

THE MINERAL INDUSTRIES OF LATIN AMERICA AND CANADA¹

By David B. Doan, Alfredo C. Gurmendi, Ivette E. Torres, Pablo Velasco,
and David R. Wilburn

INTRODUCTION

Canada and several Latin American countries are endowed with a great diversity of mineral resources that comprise ferrous and nonferrous metals, wide variety of industrial minerals, and all forms of fossil fuels. For several of these countries, the prospecting, exploring, mining, processing, and marketing of their mineral commodities play significant roles in supporting their economies, in many instances earning export revenues and foreign exchange reserves and offering business opportunities via privatization of state-run corporations, direct acquisitions made by foreign and domestic investors, joint-venture projects (investment in equity), and debt flows (credits).

Table 1 lists the major mineral commodities produced in Latin America, Canada, and the United States during 1999. Table 2 lists the percentage of world mineral production by Latin America. Table 3 lists the significant flows of foreign direct investments (FDI) to such mineral-producing countries as Argentina, Bolivia, Brazil, Chile, Ecuador, Paraguay, Peru, and Uruguay, and domestic, world, and U.S. investments and joint ventures in their respective mineral industries. Tables 4 and 5 list the selected significant Latin American and Canadian exploration sites for 1999.

In the Western Hemisphere, the abundant and varied mineral endowment of Latin America and Canada complement the mineral resources of the United States. Interest and investment flows continued to many of these countries in spite of the economic turmoil that began in 1997 and spread to other parts of the world, lower prices for Latin America's major mineral exports, and the El Niño weather phenomenon as discussed in the ensuing country chapters.

Position in the World Mineral Economy²

Latin America produced 44% of the world's copper, 42% of silver, 29% of bauxite, and 26% of tin; it also produced 23% of iron ore, 21% of zinc, 17% of nickel, 15% of gold, and 14% of lead. Latin America and Canada combined produced 50% of the world's silver, 49% of copper, and 34% of zinc, as well as 33% of nickel, 27% of iron ore, 22% of gold, 21% of salt, 20% of lead and primary aluminum each, and 17% of crude oil (table 1). Moreover, Latin America and Canada, separately and together, were of great significance to the global economy as producers of metals and steel, crude oil and natural gas,

petroleum refinery products, and coal, significant amounts of which were exported.

Canada led the world in the production of uranium and was the third largest producer of zinc after China and Australia (Plachy, 2001). Canada had a strong showing in output of gold, nickel, and silver. Chile led the world in the production of copper, and Mexico led the world in the production of silver and strontium. Peru was second in world production of silver after Mexico. Brazil led in output of columbium and, although not the largest producer of iron ore, has been the leading exporter in recent years, as well as sixth largest steel producer in the world. In the Western Hemisphere, Brazil and Canada were second and third largest producers of steel, respectively, after the United States. Brazil was also the fourth ranking source of manganese in the world, followed in Latin America by Mexico. After Russia, Canada was the second largest world nickel producer, with other significant production in the hemisphere by Cuba, Brazil, and the Dominican Republic (Kuck, 2001). Brazil and Jamaica were the world's third and fourth largest producers of bauxite after Australia and Guinea (Plunkert, 2001).

The inclusion of the United States in table 1 shows the position of the entire Western Hemisphere in the world supply of mineral commodities. This Hemisphere produced 62% of the world's copper; 61% of silver; 45% of zinc; 37% of aluminum, gold, and lead each; and 33% of iron ore and nickel each. Among the industrial minerals, the Western Hemisphere produced 42% of the world's sulfur, 41% of salt, 37% of gypsum, and 33% of phosphate rock. Of the mineral fuels, this Hemisphere produced 38% of the world's output of natural gas, 26% of crude oil, and 31% of coal; farther in the processing stream, it produced 36% of refined petroleum products.

Production Trends

Nonfuel Minerals.—For Latin America, the most significant production in terms of share of world output included copper, silver, bauxite, tin, iron ore, zinc, nickel, gold, lead, and primary aluminum, as listed in table 2. In the past 10 years, prospecting and exploration, investment, and development have taken various new discoveries, such as copper, bauxite, nickel, tin, silver, and iron ore to the point of production. New mines had come on-stream and increased Latin America's world position in the production of those mineral commodities.

Latin America's world share of output of silver, tin, nickel, and gold has increased, and conspicuous effort has been exerted to find and produce diamond, copper, and gold. In particular, gold has been the center of attention in the Guyana Shield of Venezuela and Guyana, as well as in most of the Andean countries, and diamond, in Canada. The bauxite industry has been the object of increased interest in Brazil and Venezuela for

¹Based on information available as of December 31, 2000.

²Unless otherwise noted, all listings of mineral commodities or countries for enumerative or comparative purposes are listed in order of importance on the basis of volumes produced, exported, or imported.

domestic aluminum production. Jamaica exported its bauxite production.

Energy Minerals.—The world share of Latin American production of crude oil increased to 14% from 12% in 1995, and resultant derivatives of petroleum (products) increased to 10% from 7% in 1995. Natural gas production increased to 7% from 5% in 1995 after fluctuating unevenly since 1985. Output of crude oil reached new highs in Argentina, Brazil, Colombia, Ecuador, Mexico, and Venezuela. The top seven producers were Mexico, Venezuela, Brazil, Argentina, Colombia, Ecuador, and Trinidad and Tobago and represented 97.7% of the regional total. Venezuela, Mexico, Argentina, Trinidad and Tobago, Colombia, and Brazil also reached new highs in the production of natural gas by volume.

In the Western Hemisphere, Canada, Latin America, and the United States together have reached new highs in the production of crude oil and natural gas. Brazil, Mexico, Venezuela, and Argentina led Latin American production of refinery derivatives, and, with Canada and the United States, the region achieved a world share of 26% (table 1).

In Latin America, coal output was led by Colombia, Mexico, Venezuela, and Brazil. Products were generally competitive in world markets and increased local and regional market shares during the past 10 to 20 years. Depending upon the country, anthracite, semianthracite, bituminous, and subbituminous, plus some lignites (used locally in most cases), were mined. Latin American coals are suitable for metallurgical and thermal use, as are Canadian and U.S. coals. The Western Hemisphere coal output amounted to a 31% world share.

Trade Liberalization Developments

Canada, Mexico, and the United States, members of the North American Free Trade Agreement (NAFTA), constituted the largest and richest trading bloc in the world—370 million consumers and almost \$11 trillion of gross domestic product (GDP) as purchasing power parity. The Southern Cone Common Market (MERCOSUR), including Argentina, Brazil, Paraguay, and Uruguay, plus Bolivia and Chile as associated members, had 230 million consumers and a \$1.5 trillion economy. The excellent infrastructural connections, including railroads, highways, and pipelines, from Canada through the United States to Mexico were a significant factor in the marketing of mineral commodities. MERCOSUR's shares of the total trade with the major economic blocks were 59% within the European Union, 42% within NAFTA, and 25% within MERCOSUR. For other Latin American nations, Chile in particular, joining NAFTA would provide greater freedom of mineral trade and, ultimately, greater efficiencies of production. Canada and Chile signed a bilateral trade pact on November 19, 1996. Since 1996, Canadian FDI has increased noticeably in Chile (table 3).

During the past 30 years or more, Latin American countries have entered trade agreements among themselves. Examples include Chile's bilateral Free Trade Agreement with Mexico, the Venezuelan-Colombian agreement with the Central American Common Market, Venezuela's agreement with Chile to begin phasing out tariffs within a 6-year period, and a free trade pact among Colombia, Mexico, and Venezuela to phase

out tariffs. In 1996, Chile signed an agreement with Colombia to eliminate tariffs entirely by yearend 2000. Argentina and the United States signed a bilateral investment treaty in 1993, whereby investors received most-favored-nation treatment, a guarantee of free transfer of profits, and access to international arbitration.

