. high, wood construction
- 1 hoist and compressor house 36×30 ft., wood frame, aluminum sheeting
- 1 water tank 12×14 ft., B.C. fir stave
- 1 pump house 8×7 ft., wood frame, aluminum sheeting.

Added equipment was as follows:

- 1 tugger hoist
- 1 compressor, 750cfm capacity
- 1 pump, size 1½×2 in.
- 1 stoper drill.

A total of 58,049 tons of ore was hoisted and milled at a daily average of 220 tons.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Mining

| SOURCES OF ORE MILLED FROM | 1965 | | | 1964 | | |
|-------------------------------|--------|---------------|-------------|--------|---------------|-------------|
| | Tons | Oz Per Ton | Total Oz | Tons | Oz Per Ton | Total Oz |
| Development | 3,662 | 13.1 | 47,901 | 3,056 | 18.6 | 56,918 |
| Mining | 54,387 | 18.6 | 1,011,667 | 60,963 | 21.3 | 1,296,887 |
| Waste rock (to back fill) | 8,181 | | | 10,666 | | |
| Broken ore reserves | 10,186 | | | 14,380 | | |

Milling

| | | 1965 | 1964 |
|---------------------------|------------|-----------|-----------|
| Ore treated | ton | 58,049 | 64,019 |
| Calculated heads | oz per ton | 18.78 | 21.73 |
| Mill residues | oz per ton | 0.58 | 0.58 |
| Recovery | percent | 97.18 | 97.35 |
| Total recovery at mill | oz | 1,059,568 | 1,353,805 |
| Hand-picked mine ore | oz | 44,217 | 45,717 |
| Overall silver production | oz | 1,103,785 | 1,399,522 |

The mill maintained satisfactory performance and in spite of the slightly lower grade milled the percentage of recovery remained about the same. Including hand picked crude ore, overall recovery in high grade form accounted for 87.2 percent (87.7 percent in 1964) of total production distributed as follows:

| | | 1965 | 1964 |
|------------------------|---------|-------|-------|
| Hand-picked high grade | percent | 4.0 | 3.3 |
| Table concentrates | percent | 83.2 | 84.4 |
| Flotation concentrates | percent | 12.8 | 12.3 |
| | | 100.0 | 100.0 |

Operating Costs

| | 1965 | | 1964 | |
|----------------------------------|----------------|----------------|----------------|----------------|
| | per ton | per oz Ag | per ton | per oz Ag |
| Marketing (including smelting) | \$ 2.04 | \$0.107 | \$ 2.33 | \$0.107 |
| Exploration and development | 2.09 | 0.110 | 2.24 | 0.102 |
| Mining | 6.71 | 0.353 | 6.52 | 0.298 |
| Milling | 2.02 | 0.106 | 1.86 | 0.085 |
| Mine overhead | 1.53 | 0.080 | 1.33 | 0.061 |
| Total mine operating cost | \$14.39 | \$0.756 | \$14.28 | \$0.653 |

Employment and Management

The average number of employees was 94: 61 underground and 33 on surface. E. A. Pearson was the mine manager.

Sudbury Contact Mines Limited

Sudbury Contact Mines Limited was incorporated in October 1927 with an authorized capitalization of 6,000,000 shares of \$1 par value, of which 4,955,000 shares have been issued. The directors and officers were: Paul Penna, president and director; N. B. Sheriff, vice-president and director, B. Kraft, secretary-treasurer; and W. L. Hogarth Jr., assistant secretary treasurer. The head office is Suite 1101, 365 Bay Street, Toronto 1. The mine address is Box 9, Cobalt.

The property, formerly known as the Provincial mine, consists of approximately 40 acres in Gillies Limit, District of Timiskaming.

Operations went on from May to December 1965. Three vertical, two compartment shafts had been sunk by former operators, the deepest being No. 2 which was 350 feet below the collar. The mine was dewatered and an underground diamond-drilling program commenced; at year end 15 holes totaling 4,840 feet had been completed.

Major construction consisted of a hoistroom, 40×20 feet, of wood-frame construction.

Equipment installed included a reversible air hoist, 10×12 in., and two pumps with 40 hp motors, 480gpm at 200-ft. head.

Employment and Management

The average number of employees was 3: 2 underground and 1 on surface. L. J. Cunningham was the mine manager.

TELLURIUM—see NICKEL AND COPPER**THORIUM****Rio Tinto Dow Limited**

Rio Tinto Dow Limited was incorporated in January 1958, with an authorized capitalization of 200,000 shares: 100,000 preference shares, and 100,000 common shares each of \$10 par value, of which 43,000 preference and 35,000 common shares have been issued. The directors and officers were: W. B. Malone, president and director; W. P. Arnold, vice-president and director; H. S. Wilson, G. Baker, and B. R. MacKenzie, directors; G. R. Devey, secretary; D. G. Scott, treasurer; and J. S. Turnbull, assistant-secretary. The head office is at 335 Bay Street, Toronto 1. The plant address is Box 190, Elliot Lake.

Annual Report for 1965

Production of crude thorium sulphate was much lower due to the shut down of the plant at Nordic in March. Thorium oxide was produced from the sulphate at the Quirke plant during the summer. Production of nuclear-grade uranium oxide and rare-earth minerals was increased by the enlargement of the plant.

Major construction in 1965 at the Nordic mine included an annex to house acid make-up and precipitation tanks and alterations to the mixer agitator tanks.

Added equipment included acid storage and precipitation tanks, a 24-inch filter press, and a 10-foot drier.

Production in 1965 was as follows:

| | | |
|----------------|----|---------|
| Thorium sludge | lb | 155,085 |
| Thorium oxide | lb | 9,817 |
| Yttrium oxide | lb | 541 |

Company Annual Report

The following is taken from the Rio Algom Mines Limited annual report for the year ending 31 December 1965.

In November 1965, the company acquired from Dow Chemical of Canada Limited the latter's 50 percent interest in the capital of Rio Tinto Dow Limited, as a result of which it is now wholly-owned. Its name will be changed from Rio Tinto Dow Limited to Rio Tinto Nuclear Products Limited. The operations are managed by the company's mining division.

Sales of thorium concentrates during the year were only moderately satisfactory, although there is hope of improvement arising from a growing demand for thorium-magnesium alloys. The most interesting development, however, is a new market for the rare-earth yttrium, which is used in the production of colour television tubes. Yttrium can be produced in conjunction with thorium from the waste liquors of Nordic's uranium circuit and a plant with a capacity of 100,000 pounds per annum has been installed at the Nordic mill at Elliot Lake; first shipments being made in December 1965. Marketing arrangements have been made through associated companies in Great Britain and the U.S.A.

