Gold

Gilles Couturier

The author is with the Minerals and Metals Sector, Natural Resources Canada.
Telephone: (613) 992-4404
E-mail: gcouturi@nrcan.gc.ca

Canada's gold output increased by 12.6 t to 163.5 t in 1996, resulting in the highest production since the record level of 175.3 t set in 1991. Canada is the world's fourth largest gold producer behind South Africa, the United States and Australia. The value of Canadian gold shipments remained constant at $2.8 billion in 1996.

During the next few years, gold production in Canada should continue to increase. Increased production will come from a number of sources: Royal Oak Mines Inc.'s Kemess project in British Columbia; Royal Oak Mines Inc.'s Pamour open-pit, Matachewan and Nighthawk Lake projects, as well as Placer Dome Inc.'s Musselwhite project and Echo Bay Mines Ltd.'s Aquarius project, all in Ontario; and various other new mine openings and expansions that are scheduled to start before the end of 1998. Together these projects should boost gold production from its current level of 163.5 t in 1996 to around 170 t/y by 1998 and then to more than 180 t/y until the end of the decade.

The average price of gold in 1996 increased to US$387.69/troy oz from $384.15/oz (London a.m. fix) in 1995 and was volatile trading in a range of US$368.30-$416.25/oz. The price peaked in February 1996 because of the record fabrication demand levels achieved in 1995. However, the sale of 300 t by the Bank of the Netherlands at the end of 1996 and the possibility of the future sale of 150 t (of total reserves of 3200 t) by the International Monetary Fund (IMF), as well as the strengthening of the U.S. dollar, resulted in a negative market sentiment. From January 1 to February 14, 1997, prices have traded between US$336.90 and $367.80/oz.

Canadian Developments

There were about 50 primary gold mines operating in Canada at the end of 1996 accounting for 89.5% of the gold produced. The rest of the gold came from base-metal mines (8.4%) and placer operations (2.1%). A total of five mines opened while three closed during the year. Employment in primary gold mines in 1996 totalled 9406, compared to the 1995 level of 9472. Employment figures in the gold industry have been generally declining from their 1989 peak of 12 631.

Battle Mountain Gold Company acquired Hemlo Gold Mines Inc. in 1996. With the new acquisition, Battle Mountain Gold will increase its annual production to 30 t.

British Columbia

British Columbia's gold production decreased by 8.4% to 17.2 t in 1996 from 19.3 t in 1995 as a result of the closure of Prime Resources Group's Nickel Plate mine and Westmin Resources Limited's Premier mine. However, production is expected to increase until the end of the decade as the Kemess, Red Mountain and Mount Polley projects begin operations.

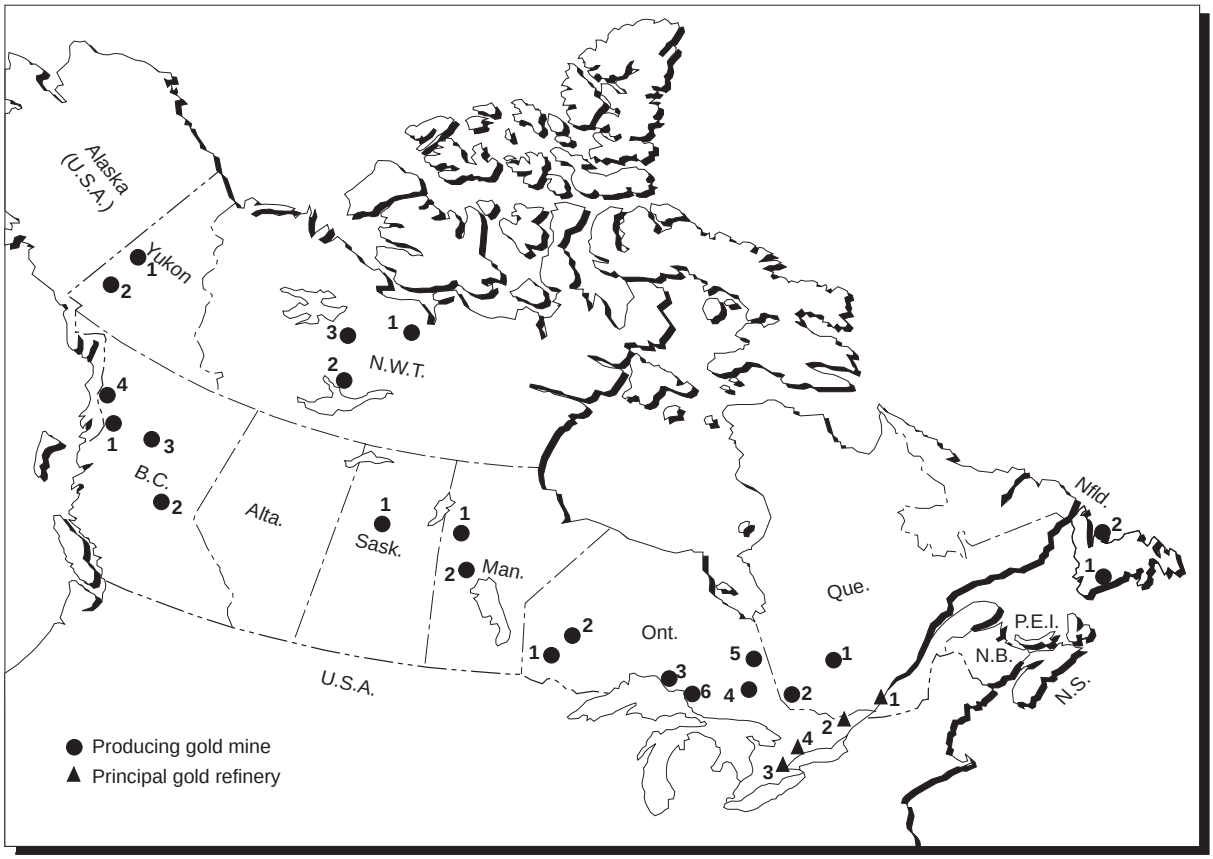
The Eskay Creek project of Prime Resources Group is British Columbia's largest gold producer with an output of 6.6 t in 1996. The ore at the Eskay Creek mine, which began production in 1995, is shipped to smelters in Japan, the United States and the province of Quebec. Prime Resources has also completed a feasibility study for the construction of a $17 million 150-t/d milling facility at the Eskay Creek mine site. The proposed mill would treat ore zones that are amenable to gravity and flotation concentration. Eskay Creek is one of the highest-grade deposits in the world with reserves of 1 Mt grading 66 grams per tonne (g/t) gold and 2930 g/t silver. Homestake Mining Company, which holds a 54% controlling interest in Prime Resources Group, is the mine operator at Eskay Creek.

Imperial Metals Corporation and Sumitomo Corporation are expected to begin production at the Mount Polley copper-gold project in 1997. Mount Polley has reserves of 81.5 Mt grading 0.4 g/t gold and 0.30% copper. Production is expected to be at a rate of 2.7 t/y of gold.

Royal Oak Mines Inc. plans to start production at the Kemess gold project in 1998 at a rate of 6.5 t/y. Kemess has reserves of 200 Mt grading 0.63 g/t gold and 0.22% copper. Royal Oak may also bring the Red

Figure 1

Primary Canadian Gold Mines and Principal Gold Refineries, 1996



PRIMARY GOLD MINES

Yukon
1. Viceroy Resources Corp. – Brewery Creek mine
2. B.Y.G. Natural Resources Inc. – Mt. Nansen mine

Northwest Territories
1. Echo Bay Mines Ltd. – Lupin mine
2. Royal Oak Mines Inc. – Giant and Super Crest mines
   Miramar Mining Corporation – Con mine
3. Royal Oak Mines Inc. – Colomac and Cass mines

British Columbia
1. Prime Resources Group Inc. – Eskay Creek mine
2. Kinross Gold Corporation – QR mine
3. Cusac Gold Mines Inc. – Table Mountain mine
4. Prime Resources Group Inc. – Snip mine

Saskatchewan
1. La Ronge Area
   Claude Resources – Seabee mine
   Cameco Corporation and Uranerz Exploration and Mining Limited – Contact Lake mine

Manitoba
1. Black Hawk Mining Inc. – Farley Lake mine
2. TVX Gold Inc. and High River Gold Mines Ltd. – New Britannia mine

Ontario
1. Red Lake Area
   Placer Dome Inc. – Campbell mine
   Goldcorp Inc. – Red Lake mine
2. Pickle Lake Area
   Barrick Gold Corp. – Golden Patricia mine
3. Hemlo Area
   Homestake Mining Company/Teck Corporation – Williams mine
   Battle Mountain Gold Ltd. – Golden Giant mine
   Homestake Mining Company/Teck Corporation – David Bell mine
4. Timmins – Kirkland Lake Area
   Placer Dome Inc. – Dome mine
   Royal Oak Mines Inc. – Pamour, Hoyle and Nighthawk Lake mines
   Kinross Gold Corporation – Hoyle Pond mine

Ontario (cont'd)
4. Timmins – Kirkland Lake Area (cont'd)
   Kinross Gold Corporation – Macassa mine and Lake Shore tailings project
   Barrick Gold Corp. – Holt-McDermott mine
   Battle Mountain Gold Company and Teddy Bear Valley Mines Ltd. – Holloway mine
   A.J. Perron Gold Corp. – Kerr mine
5. Placer Dome Inc. – Detour Lake mine
6. River Gold Mines Ltd. – Eagle River mine

Quebec
1. Desmaraisville – Chibougamau Area
   Campbell Resources Inc. – Joe Mann mine
   MSV Resources Inc. – Copper Rand and Portage mines
2. Rouyn-Noranda – Val-d'Or Area
   Barrick Gold Corp. – Doyon and Bousquet mines
   Agnico-Eagle Mines Limited – LaRonde mine
   Placer Dome Inc. – Sigma and Kiena mines
   Cambior Inc. and Aurizon Mines Ltd. – Sleeping Giant mine
   Cambior Inc. – Mouska mine
   Battle Mountain Gold Ltd. – Silidor mine
   Mine Richmont Inc. – Francœur mine
   Western Quebec Mines – Joubi mine
   Aurizon Mines Ltd. and Louvem Mines Inc. – Beaufor mine
   Lithos Corporation – Wrightbar mine

Newfoundland
1. Royal Oak Mines Inc. – Hope Brook mine
2. Richmont Mines Inc. – Nugget Pond mine

PRINCIPAL GOLD REFINERIES

1. Noranda Minerals Inc. Canadian Copper Refiners
2. Royal Canadian Mint
3. Johnson Matthey Limited
4. Imperial Smelting and Refining

Mountain mine on stream before 2000 at a rate of 4.5 t/y. Current reserves at Red Mountain are estimated at 24 t of gold.