The Brazilian Government indicated that MERCOSUR made progress in trade talks with Mexico, the four-nation Andean Pact (Colombia, Ecuador, Peru, and Venezuela), and South Africa, and the private sector continued favoring strong ties with MERCOSUR, although trade liberalization was proceeding at a slow pace. The expansion of MERCOSUR has been a strategic objective of Brazil in the planned talks towards a Free Trade Area of the Americas (FTAA). Repeated efforts during the past 4 years between MERCOSUR and the four-nation Andean Pact to create a larger South American Free Trade Area (SAFTA) have not produced any visible results yet. SAFTA at the regional level and FTAA in the Western Hemisphere as trade blocs would enhance world trade relations and bring benefits to all parties involved.

Investment opportunities for U.S. and foreign companies have increased because of the liberalization of the Andean Pact and the MERCOSUR countries' economies and the privatization of many Latin American mineral, oil and gas, utilities, and infrastructure sectors. In the mineral industries, 100% of equity ownership was allowed by means of privatization or by direct acquisition, profits were allowed to be expatriated, and, more importantly, restrictions on foreign investments were removed. Between 1998 and 1999, Latin America's FDI increased to about \$86 billion from \$76.7 billion compared with the decrease in Asia's net inflow of FDI to \$76.3 billion from \$88.4 billion.

In 1999, Brazil had record inflows of capital, even without significant mergers and acquisitions. The U.S. Department of Commerce and the United Nation's Economic Commission for Latin America and the Caribbean reported that Brazil received \$31 billion, or 36.1% of FDI, followed by Mexico (13.3%), Argentina (8%), Chile (6%), and Venezuela (5.8%), thus making it the second most popular emerging market after China for foreign investments. By selling 65 companies to the private sector between 1991 and 1999 Brazil realized, through its privatization program, about \$19.7 billion and transferred a debt of \$9.2 billion.

In 1999, some countries of Latin America, in sequence of investment, received the following mineral sector FDI's—Brazil, \$13.8 billion; Argentina, \$6.9 billion; Chile, \$5.2 billion; Peru, \$1.8 billion; Bolivia, \$800 million; Ecuador, \$470 million; and Paraguay and Uruguay, \$100 million each (table 3).

Privatization and Investment Interest

Latin America's economic growth was characterized by increased privatization, joint-venture projects, and reduced trade barriers. Privatization has been changing the industrial operating mode to a privately owned/Government-regulated regime from a Government-owned/Government-operated regime. The establishment of joint ventures, such as in construction and management of infrastructure, energy and mining projects, and deregulated industries (electricity, gas, telecommunications) was a common practice in the region.

Foreign investors have been attracted to Latin America's open-market economies. These changes, coupled with the growing awareness of environmental protection, are leading to the establishment of increasingly effective environmental regulations and controls (EERC's) for all Latin American industries. With respect to environmental, geologic, economic, and social impacts in the region, the implementation of EERC's, however, will require further consideration of many factors to find a balance between continued industrial profitability and environmental protection.

Governments of the region recognize that privatization and acceptance of foreign investment foster vigorous growth, not least in the mining industry, and lead to enhanced revenues and, for many countries, expanded overall economic strength in labor and wages and social welfare.

The lure of rights to private ownership in Latin American countries, such as Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Mexico, Peru, and Venezuela, attracted great interest in the mineral endowment of those countries. Seeking sources of hard currency for its economy, Cuba has increasingly allowed foreign companies to participate in prospecting and exploring, producing, and refining of metals and crude oil.

Among the most popular geologic exploration targets continued to be the Cordillera and the Guyana Shield. The Cordillera extends southward through Mexico and Central America to the Andes of South America virtually to Tierra del Fuego, and the Guyana Shield comprises northwestern Brazil, southeastern Venezuela, French Guiana, Guyana, and Suriname.

Venezuela courted foreign exploration for metals, particularly gold, and encouraged joint efforts in petroleum operations. Las Cristinas, which was Venezuela's major gold project, in the "Kilometro 88" on Highway 10 south of El Dorado, is a joint-venture operation between Placer Dome Inc. and the state-owned Corporación Venezolana de la Guayana. Las Cristinas' production was postponed again because of the prevailing lower gold prices.

In 1999, Argentina's loss in comparative competitiveness deepened with its financial crisis, despite the slight economic growth in Brazil. Changes in the national mining legislation, however, opened up business opportunities in its mining and oil sectors. After peaking in 1997-98, exploration continued on a smaller scale by a reduced number of firms with long-term commitments in the country. In the country, FDI appeared to be strong—a consortium led by Mount Isa Pacific Pty. Ltd. will be investing \$1.2 billion by 2000 in the Bajo de la Alumbrera, which was Argentina's first operating copper mine; it is located in Catamarca of the northwestern Argentina.

In 1999, the Corporación Minera de Bolivia, which was once the leading mineral producer in the country, sought private partners to operate its existing mines under joint-venture agreements or other contracts. The Bolivian Government undertook significant legal and regulatory reforms, such as a single income tax rate of 25%, enactment of environmental laws to protect the environment and to pursue sustainable development, and revision of its mining code to ensure equal treatment of foreign and domestic investors. The 3,300-kilometer Bolivian-Brazilian gas pipeline will begin delivering natural gas at the end of the first quarter of 2000; 8 million cubic meters per day (m³/d) will be pumped to Brazil, and will increase to 16 m³/d in 2005 and 30 m³/d in 2010. Brazil's

energy mix was expected to include 12% natural gas by 2010.

Following Brazil's real devaluation and subsequent economic downturn in 1999, intraregional trade decreased to \$15 billion from \$20 billion in 1998. The real was devalued to reduce severe losses in foreign reserves, which decreased to about \$23.4 billion from a balance of \$45 billion at the end of 1998. Despite the financial difficulties, the Brazilian Government was able to identify \$160 billion in investment opportunities for U.S. and foreign investors, particularly in the telecommunication and energy sectors.

The situation in Colombia continued as before with no realistic resolution in sight among the various political factions. The country ended 1999 in a severe recession when the GDP fell by 5%. Colombia has had positive growth of its GDP for more than six decades and was the only Latin American country not to default on or to restructure its foreign debt during the 1980's, probably owing in no small part to the conservative monetary policy conducted by its independent Central Bank. The Colombian Government was taking steps to lower interest rates and to shore up the financial system. Colombia's main exports, oil and coffee, face an uncertain future; new exploration is needed to offset the declining oil production. Efforts to expand the mineral sector were hindered by continuing terrorist activity, which included destruction of oil pipelines and attacks on mines, petroleum production facilities, and personnel. The lack of public security continued to be a key concern for investors. Colombia was seeking international financial assistance to boost economic recovery and peace prospects. Privatization continued, in descending order of revenues received, in the electric power, mining, natural gas, and telecommunications sectors.

Economic growth in Chile was negative for the first time in more than 15 years. Despite the effects of the recession, the country sustained its reputation for strong financial institutions and sound macroeconomic policies. By the end of 1999, exports and economic activities had begun to recover. Foreign investment has played an important role in the modernization and growth of the Chilean economy. In Chile, FDI was \$8.9 billion, which was almost a 36% increase compared with that of 1998 despite investment withdrawals from Latin America. The mining sector received about 58% of this investment in 1999. Most of the foreign capital went to mining and such services as telecommunications, energy, banking, and retail trade.

Mexico has a free market economy. In 1999, the Government has revised its mining and environmental laws. After being hindered by the collapse of the peso at the end of 1994 and into 1995 that resulted in a deep economic recession and temporary financial uncertainty, the country's economy was bolstered by a strong export sector and new foreign investments in many of its basic industries that helped to cushion the economy's decline in 1995 and led the recovery from 1996 to 1999.

Trade with Canada and the United States has nearly doubled since NAFTA was implemented in 1994. Mexico is pursuing additional trade agreements with most countries in Latin America and has signed a free trade deal with the European Union. The Government was pursuing conservative macroeconomic policies added by the strong U.S. economy and higher oil prices to avoid another economic crisis.

