

# Summary & Outlook

## Platinum

- Autocatalyst demand rebounded by 14 per cent as diesels gained market share and auto makers bought more platinum for use on gasoline vehicles.
- Consumption in jewellery fell 1 per cent as weakness in Japan outweighed growth in China and the rest of the world.
- Strong offtake for the manufacture of computer hard disks and LCD glass boosted industrial demand by 8 per cent.
- Investment demand was negative as investors sold back large bars in Japan and sales of coins halved.
- Supplies rose by 9 per cent as a doubling of Russian sales outweighed a decline in output from western mines.
- Following the record deficit in 1999, another shortfall in 2000 helped propel prices to \$625 in December, 50 per cent above the January low.

Platinum Supply and Demand '000 oz		
	1999	2000
<b>Supply</b>		
South Africa	3,900	3,800
Russia	540	1,100
North America	270	285
Others	160	105
<b>Total Supply</b>	<b>4,870</b>	<b>5,290</b>
<b>Demand</b>		
Autocatalyst: gross	1,610	1,840
recovery	(420)	(470)
Jewellery	2,880	2,840
Industrial	1,340	1,450
Investment	180	(60)
<b>Total Demand</b>	<b>5,590</b>	<b>5,600</b>
Movements in Stocks	(720)	(310)

## Overview

Demand for platinum in 2000, at 5.6 million oz, was marginally up on the record level achieved in 1999, but the pattern of consumption was significantly different from that of recent years. Sales to the auto industry rose after declining in each of the previous three years, while industrial demand grew once again. However, jewellery demand fell for the first time in seventeen years, and net investment was negative with significant numbers of large bars being sold back to the market by investors in Japan.

The largest growth sector was the auto industry where demand increased by 250,000 oz to reach 1.84 million oz. In the European car market, the share taken by diesel engines rose to almost one third and this, coupled with the

imposition of Euro Stage III emissions regulations, boosted platinum use. In North America the major portion of the increase in demand came from stock building by auto companies that expect to use more of the metal to replace palladium in future.

Industrial demand rose by 110,000 oz to 1.45 million oz, with further increases in the use of the metal in computer hard disks and in plant for the production of speciality glass, especially for liquid crystal displays.

A fall in jewellery fabrication in Japan was the cause of the first decline in this sector since 1985. Increased recycling of old jewellery, combined with a loss of market share to white gold at the cheaper end of the market, led to a 20

per cent fall in Japanese demand. As a result, Japan was overtaken as the largest market for platinum jewellery by China, where demand exceeded 1 million oz for the first time. Total jewellery demand fell by 40,000 oz to 2.84 million oz.

Investment demand was weak, with sales of coins and investment bars halving to 40,000 oz and a net sellback of 100,000 oz of large bars in Japan.

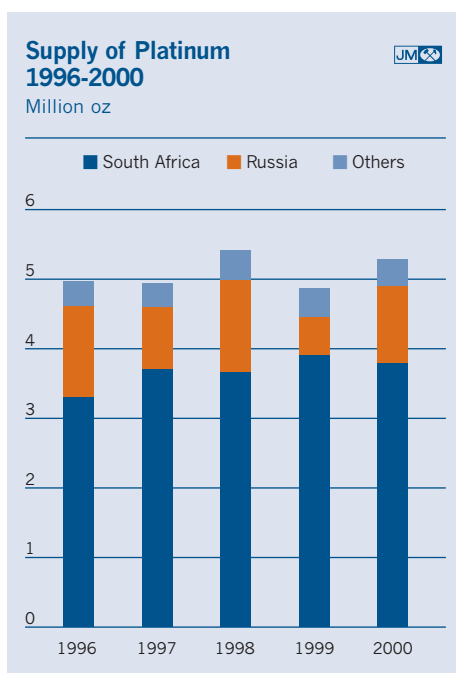
Supplies of platinum rose by 420,000 oz to 5.29 million oz and would have been significantly higher if the output of mines in South Africa had met plans. A combination of exceptionally bad weather in the first quarter and a strike at Anglo Platinum later in the year, reduced South African supplies by 100,000 oz compared with 1999. The shortfall was

more than made up for by higher shipments from Russia. Freed from the restrictions imposed by the Clause 19 problem of the previous year, Russian supplies more than doubled to 1.1 million oz.