Construction of a 150-ton-per-year uranium refinery at Elliot Lake is in progress and should be completed in May 1966. The new facility will be used for continuing process development in this important field as well as to meet what are, as yet, still small commercial orders.

Employment and Management

The average number of employees was 23. M. E. Grimes was the manager of operations.

URANIUM OXIDE

The production of uranium oxide in Ontario decreased 42.19 percent in quantity, from 11,805,143 pounds in 1964 to 6,825,046 pounds in 1965. The value of production decreased 25.73 percent, from \$63,606,944 in 1964 to \$47,234,892 in 1965.

The industry paid \$1,665,574 to 248 salaried employees and \$6,517,491 to 1,087 wage-earners. Fuel and electricity cost \$1,585,189, and process supplies \$5,907,379.

Denison Mines Limited

Denison Copper Mines Limited was incorporated in November 1936. It was succeeded in 1946 by Denison Nickel Mines Limited. In 1949 the name was changed to North Denison Mines Limited. In March 1954 it was again changed to Consolidated Denison Mines Limited. In March 1960, on amalgamation of Consolidated Denison Mines Limited and Can-Met Explorations Limited, the name was changed to Denison Mines Limited. The authorized capitalization is 6,000,000 shares of \$1 par value, of which 4,474,703 shares have been issued. The directors and officers were: S. B. Roman, chairman, president and director; John Kostuik, vice-president, general manager and director; Jean Bodson, vice-

president and director; John C. Puhky, secretary and director; J. W. Berry, Hon. George Drew, F. H. Jowsey, L. R. Perini, A. W. Stollery, Hon. H. A. Willis and B. E. Willoughby, directors; E. B. McConkey, vice-president finance and treasurer; J. G. Pickard, vice-president industrial division; and A. F. Risso, comptroller. The head office is at 4 King Street West, Toronto 1. The mine address is P.O. Box B-2600, Elliot Lake.

The Denison property comprises 123 claims in Townships 144 and 150, Blind River area, District of Algoma.

SHAFTS, DENISON MINE

| SHAFT | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | TOTAL DEPTH FROM SURFACE |
|-------------|--|-------------|------------------------|--------------------------|
| No. 1 | S586071 | Vertical | 5 | feet 1,856 |
| No. 2 | S586118 | Vertical | 8 | 2,776 |
| Ventilation | on claim line between S67429 and S67430 | Vertical | 1 | 330 |

Development work in 1965 consisted of 10,598 feet of drifting and 666 feet of raising. Total development footage on a single plane to 31 December 1965 was 164,236 feet of drifts and 3,114 feet of raises. Altogether, 1,022 diamond-drillholes from underground totalling 16,069 feet, were completed in 1965.

New construction in 1965 consisted of an addition to the mill, 90×122×93 ft, and a new leaching area.

Major equipment added was as follows:

- 1 propane gas tank, 18,000 U.S. gal. capacity
- 3 vaporizers
- 1 propane gas burner, 16,000,000 BTU
- 1 air blower with piping, valves and safeguard controls
- 2 ventilation fans (one 110 in., one 144 in.)
- 12 Pachuca tanks, 22.5 ft. diameter and 50 ft. high.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Summary of Production

| | | 1964 | 1965 |
|---|---------|-----------|----------------------|
| Ore broken | tons | 1,232,742 | 874,544 |
| Milled | tons | 1,275,384 | 889,391 ¹ |
| Average milled per day | tons | 3,573 | 2,624 |
| Recovery | percent | 95.57 | 95.27 |
| U ₃ O ₈ produced | pounds | 3,950,364 | 2,561,164 |
| Average U ₃ O ₈ per ton | pounds | 3.14 | 2.93 |

¹Plant shut down for annual vacation.

Mining

Mining was concentrated in the northeast and southwest sections of the No. 1 shaft area. Emphasis was maintained during the year on the overall development of the mine to the east, which will be served by the accessways and conveyorways of the Axis "B" system. This will provide a new block of ore from which production is scheduled to commence in 1967. An inter-connecting roadway between the two shafts is being driven to service the eastern area and will provide an alternate and more direct route to the one presently being used in the western section.

Provisions for the overall, and increased capacity, ventilation program for the underground were accelerated during the year.

A total of 884,527 tons of ore was hoisted; 813,966 tons from No. 1 shaft, and the remainder from the No. 2 opening. Total heading advance amounted to 24,738 lineal feet. The overall development and servicing program to maintain accessible ore reserves was continued. A total of

Annual Report for 1965

49,931 tons of waste was broken from all the various development headings being driven. The average grade of the ore mined was 2.93 pounds of U_3O_8 per ton, and is consistent with the projected grade for the areas being worked.

The mining industry here, as elsewhere, suffers from a lack of skilled manpower especially in the miner and tradesman classifications. A training program has now been instituted at the operation for miners, which is a first in the industry. The venture is jointly sponsored with the Ontario Department of Labour under the Federal Government's Program No. 4—"Training in Cooperation with Industry". In a period of a year it is planned to graduate over 140 qualified miners by this scheme.

Research is being carried out on various phases of the metallurgy of Denison ore, with particular emphasis on the long term outlook.

Employment and Management

The average number of employees was 686: 380 underground and 306 on surface. M. J. de Bastiani was the mine manager.

Rio Algom Mines Limited

Algom Uranium Mines Limited was incorporated in July 1953. Milliken Lake Uranium Mines Limited was incorporated in October 1952. Northspan Uranium Mines Limited was incorporated in June 1956. Pronto Uranium Mines Limited was incorporated in June 1953. The four companies were controlled by Rio Tinto Mining Company of Canada Limited. In June 1960, they were amalgamated under the name of Rio Algom Mines Limited with an authorized capitalization of 12,000,000 shares of no par value, of which 10,612,132 shares have been issued. The directors and officers were: J. N. V. Duncan, chairman, chief executive officer and director; W. B. Malone, first vice-president and director; Henry Borden, F. G. Gardiner, Sam Harris, Leo Model, F. A. Petit, B. R. MacKenzie, W. A. Arbuckle, L. A. Lapointe, J. B. Ridley, J. G. Edison, Hon. S. A. Hayden, Sir Mark Turner, J. H. Smith and R. W. Wright, directors; W. P. Arnold, vice-president and general manager of operations (mining division); H. S. Wilson, vice-president (finance) and treasurer; G. Baker, vice-president administration, and secretary; and G. R. Albino, vice-president, planning and development. The head office is at Suite 1100, 335 Bay Street, Toronto 1. The address of mines in the Elliot Lake area is Elliot Lake. Details on the Rio Algom Mines Limited, Pronto Division, Pater mine appear in the Nickel-Copper section of this report. (p. 110)

ALGOM DIVISION

The property comprises some 283 claims in the Blind River area, District of Algoma. Two mines, the Nordic and the Quirke, were being operated. Milling operations were suspended at the Quirke mine on 26 January 1961. Dewatering of the mine and introduction of the leaching process for the recovery of uranium oxide were commenced in September 1965.