An important mineral producer, Mexico ranked among the top world producers in a variety of nonfuel minerals. The

country was the world's leading producer of silver and celestite and a significant supplier of mineral products to the world markets (table 1). In November 1999, Grupo México S.A. de C.V. became the world's third largest copper producer after acquiring ASARCO Incorporated for \$2.5 billion. Asarco had mines and facilities in the United States and Peru, which included 54.2% interest in Southern Peru Copper Corporation.

In spite of the effects of El Niño, the Asian financial crisis, the instability of the Brazilian markets, and the lower prices for its major mineral exports, mainly copper, gold, lead, and zinc, the Peruvian economy had a positive growth for 1999. The privatization of state-owned corporations and the formation of joint ventures in the mining industry continued, and foreign investors viewed Peru as an attractive open-market economy. In Peru, FDI amounted to about \$9 billion, and revenues from the mining sector were \$1.7 billion, with projected investments of \$12.4 billion. The privatization program was expected to continue to generate capital flows in every sector of the Peruvian economy, particularly in the mining, energy, and telecommunications industries. The Government also slashed subsidies and tariffs, freed foreign exchange and interest rates, established concessions for construction and operation of public infrastructure (roads, ports, and airports), and embarked on fiscal austerity and investment in social development and agriculture.

Exploration continued in the Central American countries, primarily for gold. Dominican Republic and Nicaragua were the only significant producers. Guatemala produced antimony, and Honduras continued its output of lead and zinc. Panama has huge copper resources that were not being fully developed yet.

As an affluent high-tech industrialized country, Canada closely resembled the United States in its market-oriented economy, similar pattern of productivity, and high living standards. Real rates of growth have averaged nearly 3% since 1993. NAFTA created a dramatic increase in trade and economic integration with the United States. With its great natural resources, skilled labor force, and modern technology, Canada enjoyed solid economic prospects.

The decline in metals prices from 1997 and throughout 1999 led to a decrease in Canadian mine output of base and precious metals that was compensated, in part, by greater production of industrial minerals and so-called structural mineral materials. The lower prices for gold, however, were marginalizing several gold mines in the country.

The GDP slowed for most of 1998, but in 1999, growth accelerated to 5.3% compared with that of 1997 (3.8%) showed the country as a whole to have been doing well, but the mining sector was not keeping up. Exploration for diamond continued with less public interest, but with an increasing number of discoveries and openings, such as the Ekati Mine in the Northwest Territories, Canada became a factor in the world diamond markets for the first time. In 1999, production of gem-quality diamond increased to 10% from 5% in 1998. Inco Limited's huge nickel-copper-cobalt discovery at Voisey's Bay on the Labrador coast languished after the Provincial Government of Newfoundland demanded that the ore be smelted and refined in that Province rather than in the Sudbury district, Ontario, which had been the company's intention. Some Canadian companies sought mineral properties in Central

America and South America where they saw that foreign investment was welcomed, mining laws were coherent and reasonable, and profits could be repatriated.

Latin American Exploration

Since 1993, the Latin American region has sustained the greatest amount of exploration activity, in terms of total dollars budgeted and world share, according to the Metals Economics Group (MEG) of Halifax, Nova Scotia, Canada. The MEG based its annual surveys on planned corporate budgets for the year under review. Although Latin America maintained its world share for mineral exploration at above 28% during 1999, budget allocations for Latin American exploration fell by about \$184 million between 1998 and 1999. In 1999, total exploration dollars budgeted for Latin America by 132 companies was reported to be \$630 million (Metals Economics Group, 1999a) and \$719 million, by 670 companies in a broader survey (Metals Economics Group, 2000a). Latin American countries in the MEG's top 10, which was based on budget allocations, included, in descending order of allocation, Chile, Peru, Mexico, Brazil, and Argentina. Reasons for the overall budget decline included weak commodity prices, reduced investor interest in emerging markets, and lingering uneasiness that resulted from the financial turmoil in Southeast Asia.

The search for gold attracted about 67% of the total exploration projects in Latin America on the basis of a U.S. Geological Survey review of world exploration projects. Interest in base metals reached 18%, and silver achieved about 9% of the total. Investment in 1999 was primarily used to define further newly discovered resources.

On the basis of expenditures, exploration for gold concentrated on Argentina, Mexico, and Peru, and (in descending order of activity) on Ecuador, Honduras, Chile, Brazil, and Colombia. In 1999, gold production began at the El Peñón property in Chile and the San Andrés property in Argentina. Successful exploration programs led to development decisions for the Don Mario gold/copper deposit in Bolivia and the Vueltas del Rio deposit in Honduras. The Lo Increíble deposit in Venezuela and the San Martín deposit in Honduras advanced to the feasibility stage in 1999. Table 4 highlights the significant Latin American exploration activities for 1999. The Veladero discovery in Argentina revived interest in the Argentinean/Chilean Andes as an area for exploration. GOLDFIELDS LTD., which was recently formed by the consolidation of South African mining interests, expanded its search for gold into South America. Its announced plan to spend \$5 million on exploration at the Cachoeira deposit in Brazil represented an attempt to develop its resource base outside of South Africa. Similarly, Canadian explorer Arizona Star Resource Corp. announced plans to conduct extensive drilling to extend its resources at the Aldebaran gold/copper deposit in Chile. In Mexico, numerous gold/silver projects were being evaluated. In Peru, gold often occurs with other metals; deposits, such as Yanacocha, which are suitable for heap leaching, were considered to be prime targets.

Exploration for base metals focused on Chile, Mexico, and Peru. The Spence copper/silver deposit in Chile advanced to the feasibility stage. Mexico's commitment to privatization continued during 1999, releasing additional land for

exploration. Recent (1999) regulatory reforms in Peru triggered diversification into copper and gold exploration from the silver/lead/zinc targets explored and typically exploited in the past. Exploration delineated additional resources at the Sossego copper/gold deposit in Brazil, the Campo Morado base metals deposit in Mexico, and at the Antamina, the Bongara, and the Tambo Grande base metal properties in Peru.

In 1999, silver remained an important mineral target in Latin America, particularly in Argentina, Bolivia, and Mexico. The La Colorada deposit in Mexico began production and the Piriqitas deposit in Argentina and the Atocha deposit in Bolivia were reported to have begun development. In addition, significant silver resources were announced for the Diablillos deposit in Argentina and the Alamo Dorado deposit in Mexico; significant drilling was reported for the Peñasquito deposit in Mexico. Diamond exploration took place in Brazil, French Guiana, Guyana, and Uruguay.

Canadian Exploration

In 1999, Canadian mineral exploration continued a downward trend in budgeted exploration since the peak year of 1996, according to data compiled by the MEG and the Canadian Government. Although Canada maintained its market share for mineral exploration during 1999 at about 11%, budget allocations for exploration fell by about 24% between 1998 and 1999 (Metals Economics Group, 1999b; Natural Resources Canada, 2000b). Exploration budget estimates for Canada were reported to be \$234 million by 132 companies (Metals Economics Group, 1999b), \$310 million by 670 companies (Metals Economics Group, 2000b), or \$335 million (C\$501 million) as reported by Natural Resources Canada (NRC) (Natural Resources Canada, 2000, Exploration and deposit appraisal expenditures, by province and territory, 1997-2000, accessed January 4, 2001, via URL <http://www.nrcan.gc/mms/efab/mmsd/exploration/byprov.htm>). This level of spending represented the lowest level since 1992 and the third lowest in the past 30 years and can be attributed to the low gold and base metal prices and the perception by investors that conditions would not improve in the short term (Natural Resources Canada, 2000, Exploration and deposit appraisal expenditures, by province and territory, 1997-2000, accessed January 4, 2001, via URL <http://www.nrcan.gc/mms/efab/mmsd/exploration/byprov.htm>).