Northwest Territories and Yukon

Gold production in the Northwest Territories and the Yukon decreased by 5.6% from 19.2 t in 1995 to 18.1 t in 1996. Echo Bay's Lupin mine is the Northwest Territories' largest gold producer with an output of 5.2 t in 1996.

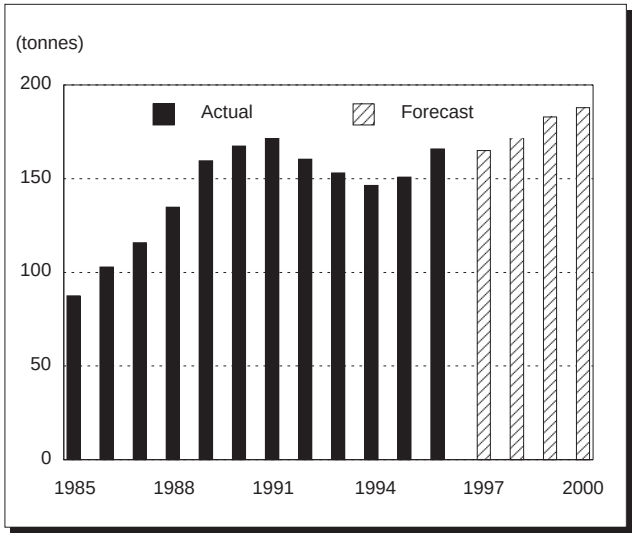
In order to supplement depleting reserves at the Colomac mine, Royal Oak is extracting ore at the Cass project. According to Royal Oak, this project, along with other exploration efforts, could extend the life of its operations beyond the year 1999.

The Yukon's 1996 gold production of 4.5 t was derived mostly from placer deposits. However, following the production start-up of two gold mines in 1996, the Yukon's gold output is expected to increase to 8 t in 1997.

Loki Gold Corporation's Brewery Creek project, which came on stream in the third quarter of 1996, is expected to produce gold at a rate of 2.5 t/y starting in 1997. The heap leaching operation has reserves of 16 Mt grading 1.5 g/t gold.

In late October, B.Y.G. Natural Resources Inc. started production at its Mt. Nansen mine at a rate of 1.5 t/y. Reserves at Mt. Nansen are 1.1 Mt grading 14.6 g/t gold. B.Y.G. has plans to increase production to 2 t/y within the next few years.

Figure 2
Canadian Gold Production, 1985-2000



Source: Natural Resources Canada.

Saskatchewan

Currently, the following three gold mines operate in Saskatchewan: Cameco Corporation's Contact Lake mine, Claude Resources' Seabee mine, and Golden Rule Resources Ltd.'s Komis mine. Total production at these operations should reach 4 t of gold once the Komis mine has been operating for a full year. In addition to these mines, the Goldfields project of Greater Lenora Resources has the potential to produce 3 t/y of gold.

Manitoba

Manitoba's gold production increased from 3.5 t in 1995 to 6.1 t in 1996 following production start-up at the New Britannia mine. The New Britannia mine of TVX Gold Inc. and High River Gold Mines Ltd. began operating in August 1995 at an estimated rate of 2 t/y of gold. Also in 1996, Black Hawk Mining Inc. produced around 1.2 t of gold at the Farley Lake mine in the Lynn Lake area. Probable ore reserves from the open-pit mine at Farley Lake are estimated at 1.5 Mt grading 4.4 g/t gold. Elsewhere, REA Gold Corporation announced that the Bissett gold mine will begin producing in 1997. Reserves at Bissett are 3.2 Mt grading 9 g/t gold, and production at Bissett is expected to reach nearly 3 t/y of gold.

Ontario

Ontario's gold production increased by 18.4% to 74.4 t in 1996, compared to its 1995 level of 62.9 t. This important increase was fueled by a full year's production at Battle Mountain Gold's Golden Giant mine, which had experienced a five-month strike in 1995. Significant output inceases were also registered at the Dome mine of Placer Dome Inc. and the David Bell mine of Teck Corporation and Battle Mountain Gold. In addition, several operators, such as Gold Corp. Inc. at its Red Lake mine and Kinross Gold Corporation at its Hoyle Pond mine, are expected to register production increases. Ontario's output is expected to recover from its current level of 74.4 t to around 85 t/y by 1999.

The three mines in the Hemlo area accounted for 41.2% of Ontario's total gold production in 1996.

Production started at the Holloway mine owned by Battle Mountain Gold and Teddy Bear Valley Mines Ltd. in 1996. Total reserves at the Holloway project are 6 Mt grading 6.8 g/t gold, and its gold production is expected to reach 3 t/y.

Royal Oak Mines Inc. announced that its annual production from the Timmins gold camp will increase from its current level of 2.5 t in 1996 to 9.3 t/y by the end of 1998 following an expansion of the Pamour and Hoyle mines, and the start-up of the Matachewan and Nighthawk Lake mines.

Placer Dome Inc. announced that the Musselwhite project in northwestern Ontario is estimated to have reserves of 11 Mt grading 9.5 g/t gold, equivalent to 98 t of gold. Its production is expected to reach 6 t/y starting in the middle of 1997. This project is 32% owned by TVX Gold Inc.

Echo Bay Mines Ltd. announced that the Aquarius mine will be brought on stream in the fourth quarter of 1998 at a rate of 5 t/y. Proven and probable reserves at the Aquarius mine are 19 Mt grading 2 g/t gold.

Quebec

Quebec's gold production increased 1.9% from 40.3 t in 1995 to 41 t in 1996. Inmet Mining Corporation bought the Troilus project on stream at the end of 1996. The Troilus project, located 150 km north of Chibougamau, has reserves of 49 Mt grading 1.34 g/t gold. Its gold production is expected to reach 5 t/y.

The Chimo mine of Cambior inc. closed in December of 1996. Closures in 1997 will include MSV Resources' Portage mine and Battle Mountain Gold's Silidor mine.

In January 1997, TVX Gold Inc. and Golden Knight Resources Ltd. announced the closure of the Casa Berardi mine. Gold production at the Casa Berardi complex was approximately 3 t in 1996. The owners of the Casa Berardi mine are currently looking for buyers for the operation. In addition, Placer Dome Inc. announced its plan to sell the Kiena and Sigma mines near Val-d'Or.

Newfoundland

Royal Oak Mines Inc. announced that the Hope Brook mine will be shut down in September 1997. The mill will be moved to the Matachewan mine near Timmins. The Hope Brook mine had a production level of 3 t/y of gold. Also in Newfoundland, Richmont Mines Inc. will begin production in 1997 at the Nugget Pond mine at a rate of 1.3 t/y.

WORLD DEVELOPMENTS

South Africa

South Africa remained the world's largest gold producer with an estimated output of 493 t in 1996. South Africa's share of world production was estimated at 21% in 1996, compared to approximately 66% in 1970. The gold industry's share of South Africa's Gross Domestic Product has gone from 15.4% in 1986 to 7.5% in 1996, but gold still accounts for over 60% of the value of South African mine output.

The newly elected government announced plans to adopt a new mineral policy for South Africa, which includes the transfer of mineral rights to the State. It is expected that such a transfer could accelerate the development of gold projects by increasing competition and allowing small mining companies, as well as foreign companies, to invest in South Africa.

To address the high fatality rate in South African gold mines, which has exceeded 500 per year over the last 10 years, the South African government enacted a new *Mine Health and Safety Act*. The introduction of this new Act was prompted by the 1995 Vaal Reefs gold mine accident in which 104 miners were killed.

South Africa has moved from being the lowest-cost gold producer in 1985 to being one of the highest-cost producers. Cash costs in South Africa in 1985 were approximately US$147/oz, while costs at other major Western World producers averaged about $200/oz. However, by 1995, South Africa had a cash cost of $323/oz, compared to the average Western World cost of $257/oz. The production cost increases were partly offset by a 23% devaluation of the Rand in the first six months of 1996 from 3.65 Rands per U.S. dollar to around 4.5 Rands per U.S. dollar in July.

In South Africa, wages represent more than 50% of total production costs. The National Union of Mineworkers (NUM) and the Chamber of Mines agreed on a 9% salary increase in 1996, which is equivalent to the current inflation rate in South Africa. This was in addition to an increase in the number of public holidays from 4 to 12 in 1995.

Historically, South Africa's entire gold production has been refined at the Rand refinery, which operates at 50% of its refining capacity of 1000 t/y. Recently, Randgold Resources and Explorations Ltd. obtained permission from the South African government to build a 24-t/y refinery using Mintek's technology to process dore from the Harmony and Unisel mines.

Anglo American Corporation of South Africa Ltd. is the world's largest gold producer with production of 235 t in 1995. Anglo American Corporation operates the Freegold mine, which is the world's largest gold mine. Production at Freegold declined from 92.5 t in 1995 to an estimated 78 t in 1996.

Gold Fields of South Africa Ltd. is the world's second largest gold producer with output of 105 t in 1995, while Gencor ranked fourth behind Barrick Gold Corporation with production of 63 t.

Despite the fact that South Africa accounts for 40% of the world's identified gold reserves, its gold industry faces major difficulties due to declining ore grades, the extreme depth of gold reserves (an average depth of 2500 m), intensifying competition from low-cost producing countries, rising labour costs, and a domestic inflation rate of 9%. In addition, since the elimination of various economic and political sanctions, South African gold producers are increasing their investments abroad. The South African mines'

ability to continue reducing costs is limited by their relatively low-grade reserves. Grades have declined from 13 g/t gold in 1973 to around 5 g/t in 1996.