Nordic Mine

Mining and milling operations continued throughout 1965 at the Nordic mine consisting of 140 claims in Townships 143, 149, and 155.

The vertical six-compartment, Nordic No. 1 shaft located on claim S66619, in Township 149, has a total depth of 1,780 feet below the collar. Development work in 1965 consisted of 8,984 feet of drifting and 25,364 feet of raising. Total development footage to 31 December 1965 was 107,832 feet of drifts, 21,362 feet of crosscuts, and 202,002 feet of raises. One diamond-drillhole, totalling 746 feet, was completed from surface.

In all, 1,187,870 tons of ore were hoisted, and 1,190,000 tons were milled. The mill averaged 3,449 tons per working day.

MILLIKEN DIVISION

The property consists of 24 claims immediately east of Elliot Lake in Township 149, District of Algoma.

Mining continued from 1 January to 26 June, milling from 1 January to 30 June 1964. In 1965 the only activity consisted of pumping mine water for leaching purposes which was terminated in September.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

Uranium operations and revenues were maintained throughout the year at the rate scheduled in the master contract with Eldorado Mining and Refining Limited. Quantities of U_3O_8 under this contract remaining to be delivered at year-end totalled 13,870,976 pounds.

In July 1965, the company entered into an agreement whereby it could deliver at its option to the Canadian Government a total of 3,000,000 pounds of U_3O_8 over a 5-year period at the rate of 600,000 pounds a year. The above quantities would be reduced by any open market sales made during the period. In 1965, 275,000 pounds were delivered under this contract.

Production

Total production for the year was 2,717,198 pounds of U_3O_8 including 40,000 pounds recovered by treating Nordic mine waters and 80,000 pounds obtained by underground leaching in the Milliken mine.

Nordic continued to be the only uranium mine which the company had in operation in 1965 and 1,190,000 tons of ore were treated, with an average grade of 2.33 pounds of U_3O_8 per ton and a recovery of 94.8 percent.

In the third quarter of 1965 work started on dewatering the Quirke mine, a process which will be completed by June 1966. At that time the mine workings will be on a ready-stand-by basis and the mine and mill could be brought back into production within a relatively short period of time at an estimated cost of \$2,500,000.

The experimental underground water-leaching programme at Milliken was terminated in September 1965 when yields became uneconomic and with the termination of the operation, remaining track and underground electrical equipment and pumps were salvaged from the workings and the property was placed on an idle mine basis.

Employment and Management

The average number of employees at all operations was 618: 310 underground and 308 on surface. E. W. Cheeseman was the mine manager.

Stanrock Uranium Mines Limited

Stanrock Uranium Mines Limited was incorporated in March 1956, with an authorized capitalization of 6,000,000 shares of \$1 par value, of which 4,993,286 shares have been issued. The directors and officers were: G. W. Rowe Jr., president and director; D. S. Robertson, vice-president and director; J. F. A. Nisco, V. V. Jacomini, J. R. Dunning, Robert Frankel, J. C. Ward Jr., James Bruce and N. C. Steenland, directors; Harmon Duncombe, secretary; and D. C. Marshall, treasurer. The head office is at Suite 804, 80 Richmond Street West, Toronto 1. The mine address is Box 1700, Elliot Lake.

The property comprises 22 claims, about 595 acres in Township 144 and 150, Blind River area, District of Algoma.

Leaching operations at the mine continued from 1 January to 31 December 1965.

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SHAFTS, STANROCK MINE

| | CLAIM NO. | INCLINATION | NUMBER OF COMPARTMENTS | TOTAL DEPTH |
|---------------|-----------|-------------|------------------------|---------------|
| No. 1 shaft | S82324 | Vertical | 3 | feet 3,379 |
| No. 2 shaft | S82323 | Vertical | 2 | 2,953 |
| Service raise | S82323 | Vertical | 3 | 220 |

The following table gives the development footage in 1964, and the total to the time of mine closure, 30 October 1964.

| | DRIFTS | CROSSCUTS | CONVEYORWAYS | RAISES ¹ |
|-----------------------|---------|-----------|--------------|---------------------|
| Completed 1964 | 3,773 | 9 | .... | 351 |
| Total previous | 110,272 | 2,852 | 6,020 | 4,025 |
| Total 30 October 1964 | 114,045 | 2,861 | 6,020 | 4,376 |

¹Note: These refer to raises driven between ore sheets for ventilation and access, and do not include some 46,000 feet of advance for slot raising in production mining or boxhole raising.

Company Annual Report

The following is taken from the company annual report for the year ending 31 December 1965.

In 1965 value of production of uranium oxide amounted to \$813,738 and sales of surplus plant and equipment, the latter being a nonrecurring source of revenue, amounted to \$535,957. Interest income amounted to \$8,238. Net income from these sources, after costs of \$764,781, was \$593,152.

In 1965, 147,750 pounds of uranium oxide was packaged and an estimated 7,434 pounds remained in the mill circuit at year end. A total of 115,428 pounds was delivered to Eldorado in 1965, leaving a balance of 94,179 pounds to be delivered under the present contract which should be completed in the first half of 1966. Approximately \$5.50 per pound of U₃O₈ was paid under this contract.

All production in 1965 was by the bacterial leaching method. Bacterial leaching involves washing down the underground workings with water under pressure, collecting the run-off, pumping it to the surface and treating it there in part of the mill. This water, due to action of bacteria on the underground workings, carries commercially extractable uranium values. No conventional underground mining is carried on; that is to say, there is no drilling, blasting or handling of broken rock. There is insufficient experience with bacterial leaching to know how often or how long washing down the same areas of the mine will continue to produce significant quantities of uranium oxide. There are parts of the mine that have not yet been washed. Other parts have been washed eleven times on a three-month cycle without decrease in yield.

The company has been advised by Eldorado that a new contract will be received to sell U₃O₈ to Eldorado, under the Canadian Government stockpiling program, at \$4.90 per pound plus allowances to cover increases in certain costs, deliveries to commence upon completion of the present contract and to continue until June 1970. Under the new contract Stanrock may elect, under certain conditions, not to sell its product to Eldorado if higher prices from other purchasers can be obtained.

Costs under the company's bacterial leaching method have steadily decreased. In the first half of 1965 direct costs of production were approximately \$4.80 per pound of U₃O₈ produced; in the second half they were approximately \$3.45. Production has steadily increased: average monthly production in the first half of the year was 10,112 pounds, in the second half 14,512 pounds.

In view of the success the company has had so far with bacterial leaching and the assurance of a market until 1970 installation of new equipment at the mine, comprised of rubber-lined pipes and stainless steel pumps was completed in February. This should increase production, eliminate the use of corrosion-preventing chemicals and reduce maintenance costs.