Globally, Canada remained one of the world's top mineral exploration target areas. Gold targets accounted for about 39% of the exploration projects reported in Canada, according to a U.S. Geological Survey review of world exploration projects. On the basis of the number of reported projects, the greatest amount of activity occurred in the Northwest Territories, Ontario, and British Columbia. Base metals accounted for about 37%, of that about 39% was allocated for copper targets; 38%, for lead/zinc targets; and 17%, for nickel targets. Base metals activity took place in the newly created Territory of Nunavut and in Newfoundland, Ontario, and Quebec. Diamond activities accounted for about 29% of all exploration targets in 1999. Activity centered in the Northwest Territories (including Nunavut), Alberta, and Ontario. Establishment of the Ekati Mine in the Lac de Gras region of the Northwest Territories and an increased resource estimate for the nearby Diavik diamond

field have encouraged regional diamond exploration. Developmental activities at Diavik were suspended owing to a decision by the Canadian Government not to issue an interim land-use permit.

Statistics reported by Natural Resources Canada for 1999 suggest that exploration activity in all Canadian provinces could decrease in exploration and deposit appraisal spending in 1999. Saskatchewan, Newfoundland, and the Northwest Territories were expected to experience the largest decreases on the basis of anticipated exploration budgets; Quebec, Ontario, and the Northwest Territories together should account for more than 60% of all Canadian exploration. In 1999, about 78% of Canadian exploration took place in areas outside of active mine sites. Approximately 65% of anticipated exploration could come from major companies, which was a 21% decrease in major company expenditures compared with those of 1998. Junior companies also expected a decrease in spending of about 14% in 1999 compared with that of 1978 (Natural Resources Canada, 2000, Exploration and deposit appraisal expenditures, by province and territory, 1997-2000, accessed January 4, 2001, via URL <http://www.nrcan.gc/mms/efab/mmsd/exploration/byprov.htm>).

Table 5 highlights significant Canadian exploration activities in 1999. Major drilling programs for gold were implemented in British Columbia (Prosperity), Nunavut (Meliadine), Ontario (Madsen and Red Lake), and Quebec (Casa Bernardi and Sleeping Giant). Most of these efforts were advanced-stage explorations that attempted to increase or improve previous resource estimates. Major base metals exploration took place in Nunavut (Ferguson Lake), Ontario (Lac des Îles area), Quebec (Caber, Lac Rocher, and Langois), and Saskatchewan (McIlvenna Bay). On the basis of the success of the Ekati Mine and the Diavik projects, significant diamond exploration focused on Alberta and the Northwest Territories. In general, exploration has been turning up more mine possibilities in Western Canada.

References Cited

- Kuck, P.H., 2001, Nickel: U.S. Geological Survey Mineral Commodity Summaries 2001, p. 112-113.
- Plachy, Jozef, 2001, Zinc: U.S. Geological Survey Mineral Commodity Summaries 2001, p. 186-187.
- Plunkert, P.A., 2001, Bauxite and Alumina: U.S. Geological Survey Mineral Commodity Summaries 2001, p. 28-29.
- Metals Economics Group, 1999a, Overview of worldwide exploration budgets (part 1): Strategic Report, September/October, p. 1-5.
- 1999b, Overview of worldwide exploration budgets (part 2): Strategic Report, November/December, p. 1-7.
- 2000a, Overview of worldwide exploration budgets (part 1): Strategic Report, September/October, p. 1-5.
- 2000b, Overview of worldwide exploration budgets (part 2): Strategic Report, November/December, p. 12-19.

SELECTED GENERAL SOURCES OF REGIONAL INFORMATION

- American Petroleum Institute, Washington, DC: Basic Petroleum Data Book, annual.
- Barclays Bank International, London: ABECOR Group Country Reports.
- British Sulphur Corp. Ltd., London: Nitrogen, bimonthly.

- Phosphorus and Potassium, bimonthly.
Sulphur, bimonthly.
- Bureau de Documentation Minière, Paris: *Annales des Mines*, monthly.
- Bureau de Recherches Géologiques et Minières, Paris: *Chronique de la Recherche Minière*, quarterly.
- Business International Corporation, New York: *The New Latin America Market Atlas*, 1992.
- EMEP—Editorial Ltda. São Paulo, Brazil: *Minérios Extração and Processamento*, monthly.
- G & T International (Chile): *Latinominería*, quarterly.
- Institute of the Americas, La Jolla, California: *HEMISFILE and News & Events* and summary reports of all major conferences.
- Instituto Latinoamericano del Fierro y el Acero (ILAFA), Santiago: *Anuario Estadístico de la Siderurgia y Minería del Hierro de América Latina*, annual.
Siderurgia Latinoamericana, monthly.
- Inter-American Development Bank, Washington, DC: *Economic and Social Progress in Latin America*, annual report.
IDB News, monthly.
- International Lead and Zinc Study Group, London.
- International Monetary Fund, Washington, DC: *International Financial Statistics*, monthly.
Annual Yearbook.
- International Nickel Study Group, The Hague, the Netherlands, monthly.
- Latin American Energy Organization (OLADE): *Energy Statistics*, annual.
Energy Magazine, issued every 4 months.
- Latin American Mining Institute, Washington, DC: *The South American Investment and Mining Guide for the mid 80's*.
- Latin American Newsletters Ltd., London: *Weekly Report Commodities Report*, biweekly.
Latin American Economic Report, weekly.
- McGraw-Hill, Inc., New York: *Engineering and Mining Journal*, monthly.
- Metal Bulletin, London: *Metals & Minerals Latin America*, biweekly.
- Metal Bulletin, London: *World Mining Equipment*, biweekly.
- Metals Economics Group, Halifax, Nova Scotia, Canada: *Latin America Gold—Transactions and Opportunities*.
- Metallgesellschaft Aktiengesellschaft, Frankfurt: *Metal Statistics*, annual.
- MIIIDa Limited, London: *Latin American Mining Letter*, biweekly.
- Mining Journal Ltd., London: *Mining Magazine*, monthly.
Mining Journal, weekly.
- Mining Annual Review, July issue.
- Mexico and Central America Investment and Mining Guide, annual.
- National Mining Association, Washington, DC: *International Coal*, annual.
- Natural Resources Canada, Ottawa: *Minerals and Metals Sector*, annual.
- Organization of American States, CECON, Washington, DC: *Trade News*, monthly.
- Organization of Petroleum Exporting Countries, Vienna, Austria: *Annual Report and Annual Statistical Bulletin*.
- PennWell Publishing Co., Tulsa, Oklahoma: *International Petroleum Encyclopedia*, annual.
- PennWell Publishing Co., Tulsa, Oklahoma: *Oil & Gas Journal*, biweekly.
- Robertson, Andrew, *Atlas of the Latin American and Caribbean Mineral Industry*. Mining Journal Books, Kent, England, 162 p.
- United Nations, New York, NY: *Chronicle of the United Nations Mineral Resources. Exploration in Developing Countries 1988-93*. Yearly updates.
- United Nations Economic Commission for Latin America and the Caribbean: *Preliminary Economic Overview*, annual.
CEPAL News, monthly.
Statistical Office, U.N. Trade Statistics.
- U.S. Agency for International Development: *Latin America and the Caribbean—Selected Economic and Social Data*, annual.
- U.S. Department of Commerce:
U.S. Census Bureau, trade statistics.
International Trade Administration:
Foreign Economic Trade and their Implications for the United States, semiannual by country.
International Marketing Information Series.
- U.S. Department of Energy, Office of International Energy Analysis: *International Energy Annual*, DOE/EIA-0219.
Petroleum Supply Annual v. 1 and 2. DOW/EIA-0340.
- U.S. Department of the Interior, U.S. Geological Survey:
Mineral Commodity Summaries, annual.
Minerals Yearbook, Annual Commodity Reports.
- University of Miami, North-South Center for Latin American Studies: *North-South, the Magazine of the Americas*, bimonthly.
- World Bank, Washington, DC: Bank news releases (<http://www.worldbank.org>).
- World Bureau of Metals Statistics, London: *World Metal Statistics*, monthly.
- World Reports Limited, New York: *The Latin American Times*, monthly.