With increasing production costs, it is anticipated that a rationalization of the gold industry will take place. In January 1997, Gencor Ltd. and Anglo American Corporation announced an agreement to exchange mineral rights to access reserves containing 230 t of gold. In addition to asset swaps, some operations will have to close. It is also likely that there will be some pressure to further reduce the existing work force of around 350 000 employees.

There are several major projects that will come on stream before the year 2000 that will enable South Africa to maintain its production level at between 450 and 500 t/y until the end of the decade. The three largest projects that are expected to be brought on stream in 1997 are the Target mine (17.2 t/y) of Anglovaal, and the Moab mine (11.6 t/y) and Saaiplaas No. 5 Shaft (5.6 t) of Anglo American Corporation. In addition, other projects, such as the Freddies No. 4 Shaft (8.7 t) at Anglo American Corporation's Freegold mine complex, will be on stream by 1998.

United States

Gold production in the United States remained stable at around 312 t in 1996. U.S. gold production has enjoyed a decade of rapid growth from its 1985 level of 80 t. The United States is the world's second largest gold producer behind the Republic of South Africa. According to the U.S. Geological Survey, 25 mines yielded about 75% of the gold produced in the country. The state of Nevada was the leading producer with several heap leaching operations accounting for about two thirds of U.S. production, or 214 t. The other major producing states are California (24.5 t) and Montana (10.8 t).

Cumulative production from Newmont Gold Company's Carlin mine and Barrick Gold Corporation's mine complex increased by 24 t to 137 t in 1996, mainly as the result of Barrick Gold Corporation's production start-up at the Meikle deposit in the third quarter of 1996. The Meikle deposit is located 2 km north of the Betze-Post mine. It contains 6.5 Mt of ore grading 21.6 g/t gold. The Meikle underground mine is expected to produce 11 t/y of gold for 11 years.

Placer Dome Inc. (60%) and Kennecott (40%) own the Pipeline and South Pipeline projects, which host total reserves of 81 Mt grading 2.8 g/t gold, containing over 200 t of gold. Placer Dome Inc. announced that, once they are in full production, the Pipeline and South Pipeline projects will produce nearly 18 t/y at a cash operating cost of US$115/oz for an estimated period of 12 years. Initial production at the Pipeline mine is expected in the spring of 1997.

Santa Fe Pacific Gold Corporation, which is at the centre of a takeover battle between Homestake Mining Company and Newmont Gold Corporation, started production at the Mule Canyon project in the third quarter of 1996 at a rate of 3 t/y for a period of eight years. Mule Canyon has reserves of 9 Mt grading 3.7 g/t gold.

Canyon Resources began producing gold in October at the Briggs mine. Production at Briggs is expected to be about 2.3 t/y for a period of seven years. Amax Gold Inc. plans to start production at the Fort Knox mine in Alaska in 1997 at a rate of 11 t/y.

Echo Bay Mines Ltd. decided to abandon the Juneau project in Alaska due to higher-than-anticipated costs and a lower gold price. The company recorded a US$77 million write-down on Juneau, which has gold reserves of 100 t.

Battle Mountain Gold, which had previously acquired Hemlo Gold Mines Ltd., was offered compensation by the U.S. government to abandon the New World gold project near Yellowstone National Park in Montana.

After a period of substantial growth, gold production in the United States is expected to remain fairly stable at a level of between 310 and 330 t/y until the end of the decade.

Australia

Australia's gold production increased by 33 t to an estimated level of 286 t in 1996. Its gold production has shown a spectacular increase over the past 11 years from its 1985 level of 59 t. It is expected that Australia's gold production could reach 330 t/y by the year 2000, and therefore challenge the United States as the world's second largest gold producer. The growth in Australia's gold industry was made possible by the success of its mining companies continuing their underground operations once their open-pit reserves were exhausted. Currently, Australia has 155 gold mines in operation. Its production is derived mainly from Western Australia (75%), Queensland (12%), the Northern Territory (7%), and New South Wales (3%).

Australia's most important mines in 1995 were the Super Pit of Kalgoorlie Consolidated Gold Mines (19 t), PosGold Ltd.'s Boddington mine (13 t), Newcrest Mining's Telfer mine (13 t), and Western Mining Corporation's St. Yves mine (12 t).

In 1996, Australia's gold industry experienced a series of mergers and acquisitions. The merger of Normandy, PosGold and Gold Mines of Kalgoorlie took place in November when Newcrest sold its holdings. Normandy has become the world's eighth largest gold producer with an estimated output of 50 t/y. In addition, Sons of Gwalia merged with Burmine Ltd., Gascoyne Gold Mines NL and Orion Resources NL. This merger will increase Sons of Gwalia's gold production to around 15 t/y.

Placer Dome Inc. acquired the 24.6% publicly owned shares of its subsidiary, Placer Pacific Limited, through a takeover bid. Placer Pacific produced 25 t of gold in 1996 from its operations in Australia and Papua New Guinea.

In Northern Queensland, MIM Holdings Ltd. (51%) and Savage Resources Ltd. (49%) brought the Ernest Henry copper-gold mine on stream in November 1996. Its production is expected to be around 4 t/y of gold.

Other major gold projects that came on stream in Australia in 1996 include Great Central Mines' Jundee mine (7 t/y), Eagle Mining's Nimary mine (3 t/y), and Goldfields' Henty mine (3 t/y).

North Ltd.'s initial plans to develop the Lake Cowal gold deposit were rejected by the New South Wales government. The project was re-submitted and approved by government authorities subject to strict environmental guidelines. The A$177 million project has a resource of 49 Mt grading an average of 1.5 g/t gold with an anticipated production level of 7 t/y.

Also in New South Wales, Newcrest Mining plans to bring the Cadia Hill mine on stream in September 1998 at a cost of A$400 million. Cadia Hill, which is scheduled to produce 9 t/y, has reserves of 200 Mt grading 0.74 g/t gold and 0.17% copper.

Australia's future growth in its gold output is also going to be helped by increased production at Great Central NL's Bronzewig mine, which will reach 12.5 t in 1997.

GoldCorp was set up by the Western Australian government to produce a series of Australian Nugget bullion investor coins. The coins come in denominations of two ounces, ten ounces and one kilogram. GoldCorp is Australia's largest gold refiner with a capacity of 150 t/y.

Asia and the Pacific

In addition to being prolific regions for gold production, Asian countries are very significant gold consumers.

China

China produced 121 t of gold in 1996, an 11.7% increase over the 1995 total of 108 t. According to the Gold Administration Bureau of the Ministry of Metallurgical Industries (MMI), the four largest provinces that account for 55% of Chinese gold production are: Shandong (27.4 t), Henan (13.7 t), Hebei (8.9 t) and Shaanxi (7.8 t). The MMI also announced that Chinese gold production is expected to reach 150 t/y by the year 2000.

It is reported that the majority of China's 600 mines produce less than 0.3 t/y of gold each, while 40 operations produce more than 0.3 t/y each. The majority of China's production is derived from lode deposits (75%); the balance of output is 15% from placer deposits (mainly from the Heilongjiang Province), and 10% as a by-product of base-metal deposits (primarily copper mines from the Jiangxi and Anhui provinces). According to the China National Gold Corporation (CNGC), employment in China's gold production sector numbers around 200 000. However, this figure also includes employees from institutions such as hospitals and schools. The main government organization dealing with gold production is the CNGC, which accounts for 10% of China's gold production. The CNGC reports to the MMI's Gold Administration Bureau, which has responsibility for overall policy formulation, management, monitoring and coordination.

To become more attractive to foreign investment, China amended its Mineral Resources Law in the summer of 1996, but several factors prevent China from increasing its gold production faster. By law, gold producers have to sell their entire production to the People's Bank of China (PBOC). In September 1993, the Chinese government changed its policy to try to attract gold producers by offering to purchase gold at 10% below the world market price, which represents a significant increase over previous prices. It was reported that the PBOC announced in January 1997 a 5 yuan-per-gram decrease in the gold price to reflect the weakness in world gold markets.

Gold smuggling occurs mostly between gold producers and converters (predominantly jewellery manufacturers). Gold and gold jewellery imports are subject to duties and local taxes of 127%. There is significant gold smuggling to Hong Kong for finished gold products illegally exported back to China. It was also reported that significant quantities of gold are being smuggled each year into China from Russia.

As another measure to encourage growth in its gold production, the country announced that foreign companies will be allowed to engage in gold mining in China. China has made available to foreign companies a number of low-grade deposits with refractory ore grading less than 3.5 g/t gold.

Vancouver-based Asia Minerals and the Zhaoyuan Gold Industrial Group announced the signing of the final contract to establish the Yingezhuang gold joint venture. After completing the feasibility study in 1996 and a US$72 million investment in the mine expansion, the joint-venture partners will each have a 50% interest in the Yingezhuang gold mine located in Shandong Province. The project will expand the mine's production from 0.3 to 2 t/y. Yingezhuang is the first foreign joint venture in China's gold mining industry.

In November 1994, Barrick Power Gold Corp. (a joint venture between Barrick Gold Corporation and Power Corporation of Canada) signed two letters of

intent with the CNGC covering the development of the Paishanlou deposit in Liaoning Province and the Changkeng deposit in Guangdong Province. Barrick Power has the option to acquire a 75% interest in the joint venture.

According to the China Pearl and Diamond Corporation, Chinese gold consumption totals around 300 t, with jewellery representing about 85% of that amount. There are currently about 700 jewellery manufacturing plants in China with some devoted entirely to the re-export market.

With the recent growth in gold consumption, the Chinese government has been increasing taxes on jewellery sales to diminish the gap between internal production and national demand. According to the World Gold Council, current gold consumption in China is around 0.2 g/y per person compared to 8 g/y in Taiwan. The average annual salary for citizens living in the largest 100 cities in China is US$500. As this figure increases, so should gold demand.