The monthly amount of U₃O₈ to be delivered under the proposed new contract with Eldorado will depend in part on the production capacity and will not be fixed until after a period of experience has been had with the new pipes and pumps. The monthly production is expected to exceed 15,000 pounds.

Employment and Management

The average number of employees was 46: 21 underground and 25 on surface. B. G. MacDermid was the manager.

ZINC—see LEAD AND ZINC

NON-METALLICS AND FUELS

ARSENIC

In 1965, 403,011 pounds of arsenic trioxide, valued at \$13,150, was recovered from concentrates shipped from the Cobalt-Gowganda area. In 1964, 323,900 pounds, valued at \$16,195 was recovered.

ASBESTOS

The production of asbestos in Ontario decreased 88.67 percent in tonnage from 15,512 tons in 1964 to 1,758 tons in 1965. The value of production decreased 96.85 percent from \$2,199,918 in 1964 to \$69,258 in 1965. There was no production from the Reeves and Munro properties of Canadian Johns-Manville Company Limited.

The general statistics for asbestos, gem stone, gypsum, nepheline syenite, peat moss, quartz, and talc are combined in this report. These industries paid \$413,731 to 70 salaried employees, and \$1,400,952 to 272 wage-earners. Fuel and electricity cost \$430,037 and process supplies \$658,740.

Canadian Johns-Manville Company Limited

Canadian Johns-Manville Company Limited was incorporated in December 1918. It is a wholly owned subsidiary of Johns-Manville Corporation. The authorized capitalization is 25,000 shares of \$100 par value, of which 15,705 shares have been issued. The directors and officers were: K. V. Lindell, chairman and director; A. G. Sinclair, president and director; L. M. Adamson, and F. A. H. Gallop, N. W. Hendry and J. O. Eby, directors; W. H. Soutar secretary. The head office is at 310 Victoria Avenue, City of Westmount, Quebec; the mine address is Matheson.

The company's new asbestos orebody prospect comprises 40 claims in Reeves township, District of Sudbury, southwest of Timmins. Mining and milling at the Munro mine, which had been the only major asbestos producer in Ontario was terminated on 31 July 1964.

Mining operations proceeded at the Reeves property from 3 January to 30 June 1965. Test milling was carried out at the Munro mill from 3 January to 15 March.

Exploration work consisted of stripping a surface area 40×30 feet to an average depth of 20 feet. In all, 43 diamond-drillholes totalling 41,434 feet were completed from surface.

The small exploration shaft sunk in 1964 was filled early in the year.

Altogether, 2,460 tons of test material was trucked to the Munro mill, and 1,848 tons were milled.

Employment and Management

The average number of employees at all operations was 27: 1 in the open pit and 26 on surface. F. J. Evelegh, regional geologist for the exploration department, was in charge.

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Hedman Mines Limited

Hedman Mines Limited was incorporated in August 1956 with an authorized capitalization of 3,000,000 shares of \$1 par value, of which 1,428,270 shares have been issued. The directors and officers were: J. J. Mangan, president and managing director; J. C. Lavigne, vice-president and director; S. E. McCrory, secretary-treasurer and director; and H. K. Passmore and H. E. Dyer, directors. The head office address is Box 467, Timmins. The mine address is P.O. Box 336, Matheson.

The property comprises 29 claims about 1,164 acres, located in Warden and Munro townships, District of Cochrane, about 25 miles north-east of Matheson. The open pit is located near the centre of the Warden township property; the pilot plant is on the railway siding at Matheson.

Operations continued throughout 1965. The 40-ton pilot plant was operated intermittently, 2,878 tons of ore were treated at an average of 7.9 tons daily, producing special asbestos for test purposes. Market research, machinery evaluation, and production mill planning were also carried out.

Added equipment consisted of:

- 4 screw conveyors
- 1 exhaust fan, 20 in.
- 1 fork lift truck
- 1 end loader, TD9
- 3 electric motors, one 7½ hp, one 3 hp, one 1½ hp.

Employment and Management

The average number of employees was 11: 2 in the open pit and 9 on surface. E. W. Gagan was the consulting engineer in charge of operations.

FLUORSPAR

There was no recorded production of fluorspar in Ontario in 1965.

GARNET

There was no recorded production of garnet in Ontario in 1965.

GYPSUM

The production of gypsum in Ontario increased 2.84 percent in tonnage from 517,239 tons in 1964 to 531,918 tons in 1965; the value of production increased 4.89 percent from \$1,376,992 in 1964 to \$1,444,293 in 1965.

The general statistics for the industry are given under "Asbestos" (p. 147).

GYPSUM

Canadian Gypsum Company Limited

Canadian Gypsum Company Limited was incorporated in September 1907 with an authorized capitalization of 3,000 shares of \$100 par value, of which 2,710 shares have been issued. The directors and officers were: G. A. Long, president and director; D. C. McConkey, secretary, treasurer and director; and H. F. Kent, B. Matthews, and Edward Rembert, directors. The head office is at 790 Bay Street, Toronto 2. The mine address is Hagersville.

The company operates a gypsum mine and plant in lots 14 and 15, concession IV, Oneida township, Haldimand county. The company owns or holds the mining rights on approximately 2,623 acres.

The mine is operated through the three-compartment, No. 1 vertical shaft, 102 feet deep in lot 15. There is a vertical two-compartment ventilation and escapement shaft, 90 feet deep, known as No. 2 in lot 15. In 1959, No. 3 vertical, two-compartment, ventilation and escapement shaft was completed at a depth of 86 feet below the collar in lot 14. The room-and-pillar method of mining is used.

The mine and mill operated throughout 1965.

The tonnage of gypsum mined during 1965 exceeded that of the previous year, reflecting the percentage increase of housing starts using plaster and wall-board, and to a lesser extent an increased use of gypsum by the company's cement plant customers.

The electro-hydraulic four-wheel-drive auger drill-mobile was used throughout the year in some of the room-and-pillar mining sections with favourable results. The trend to complete mechanization appears necessary in order to hold in balance projected production and the supply of miners.

In 1965, 346,294 tons of ore were hoisted, 334,428 tons were milled, and the mill averaged 1,104 tons daily.

Employment and Management

The average number of employees, excluding the mill, was 83: 71 underground and 12 on surface. R. C. Nelson was works manager and Ray Hartviksen replaced C. F. McGrath as mine superintendent.

Domtar Construction Materials Limited

(Gypsum Division)

Gypsum, Lime and Alabastine, Canada, Limited was incorporated in July 1927, and in May 1956, the capitalization was increased. The company became a wholly owned subsidiary of Dominion Tar and Chemical Company Limited in February 1959, and in March 1961 the name was changed to Domtar Construction Materials Limited, (Gypsum Division). The head office is at 2100 Sun Life Building, Montreal 2, Quebec; the mine address is Caledonia.