TABLE 1
PRODUCTION OF SELECTED MINERALS IN LATIN AMERICA AND CANADA, 1999

(Thousand metric tons unless otherwise specified)

	Metals										
	Aluminum primary metal	Bauxite	Copper mine output	Gold (tons)	Iron ore, gross weight	Lead mine output	Nickel mine output	Silver (tons)	Steel, crude	Tin mine output	Zinc, mine output
Argentina	206	--	210	39	--	15	--	74	3,797	--	34
Belize	--	--	--	(1/)	--	--	--	--	--	--	--
Bolivia	--	--	(1/)	10	--	10	--	422	--	12	146
Brazil	1,245	12,880	31	49	194,000	10	44	42	25,700	13	99
Chile	--	--	4,383	48	8,345	(1/)	--	1,381	1,180	--	32
Colombia	--	2	1	19	580	(1/)	39	4	700	--	--
Costa Rica	--	--	--	1	90	--	--	(1/)	--	--	--
Cuba	--	--	1	1	--	--	68	--	300	--	--
Dominican Republic	--	--	--	1	--	--	39	3	31	--	--
Ecuador	--	--	(1/)	4	--	(1/)	--	2	46	--	(1/)
El Salvador	3	--	--	--	--	--	--	--	--	--	--
Guatemala	--	--	--	(1/)	3	(1/)	--	--	--	--	--
Guyana	--	3,300	--	13	--	--	--	--	--	--	--
Honduras	--	--	--	(1/)	--	5	--	47	--	--	41
Jamaica	--	11,688	--	--	--	--	--	--	--	--	--
Mexico	63	--	381	24	11,475	126	--	2,467	15,299	(1/)	363
Nicaragua	--	--	--	3	--	--	--	1	--	--	--
Panama	--	--	--	2	--	--	--	2	--	--	--
Paraguay	--	--	--	--	--	--	--	--	56	--	--
Peru	--	--	536	128	3,886	272	--	2,231	510	30	900
Suriname	29	4,000	--	(1/)	--	--	--	--	--	--	--
Trinidad and Tobago	--	--	--	--	--	--	--	--	729	--	--
Uruguay	--	--	--	2	4	--	--	--	50	--	--
Venezuela	570	4,166	--	6	14,051	--	--	--	3,261	--	--
Others 2/	--	--	--	4	--	1	--	--	--	--	--
Total Latin America	2,116	36,000	5,543	354	232,000	439	190	6,676	51,709	55	1,615
Share of world total (percent)	9	29	44	15	23	14	17	42	7	26	21
Canada	2,390	--	614	159	34,487	161	186	1,231	16,300	--	1,009
Total Latin America and Canada	4,506	36,000	6,157	513	267,000	600	376	7,907	68,000	55	2,624
Share of world total (percent)	20	29	49	22	27	20	33	50	9	26	34
United States	3,800	W	1,660	340	57,000	520	--	1,860	93,000	--	810
Total Western Hemisphere 3/	8,306	36,000	7,817	853	324,000	1,120	376	9,767	161,000	55	3,434
Share of world total (percent)	37	29	62	37	33	37	33	61	21	26	45
Total world 4/	22,700	123,000	12,600	2,330	992,000	3,040	1,140	15,900	754,000	210	7,640

See footnotes at end of table.

TABLE 1--Continued
 PRODUCTION OF SELECTED MINERALS IN LATIN AMERICA AND CANADA, 1999

(Thousand metric tons unless otherwise specified)

	Industrial minerals						Fuels			
	Barite crude	Cement, hydraulic	Gypsum crude	Phosphate rock (P ₂ O ₅)	Salt, all forms	Sulfur, all forms	Coal, all grades	Natural gas, gross (million cubic meters)	Petroleum (million 42-gallon barrels)	
									Crude	Products
Argentina	1	7,187	650	--	851	--	300	40,000	309	180
Bolivia	6	1,202	--	--	4,500	--	--	6,800	14	13
Brazil	49	40,300	1,456	1,528	5,958	298	5,618	11,898	413	829
Chile	2	3,100	785	15	6,400	700	508	2,957	2	67
Colombia	6	9,200	560	75	495	64	34,500	13,100	301	105
Costa Rica	--	1,100	--	--	37	--	--	--	--	5
Cuba	--	1,801	130	--	180	5	--	1,500	13	60
Dominican Republic	--	2,000	86	--	55	--	--	--	--	11
Ecuador	--	3,000	2	--	95	14	--	190	144	53
El Salvador	--	1,134	6	--	90	--	--	--	--	6
Guatemala	1	1,600	30	--	50	--	--	33	9	7
Guyana	--	--	--	--	--	--	--	--	--	--
Honduras	--	3,000	30	--	25	--	--	--	--	2
Jamaica	--	504	236	--	19	--	--	--	--	4
Mexico	158	29,413	6,954	951	8,236	1,310	13,302	49,506	1,061	483
Nicaragua	--	350	23	--	15	--	--	--	--	6
Panama	--	760	--	--	23	--	--	--	--	10
Paraguay	--	730	4	--	--	--	--	--	--	2
Peru	34	3,800	76	9	778	60	47	1,464	37	56
Suriname	--	50	--	--	--	--	--	--	4	--
Trinidad and Tobago	--	688	--	--	--	15	--	13,240	46	53
Uruguay	(1/)	1,000	1,050	--	--	3	--	--	--	11
Venezuela	--	8,500	42	366	350	350	6,593	58,744	1,040	400
Others 6/	--	630	--	--	650	78	--	35	(1/)	290
Total Latin America	257	121,000	12,120	2,944	28,800	2,900	60,900	199,000	3,393	2,700
Share of world total (percent)	7	8	12	7	14	5	2	7	14	10
Canada	126	12,604	9,471	--	12,481	9,638	72,472	209,970	698	708
Total Latin America and Canada	383	134,000	21,591	2,944	41,300	12,500	133,400	409,000	4,091	3,400
Share of world total (percent)	10	9	20	7	21	22	4	14	17	13
United States	375	87,300	19,400	11,800	41,400	11,100	997,100	678,200	2,147	6,286
Total Western Hemisphere 3/	758	221,000	39,600	14,700	82,700	23,600	1,130,500	1,087,000	6,238	9,700
Share of world total (percent)	20	14	37	33	41	42	31	38	26	36
Total world 4/	3,750	1,560,000	108,000	45,100	200,000	55,900	3,683,777	2,846,318	23,972	26,750

W Withheld to avoid disclosing company proprietary data. -- Zero.

1/ Less than 1/2 unit.

2/ French Guiana.

3/ Excludes Greenland.

4/ Columns may not add up to totals shown because of independent rounding.

5/ Includes only output used to manufacture fertilizers.

6/ Aruba, Barbados, French Guiana, Guadeloupe, Martinique, and the Netherlands Antilles.

7/ Includes synthetic crude (from oil shale and/or tar sands).

TABLE 2
 ROLE OF LATIN AMERICA IN WORLD MINERAL PRODUCTION

(Percentage of world output) 1/

Commodity	1985	1990	1995	1997	1998	1999
Copper	26	26	33	48	49	44
Silver	35	35	33	42	39	42
Bauxite	20	24	30	32	30	29
Tin	25	28	31	29	24	26
Iron ore	17	21	22	22	24	23
Zinc	17	17	20	21	20	21
Nickel	6 e/	11	14	16	15	17
Gold	10	9	10	12	13	15
Lead	15	13	16	16	15	14
Crude oil	12	11	12	12	15	14
Petroleum products	7	9	7	8	10	10
Aluminum	8	10	10	10	9	9
Cement	7	7	6	7	8	8
Steel	5	5	6	7	7	7
Coal	1	1	1	1	2	2

e/ Estimated.

1/ By volume.