Should gold prices remain weak, China, which currently faces increased production costs, may experience difficulty in reaching its objective of producing some 150 t/y of gold by the year 2000, unless it becomes more attractive to foreign investment.

China mints 99.9%-pure gold and silver Panda coins. According to the China Gold Coin Corporation, gold coin sales are estimated at 3 t/y. The gold coins are available in five sizes ranging from one ounce to one twentieth of an ounce.

Indonesia

Indonesia's gold output increased by 16 t to 91 t in 1996. Indonesian gold production is likely to continue to grow at a rapid pace.

The bulk of Indonesia's production is from Freeport McMoRan Copper and Gold Inc.'s Ertsberg/Grasberg copper-gold mine. After expanding its daily milling capacity from 71 000 t to 115 000 t, the company is planning a further expansion to a possible 190 000 t/d. Gold production by Freeport McMoRan was around 60 t in 1996. Proven and probable reserves stand at 2 billion t grading 1.18 g/t gold, 3.8 g/t silver and 1.19% copper. The precious metal content of the ore represents 1720 t of gold and 3691 t of silver. The U.S. government's Overseas Private Investment Corp. (OPIC), which provides political risk insurance, has withdrawn its coverage for Freeport McMoRan because of its major discharge of tailings into the Ajkwa River.

Newmont Gold Corporation commissioned the Minahasa mine in early 1996. The US$130 million mine will produce 4.4 t/y of gold for a period of 13 years. In addition, Newmont announced that the Batu Hiau copper-gold project has reserves of 450 t of gold. Once in production by the year 1999, the US$1.9 billion mine will produce in excess of 15 t/y of gold as well as significant copper values. Batu Hiau is owned by Newmont Gold (45%), Sumitomo Mining (35%) and an Indonesian partner (20%).

Other producing mines in Indonesia include CRA's Kelian mine, which produces around 10 t/y of gold.

Papua New Guinea

Papua New Guinea's (PNG) gold production in 1996 remained stable at around 55 t; its production peaked in 1992 at 71 t. PNG's gold production is expected to recover to 70 t/y by 1998 once the Lihir mine reaches full production.

Initial production at Lihir is expected to begin by the middle of 1997 at a rate of 19 t/y, and its development costs are expected to be US$670 million. Lihir is owned by Lihir Gold Ltd., which in turn is owned by RTZ Corporation PLC and Venezuelan Goldfields Ltd. (with 17% and 7.5% respectively), and Niugini Mining (17%), as well as Orogen Minerals, the PNG government and the land-owners of Lihir Island each with an 8.5% share. The balance of Lihir Gold Ltd. shares are held by institutional investors and the general public. Lihir has mineable reserves of approximately 104 Mt grading an average of 3.25 g/t gold. Its cash operating cost is projected to be US$214/oz for the first five years of the project.

Production from the Porgera gold mine remained stable at around 26 t in 1996. Porgera's production peaked at 46 t in 1992. Although ore grades are currently lower, the recent increase in milling capacity to 16 500 t/d will likely increase its production levels to above 30 t/y until the end of the decade. Porgera's proven and probable reserves are 78.7 Mt grading 4.5 g/t gold, representing around 350 t of gold. Following the acquisition of Highland Gold by Placer Dome Inc., the mine is now owned by Placer Dome Inc. (50%) (the operator), Renison Goldfields Consolidated (25%) and the government of PNG (25%).

The OK Tedi gold-copper mine is owned by Broken Hill Pty. Co. Ltd. (52%), Inmet Mining Corp. (18%) and the PNG government (30%). It has reserves of 350 Mt grading 0.9 g/t gold and 0.87% copper, and a production capacity of 15 t/y of gold.

Other operating gold mines in PNG include Placer Dome's 100%-owned Missima mine, which produced 8 t/y of gold in 1996. Missima has ore reserves of 19 Mt grading 1 g/t gold.

The PNG government was reportedly willing to purchase RTZ-CRA's 53.6% interest in the Bougainville mine. The mine, which closed in 1989 due to riots, has reserves of 500 Mt grading 0.42% copper and 0.55 g/t gold.

Commonwealth of Independent States

Gold production in the Commonwealth of Independent States (C.I.S.) was estimated to be 220 t in 1996. The general decline in production from a peak of over 285 t in 1989 is largely attributed to the exhaustion of some placer deposits (particularly in Russia) and a shortage of hard currency to develop new mines. About 20% of the C.I.S.'s annual gold production is believed to originate as a by-product from base-metal operations, particularly copper.

As a result of foreign investment, gold production in the C.I.S. is expected to grow in the next few years, even though there will be a decline in placer gold production in Russia.

Russia

Russia's gold production in 1996 was reported to have decreased by 2 t to 124 t. Currently, Russia's production originates mostly from the Far East (62%), East Siberia (24%) and the Ural mountains (12%). The decreased Russian production can be attributed principally to declining reserves at several alluvial operations, high taxes averaging 60%, and late payments by central authorities. Other problems include high import taxes for machinery and a shortage of funds for geological surveys.

About 80% of Russia's gold production comes from placer deposits, but these deposits account for only 20% of the total proven reserve base. As gold reserves are generally concentrated in large low-grade deposits, Russian gold production will likely continue to decline in the medium term.

The Russian Federation Committee on Precious Metals and Precious Stones (Roskomdragmet), which exercised state regulations over the extraction and production of precious metals and stones, was dismantled. Roskomdragmet's functions pertaining to production were transferred to the Ministry of Industry, while refining and assaying responsibilities are now part of the Ministry of Finance.

Russia's gold output is produced by state-owned enterprises and by private enterprises and cooperatives known as Artels. There are about 350 producers with various forms of ownership, including 200 Artels that generally operate small placer deposits. Artels account for approximately 60% of Russia's total gold production originating mostly from Magadan, Yakutia and Chita.

The gold industry is of great importance to the Russian Federation. To address the problem of declining production, Russia has decided to open gold exploration to tenders in several regions. However, as many privatized projects do not have the funds required to bring new mines into production, Russia's gold output is expected to continue to decline.

In November 1995, an interim government decree on precious metals and stones was introduced. However, the law has not yet been approved by parliament. Under that law, ownership of the diamonds and precious metals would be given to the producers, but the State would have the right of first refusal.

In August 1996, Polyus commissioned the 7-t/y Olimpiada mine in the Krasnoyarsk region of central Siberia. This project was entirely developed using Russian capital.

Amax Gold Inc. plans to bring the Kubaka gold project in the Magadan region on stream in 1997 at a cost of US$228 million. Amax Gold, which owns 50% of the Omolon Mining Company, plans to produce 10 t/y at Kubaka for a period of seven years. Cyprus Amax Minerals has also formed a joint venture with Russian partners to evaluate the Vorontsovka gold project in the Ural mountains.

Star Mining Corp. of Australia has an option to earn a 35% interest in the LenaGold Company and the Sukhoi Log project in eastern Siberia. Sukhoi Log, with estimated reserves of 400 Mt grading 2.6 g/t gold and a potential production of 50 t/y, is reported to be one of the largest undeveloped gold deposits in the world.

TVX Gold Inc. has acquired a 50% interest in the Asacha and Rodnikovoe gold-silver deposits in Kamchatka through the acquisition of 50% of Trevozhnoye Zarevo. According to preliminary estimates, these deposits contain 45 t of gold.

Kinross Gold Corporation acquired ASARCO Incorporated's interest in the Aginskoe deposit located in the Kamchatka region. Kinross (the operator) and Grynberg Resources Ltd. each own 25% of the Kamgold joint venture, which hosts proven reserves of 0.9 Mt grading 29.6 g/t gold. Production at Aginskoe could start by the middle of 1998 at a rate of 6 t/y upon receipt of appropriate permits from the Russian government.

RTZ Corporation PLC decided to terminate its Svetlinskoye joint venture, which was studying the feasibility of bringing the Svetlinskoye mine on stream in the southern Urals. Svetlinskoye is estimated to have a production capacity of 5 t/y of gold.

Armada Gold of Canada owns a 64% interest in the Baley project in the Chita region. According to a preliminary feasibility study, Baley is estimated to contain around 200 t of gold.

Far East Gold, also of Canada, acquired an 80% interest in Koryakiya Mining Company, which owns the Ametistovoe gold deposit. Estimated reserves at Ametistovoe are 6.6 Mt grading 15.5 g/t gold.

Echo Bay Mines Ltd. of Canada announced the formation of a joint venture with Sakhazoloto and

Aldanzoloto to mine the Kuranakh gold occurrence in Southern Yakutia. This heap leaching project is reported to have a production capacity of around 7 t/y of gold.

High River Gold Mines Ltd. acquired a 22.9% ownership in Buryatzoloto, which operates the Zun-Holba and Irokinda mines, as well as placer deposits. Buryatzoloto's total current production is around 1.7 t/y.

Uncertainty about Russia's legal framework and the jurisdictional conflicts between local and central authorities make the present investment climate there unattractive. However, the enormous undeveloped potential of Russia, coupled with its high need for foreign investment, is expected to encourage authorities to make Russia's legal framework more attractive for foreign investment in mining. According to Russian government sources, Russia's gold mining industry would require more than US$5 billion to build or upgrade approximately 30 mining and milling complexes in the next four years.

Uzbekistan

Uzbekistan's gold production in 1996 was estimated at 70 t.

The Muruntau low-grade open-pit mine was commissioned in 1969 and is reported to have an annual production of 55 t. The mine treats about 20 Mt/y of ore grading 3 g/t gold. Production at the Zarafshan tailings retreatment joint venture at Muruntau, which began operating in 1995, achieved an output of 13 t in 1996. The Zarafshan joint venture is owned by Newmont Gold Company (50%) and the Uzbek State Committee of Geology and Mineral Resources and Navoi Mining and Metallurgical Combinat each with a 25% share. The joint venture plans to process Muruntau gold tailings with reserves of 150 t of gold over a 16-year period.