The company has two gypsum properties and a mill in Seneca township, Haldimand county. The old mine, in lot 10, range 1 west, has been abandoned. Operations at the new mine in lot 8, range 2 west, continued throughout 1965. The room-and-pillar method of mining is used, which consists of rooms or pockets, leads, and crosscuts, all approximately 21 feet in width by 8.5 feet in height. A ton of gypsum ore in place is equivalent to about 13.7 cubic feet; each foot of advance produces an average of 13.3 tons of gypsum. The total advance in 1965 was 15,051 feet, approximately 9.5 acres were mined out.

The tonnage of gypsum hoisted in 1965 from underground was unchanged from that of the previous year. The current trend toward the use of anhydrite from deposits in eastern Canada continued in some cement manufacturing plants, thus curtailing the normal gypsum requirements. The drop, however, was offset with an increased production in the plaster and wall division to meet the demand of the domestic and export markets.

Annual Report for 1965

The diesel-driven, high-pressure hydraulic rotary drill replaced percussion drilling and decreased noise and dust while providing efficiency and flexibility in the room-and-pillar mining method. The trend to complete mechanization has been achieved with the exception that men are not transported up or down the shaft.

During the year a total of 197,868 tons of ore was hoisted, and 151,657 tons were milled at an average of 530 tons daily.

Employment and Management

The average number of employees, excluding the mill, was 23: 21 underground and 2 on surface. C. L. Dryden was plant manager and G. R. Hunt was mine superintendent.

MICA

There was no reported production of mica in 1965.

MINERAL WATER

There was no recorded production of mineral water in Ontario in 1965.

NATURAL GAS AND PETROLEUM

Production of natural gas decreased 8.66 percent in quantity from 13,815,967 thousand cubic feet in 1964 to 12,619,867 thousand cubic feet in 1965; the value of production decreased 15.69 percent from \$5,759,876 in 1964 to \$4,856,125 in 1965.

Production of petroleum increased 2.62 percent in quantity from 1,246,682 barrels in 1964 to 1,279,321 barrels in 1965, while the value of production increased 1.97 percent from \$4,014,316 in 1964 to \$4,093,318 in 1965.

Full details on these industries are given in the 1965 annual report of the Ontario Department of Energy and Resources Management.

NEPHELINE SYENITE

Production increased 17.11 percent in quantity from 290,300 tons in 1964 to 339,982 tons in 1965, while the value of production increased 10.27 percent from \$3,097,172 in 1964 to \$3,415,387 in 1965.

Industrial Minerals of Canada Limited

Nepheline Syenite Division

American Nepheline Limited was incorporated in January 1945. In 1961 the name was changed to Industrial Minerals of Canada Limited. In 1962 it was changed again to Indusmin Limited; in July 1965, Indusmin Limited and Canadian Silica Corporation Limited were amalgamated under the name of Industrial Minerals of Canada Limited. It is a subsidiary of Falconbridge Nickel Mines Limited. The authorized capitalization is 1,000,000 shares of no par value, of which 856,855 shares have been issued. The directors and officers were: H. J. Fraser, president and director; J. J. Mather, executive vice-president and director; F. D. Hart, R. C. Mott, G. T. N. Woodrooffe and P. Dessaulles, directors; T. J. McWhirter, treasurer; and D. D. Anderson, secretary. The head office is at 7 King Street East, Toronto 1. The mine address is Nephpton.

The property, consisting of approximately 2,424 acres, is located in concession IX, Methuen township, County of Peterborough, about 35 miles northeast of Peterborough.

Operations continued throughout 1965 in the open pit on the Cabin Ridge section of the property. Some 13 diamond-drillholes, totalling 2,087 feet were completed from surface.

New construction in 1965 consisted of a storage building of fire resistant construction, 64×35 feet, and a townsite garage, 24×14 feet.

Major added equipment included the following:

- 1 impactor, F50A in the mill
- 2 separators in the mill
- 1 front end loader, 5½-yard capacity in the pit.

A total of 259,718 tons of ore was crushed and milled at a daily average of 753 tons per working day.

Employment and Management

The average number of employees was 76: 62 in the plant and 14 in the pit. D. C. McDonald was the general manager; D. L. Murdy was the resident manager.

International Minerals and Chemical Corporation (Canada) Limited

Canadian Flint and Spar Company Limited was incorporated in March 1930. In December 1955, the name was changed to International Minerals and Chemical Corporation (Canada) Limited. The company is wholly owned by International Minerals and Chemical Corporation, Old Orchard Road, Skokie, Illinois, U.S.A. The company officers were: T. M. Ware, president and director; B. R. Carlson, treasurer and controller; and J. R. Taylor, secretary. The head office is at 4 King Street West, Toronto 1. The mine address is Box 309, Havelock.

The company owns 511 acres, in Methuen township, County of Peterborough. The present operation is in lots 19, 20, and 21, concession VI, at the northeast end of Blue Mountain. The Blue Mountain nepheline syenite deposit is some five miles long with an average height of 350 feet above the surrounding country. The width varies from one quarter of a mile at the narrow portion to one mile at the widest part.

The rock is quarried, crushed and ground to a granular sand size, (30 mesh). At this size minor iron minerals are removed by magnetic separation. Some of the material is then ground further to produce various grades of powder from 200 mesh to micron size. The material is used mainly in the glass industry; in ceramics; and as a filler in paints, rubber, and plastics.

Added equipment in 1965 consisted of a wet scrubber and a dust collection unit on the 6×12 ft. rod mill circuit.

Mining and milling continued throughout 1965. The mill treated 178,005 tons compared to 154,724 tons in 1964 and averaged 682 tons daily.

Employment and Management

The average number of employees was 44: 37 in the plant, and 7 in the pit. L. F. McDonnell was the area manager.

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PEAT MOSS

The production of peat moss decreased 25.68 percent in tonnage from 27,065 tons in 1964 to 20,115 tons in 1965. The value of production decreased 32.07 percent from \$573,538 in 1964 to \$389,615 in 1965.

In 1965 there were four Ontario producers of Peat Moss.

Atkins and Durbrow (Erie) Limited gathered material in Welland county from 2 January to 24 December.

Amaranth Peat Products operated at Shelburne in Dufferin county from June to September.

Stratford Peat Moss Products operated in Perth county from 1 April to 15 May.

Alfred Cooper and Company Limited of Fort William operated intermittently in the Thunder Bay district.

General statistics for the industry are given under "Asbestos," p. 147.

