

25 p.c. of the production is derived, are copper, copper-nickel and copper-zinc ores, especially those mined in Ontario and Quebec. The silver-cobalt ores mined near Cobalt and Gowganda in northern Ontario account for about 15 p.c. of the output and small amounts are derived from lode- and placer-gold ores.

Canada's principal producer of refined silver is The Consolidated Mining and Smelting Company of Canada Limited which recovers silver from silver-lead-zinc ores treated at Trail, B.C. Other producers were Canadian Copper Refiners Limited at Montreal East, Que. (from blister copper), The International Nickel Company of Canada, Limited at Copper Cliff, Ont. (from blister copper), Hollinger Consolidated Gold Mines, Limited at Timmins, Ont. (from gold precipitates), the Royal Canadian Mint at Ottawa (from gold bullion), and Cobalt Refinery Limited at Cobalt, Ont. (from silver concentrates). The last company was formed in mid-1962 to operate a refinery which was erected in 1949 but had never produced on a permanent basis.

United Keno Hill Mines Limited is Canada's largest mine producer of primary-product silver. During the year ended on Sept. 30, 1962, this company produced 7,000,837 oz.t. from its three mines in the Mayo district of Yukon Territory. Other leading primary producers in 1962 were: Glen Lake Silver Mines Limited which commenced operations in mid-1962; Agnico Mines Limited; Langis Silver and Cobalt Mining Company Limited; McIntyre Porcupine Mines, Limited; and Siscoe Metals of Ontario Limited, all in the Cobalt and Gowganda areas of Ontario. Mastodon-Highland Bell Mines Limited in British Columbia is also a leading producer.

**Platinum Metals.**—Production of platinum metals—including platinum, iridium, rhodium, ruthenium and palladium—amounted to 453,526 oz.t. valued at \$28,085,528 in 1962, compared with a 1961 production of 418,278 oz.t. valued at \$24,534,349. These metals are derived as by-products of the treatment of nickel-copper ores and the entire output, except for an occasional ounce of placer production from British Columbia or the Yukon, comes from the International Nickel and Falconbridge mines in the Sudbury district of Ontario. The precious metal content of bulk nickel-copper concentrates smelted by International Nickel at Copper Cliff, consisting chiefly of platinum, has been estimated at \$3 a ton. The Thompson nickel project in northern Manitoba and the two new nickel-copper mines in Quebec and Ontario (see p. 522) are potential producers of platinum metals.

Canada, the Republic of South Africa and the Soviet Union supply the bulk of world output of platinum metals which, in 1961, amounted to 1,190,000 oz.t. Of that amount Canada contributed 418,278 oz.t., South Africa an estimated 357,000 oz.t. and the Soviet Union an estimated 350,000 oz.t.

The use of platinum metals in industry is becoming more diverse as research progresses. Palladium-silver alloys are now being used as membranes in diffusion cells in hydrogen purification; members of the platinum group are being increasingly used in fuel cells during research; platinum metals, either as catalysts or as electrode materials, are being considered for many auto smog control units; and the lesser known platinum metals—rhodium, ruthenium and osmium—show increasing desirability as polymerization and hydrogenation catalysts.

**Cobalt.**—Cobalt is derived as a by-product from the smelting and refining of the nickel-copper ores of Sudbury, Ont., and Lynn Lake, Man., and from the nickel ores of Thompson, Man. International Nickel recovers cobalt from its refinery operations at Port Colborne, Ont., and Clydach, Wales, based on its Sudbury and Thompson ores. Falconbridge Nickel recovers cobalt in the refining of its Sudbury nickel-copper matte at its refinery at Kristiansand, Norway. Sherritt Gordon produces refined cobalt powder and briquettes, and cobalt metal strip, in its refinery at Fort Saskatchewan, Alta., using nickel concentrates shipped from its mine at Lynn Lake in northern Manitoba. In 1962, Canadian cobalt production amounted to 3,441,746 lb. valued at \$6,382,502, compared with 3,182,897 lb. valued at \$4,751,543 in 1961.