Lonrho plc, the State Committee of Geology and Mineral Resources, and the Navoi Mining and Metallurgical Combinat, as well as the International Finance Corporation (IFC), are in negotiations regarding the development of the Amantaytua and Daughystau deposits located south of the Zarafshan gold fields. Initial production could be around 10 t/y. Reserves are reported to be 60 Mt grading 3 g/t gold, while the capital cost to build the project is expected to be US$250 million.

Kazakstan

Kazakstan's 20-t/y gold production is derived mostly from the Ust-Kamenogorsk base-metal operation and the Tselinny mining and chemical plant slag heaps.

In December 1996, Bakyrchik Gold and Indochina Goldfields reached a deal with the Kazakstan government to increase private ownership of the Bakyrchik mine from 40% to 85%. Previously, the Kazakstan government owned 60% of Bakyrchik. Production at Bakyrchik is expected to double from its current level to reach 8 t/y by 1997. The Bakyrchik mine contains proven and estimated reserves of around 30 Mt grading 9 g/t gold, equivalent to about 250 t of gold.

No final decision has yet been reached regarding the privatization of the Vasilkovskoye gold deposit. Vasilkovskoye has a geological resource of 138 Mt grading 3 g/t gold.

Kyrghyzstan

Kyrghyzstan's gold production is derived almost exclusively from the Machmal mine, which produces gold at a rate of 3 t/y. However, by the year 1998, Kyrghyzstan's production could easily reach between 20 and 25 t/y as new mines begin to produce.

The most important new operation is that of the Kumtor Operating Company, owned by Cameco (33%) and the Kyrghyzstan government (67%), where development of the Kumtor deposit is under way. Production at the US$375 million open-pit gold project started in January 1997 at a rate of 15.6 t/y for a period of 11 years. Kumtor has total estimated reserves of 517 t of gold, of which 211 t are amenable to open-pit mining. Grades at Kumtor are 3.9 g/t gold, and its cash operating costs are expected to be US$160/oz.

Tadjikistan

Nelson Gold commissioned the Zeravshan gold project in early 1996. Zeravshan, in which Nelson has a 44% interest, has reserves of 28.3 Mt grading 1.4 g/t gold. Other owners of the Zeravshan mine are the Tadjik government (51%) and the International Finance Corporation (5%). Initial production was expected to be 2.4 t/y of gold. However, operations had to be suspended for a period of three months starting in September 1996 to reach agreements with the Tadjik government on issues such as gold sales on the international market, taxation and royalty regimes.

Africa

Following important investments by international development agencies and local governments in geoscience activities, as well as the revision of mining codes and investment laws, increased attention is being devoted to gold exploration in African countries.

Ghana

Ghana's gold production has more than tripled in the past six years from 17 t in 1990 to 54 t in 1996. According to national authorities, production could reach 75 t/y by the end of the century due to good mineral potential and a liberalization of the country's mining laws.

Gold production in 1996 at Ashanti Goldfield Company Limited's Oabusi mine was expected to total 25 t. Production at the Oabusi gold mine is derived from underground, open-pit and tailings retreatment operations. Total reserves at the Oabusi mine are 91 Mt grading 7.1 g/t gold. Ashanti Goldfields is owned by Lonrho plc (41.3%) and the Ghana government (31.3%), with institutional and private investors owning the remainder.

During the past year, Ashanti Goldfields acquired three companies that will enable its gold production to grow to around 40 t/y by 1998. The three acquisitions were Cluff Resources, which operated the Ayanfuri mine (1 t/y) in Ghana and the Freda Rebecca mine (3 t/y) in Zimbabwe; Golden Shamrock Mines Ltd., the owner of the Iduapriem mine (6 t/y) in Ghana and the Siguri project in Guinea; and International Gold Resources, who had the rights for the Bibiani deposit in Ghana.

Pioneer Group Inc.'s Terebie Goldfields mine increased production from 5.5 t to 7.8 t at the end of 1995. An additional expansion could boost its production to over 12 t/y by 1998.

GoldFields of South Africa Limited announced a production increase at the Tarkwa mine complex. In addition to the current underground operation which produced 1.4 t in 1996, Goldfields will commission an open pit that will increase production from its current level of 1.4 t/y to 9 t/y by the year 2000. The total resource at Tarkwa is 286.6 Mt grading 1.4 g/t gold.

Zimbabwe

Zimbabwe's gold production increased by 2 t to 28 t in 1996. Zimbabwe's largest operation is Ashanti Goldfields' Freda Rebecca mine with an output of 3 t/y.

Mali

Production at the Syama gold mine in Mali was estimated at 3.5 t in 1996. BHP Minerals sold its 65% ownership in Syama to Randgold Resources. The other owners are the government of Mali (20%) and the International Finance Corporation (IFC) (15%). The deposit is expected to contain 100 t of gold. According to Randgold, production at Syama should increase to 6 t/y within two years.

Anglo American Corporation of South Africa Ltd. started production at the Sadiola mine in early 1997. Once in full production in the summer of 1997, Sadiola will produce 11 t/y of gold. Its reserves are estimated at 50 Mt grading 2 g/t gold. Anglo American Corporation and International African Mining Gold Corp. (IamGold) each own 38% of the project, while the government of Mali and the IFC own 18% and 6% respectively.

Latin America and Mexico

Currently, there are several foreign companies pursuing gold mining projects in Latin America, particularly in Brazil, Chile, Peru, Mexico, Argentina and Venezuela. In the region, a number of state-owned enterprises in Brazil, Peru and Venezuela are currently in the process of being privatized. Because of these factors, South American gold output could increase from its 1996 level of nearly 300 t to 400 t/y by the turn of the decade.

Brazil

Brazil's 1996 gold production was expected to have declined by 2 t to 65 t. Mining companies accounted for approximately 65% (42 t) of production in 1996, while the Garimpeiros' share of output continued to decline to 35% (23 t).

With the introduction of new constitutional reforms that enable foreign companies to hold 100% interests in Brazilian operations, as well as the introduction of a new mining code, it is expected that gold mining investment in Brazil will continue to increase over the next three years.

The sharp decline in the Garimpeiros' production from its peak of 90 t in 1989 is mainly due to the depletion of easily accessible alluvial gold deposits, more stringent environmental regulations, and restricted land access to certain regions, particularly in the Amazon. The number of Garimpeiros, which was estimated at one million in 1989, the year when Brazilian gold production peaked at 101 t, has declined to less than 300 000 in 1996.

Production by the state-owned Companhia Vale Rio Doce (CVRD), Brazil's largest gold producer, was expected to reach 18 t in 1996. CVRD plans to increase production to around 30 t/y by the year 2000. Currently, the Igarape Bahia mine is the company's largest gold mine with an output of 10 t in 1996.

To achieve its objective of producing around 30 t/y by the year 2000, CVRD plans to bring its newly discovered Serra Leste project on stream, which is reported to contain 150 t of gold. In addition, CVRD and Mineracao Morro Velho are currently trying to reach a financing agreement to develop the Salobo copper-gold deposit that could produce 8 t/y of gold by the year 2000. In view of the rapid expansion of its production in the country, CVRD is planning to build a gold refinery in Para State. Currently, Brazil has two refineries located in Rio de Janeiro and Sao Paulo.

A major unknown that could significantly affect CVRD's expansion projects are the Brazilian government's plans to privatize its 51% ownership of CVRD in the first half of 1997. The government estimates that its holding in CVRD has a value of around US$5 billion.

Mineracao Morro Velho S.A. has become a wholly owned subsidiary of Anglo American Corporation following the purchase of a 51% interest from the Bozzano Simonson Group. Mineracao Morro Velho, which is Brazil's second largest gold producer with an estimated output of 10 t/y, operates the Morro Velho and Crixas mines.

William Resources bought the Jacobina Mineracao mine, which produces around 2 t/y, from Mineracao Morro Velho S.A. William Resources also plans to bring the Sabara mine on stream in 1997.

TVX Gold Inc. owns portions of two Brazilian operations. It has a 50% share in the Crixas Goias mine and a 33% share in the Brasilia mine, which is the second largest gold operation in Brazil. TVX and its partner RTZ-CRA announced that they plan to invest US$65 million to increase production at Brasilia to 8 t/y starting in 1998.

Eldorado Gold Corp. acquired the 3-t/y Sao Banto gold mine and the Piaba advanced gold deposit through a share exchange with the Gencor Group.

Peru

In 1995, Peru became Latin America's second largest gold producer, and in 1996 increased its production by 8 t to 60 t. According to officials of the Energy and Mines Ministry of Peru, its production could rise to 100 t/y by the year 2000. The portion of Peru's gold production that is derived from placer operations was around 22 t in 1995.

The Yanacocha open-pit heap leaching mine of Newmont Mining (51.4%), Compania Minera Condessa (43.6%) and the International Finance Corporation (IFC) (5%) remained South America's largest gold mine in 1996 with a production level of 25 t/y at a cash operating cost of US$95/oz. Total reserves at Yanacocha are estimated at around 200 t of gold.

Following the decision of the Superior Court of Peru, Newmont and the Compania Minera Condessa shared on a proportional basis the 24.3% equity ownership of the Bureau de Recherches Géologiques et Minières (BRGM) in Yanacocha. The Superior Court of Peru ruled that BRGM could not sell its ownership in Yanacocha to a third party without a prior sale offer to its joint-venture partners.

Barrick Gold Corporation acquired the Pierina project from Arequipa Resources Ltd. Pierina, which is an early-stage exploration project, could have an annual output of 15 t of gold within a few years.

Barrick Gold Corporation also announced that it will not go ahead with the Cerro Corona project, which is estimated to contain 90 t of gold.

Chile

Chile's 1996 gold production grew by 5 t to around 53 t. According to Chilean government officials, the country's annual gold production could reach 60 t by the year 2000. Approximately 6 t, or 15%, of Chile's gold production was as a by-product of copper mining.

Barrick Gold Corporation operates the El Indio and Tambo mines, which together produced 10 t of gold in 1996. Barrick will also bring the Pascua mine (formerly called Nevada), located 30 km north of the El Indio complex, on stream in 1998. The cost of developing this project is US$300 million, and its production is expected to range between 9 and 12 t/y of gold depending on the results of future exploration. Current reserves are around 200 t of gold.