PETROLEUM—see NATURAL GAS AND PETROLEUM

QUARTZ

The production of quartz and quartzite increased 15.45 percent in tonnage from 1,127,425 tons in 1964, to 1,301,583 tons in 1965. The value of production decreased 5.58 percent from \$836,937 in 1964 to \$790,245 in 1965. The major portion is produced by the mines in the Sudbury area, from their own pits and quarries and used as flux for ore processing.

SALT

The production of salt increased 16.93 percent in quantity from 3,335,683 tons in 1964 to 3,900,484 tons in 1965; the value of production increased 6.51 percent from \$14,552,559 in 1964 to \$15,499,274 in 1965. Brining operations were continued in Essex county at Brunner Mond Canada Limited, Canadian Brine Limited and Canadian Salt Company Limited in the Windsor-Amherstburg area, in Lambton county by Dow Chemical of Canada Limited, in Huron county by Domtar Chemicals Limited, and by Sifto Salt Division in the Goderich area. Underground mining of salt continued at the Canadian Rock Salt Company Limited at Ojibway near Windsor; and at Domtar Chemicals Limited, Sifto Salt Division, Goderich mine at Goderich.

The industry paid \$607,129 to 93 salaried employees and \$2,681,498 to 460 wage-earners.

Fuel and electricity cost \$702,323, and process supplies cost \$2,879,007.

The Canadian Rock Salt Company Limited

The Canadian Rock Salt Company Limited was incorporated in September 1952, with an authorized capitalization of 50,000 shares of no par value, of which 5,162 shares have been issued. The directors and officers were: Daniel Peterkin Jr., chairman of the board and director; W. D. Mahaffy, president and director; H. A. Clarke, vice-president, secretary-treasurer and director; J. D. Mair, vice-president and director; L. M. McBride, assistant secretary and director; F. B. Common Jr., N. C. Hobson, F. H. Sobey, E. G. Smith, H. R. Stratford and

R. C. Vail, directors. The head office is at 30 Prospect Avenue, Windsor. The mine address is Ojibway mine, Windsor.

The company's property is in concession 1, Sandwich West township, Essex county, on the shore of the Detroit River.

Mining and milling operations continued from 4 January to 30 December 1965.

SHAFTS, CANADIAN ROCK SALT MINE

| | INCLINATION | NUMBER OF COMPARTMENTS | TOTAL DEPTH |
|-------------|-------------|------------------------|-------------|
| | | | feet |
| No. 1 shaft | Vertical | 4 | 1,082 |
| No. 2 shaft | Vertical | 3 | 1,025 |

Production and shipments in 1965 were higher than in the two preceding years. An increased demand for rock salt was noticeable in both the export and domestic markets. During the year, the program of phasing out older mining equipment and installing newer and larger units continued. Universal undercutters replaced Shortwall machines, one new face loader as well as a hydraulic drill jumbo were placed in service. It is proposed to install another 2,000 feet of permanent conveyor section with an advanced crusher station as well as another face loader and drill jumbo early in 1966. The first of several larger trucks is expected to be in operation in 1966.

The mining pattern of room-and-pillar layout, with faces to a height of 20 feet, continues. The rooms are 50 feet wide and truckways are 30 feet wide. The recovery factor of 50 percent remains unchanged and the practice of leaving a minimum of six feet of salt on the roof is being maintained. In the mill, the number of electronic sorting machines to beneficiate one of the larger product sizes was doubled to meet an increasing export demand.

Added equipment in 1965 included the following:

- 2 sortex machines, No. 526M in mill
- 2 undercutters, 185 hp for cutting salt underground
- 1 loader, 156 hp for loading salt underground
- 1 two-drill kumbo, CD73 for drilling salt underground.

Development work in 1965 on the 975-foot level consisted of 7,032 feet of drifting, 9,788 feet of crosscutting and 14,865 feet of rooms. Total development footage to 31 December 1965 was 59,794 feet of drifts; 53,953 feet of crosscuts; and 106,691 feet of rooms.

A total of 1,536,792 tons of salt was hoisted and milled as compared to 1,123,368 tons in 1964. The mill treated a daily average of 5,187 tons.

Employment and Management

The average number of employees was 201: 124 underground and 77 on surface. W. M. Rice was the mine manager.

**Domtar Chemicals Limited
(Sifto Salt Division, Goderich Mine)**

Astrea Company Limited was incorporated in March 1956, under Dominion charter. In December 1956, the name was changed to Dominion Rock Salt Company Limited; in July 1959 to Sifto Rock Salt Limited, in 1960 to Sifto Salt

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(1960) Limited, and in 1962 to Domtar Chemicals Limited, Sifto Salt Division, Goderich mine. The company is a wholly owned subsidiary of Dominion Tar and Chemical Company Limited. The head office is at 2240 Sun Life Building, Montreal 2, Quebec. The mine address is Box 96, Goderich.

Operations continued throughout 1965.

SHAFTS, SIFTO SALT DIVISION, GODERICH MINE

| | INCLINATION | NUMBER OF COMPARTMENTS | TOTAL DEPTH |
|-------------|-------------|---------------------------|-------------|
| | | | feet |
| No. 1 shaft | Vertical | 3 | 1,867.5 |
| No. 2 shaft | Vertical | .. | 1,835 |

Note: No. 2 shaft is 16 feet in diameter with partitioned manway from collar to sump.

During the past year, no major new construction was completed and efforts were concentrated on maintaining a high rate of production and improving existing facilities. Salt inventories at the various depots served by this mine were low at the end of the winter and for this reason boat shipments during the past season were higher than normal. Also, new and enlarged depots were responsible for some of this heavier movement.

Last summer, another Caterpillar 966B rubber-tired front-end loader was added to the underground fleet of mobile equipment. This type of loader is now being used extensively to load the trucks with blasted salt.

A large Whiting model 7TM trackmobile was placed in service during the year. This unit is particularly helpful in moving the new heavier hopper cars.

Plans are now in progress to erect a headframe over No. 2 shaft and to install a service friction hoist during the coming year. The cage will run on rope guides.

Development footage in 1965 on the main level at 1,760 feet consisted of 6,810 feet of drifting. Total development footage to 31 December 1965 consisted of 44,134 lineal feet of drifts, and does not include 220 feet of drifting and 108 feet of raising driven for mine ventilation.

Altogether, 1,135,917 tons of salt were hoisted, while 1,330,000 tons were milled at an approximate daily average of 4,500 tons.

Employment and Management

The average number of employees was 136: 86 underground and 50 on surface. W. G. Muir was the mine manager.

SULPHUR

The total value of sulphur and sulphur products produced in 1965 decreased 21.12 percent from \$1,676,727 in 1964 to \$1,322,611 in 1965. Some elemental sulphur is recovered, however the greater portion of Ontario's production is represented by the sulphur content of liquid sulphur dioxide and sulphuric acid manufactured from smelter gases in the Sudbury area. There is also production of liquid sulphur dioxide and sulphuric acid in the Port Maitland area, from the smelting of zinc concentrates received from the mines operating in the Manitouwadge area.

