

market price fell to \$7.93 a gram in June 1982 before recovering to \$12.80 at year end. At the end of 1982 the market price per gram for palladium was \$2.93; iridium, \$10.61; rhodium, \$8.63; ruthenium, \$1.16 and osmium, \$4.26.

**Molybdenum.** Canada is the western world's largest molybdenum producer, accounting for about 18% of its production in 1982. Molybdenum shipments increased from 11 889 t in 1979 to 15 232 t in 1982. Value of shipments declined in both 1980 and 1981 but rebounded in 1982.

Molybdenum was in tight supply worldwide in 1979, partly because of strikes at Canadian mines. In 1980 the market situation changed sharply. Consumption decreased in the recession while production continued to increase. By 1982, a rapid inventory build-up and depressed market led Canadian producers to cutback production and lay off mine workers. Molybdenum mines were operating at only 55% of capacity at the end of 1982.

Canadian molybdenum production capacity increased 33% in 1981, with two new mines and an expansion of two others in British Columbia.

About 95% of Canadian molybdenum is produced in British Columbia, with Quebec the only other producing province. It is derived both from primary molybdenum mines and as a byproduct or co-product of copper mines.

**Cobalt.** Shipments of cobalt declined by almost 30% in 1982, after marginal changes in 1981 and an increase of 29% in 1980. The value of shipments showed a similar pattern, down in 1982 to about one-third the value of 1980. In Canada, cobalt is recovered principally as a byproduct from nickel-copper ores.

Canada's leading producer recovered cobalt as oxide and hydrates at nickel refineries in Thompson, Man. and Port Colborne, Ont. The oxide was further processed at a Clydach, Wales refinery into upgraded oxides and salt compounds. The hydrates were shipped for toll-refining in Norway. Production of cobalt salts was discontinued in the Clydach refinery at the end of 1982.

A \$25 million electrolytic refinery at Port Colborne was scheduled for start-up in 1983. The new plant, replacing the cobalt oxide production line, will have an annual capacity of 907 t of cobalt metal a year.

Cobalt metal, from nickel matte produced in Canada, was recovered at a refinery in Kristiansand, Norway. Cobalt metal powder was produced by a hydrometallurgical refinery at Fort Saskatchewan, Alta. which treats nickel-copper concentrates from domestic and imported sources. Refining capacity at both locations was increased in response to growing demand for toll-treatment services.

**Magnesium.** The only Canadian producer of primary magnesium operates a mine and smelter at

Haley, Ont. 80.5 km west of Ottawa. Its production statistics are confidential. Reduced demand caused world production to fall in 1982, but the United States remained the largest single producer, accounting for over 40% of the total world production.

Exports of Canadian magnesium metal have entered the United States duty-free under a Canada/US defence production sharing program but on a reduced scale over the past few years. Exports of unwrought Canadian magnesium otherwise faced a 16.5% tariff when entering the US domestic market in 1982 while the comparable Canadian import tariff is 4.8%. This US duty on unwrought magnesium is being reduced progressively to 1987 in accordance with the General Agreement on Tariffs and Trade. Only in certain high-purity applications can the Canadian product best compete in the United States.

**Columbium.** Shipments of columbium pentoxide declined slightly in 1980 but increased by about 11% a year in both 1981 and 1982 as a result of an expansion program by Canada's only columbium producer at Chicoutimi, Que. The mine at Chicoutimi is one of three pyrochlore operations in the world; the other two are in Brazil.

**Tantalum.** Production of tantalum is derived from a mine and mill at Bernic Lake, Man. An expansion program in 1980 raised mill capacity and provided for the treatment of lower grade ore and tailings. But shipments from the mine declined significantly between 1979 and 1983 as a result of a sharp reduction in demand worldwide. Part of the deteriorating demand was attributed to substitution and reduced consumption in the late 1970s when tantalum prices were high.

The mine was closed for one month during the summer of 1982 because of high inventories. Deteriorating market conditions led to a decision to close the mine in December 1982 for at least one year.

**Cadmium.** Production in all forms decreased from 1 209 tonnes valued at \$8.6 million in 1979 to 739 tonnes valued at \$2.2 million in 1982. Refined metal production declined from 1 455 tonnes to 1 109 tonnes. Most zinc ores in Canada and zinc concentrates contain recoverable cadmium. The largest production comes from mines in Ontario, British Columbia and Quebec.

Metallic cadmium is recovered as a byproduct at electrolytic zinc plants at Trail, BC, Flin Flon, Man., Valleyfield, Que., and Timmins, Ont. Total capacity of these plants to produce primary cadmium metal is 1 700 tonnes a year.

**Tungsten.** Production increased to a record 4 010 t of tungsten trioxide in 1980 following the doubling of capacity at Canada's main mine in Northwest Territories. A seven-month strike at this mine severely reduced production in 1981. Production