Cyprus Amax and Bema Gold Corporation started production at the Refugio property in February 1996. The US$130 million heap leach mine is expected to produce 7 t/y of gold for a period of 9.4 years. Reserves at the Refugio mine are 101 Mt grading 1 g/t gold.

Compania Minera Dayton de Chile Ltda commissioned the 4-t/y Andacollo gold mine in early 1996. The mine has reserves of 32 Mt grading 1.2 g/t gold. The development cost of the Andacollo project is expected to be US$100 million, and the mine is expected to operate for a period of eight years.

Production at the La Coipa mine of Placer Dome Inc. and TVX Gold Inc. stood at around 4 t of gold and 210 t of silver in 1996.

Teck Corporation and Anglo American Corporation announced that they will produce around 10 t/y of gold at the Lobo-Marte mine by the year 2000.

Mexico

Gold production in Mexico is also expected to grow very rapidly from its current level of around 20 t/y, which will consolidate Mexico's position as Latin America's fourth largest gold producer. As with other Latin American countries, Mexico's gold production outlook is fueled by foreign investment.

Currently, Industrias Penoles is Mexico's largest gold producer with an output of 7 t/y. The La Cienega mine is Mexico's largest gold mine with an estimated output of 3 t/y. Corporacion San Luis started production in 1996 at the Malanoche mine in Durango State at a production rate of 1 t/y. Geomaque Explorations Ltd. started production at the San Francisco gold mine in Mexico. San Francisco's production capacity will be increased from its current rate of 1.5 t/y to 2.5 t/y by 1998 following the doubling of reserves to 43 t. William Resources started production at the 1.3-t/y Velardena mine in Mexico. Great Lake Minerals started production at the 1-t/y Lluvia de

Oro mine in 1996. The Lluvia de Oro heap leaching mine has reserves of 0.7 Mt grading 1 g/t gold.

Several projects are also anticipated to come on stream within the next few years. Metallica Resources Inc. is scheduling a production start-up at the Cerro San Pedro gold project in 1998. The future mine, which is expected to produce 4.5 t/y of gold, has reserves of 77 Mt grading 0.6 g/t gold and 24.8 g/t silver.

Echo Bay Mines Ltd. (60%) and Viceroy Resources Corporation (40%) also anticipate producing 4 t/y of gold at the Paredones Amarillios mine. The future mine has reserves of 36 Mt grading 1.1 g/t of gold.

A decision is expected to be taken on Placer Dome Inc.'s 70%-owned Mulatos property in Sonora State, which has an identified geological resource of 30 t of gold. Other promising projects include Cambior's (50%) and Corporación San Luis's (50%) Metates project in Durango State that shows a mineral inventory of 400 Mt grading 1 g/t gold. Teck Corporation and Miral Gold plan to complete a feasibility study in 1997 on the Nukay project. Miral Gold currently operates a small mine that produces 0.5 t/y of gold at the site.

Bolivia

Bolivia's gold production was expected to rise to 20 t in 1996, and its future growth is being triggered mainly by the privatization of assets and expansions at the Korri Kollo mine.

Battle Mountain Gold Co. (88%) and Zeland Mines SA (12%) were expected to produce a total of 12.5 t of gold in 1996 following a US$150 million expansion program at the Korri Kollo mine. Current gold recoveries at the 19 000-t/d mine are 70%. Reserves at Korri Kollo total 40 Mt grading 2.2 g/t gold and 15 g/t silver.

Venezuela

Venezuela's gold production, estimated at 20 t in 1996, was mostly attributed to placer mining by several small private miners. State-owned Minerven is currently Venezuela's largest gold producer with an estimated output of 7 t/y. The remainder of Venezuela's gold production is mostly from artisanal miners.

Placer Dome Inc. and Coporacion Venezolana de Guayana signed a definitive shareholders agreement and reached agreement on the terms for construction of the mine and power line required to develop the Las Cristinas gold mine. The environmental permits and the wholesale tax exemption are the two outstanding issues that remain to be resolved.

The Las Cristinas deposit, which was found in 1992, is owned 70% by Placer Dome Inc. and 30% by Corporacion Venezolana de Guayana. According to Placer Dome's feasibility estimates, the Las Cristinas mine has a resource of 233 Mt grading 1.21 g/t gold. Gold production at Las Cristinas is expected to average 15 t/y over a period of 16 years, while the development cost is estimated at US$576 million.

The government of Venezuela is currently in the process of implementing economic reforms, including moving from a fixed to a floating currency, to make the country more attractive.

Argentina

Argentina's gold production should grow very rapidly from its current level of 1 t/y. Several projects, mainly gold-copper, are expected to come on stream before the year 2000.

The most promising project is the Bajo de la Alumbrera copper-gold project of MIM Holdings Ltd. (50%), North Ltd. (25%) and Rio Algom (25%) that will start production in 1997 at a rate of 21 t/y. According to feasibility estimates, this mine has reserves of 581 Mt grading 0.67 g/t gold and 0.52% copper. The project is expected to have an average production level of 20 t/y for a 20-year period.

Amsa, a subsidiary of Anglo American Corporation and Perez Companac, is expected to bring the Cerro Vanguardia mine on stream in 1998. The US$180 million project is expected to produce 6.5 t/y of gold.

To facilitate the development of mineral deposits that are close to the Chilean-Argentinean border, the governments of Chile and Argentina agreed to offer full border cooperation during the construction and operational phases of the mines.

Guyana

Production at Omai Gold Mines Limited's Omai mine resumed in February 1996 following the collapse of the tailings dam in August 1995. A Commission of Enquiry created by the government of Guyana determined that the tailings dam breach occurred because of improper design. In February 1996, the Omai mine was allowed to re-open using a new tailings impoundment facility. Production at Omai in 1996 was 7.9 t. An expansion of the mine/milling facility from 12 000 t/d to 20 000 t/d is expected to increase output to 10.6 t in 1997. Total reserves at Omai are 69 Mt grading 1.5 g/t gold. Omai Gold Mines Limited is owned by Cambior (65%), Golden Star Resources Ltd. (30%) and the Guyana government (5%).

CONSUMPTION AND USES

Total world fabrication demand for gold in 1996 increased by about 1% to reach 3300 t. Gold jewellery demand has nearly doubled in the past 10

years, and it exceeded total world production of gold by 500 t in 1996. World gold jewellery manufacturing increased by about 2% to 2800 t in 1996.

Other important sectors where gold is in demand include electronics, dentistry and coinage. World demand from the electronics sector in 1996 decreased by around 1% to 200 t. Japan accounts for nearly 40% of fabrication in this sector. Demand for coinage decreased by 25% from 90 t in 1995 to 65 t in 1996. The coinage market is subject to volatility from gold speculative trends and to commemorative coin issues. Dentistry fabrication was stable at around 60 t, with Japan accounting for 28% of that market.

India is by far the largest consumer of gold in the world accounting for 500 t in 1996. Following India, the United States consumed 345 t and China consumed 250 t. The future growth in Asian countries is expected to remain the driving force behind the gold market. Consumption demand from India and the United States increased by 6% in 1996. Major consumption declines took place in Japan (a 41% decline) and China. Investment demand in Japan experienced a major decline from 160 t in 1995 to 57 t in 1996 despite Japanese investor purchases of a record 39 t of gold for their Gold Accumulation Plans in 1996. Several Japanese investors decided to sell at a profit after the decline in the yen gold price to a 12-month low. In China, the restrictive monetary policies of the Chinese government have been having a dampening effect on the overall demand for gold in that country.

Canada's gold fabrication demand decreased to around 25 t in 1996 from 28 t in 1995. The decrease was attributable to a major decline in sales of gold Maple Leaf coins from 10.1 t in 1995 to 6.8 t in 1996. Aside from coin production, gold fabrication demand in Canada in 1996 was: jewellery, 13 t; electronics, 0.4 t; and dentistry and other industrial uses, 0.5 t. It was estimated that jewellery consumption in Canada stood at 20 t in 1996.

The Royal Canadian Mint produces two official coins that contain gold: a numismatic gold coin containing one quarter of an ounce of gold, and the gold Maple Leaf coin containing 1 ounce. Since its introduction in 1979, the Maple Leaf coin program has consumed some 510 t of gold, or 24.3% of total Canadian gold production during that period. In 1996, the gold Maple Leaf coin ranked third behind Austria's Philharmonic coin and the Australian Nugget.

OUTLOOK

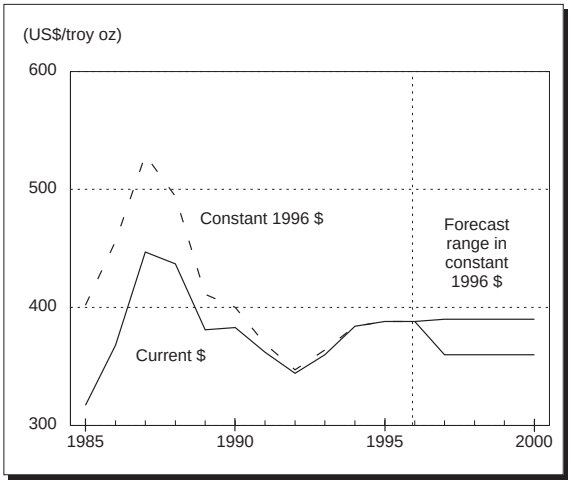
The world's current economic growth, low inflation rates and the relative stability of its political climate should help keep gold prices relatively stable in the short term. It is expected that fabrication demand will continue to exceed gold production in the future. However, central banks, as well as private sales, are expected to continue to narrow that gap, especially when market conditions are positive. There will be a continuing threat of central bank sales in 1997, particularly by those European countries that want to achieve criteria for the European Monetary Union by 1999. In addition, the potential sale of 150 t of gold by the International Monetary Fund (IMF) will also continue to impact on the market, given that the IMF has total gold holdings of 3200 t.