Despite the 9 per cent increase in total supplies, they once again failed to match the level of demand. The deficit, at 310,000 oz, was not as large as in 1999, but the combined shortfall of just over 1 million oz in two years put pressure on the price of platinum, which rose steadily through the year from a low of \$414 in January to a high of \$625 in December.

## Supply

The South African platinum industry enjoyed record profits in 2000 and all the major mining companies announced plans to expand output. Expansion plans already underway had been expected to yield increased output in 2000. However, extraordinarily heavy rainfall in the early part of the year reduced mining and milling rates at both Anglo Platinum's and Impala's operations in the Rustenburg area. This, coupled with a strike at Anglo Platinum in September, outweighed increased production at Lonmin and Kroondal and resulted in a 3



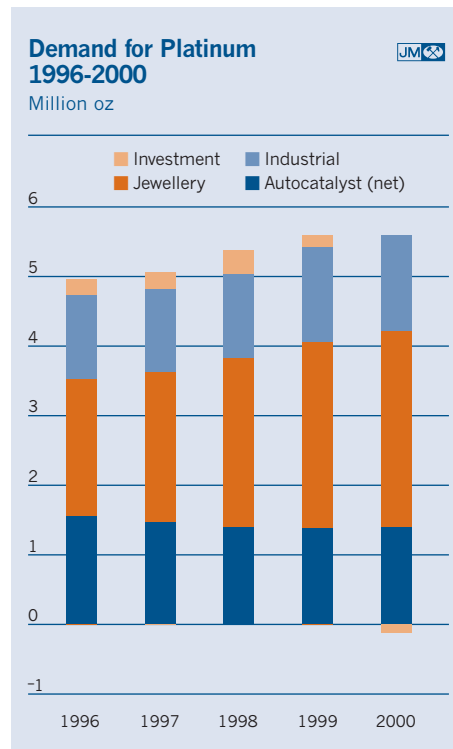
per cent fall in South African supplies to 3.8 million oz.

Assuming that operational problems do not recur on last year's scale, the South African platinum mines should produce significantly more platinum in 2001. Further growth can be expected in future years, with the existing mining companies having already announced expansions totalling around 2 million oz, and having indicated that they plan to increase output even more. The basket of pgm prices was at an all time high in 2000 and South African producers are using the funds generated from the buoyant market to invest to meet expected growth in demand.

The most aggressive expansion is by Anglo Platinum, which has scheduled an increase in its platinum output from the 1.87 million oz produced in 2000 to 3.5 million oz by 2006. Impala, directly and through its subsidiary Barplats, is planning to add 250,000 oz to its capacity. The company will also increase its refinery output through its concentrate purchase agreements with Aquarius and Messina, assuming their projects proceed as planned.

The third largest South African producer, Lonmin, had already committed to add at least 200,000 oz to output at its mines and in April 2001 announced a joint venture with Anglo Platinum that will mine a further 250,000 oz of platinum. Northam, the other current producer, expects to increase its output by 50,000 oz by mining UG2 ore for the first time.

After a year of sharply reduced sales in 1999, Russia exported 1.1 million oz of platinum last year. Delays in presidential approval of export quotas and licences prevented sales in the first quarter of the year and it was not until April that metal began to flow to the west. Thereafter, strong demand enabled the Russians to supply platinum in excess of current production levels without negatively impacting the rising price.



However, not all Russian production from last year was sold; the alluvial producers of Koryak and Kondyor in the Far East of Russia were once again denied export quotas. As a result their only option was to sell metal on the internal market, where the prices offered by Gokhran and the Central Bank were substantially lower than the world price. It is reported that the producers declined to sell at least part of their output in 2000 in protest against the discount.

As in the previous four years, the granting of export licences and quotas has again been problematic in early 2001. Reports suggest that President Putin signed the quotas in mid March, but the procedures for issuing export licences appear to have delayed exports and there was little sign of Russian sales until April. The indications are that one year quotas have been granted to Norilsk Nickel and, for the first time, to the alluvial producers of the Far East. Without knowledge of the level of quotas, the impact this may have on total Russian shipments in 2001 is difficult to predict.

Supplies from other western mines declined by 9 per cent in 2000. Although

production at Stillwater was up, a strike at Falconbridge impacted Canadian output and supplies from Zimbabwe fell due to the closing in 1999 of the Hartley Platinum mine.