TABLE 3
SIGNIFICANT INVESTMENT FLOWS TO ARGENTINA, BOLIVIA, BRAZIL, CHILE, ECUADOR, PARAGUAY, PERU, AND URUGUAY 1/ 2/

(Million dollars unless otherwise specified)

Country and project	Major operating companies and major equity owners	Country and investment	Product	Year
ARGENTINA				
Las Flechas, San Juan	Minas Argentinas S.A., 50%; Ima Resources Corp., 50%	Argentina/Canada	50 Au/Ag	1997
Del Carmen, San Juan	Argentina Gold Corp., 40%; Barrick Gold Corp., 60%	do.	50 Gold	1997
El Pachón, San Juan	Cía. Minera San José S.A., 50%; Cambior Inc., 50%	do.	150 Copper	2000
Bajo La Alumbra, Catamarca	Mount Isa Pacific Pty. Ltd., 50%; North Ltd. of Australia, 25%; Rio Algom Ltd., 25%	Australia/Canada	1,200 Au/Cu	2000
Agua Rica, Catamarca	BHP Minerals Inc., 70%; Northern Orion Exploration Ltd., 30%	do.	25 do.	1997
Fenix/Salar del Hombre Muerto, Ca.	Minera del Altiplano S.A. (FMC Lithium Corp., 100%)	United States	110 Lithium	2000
Cerro Vanguardia, Santa Cruz	Minera Mincorp S.A. (Anglo American Corp., 100%)	South Africa	190 Gold	2000
Rio Colorado, Mendoza	Potasio Rio Colorado S.A. (CRA-Minera TEA S.A., 100%)	Australia	150 Potassium	2000
San Jorge, Mendoza	Grupo Minero Aconcagua S.A., (private, 100%)	Canada	25 Au/Cu	2000
Total Investment in the Minerals Sector to 1999 1/			2,250	
Total U.S. Investments in the Minerals Sector to 1999 1/			110	
Foreign Direct Investments for 1999 2/			6,900	
BOLIVIA				
Kori Kollo and Llallagua, near Oruro	Inti-Raymi S.A. (Battle Mountain Gold 88%, EMUSA 12%)	United States/Bolivia	50 Au/Ag	1999
Don Mario gold project, Santa Cruz	Orvana Minerals Corp./ EMUSA	Canada/Bolivia	54 do.	2000
San Cristobal, Southern Bolivia	Apex Silver Mines Ltd., 70%; Phelps Dodge Corp., 30%	United States	413 Ag/Pb/Zn	2000
Empresa Metalurgica de Vinto, Oruro	Corporacion Minera de Bolivia (COMIBOL)	Bolivia	50 Sn/Sb	2000
Yacimientos gas, Santa Cruz	Petrobras 35%, Petrolera Andina 50%, Total of France, 15%	Brazil/Bolivia/France	2,000 Natural gas	2000
Total Investments in the Minerals Sector for 1999 1/			2,567	
Total U.S. Investments in the Minerals Sector for 1999 1/			457	
Foreign Direct Investments for 1999 2/			800	
BRAZIL				
Serra dos Carajás, Pará State	Companhia Vale do Rio Doce (CVRD); Consortium led by Cia. Siderurgica Nacional (private, 100%)	Brazil	7,600 Privatization Fe/Mn/Au	1997
Salobo Metais, Pará State	CVRD/Anglo American Corp./BNDES	Brazil/South Africa	20 Cu-evaluation	1997
Sossego Metais, Pará State	CVRD/Phelps Dodge Corp.	Brazil/United States	50 Cu	1997
Nickel Tocantis, Tocantins State	Cia. Niquel Tocantins	Brazil	86 Ni-expansion	1997
Saramenha-refinery, Minas Gerais	Alcan Aluminio do Brazil S.A. (Alcan Aluminum Ltd. (private, 100%))	Canada	380 Al-expansion	1997
São Luis-refinery, Maranhao State	Alcoa Aluminio S.A. (Aluminum Co. of America (Alcoa) (private, 100%))	United States/Netherlands	400 do.	1997
Caraiiba Metais-refinery, Bahia State	Paranapanema Group	Brazil	20 Cu-expansion	1997
Corumba-plant, Mato Grosso State	Mineração Corumbaense (Rio Tinto Group)	United Kingdom	200 Hot-briq-iron	2000
Campos district, Rio and São Paulo	Petróleo Brasileiro S.A. Group	Brazil/United States	13,800	
Total Investments in the Minerals Sector to 1999 1/			22,556	
Total U.S. Investments in the Minerals Sector to 1999 1/			5,545	
Foreign Direct Investments to 1997 (industry, 41.5%; services, 56.7%; others, 1.8%) 2/			65,507	
Foreign Direct Investments for 1998 (industry, 41.5%; services, 56.7%; others, 1.8%) 2/			5,000	
Foreign Direct Investments for 1999 (minerals, 44.5%; services, 33.0%; others, 22.5%) 2/ 3/			31,000	
Foreign Direct Investments to 1999 (industry, 41.5%; services, 56.7%; others, 1.8%) 2/ 3/			101,507	
Total U.S. Investments to 1999 (manufacturing, 74%; banking and finance, 16%; others, 10%) 2/ 3/			27,355	
CHILE				
Rodomiromo Tomic	Corporación Nacional del Cobre de Chile S.A., 100%	Chile	662 Copper	1998
Collahuasi, Region I	Falcombrige Ltd., Minorco plc	Canada/Luxembourg	2,185 do.	1998
Cerro Colorado, Region I	Rio Algom Inc.	Canada	200 do.	1998
Quebrada Blanca, Region I	Cominco Ltd., Teck Resources International Ltd., and Empresa Nacional de Minería of Chile (ENAMI)	Canada/Chile	373 do.	1997
El Abra, Region II	Cyprus-Amax Minerals Co., 51%; Corporación Nacional del Cobre de Chile S.A., 49%	United States/Chile	1,800 do.	1997
La Disputada, Region II	Exxon Minerals Company	United States	1,731 do.	1995
Zaldivar, Region II	Placer Dome Ltd., Outokumpu Copper Resources	United States/Finland	600 do.	1995
Santa Barbara (expans.), Region II	Mantos Blancos S.A., Anglo American Corp.	Chile/South Africa	160 do.	1995
Lomas Bayas, Region II	Gibraltar Mines Ltd.	Canada	300 do.	1998
La Escondida (expansion), Region II	Broken Hill Proprietary Company Ltd., Rio Tinto Zinc Corp., Japan Escondida Corp., and International Finance Corp.	Australia/United Kingdom/Japan/World Bank	1,393 do.	1997
Los Pelambres (expans.), Region IV	Luksic Group of Chile and Japanese Group	Chile/Japan	1,307 do.	1999
Tulna, Region II	Minera Mahogany and Minera Northern	United States/Chile	7 do.	TBD
Fundición La Negra, Region II	American Barrick Resources Corp., and Noranda Inc.	Canada	48 do.	1997

See footnotes at end of table.