In 1997, a 2-3% increase in total gold fabrication demand is anticipated, with the jewellery sector being responsible for most of that growth. The current low real interest rates are positive for the gold market. However the strengthening of the U.S. currency, particularly vis-à-vis other currencies such as the Japanese yen and the Deutsche Mark, will likely continue to dampen growth in gold consumption. In addition to the current low inflation levels, attractive returns from paper assets and increasing gold production creates bearish sentiments for the gold market. Producer hedging will likely dampen future rises in the price of gold. Finally, with the increase in production by several emerging countries, it is expected that world gold production will increase at an average rate of 1-2% per year for the next five years.

In 1997, an average gold price of US$350/troy oz is forecast, compared to $388/oz in 1996. In the medium term, the combined effect of increased demand for gold products, particularly in the jewellery sector, along with a moderate increase in world gold production, should result in some strengthening in the price of gold. For the rest of the decade, an average annual gold price in constant 1996 dollars of between US$360 and $390/oz is forecast.

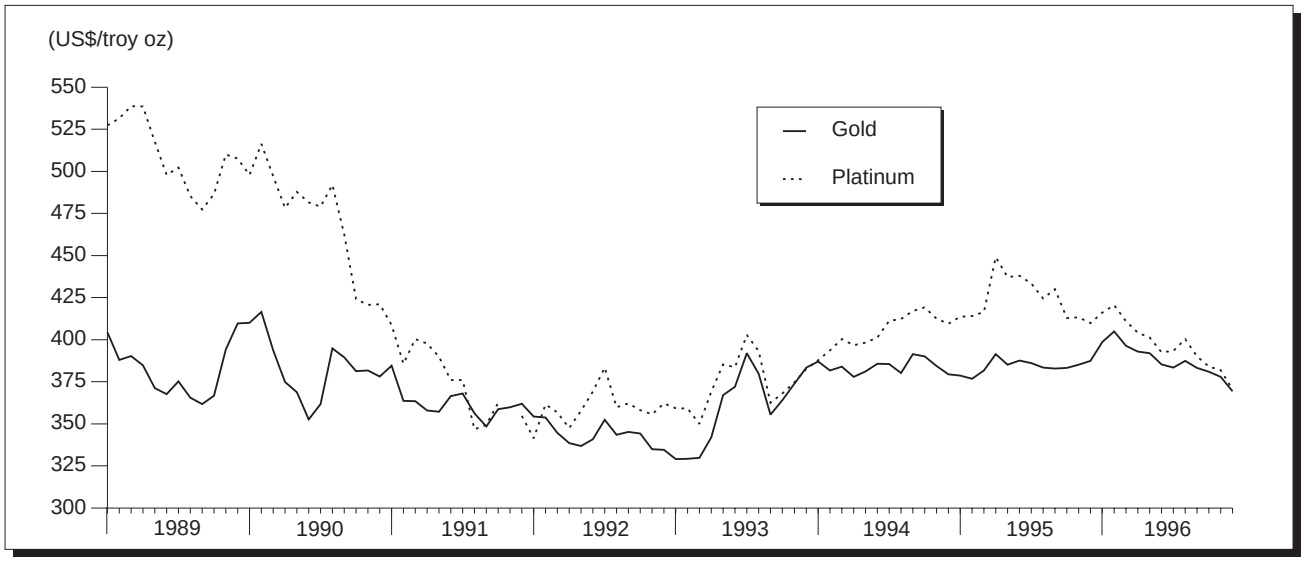
Notes: (1) For definitions and valuation of mineral production, shipments and trade, please refer to Chapter 70. (2) Information in this review was current as of February 15, 1997.

Figure 3
Gold Prices, Annual Average, 1985-2000



Sources: Natural Resources Canada; London Bullion Market Association.

Figure 4
Precious Metal Prices, Monthly Averages, 1989-96



Sources: London Bullion Market Association; Johnson Matthey Public Limited Company.

TARIFFS

Item No.	Description	Canada			United States	EU	Japan[1]
		MFN	GPT	USA	Canada	MFN	GATT
71.08	Gold (including gold plated with platinum) unwrought or in semi-manufactured forms, or in powder form						
	Non-monetary						
7108.11.00	Powder	Free	Free	Free	Free	1.6%	Free
7108.12.00	Other unwrought forms	Free	Free	Free	Free	Free	Free
7108.13	Other semi-manufactured forms						
7108.13.10	Of a purity of 10 carats or more	Free	Free	Free	Free	Free-1.6%	Free
7108.13.20	Of a purity of less than 10 carats	5.6%	3%	Free	Free	Free-1.6%	Free

Sources: Customs Tariff, effective January 1997, Revenue Canada; Harmonized Tariff Schedule of the United States, 1997; The "Bulletin International Des Douanes," Journal Number 14 (18th Edition), European Union, 1995-1996, "Conventional" column; Customs Tariff Schedules of Japan, 1996.

[1] GATT rate is shown; lower tariff rates may apply circumstantially.

TABLE 1. CANADA, GOLD PRODUCTION AND TRADE, 1995 AND 1996

Item No.		1995		1996p	
		(kilograms)	($000)	(kilograms)	($000)
PRODUCTION					
	Newfoundland	2 685	45 516	2 820	48 165
	Prince Edward Island	–	–	–	–
	Nova Scotia	–	–	–	–
	New Brunswick	252	4 267	222	3 790
	Quebec	40 285	682 912	41 787	713 598
	Ontario	62 865	1 065 682	74 274	1 268 377
	Manitoba	3 479	58 974	6 134	104 743
	Saskatchewan	2 762	46 829	3 109	53 099
	Alberta	21	348	20	348
	British Columbia	19 325	327 600	17 822	304 344
	Yukon	4 792	81 239	4 501	76 856
	Northwest Territories	14 402	244 136	13 447	229 631
	Total	150 867	2 557 502	164 136	2 802 952
	Mine output	152 032	..	165 926	..
EXPORTS					
2600.00[1]	Gold in ores and concentrates	7 066r	62 783r	5 466	65 576
7108.11	Gold powder				
	United States	20	344	16	282
	United Kingdom	1 740	27 132	–	–
	Belgium	380	335	–	–
	Japan	1 118	17 168	–	–
	Total	3 258	44 979	16	282
7108.12	Other unwrought forms				
	United States	101 990	1 723 337	131 181	2 223 892
	Switzerland	14 057	224 812	30 223	519 101
	Germany	5 529	89 372	12 322	210 364
	South Korea	2 153	34 113	8 650	146 419
	United Kingdom	1 055	4 395	3 664	64 741
	Japan	10 203	163 638	3 208	54 693
	Netherlands	–	–	1 497	26 462
	Hong Kong	16 770	282 576	1 500	25 686
	Singapore	1	19	995	16 938
	Other countries	8 906	143 595	125	2 026
	Total	160 664	2 665 857	193 365	3 290 322
7108.13	Other semi-manufactured forms				
	United States	4 600	74 399	2 960	47 297
	France	206	3 312	332	5 569
	Portugal	232	3 452	146	2 407
	United Kingdom	305	5 106	56	957
	Finland	–	–	18	305
	Thailand	87	1 286	16	274
	Costa Rica	–	–	10	185
	Other countries	100	1 578	7	128
	Total	5 530	89 133	3 545	57 122
	Total refined gold exports	169 452	2 799 969	196 926	3 347 726
IMPORTS[2]					
2600.00[3]	Gold in ores and concentrates	2 650	37 378	3 136	46 449
7108.11	Gold powder				
	United States	10	113	5	56
	Liberia	–	–	1	20
	Switzerland	–	–	1	8
	United Kingdom	1	9	...	7
	Other countries	...	4	1	7
	Total	11	126	8	98

TABLE 1 (cont'd)

Item No.		1995		1996p	
		(kilograms)	($000)	(kilograms)	($000)
IMPORTS (cont'd)					
7108.12	Other unwrought forms				
	United States	11 415r	152 560r	24 405	345 972
	Guyana	9 624	147 311	187 294	189 079
	Dominican Republic	–	–	9 673	34 105
	Surinam	–	–	2 116	25 457
	Hong Kong	–	–	622	11 217
	Australia	. . .	2	921	10 926
	Panama	415	1 543	1 777	9 459
	Other countries	909	9 958	298	4 608
	Total	22 363r	311 374r	227 106	630 823
7108.13	Other semi-manufactured forms				
	United States	1 142	12 392	1 352	10 522
	Switzerland	102	1 417	96	1 338
	Malaysia	–	–	13	236
	Germany	15	195	10	161
	Ecuador	–	–	6	71
	Italy	8	106	3	52
	Other countries	11	156	3	82
	Total	1 278	14 266	1 483	12 462
	Total refined gold imports	23 652	325 766r	228 597	643 383

Sources: Natural Resources Canada; Statistics Canada.
– Nil; . . Not available; . . . Amount too small to be expressed; p Preliminary; r Revised.
1 Includes HS classes 2603.00.82, 2607.00.82, 2608.00.82, 2616.10.82 and 2616.90.82. 2 Imports from "Other countries" may include re-imports from Canada. 3 Includes HS classes 2603.00.00.82, 2604.00.00.82, 2607.00.00.82, 2608.00.00.82, 2616.10.00.82 and 2616.90.00.20.
Note: Numbers may not add to totals due to rounding.

TABLE 2. CANADA, GOLD PRODUCTION BY SOURCE, 1975, 1980 AND 1985-96

	Auriferrous Quartz Mines		Placer Operations		Base-Metal Ores		Total	
	(kg)	(%)	(kg)	(%)	(kg)	(%)	(kg)	(%)
1975	37 530	73.0	335	0.6	13 569	26.4	51 433	100.0
1980	31 929	63.1	2 060	4.0	16 632	32.9	50 620	100.0
1985	67 241	76.8	3 464	4.0	16 857	19.2	87 562	100.0
1986	83 197	80.9	2 802	2.7	16 900	16.4	102 899	100.0
1987	94 723	81.8	4 009	3.5	17 086	14.8	115 818	100.0
1988	112 404	83.4	4 879	3.6	17 530	13.0	134 813	100.0
1989	138 211	86.6	5 354	3.4	15 930	10.0	159 494	100.0
1990	147 355	88.0	3 993	2.4	16 025	9.6	167 373	100.0
1991	153 859	87.8	3 834	2.2	17 589	10.0	175 282	100.0
1992	141 965	88.5	3 469	2.2	14 917	9.3	160 351	100.0
1993	137 346	89.7	3 787	2.5	11 997	7.8	153 129	100.0
1994	133 018	90.8	3 714	2.5	9 696	6.6	146 428	100.0
1995	132 834	88.0	5 303	3.5	12 730	8.4	150 867	100.0
1996p	146 377	89.2	3 974	2.4	13 785	8.4	164 136	100.0

Source: Natural Resources Canada.
p Preliminary.
Note: Numbers may not add to totals due to rounding.