## Demand

After sixteen years of continuous growth in jewellery demand, the rising price of platinum began to have a negative effect in 2000, and demand fell back by 1 per cent to 2.84 million oz. The decline was entirely due to weakness in the Japanese jewellery market, where fabrication demand fell by 20 per cent to 1.06 million oz. In contrast, jewellery manufacturers' demand for platinum grew in all other regions, although at lower rates than in recent years. Demand in China rose to 1.1 million oz and for the first time exceeded the level of Japan.

Retail sales of platinum pieces dropped by 4 per cent in Japan but, despite its rising price, platinum maintained its market share amongst products priced at over ¥37,500. At lower levels, where the cost of the precious metal is a more significant component of the overall price of the product, platinum

lost some market share to gold. The loss was almost entirely to white gold, indicating that the fashion for white metal jewellery continued in Japan.

Demand for platinum from jewellery manufacturers fell more sharply than the decline in pieces purchased. The wholesale and retail chain in Japan is complex and has provided opportunities for inventory reduction as the economy has stagnated in recent years. The high price of platinum in 2000, coupled with the poor economic outlook in Japan, appears to have encouraged some holders of old jewellery stock to return products for melting.

In China, consumers' desire for platinum jewellery continued on its upward path and demand exceeded 1 million oz for the first time. In the second half of the year, however, a number of difficulties became apparent. The mark up on platinum jewellery in China is lower than in most other markets; as the price of platinum rose during the year, retail prices failed to keep pace and margins for manufacturers and wholesalers were squeezed.

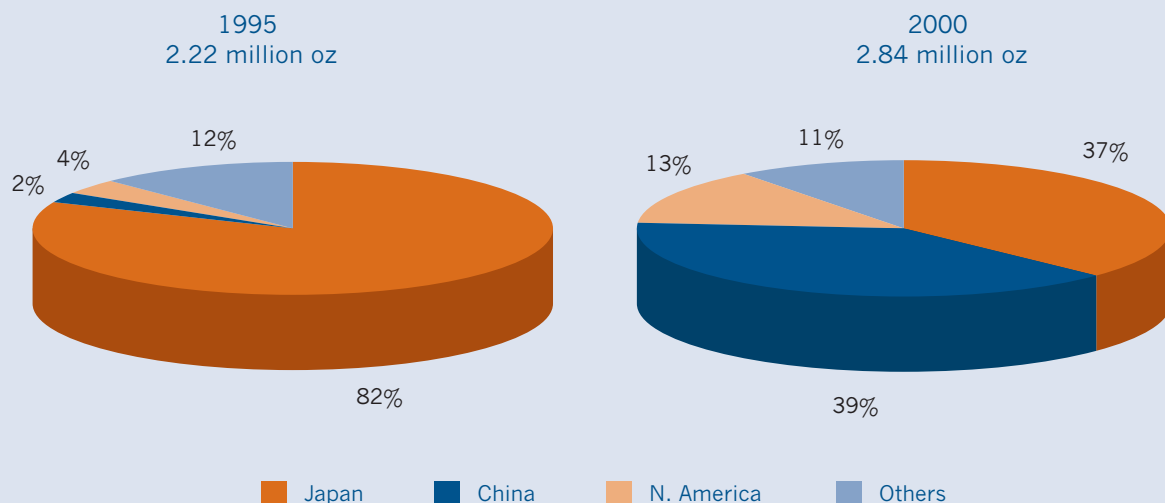
In addition, there was a burst of

activity by the Chinese tax authorities investigating the payment of import and local taxes on many goods, including jewellery, which appears to have caused some manufacturers to reduce, or even temporarily halt, their activities.

Consumption of platinum jewellery grew again in the USA as strong economic growth for much of the year fuelled sales of upmarket products. Platinum also benefited from a continued fashion trend towards white metal jewellery. Demand for platinum jewellery remains concentrated in the bridal sector but imports of lightweight chain are significant and a number of domestic manufacturers have begun to compete in this market segment.

Growth in the USA may be lower this year as the deceleration of the US economy that began in the last quarter of 2000 is expected to have an impact on consumer spending on luxury goods. This, coupled with the high price of platinum relative to gold, is likely to limit the penetration of platinum into the price sensitive fashion jewellery sector, although it should have less impact in the bridal market, where further increases in

Platinum Demand for Jewellery by Region  
1995 and 2000





Valero Energy Corporation's Krotz Springs refinery in Louisiana, USA

platinum demand can be expected.

In Europe the greatest advance for platinum in 2000 occurred in the UK market, where the weight of platinum jewellery submitted for hallmarking increased by 28 per cent. As in many other developing markets for platinum jewellery, the UK bridal sector has been the first segment to show substantial growth, but some retailers have now started to offer other platinum jewellery products, such as lightweight chain imported from Italy.