TABLE 3--Continued
SIGNIFICANT INVESTMENT FLOWS TO ARGENTINA, BOLIVIA, BRAZIL, CHILE, ECUADOR, PARAGUAY, PERU, AND URUGUAY 1/ 2/

(Million dollars unless otherwise specified)

Country and project	Major operating companies and major equity owners	Country and investment	Product	Year	
CHILE--Continued					
Andacollo Cobre, Region IV	ENAMI, Tungsten Inc., Cía. Minera del Pacífico S.A.	Canada/Chile	55	Copper	1997
Refimot, Region III	Inversiones Mineras del Pacífico, American Barrick Resources Corp. (ABRC), and Noranda Inc.	do.	100	do.	1999
Refugio, Region III	Amax Gold Refugio Inc., Bema Gold Ltd.	United States/Canada	130	Gold	1996
Fachinal, Region XI	Coeur d'Alene Mines Corp.	United States	85	Au/Ag	1996
Leonor/El Tesoro, Region II	Lukic Group of Chile and Equatorial of Australia	Australia/Chile	230	Copper	2000
Yolanda, Region II	KAP Resources Ltd. and Yukon Ltd.	Canada	89	Nitrates/iodine	1997
Minsal, Region II	Sociedad Química y Minera de Chile S.A.	Chile	290	Lithium	1994
Ivan-Zar, Region II	Rayrock Yellow Knife Resources Inc.	Canada	36	do.	1996
Manto Verde, Region III	Anglo American Corp., Minorco Ltd.	Canada/South Africa	180	Copper	1995
La Candelaria, Region III	Phelps Dodge Co., Sumitomo Corp., Minorco Services Ltd., and Falconbridge Ltd.	United States/Japan/Canada	1,500	do.	1994
La Coipa, Region III	Placer Dome and TVX Gold Inc.	Canada	400	Au/Ag	1992
Andacollo Oro, Region IV	Andacollo Gold Inc., La Serena Inc. (Dayton Mining Corp.)	do.	50	Copper	1996
Nevada, Region III	Cía. Minera San José Inc. (ABRC)	do.	168	Gold	1997
Tambo (expansion), Region IV	El Indio Property	Chile	105	do.	1995
Quebrada de Pascua, Region IV	Barrick of Canada	Canada	300	do.	NA
Santa Catalina	Outokumpu Copper Resources	Finland	100	Copper	TBD
La Negra, Region II	Noranda Inc.	Canada	158	do.	2000
Pucobre	Punta del Cobre S.A.	Chile	50	do.	2000
Atacama Kosan	Cía. Minera Cominor S.A.	do.	130	do.	1998
Sierra Gorda	Yuma Gold Mines Ltd.	Canada	85	do.	TBD
Aldebarán, Region III	Placer Dome Ltd.	do.	800	Gold	1997
Chimberos, Region III	do.	do.	20	Silver	1999
Pascua, Region III	Barrick of Canada	do.	400	Gold	TBD
Cerro Casale, Region III	Placer Dome Ltd.	do.	792	do.	TBD
Lobo Marte, Region III	do.	do.	300	do.	TBD
Los Colorados	Mitsubishi of Japan	Japan	100	Iron ore	1998
Total Investments in the Minerals Sector to 1999 1/			17,409		
Total U.S. Investments in the Minerals Sector to 1999 1/			6,274		
Foreign Direct Investments 1974-97 (mining, 43.8%; services, 22.8%; industry, 16.2%; others, 17.2%) 2/			25,535		
Foreign Direct Investments for 1999 (mining, 40%; others, 60%) 2/			11,750		
Foreign Direct Investments to 1999 (mining, 43.8%; services, 22.8%; industry, 16.2%; others, 17.2%) 2/			37,285		
Total U.S. Investments to 1999 (mining, 43.8%; services, 22.8%; industry, 16.2%; others, 17.2%) 2/			14,718		
ECUADOR					
Beroen, Western Quito	Ecuadorian Minerals Corp.	Canada	103	Au/Ag	2000
TVX's Santa Barbara	Valerie Gold Resources Ltd., 50%; TVX Gold Inc., 50%	do.	4	Au/Cu	2000
Total Investments in the Minerals Sector for 1999 1/			107		
Foreign Direct Investments for 1999 2/			470		
PARAGUAY					
Exploration Program in Paraguay	Yamana Resources and Newmont Mining Corp.	United States	5	Gold	1999
Total U.S. Investments in the Minerals Sector for 1999 1/			5		
Foreign Direct Investments for 1999 2/			100		
PERU					
Smelter-refinery, La Oroya Expansion	Doe Run Resources Corp., 90% (USA); Renco Resources Inc., 10% (Canada)	United States/Canada	247	Cu/Pb/Zn/Mo Ag/Au	1997
Casapalca Mine, Lima	Glencore International, 80% (Switzerland); Group Gubbins, 20% (Peru)	Switzerland/Peru	120	Cu/Pb/Zn/Ag	1998
Expansions: Cuajone, Moquegua Toquepala, Tacna, and Ilo's Smelter and Refinery, Moquegua Department	Southern Peru Limited (United States) (Asarco Corp., 63.0%; Phelps Dodge Overseas Capital Corp., 16.3%; The Marmon Group Inc., 20.7%)	United States	1,816	Cu/Pb/Mo/Au	1997
San Cristóbal, Mahr Túnel, and Andaychagua, Junín Depart.	Cía. Minera Volcán S.A., 100% (Peru)	Peru	73	Cu/Pb/Zn/Ag	1998
Yauricocha, Junín Department	Cía. Minera San Ignacio de Morococha, 100% (Peru)	do.	4	do.	1997
La Granja, Cajamarca Department	Cambior S.A., 100% (Canada)	Canada	2,300	Copper	1999
Cerro Negro, Arequipa Department	Sociedad Minera Cerro Verde S.A., (Cyprus-Amex Minerals Co., 90.9% (United States); Cía. de Minas Buenaventura, 9.1% (Peru))	United States/Peru	100	do.	1998
Electrowon at Cerro Verde					
Antamina, Ancash Department	Cía. Minera Antamina S.A., (Canada) (Noranda Inc., 37.5%; Rio Algom Limited, 37.5%; Teck Corporation, 25%)	Canada	2,520	Copper/zinc	2002

See footnotes at end of table.

TABLE 3--Continued
SIGNIFICANT INVESTMENT FLOWS TO ARGENTINA, BOLIVIA, BRAZIL, CHILE, ECUADOR, PARAGUAY, PERU, AND URUGUAY 1/ 2/

(Million dollars unless otherwise specified)

Country and project	Major operating companies and major equity owners	Country and investment	Product	Year
PERU--Continued				
Cerro Yanacocha Mine, Cajamarca Department	Minera Yanacocha S.A., (Newmont Mining Corp., 51.4%; Cía. de Minas Buenaventura S.A., 43.6%; World Bank's International Finance Corp., 5%)	United States/Peru/ World Bank	50 Gold	1997
Pierina, La Libertad Department	Minera Barrick Misquichilca S.A., (Canada)	Canada	316 do.	1998
Quellaveco, Moquegua Department	Minorco of Luxembourg, 50%; Anglo American Corp, 50%	Luxembourg/ South Africa	800 Copper	2000
Marcona, Ica Department	Shougang Hierro Perú S.A., (China, 100%)	China	120 Iron	1992
Refinery Expansion at Cajamarquilla, Lima Department	Refinería Cajamarquilla S.A., (Cominco Ltd. of Canada, 87%; Marubeni Corp. of Japan, 13%)	Canada/Japan	356 Zinc	2000
Tintaya, Cusco Department	BHP Tintaya S.A., (private, 100%)	Australia	273 Copper	1994
Total Investments in the Minerals Sector to 1997 1/			9,099	
Total Investments in the Minerals Sector for 1999 1/			2,092	
Total Investments in the Minerals Sector to 1999 1/			11,191	
Total U.S. Investments in the Minerals Sector to 1999 1/			4,237	
Foreign Direct Investments 1990-May 31, 1998 (services, 50.1%; others, 30.6%; and minerals, 19.3%) 2/			36,487	
Foreign Direct Investments 1993-99 (mining, 51%; petroleum, 34%; others, 15%) 2/			31,100	
Total U.S. Direct Investments 1995-99 (minerals, 84.0%; electricity, 12.5%; industry, 3.5%) 2/			7,837	
URUGUAY				
San Gregorio, Artigas	Crystallex International of Canada	Canada	29 Gold	1999
Total Investments in the Minerals Sector for 1999 1/			29	
Foreign Direct Investments for 1999 2/			100	

NA Not available. TBD To be developed.

1/ Ministries of Mines and Energy of Argentina, Bolivia, Brazil, Chile, Ecuador, Paraguay, Peru, and Uruguay.

2/ U.S. Department of Commerce: National Trade Data Bank, The Export Connection, December 1999.