TABLE 3. WORLD MINE PRODUCTION OF GOLD, 1980 AND 1989-95

	1980	1989	1990	1991	1992	1993	1994	1995
				(tonnes)				
South Africa	675.1	607.5	605.1	601.1	614.1	619.5	583.9	522.4
Canada[1]	50.6	159.5	167.4	175.3	160.4	153.1	146.4	150.9
United States	30.5	265.7	294.2	296.0	329.1	332.1	326.0	329.3
Other Africa								
Ghana	10.8	15.3	17.3	27.3	33.3	41.4	44.5	52.2
Zimbabwe	11.4	16.6	17.9	19.1	19.9	20.7	22.5	26.1
Other	11.0	35.8	35.3	43.5	48.1	49.2	50.9	52.1
Total, other Africa	33.2	67.7	70.5	89.9	101.3	111.3	117.9	130.4
Latin America								
Brazil	35.0	101.2	84.1	78.6	76.5	75.7	73.4	67.4
Peru	5.0	12.6	14.6	15.1	18.0	27.4	39.3	51.5
Chile	9.3	29.0	33.3	33.0	39.3	38.5	43.3	48.5
Colombia	17.0	31.7	32.5	30.7	29.9	26.4	25.5	24.1
Mexico	5.9	10.8	9.6	8.5	10.4	11.1	13.9	20.3
Bolivia	2.0	11.5	10.4	10.0	7.9	12.1	14.7	16.0
Venezuela	1.0	17.1	14.2	13.2	11.7	11.2	13.7	17.1
Guyana	–	2.0	2.5	2.8	3.4	10.0	11.7	8.8
Ecuador	0.7	11.3	10.0	9.2	8.6	8.1	7.6	9.6
Other	15.6	9.8	9.1	9.0	9.2	8.2	8.5	11.1
Total, Latin America	91.5	237.0	220.3	210.1	214.9	278.7	251.6	274.4
Asia								
Indonesia	2.1	10.8	17.6	24.4	45.9	52.2	55.3	74.1
Papua New Guinea	14.3	33.8	33.6	60.8	71.2	61.5	60.5	54.8
Philippines	22.0	38.0	37.2	30.5	27.2	29.8	31.0	28.4
Japan	6.7	6.1	7.3	8.3	8.9	9.4	9.6	9.2
Other	5.0	13.7	12.7	14.6	16.2	18.6	19.4	20.4
Total, Asia	50.1	102.4	108.4	138.6	169.4	171.5	175.8	186.9
Europe	11.8	30.2	35.1	32.0	25.2	25.2	26.7	27.7
Oceania								
Australia	17.0	203.6	244.2	236.2	243.5	247.3	254.9	253.5
Other	1.0	9.4	10.1	10.3	14.3	15.0	14.1	14.9
Total, Oceania	18.0	213.0	254.3	246.5	257.8	262.3	269.0	268.4
Total, Western World	960.8	1 683.0	1 755.3	1 789.5	1 872.2	1 903.7	1 897.3	1 903.0
Other countries								
C.I.S.	..	285.0	270.0	252.0				
Russia	..	..	..	..	151.7	164.5	158.1	142.1
Uzbekistan	..	..	..	..	64.5	66.6	64.4	63.6
Other C.I.S.	..	..	..	..	13.5	17.6	20.0	21.2
China	..	86.0	95.7	104.2	113.1	121.0	124.1	136.4
North Korea	..	9.5	13.0	13.0	17.0	15.0	14.0	14.0
Mongolia	..	1.1	1.0	0.8	1.0	1.4	2.1	4.9
Total, other countries	..	381.6	379.7	370.0	360.9	386.1	382.7	382.2
Total, world production	..	2 064.6	2 135.0	2 159.5	2 233.0	2 289.8	2 280.0	2 272.1

Source: Consolidated Gold Fields PLC, "Gold 1996."
– Nil; .. Not available.
[1] Production figures for Canada were obtained from Natural Resources Canada.

TABLE 4. CANADA, GOLD PRODUCTION, AVERAGE VALUE AND PERCENT OF TOTAL MINERAL PRODUCTION, 1975, 1980 AND 1985-96

	Total Production	Total Value	Average Value[1]	Gold as a Percent of Total Mineral Production
	(kg)	($000)	($/g)	(%)
1975	51 433	270 830	5.27	2.0
1980	50 620	1 165 416	23.02	3.7
1985	87 562	1 219 653	13.93	2.7
1986	102 899	1 689 292	16.42	5.2
1987	115 818	2 204 472	19.03	6.1
1988	134 813	2 331 989	17.30	6.3
1989	159 494	2 315 860	14.52	5.9
1990	167 373	2 407 654	14.38	5.9
1991	175 282	2 338 614	13.34	6.7
1992	160 351	2 141 161	13.35	6.0
1993	153 129	2 284 991	14.92	6.2
1994	146 428	2 448 926	16.86	6.0
1995	150 867	2 557 502	16.95	5.9
1996p	164 136	2 802 952	17.08	5.7

Source: Natural Resources Canada.
p Preliminary.
1 Value is based on average London p.m. fix price for gold.

TABLE 5. GOLD FABRICATION IN DEVELOPED AND DEVELOPING COUNTRIES, 1980 AND 1987-95

Fabricated Gold	1980	1987	1988	1989	1990	1991	1992	1993	1994	1995
					(tonnes)					
DEVELOPED COUNTRIES										
Carat jewellery	318	585	671	814	867	879	922	891	890	898
Electronics	93	116	125	128	137	141	130	139	148	162
Dentistry	63	45	47	47	48	50	54	54	55	57
Other uses	58	51	54	57	57	57	60	60	62	65
Medals and fake coins	18	7	8	8	9	9	6	4	4	3
Official coins	170	171	88	88	89	121	77	98	58	75
Subtotal	719	975	993	1 142	1 207	1 257	1 249	1 246	1 217	1 260
DEVELOPING COUNTRIES										
Carat jewellery	196	685	909	1 146	1 232	1 298	1 597	1 451	1 487	1 639
Electronics	2	10	10	11	12	12	13	16	20	23
Dentistry	2	4	4	5	5	5	6	6	5	5
Other uses	4	7	8	9	11	11	20	34	36	37
Medals and fake coins	3	10	13	13	14	18	23	21	23	32
Official coins	21	36	42	47	29	18	13	15	18	12
Subtotal	228	752	986	1 231	1 303	1 362	1 672	1 543	1 589	1 748
TOTAL										
Carat jewellery	514	1 270	1 580	1 960	2 099	2 177	2 519	2 342	2 377	2 537
Electronics	95	126	135	139	149	153	143	155	168	185
Dentistry	65	49	51	52	53	55	60	60	60	62
Other uses	62	58	62	66	67	68	80	94	98	102
Medals and fake coins	21	17	21	21	23	27	26	25	27	35
Official coins	191	207	130	135	118	139	90	113	76	87
Total	946	1 727	1 979	2 373	2 509	2 619	2 918	2 789	2 806	3 008

Source: Consolidated Gold Fields PLC, "Gold 1996."
Note: Numbers may not add to totals due to rounding.

TABLE 6. AVERAGE ANNUAL GOLD PRICES, 1934-94, AND MONTHLY, 1993-96

Year	US$/oz	C$/oz	Year	US$/oz	$C/oz
1934-67	35	. .	1981	459.22	550.57
1968	38.82	41.82	1982	375.52	463.51
1969	41.13	44.29	1983	423.52	521.82
1970	35.97	37.54	1984	360.63	466.99
1971	40.87	41.27	1985	317.35	433.21
1972	58.22	57.66	1986	367.58	510.73
1973	97.22	97.24	1987	446.66	592.18
1974	158.80	155.36	1988	436.45	554.76
1975	160.96	163.76	1989	381.27	451.33
1976	124.78	123.01	1990	383.72	447.79
1977	147.80	157.10	1991	362.34	415.09
1978	193.51	220.74	1992	343.86	415.23
1979	305.69	358.12	1993	360.06	464.35
1980	614.38	719.08	1994	384.15	524.60

Month	1993		1994		1995		1996	
	(US$/oz)	(C$/oz)	(US$/oz)	(C$/oz)	(US$/oz)	(C$/oz)	(US$/oz)	(C$/oz)
January	328.99	420.28	387.14	509.53	378.74	535.16	398.70	545.02
February	329.31	415.13	381.66	518.66	376.75	527.45	404.92	556.77
March	329.89	411.34	384.00	523.87	381.82	537.22	396.35	540.62
April	341.95	431.37	377.91	522.70	391.34	538.88	392.87	533.91
May	367.04	465.96	381.18	526.06	385.23	523.91	391.99	536.63
June	371.98	475.61	385.71	533.63	387.62	534.14	385.25	526.25
July	392.03	502.66	385.45	532.98	386.14	525.54	383.46	525.34
August	379.80	496.28	380.21	524.14	383.50	519.64	387.51	531.66
September	355.56	469.45	391.37	529.95	382.93	517.72	383.29	524.72
October	363.99	482.54	390.16	526.82	383.20	515.79	380.91	514.23
November	373.94	492.37	384.38	524.32	385.21	521.19	377.85	505.56
December	383.40	510.57	379.48	526.91	387.44	530.02	369.34	502.67

Source: London Bullion Market Association, a.m. fix, compiled by Natural Resources Canada.
. . Not available.