General statistics for the production of sulphur are included in the statistics under "Nickel and Copper".

Canadian Industries Limited

The Canadian Industries Limited, Copper Cliff Works at Copper Cliff, operate three acid plants, utilizing sulphur dioxide gas from the reduction processes of The International Nickel Company of Canada Limited in the Sudbury area. The No. 1 acid plant is located next to the Copper Cliff smelter and the No. 2 and No. 3 acid plants are located alongside the iron ore recovery plant. The liquid sulphur dioxide plant and an oleum plant are located in the No. 1 acid plant area.

Operations continued throughout all plants in 1965.

Production

| | 1964 | 1965 |
|---------------------------------|---------|---------|
| | tons | tons |
| Total sulphuric acid (3 plants) | 297,039 | 284,068 |
| Sulphur dioxide manufacture | 89,250 | 82,774 |

The construction of a liquid sulphur dioxide storage tank of 3,000 tons capacity, commenced in 1964, was completed in 1965.

Employment and Management

The average number of employees was 114. J. Fitch was the works manager.

TALC

The production of talc in Ontario decreased 0.40 percent in quantity from 8,060 tons in 1964 to 8,028 tons in 1965. The value of production increased 0.73 percent, from \$136,468 in 1964 to \$137,458 in 1965. The sole producer, Canada Talc Industries, also produced 2,088 tons of marble chips, valued at \$36,686, which is included in the stone totals.

Canada Talc Industries Limited

Canada Talc Industries Limited was incorporated in July 1951, with an authorized capitalization of 3,000,000 shares of no par value, of which 1,536,841 shares have been issued. The officers were: A. D. Dickson, president; N. C. Urquhart, vice-president; and C. H. Windeler, secretary-treasurer. The head office and mine office is at P.O. Box 250, Madoc.

The company's property consisting of three lots in Huntingdon, two in Elzevir, and one in Madoc townships, County of Hastings, and includes the Conley and Henderson mines.

Operations continued throughout 1965. Mining is through No. 2 shaft of the Conley mine, and No. 3 shaft of the Henderson mine.

The third level and loading pocket were established in No. 3 shaft at depths of 542 and 584 feet respectively below the collar.

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SHAFTS, CANADA TALC MINE

| SHAFT | INCLINATION | NUMBER OF COMPARTMENTS | COLLAR DEPTH | VERTICAL DEPTH BELOW SURFACE |
|---|-------------|------------------------|--------------|------------------------------|
| | | | feet | feet |
| CONLEY MINE; lot 15, concession XIV, Huntingdon twp. | | | | |
| No. 1 | Vertical | 2 (inactive) | Surface | 431 |
| 7th level winze | Vertical | 2 (inactive) | 420 | 451 |
| No. 2 | Vertical | 1 (inactive) | Surface | 185 |
| No. 3 | Vertical | 3 | Surface | 611 |
| HENDERSON MINE; lot 14, concession XIV, Huntingdon twp. | | | | |
| No. 4 | Vertical | 2 | Surface | 456 |

Development work in 1965 consisted of 557 feet of drifting, 1,603 feet of crosscutting, and 271 feet of raising. Total development footage to 31 December 1965 was 14,908 feet of drifts, 5,820 feet of crosscuts, and 4,064 feet of raises. Eight diamond-drillholes totalling 1,221 feet were completed from underground.

New construction in 1965 consisted of a concrete loading platform 51 feet long, and 15.5 feet wide.

Added equipment included the following:

- 1 locomotive, battery operated, 1½ ton
- 1 loader, 12B, 24 in. wheel gauge
- 1 battery charger for locomotive battery.

A total of 10,653 tons of ore was hoisted and milled at an average of 50 tons daily.

Employment and Management

The average number of employees was 33: 18 underground and 15 on surface. H. E. Roscoe was manager.

STRUCTURAL MATERIALS

CEMENT

The production of cement in Ontario increased 3.35 percent in tonnage from 3,043,771 tons in 1964 to 3,145,873 tons in 1965. The value of production increased 6.95 percent from \$46,804,126 in 1964 to \$50,055,554 in 1965.

The industry paid \$1,357,449 to 209 salaried employees, and \$5,565,175 to 882 wage-earners. Fuel and electricity cost \$9,329,011 and process supplies \$7,253,355.

The following is a list of the Ontario cement producers for 1965:

Canada Cement Company Limited:
 Belleville Plant, Belleville
 Port Colborne Plant, Port Colborne
 Woodstock Plant, Woodstock
 Lake Ontario Portland Cement Company Limited, Picton
 St. Lawrence Cement Company Limited, Clarkson
 St. Mary's Cement Company Limited, St. Mary's.

CLAY PRODUCTS

The value of clay products manufactured in Ontario increased 5.93 percent; from \$23,723,512 in 1964 to \$25,130,709 in 1965. There were 51 reporting companies operating 55 plants; they paid \$2,040,409 to 319 salaried employees and \$6,854,731 to 1,606 wage-earners. Fuel and electricity cost \$3,530,633 and process supplies cost \$3,440,969.

CLAY PRODUCTS MARKETED, 1965

| KIND OF PRODUCT | QUANTITY | VALUE \$ |
|---|-------------------|-------------|
| BRICK: | | |
| Soft-mud process {face | M 950 | 48,188 |
| {common | M 4 | 204 |
| Stiff-mud (wire cut) process {face | M 257,516 | 13,479,713 |
| {common | M 28,801 | 895,757 |
| Dry-press {face | M 3,870 | 182,024 |
| {common | M 1,648 | 35,692 |
| Fancy or ornamental brick (including special shape, embossed or enamelled brick) | M 26,501 | 1,752,620 |
| Sewer | M 1,747 | 69,677 |
| Paving | M 1,209 | 121,904 |
| TILE: | | |
| Structural (hollow blocks, including fireproofing and load bearing tile) | tons 42,871 | 909,728 |
| Floor | sq. ft. 1,522,661 | 174,316 |
| Drain | M 56,311 | 3,506,477 |
| Sewer pipe | feet 2,474,671 | 1,356,020 |
| Pottery—from domestic clays | ..... | 1,064,947 |
| Flue lining | feet 668,070 | 347,437 |
| Other products | | 1,186,005 |
| Total | | 25,130,709 |

Note: M = 1,000

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LIME

Production of quicklime increased 8.56 percent in quantity from 934,731 tons in 1964 to 1,014,788 tons in 1965. The value of production increased 6.77 percent from \$10,579,321 in 1964 to \$11,295,729 in 1965.