TABLE 4
SELECTED SIGNIFICANT LATIN AMERICAN EXPLORATION SITES IN 1999

Location	Type 1/	Site	Commodity	Company	Resource 2/ notes	Exploration 3/ notes
Argentina	E	Diablillos/Occulto	Ag, Au	Barrick Gold Corp.	109 Moz Ag, 664	Prefeasibility drilling.
Do.	E	Gualcamayo	Au	Viceroy Resource Corp.	1.35 Moz Au	\$5M exploration program.
Do.	E	Pascua Extension	Au, Ag	Barrick Gold Corp.	See Pascua (Chile)	Extensive drilling.
Do.	D	Piriquitas	Ag, Sn, Zn	Sunshine Mining & Refining Co.	129 Moz Ag, 59 kt Sn	Feasibility completed, operating permit granted.
Do.	E	Veladero	Au, Ag	Homestake Mining Co.	5.5 Moz Au, 81 Moz Ag	Extensive drilling.
Bolivia	F	San Cristobal	Ag, Zn, Pb	Apex Silver Mines Ltd.	470 Moz Ag, 4 Mt Zn	Feasibility drilling.
Brazil	E	Cachoeira	Au	Brazilian Int'l. Goldfields	250 koz Au	Extensive drilling.
Do.	P	São Bento	Au	Eldorado Gold Corp.	1.3 Moz Au	Underground drilling.
Do.	F	Sossego	Cu, Au	Phelps Dodge Mining Corp.	2.5 Mt Cu, 2.4 Moz Au	Extensive drilling.
Chile	F	Aguas Blancas	Iodine, nitrate	Atacama Minerals Corp.	44 Mt @ 512 ppm	Feasibility drilling.
Do.	F	Aldebaran/Cerro	Au, Cu	Arizona Star Resource Corp.	23 Moz Au, 2.7 Mt Cu	Do.
Do.	P	El Peñón	Au, Ag	Meridian Gold Corp.	1.7 Moz Au, 29 Moz Ag	Extensive drilling.
Do.	P	Pascua	do.	Barrick Gold Corp.	17 Moz Au, 558 Moz Ag	Extension of resources.
Do.	F	Spence	Cu, Ag, Mo	Rio Algom Ltd.	3.59 Mt Cu	Prefeasibility drilling.
Colombia	E	Angostura	Au, Ag	Greystar Resources Ltd.	4.9 Moz Au, 18 Moz Ag	Extensive drilling.
Mexico	E	Alamo Dorado	Ag, Au	Corner Bay Minerals Inc.	98 Moz Ag, 384 koz Au	Do.
Do.	E	Campo Morado	Zn, Ag, Au, Cu	Farallon Resources Ltd.	609 kt Zn, 82 Moz Ag,	Do.
Do.	F	Cerro San Pedro	Au, Ag	Metallica Resources Inc.	1.3 Moz Au, 50 Moz Ag	Feasibility drilling.
Do.	E	Dolores	do.	Minefinders Corporation Ltd.	1.9 Moz Au, 112 Moz Ag	Extensive drilling.
Do.	E	El Sauzal	Au	Francisco Gold Corp.	2 Moz Au	Do.
Do.	F	Magistral	Au	Queenstake Resources Ltd.	508 koz Au	Feasibility drilling.
Do.	E	Peñasquito	Ag, Zn, Pb	Western Copper Holdings	Data not released	Extensive drilling.
Peru	D	Antamina	Cu, Zn, Ag, Mo	Rio Algom Ltd.	6 Mt Cu, 5 Mt Zn, 191	Extension of resources.
Do.	E	Bongara/Florida	Zn, Ag, Pb	Solitario Resources Corp.	Data not released	\$27.5M over 3 years.
Do.	E	Sinchao	Au, Ag, Cu, Zn	Andean American Mining	do.	Extensive drilling.
Do.	E	Tambo Grande	Cu, Ag, Zn, Pb	Manhattan Minerals Inc.	863 kt Cu, 51 Moz Ag	\$10M drill program.
Do.	P	Yanacocha area	Au, Ag	Newmont Gold Corp.	32.9 Moz Au equiv.	Extensive drilling.
Venezuela	F	Brisas	Au, Cu	Gold Reserve Corp.	6 Moz Au, 332 kt Cu	Feasibility drilling.

Resource data reflect unverified public information reported by trade journals as of end-1999. Data for 2000 will be reported in May 2001 Mining Engineering article.

1/ D--Approved for development; E--Active exploration; F--Feasibility work ongoing/completed; P--Exploration at producing site.

2/ Resources reported where available based on data from various public sources. Data have not been verified by the U.S. Geological Survey.

3/ Sites where extensive (+10,000 m) drilling or significant (+\$4 million) expenditure has been reported.

TABLE 5
SELECTED SIGNIFICANT CANADIAN EXPLORATION SITES IN 1999

Location	Type 1/	Site	Commodity	Company	Resource 2/ notes	Exploration 3/ notes
Alberta	E	Buffalo Hills	Diamond	Ashton Mining of Canada Inc.	Data not released	Drilling/bulk sampling.
Brit. Columbia	F	Prosperity	Au, Cu	Taseko Mines Ltd.	9.4 Moz Au, 1.6 Mt Cu	Extensive drilling.
NW Territories	E	AK	Diamond	Mountain Province Mining Inc.	Data not released	Drilling/bulk sampling.
Do.	F	Camsell Lake	Do.	Winspear Resources Ltd.	16.45 Mcarat	Do.
Do.	F	Diavik	Do.	Rio Tinto Exploration Pty. Ltd.	101.5 Mcarat	Feasibility study.
Newfoundland	P	St. Lawrence	Fluorspar	Blue Desert Mining Inc.	2.7 Mt CaF ₂	Extensive drilling.
Nunavut	E	Ferguson Lake	Ni, Cu, Co, PGE	Starfield Resources Inc.	11 Mt resource	Extensive drilling.
Do.	E	Meliadine East/West	Au	WMC International Ltd.	6.5 Moz Au	C\$ 6.7M program.
Ontario	E	Clavos	Au	United Tex-Sol Mines Inc.	953 koz Au	Extensive drilling.
Do.	P	Lac des Îles	Pd, Pt, Au, Cu, Ni	North American Palladium Ltd.	3 Moz Pd, 262 koz Pt	C\$ 6M program.
Do.	D	Madsen	Au	Claude Resources Inc.	486 koz Au	Extensive drilling.
Do.	D	A.W. White/Red Lake	Au	Goldcorp. Inc.	2.32 Moz Au	Do.
Do.	E	Separation Rapids	Li	Avalon Ventures Ltd.	155 kt Li ₂ O	Prefeasibility drilling.
Quebec	F	Caber	Zn, Cu, Ag, Au	Southern Africa Minerals Corp.	56 kt Cu, 233 koz Ag	Extensive drilling.
Do.	D	Casa Bernardi	Au	Aurizon Mines Ltd.	1.6 Moz Au	Feasibility drilling.
Do.	E	Lac Rocher	Ni, Cu	Nuisco Resources Ltd.	Data not released	Extensive drilling.
Do.	P	Langois	Zn, Cu	Cambior Inc.	72 kt Zn	Do.
Do.	P	LaRonde	Au, Ag, Cu, Zn	Agnico-Eagle Mines Ltd.	52.1 Mt resource	Do.
Do.	P	Sleeping Giant	Au	Aurizon Mines Ltd.	259 koz Au	Do.
Saskatchewan	E	McIlvenna Bay	Zn, Ag, Cu, Au	Foran Mining Corp.	700 kt Zn, 9 Moz Ag	Do.

Resource data reflect unverified public information reported by trade journals as of end-1999. Data for 2000 will be reported in May 2001 Mining Engineering article.

1/ D--Approved for development; E--Active exploration; F--Feasibility work ongoing/completed; P--Exploration at producing site.

2/ Resources reported where available based on data from various public sources. Data have not been verified by the U.S. Geological Survey.

3/ Sites where extensive (+10,000 m) drilling or significant (+\$4 million) expenditure has been reported.