Production of hydrated lime increased 2.03 percent in quantity from 115,067 tons in 1964 to 117,405 tons in 1965. The value of production decreased 0.07 percent from \$2,548,229 in 1964 to \$2,546,440 in 1965.

The total production of lime increased from 1,049,798 tons having a value of \$13,127,550 in 1964 to 1,132,193 tons having a value of \$13,842,169 in 1965. There were 9 operators with 11 plants having a total of 60 kilns, of which 52 were used in 1965. The industry paid \$240,112 to 57 salaried employees, and \$1,815,161 to 332 wage-earners. Fuel and electricity cost \$2,110,297, and process supplies cost \$1,416,863.

The following operators produced lime in Ontario:

Bonnechere Lime Limited, Gratton township, Renfrew county.
 Brunner Mond Canada Limited, Amherstburg.
 Canada and Dominion Sugar, Chatham.
 Canadian Gypsum Company Limited, Guelph.
 Carleton Lime Products Company, Carleton Place.
 Cyanamid of Canada Limited, Ingersoll.
 Cyanamid of Canada Limited, Niagara Falls.
 Dominion Magnesium Limited, Haley.
 Domtar Chemicals Limited, Gypsum Lime Division, Beachville.
 Domtar Chemicals Limited, Gypsum Lime Division, Hespeler.
 The Steel Company of Canada Limited, Chemical Lime Works, Ingersoll.

LIME, 1965

| INDUSTRIAL CONSUMPTION | QUICKLIME | | HYDRATED LIME | |
|---|-----------|------------|---------------|-----------|
| | QUANTITY | VALUE | QUANTITY | VALUE |
| | tons | \$ | tons | \$ |
| Building trades, finishing, and masonry | 18,659 | 237,747 | 87,168 | 2,040,168 |
| Agriculture | 13,481 | 151,862 | 389 | 8,982 |
| Industry: | | | | |
| Smelters | 9,946 | 92,004 | ..... | ..... |
| Iron & Steel | 312,665 | 3,696,538 | 8,249 | 132,773 |
| Gold milling | 1,562 | 20,322 | ..... | ..... |
| Uranium milling | 22,973 | 262,056 | ..... | ..... |
| Pulp and paper | 28,068 | 314,912 | 2,793 | 48,235 |
| Sugar | 5,712 | 33,037 | 4,282 | 73,820 |
| Tanneries | 891 | 10,459 | 2,530 | 43,263 |
| Fertilizers & insecticides | 3,368 | 38,375 | ..... | ..... |
| Chemical industries | 283,023 | 2,844,259 | 1,029 | 28,206 |
| Other consumers | 314,440 | 3,594,158 | 10,965 | 170,993 |
| Total | 1,014,788 | 11,295,729 | 117,405 | 2,546,440 |

SAND AND GRAVEL

Production of sand and gravel increased 15.14 percent in tonnage from 76,917,396 in 1964 to 88,564,687 in 1965. The value of production increased 16.15 percent from \$54,589,444 in 1964 to \$63,405,954 in 1965. There were 271 pit operators and 11 dredge operators.

General statistics compiled from 133 reporting companies indicated \$2,374,272 was paid to 374 salaried personnel and \$6,465,594 was paid to 1,374 wage-earners. Fuel and electricity cost \$1,646,977, and process supplies cost \$1,017,639.

OUTPUT OF SAND AND GRAVEL

| SOURCE | | 1961 ¹ | 1962 | 1963 | 1964 | 1965 |
|---|------|-------------------|------------|------------|------------|------------|
| Private pit operators | tons | 30,905,527 | 37,742,342 | 41,033,231 | 42,406,064 | 53,939,630 |
| | \$ | 21,237,199 | 27,102,169 | 30,265,051 | 31,552,711 | 38,482,968 |
| Dredged from the Great Lakes and rivers | tons | 1,123,897 | 1,074,148 | 1,033,666 | 1,264,731 | 1,479,324 |
| | \$ | 1,380,597 | 1,257,201 | 1,158,613 | 1,563,194 | 1,750,842 |
| Ontario Department of Highways | tons | 24,395,141 | 21,123,800 | 23,802,679 | 19,876,157 | 19,914,573 |
| | \$ | 10,977,813 | 15,842,850 | 18,852,009 | 14,907,118 | 16,686,700 |
| Counties and townships | tons | 12,214,371 | 14,820,156 | 13,033,912 | 12,211,227 | 12,003,199 |
| | \$ | 6,107,186 | 7,410,078 | 6,516,956 | 6,105,614 | 6,001,600 |
| Railway ballast | tons | 1,569,263 | 1,840,367 | 1,386,262 | 1,159,217 | 1,227,961 |
| | \$ | 641,276 | 752,906 | 545,575 | 460,807 | 483,844 |
| Total | tons | 70,208,199 | 76,600,813 | 80,259,750 | 76,917,396 | 88,564,687 |
| | \$ | 40,344,071 | 52,365,204 | 56,338,204 | 54,589,444 | 63,405,954 |

¹Note: Revised figures.

STONE

Production of stone increased 3.41 percent in quantity from 23,845,993 tons in 1964 to 24,659,053 tons in 1965. The value of production increased 4.76 percent from \$30,818,734 in 1964 to \$32,284,988 in 1965. There were 72 reporting operators working about 81 quarries. The industry paid \$1,616,887 to 273 salaried employees, and \$4,508,035 to 918 wage-earners. Fuel and electricity cost \$1,053,011, and process supplies cost \$2,643,419.

OUTPUT OF STONE

| VARIETY | | 1961 ¹ | 1962 | 1963 | 1964 | 1965 |
|------------------|------|-------------------|------------|------------|------------|------------|
| Limestone | tons | 16,654,878 | 17,279,797 | 19,205,898 | 22,217,344 | 23,241,567 |
| | \$ | 19,242,067 | 19,892,022 | 20,544,057 | 25,243,229 | 27,227,844 |
| Marble | tons | 33,929 | 34,926 | 44,866 | 56,029 | 50,420 |
| | \$ | 309,628 | 288,480 | 448,220 | 568,456 | 660,641 |
| Trap and granite | tons | 1,647,655 | 1,448,916 | 1,116,629 | 1,533,473 | 1,320,619 |
| | \$ | 3,515,601 | 4,318,067 | 3,537,948 | 4,323,305 | 3,688,385 |
| Sandstone | tons | 25,381 | 34,009 | 35,201 | 39,147 | 46,447 |
| | \$ | 425,796 | 544,981 | 543,482 | 683,744 | 708,118 |
| Total | tons | 18,361,843 | 18,797,648 | 20,402,614 | 23,845,993 | 24,659,053 |
| | \$ | 23,493,092 | 25,043,550 | 25,073,707 | 30,818,734 | 32,284,988 |

¹Note: Revised figures.

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