In the auto sector, demand for platinum grew for the first time since 1996, with purchases by auto makers rising by 230,000 oz to 1.84 million oz. Much of the increase was due to the growth in sales of diesel cars in Europe and the need for heavier catalyst loadings to meet Euro III emission standards. These came into effect for new models in January 2000 and will apply to all vehicles this year. Further growth in demand can be expected in 2001 as more European consumers buy modern, fuel-efficient, diesel engines.

Most auto makers worldwide have become increasingly concerned about the rising price of palladium, and perhaps also its future availability, and are exploring ways to reduce their dependence on palladium by using more platinum in catalysts fitted to gasoline engines. Developments in catalyst technology are making it increasingly

feasible to substitute at least part of the palladium currently used by platinum, possibly by also adding some rhodium to the pgm mix. However, palladium is likely to remain to meet the most severe emissions regulations, especially in multi-brick systems where palladium-rich catalysts close to the engine manifold can be combined with platinum-rich bricks in the cooler underfloor position.

Some auto companies appear to have bought more platinum than they needed last year in order to build up stocks of the metal for future usage. This was the main reason for the 16 per cent increase in platinum demand in the North American auto sector in 2000.

In California, the Zero Emission Vehicle (ZEV) mandate is due to come into effect in 2005. After a thorough review last year, the California Air Resources Board (CARB) confirmed the legislation in January 2001. This will support the introduction of fuel-cell powered cars. The growing membership of the California Fuel Cell Partnership, which now includes eight major auto companies and a number of energy and fuel-infrastructure suppliers, reflects the momentum behind the development of fuel cell vehicles.

There was an 8 per cent increase in demand for platinum for industrial applications in 2000, with the greatest gains in the electrical and glass sectors, which grew by 23 and 28 per cent respectively.

The penetration of platinum techno-

logy into the manufacture of computer hard disks continued last year. Magnetic layers made from alloys containing platinum are now used in more than 90 per cent of all hard disks manufactured and this proportion is expected to increase further in 2001.

Manufacturing of high precision glass for liquid crystal displays (LCDs) advanced sharply in 2000. LCD technology is now gaining share of the markets for computer displays and televisions, and is already widely used in smaller electronic goods such as digital cameras and mobile phones. The consequent growth in demand for LCD glass stimulated expansion in plants to manufacture this material. As platinum-rhodium equipment is used in the manufacture of LCD glass there was a burst of activity in purchasing metal for this application which contributed to an increase demand in the glass sector to 255,000 oz.

Demand for platinum fell in the manufacture of traditional products such as nitric acid for fertilisers, and catalysts for the chemical and petroleum industries. This was largely balanced by continuing growth in demand for smaller uses such as spark plugs, sensors, medical devices and pharmaceuticals.

For the first time in twenty years net investment in platinum was negative. Bullion coin sales were largely confined to the American Eagle, but sales by the US Mint declined by over 60 per cent to 27,000 oz. The continuing interest in platinum from numismatists in the USA was shown as they purchased almost 25,000 oz of proof platinum Eagles, and 9,500 oz of Library of Congress bimetallic coins in platinum and gold. Some bullion coins and bars were sold back to the market by investors who took the opportunity afforded by high prices to realise profits. Net sales of coins and small investment bars, at 40,000 oz, were just under half of the previous year's level.

Positive demand in the small investment sector in 2000 was outweighed by

sales back to the market by holders of large platinum bars in Japan. The price of platinum in yen terms rose to levels not seen in Japan since 1990 and encouraged investors to sell three to four times as many bars as they bought last year. With the yen price of platinum having been below ¥2,000 for most of the 1990s, it is to be expected that a further significant proportion of the large bars sold over the past decade may be returned to the market if prices remain significantly above that level.

## Outlook

After two years of deficits the platinum market is expected to move closer to balance in 2001. Despite reduced forecasts of economic activity, demand for platinum is expected to rise once again. The main driver is likely to be the auto industry as sales of diesel-powered vehicles in Europe increase and as more manufacturers worldwide seek to add platinum to autocatalysts on gasoline vehicles to reduce their dependence on palladium.

Demand for platinum in industrial applications is also expected to rise,

though probably at a lower rate than over the past two years as the effects of a slowdown in world economic activity become more pronounced.

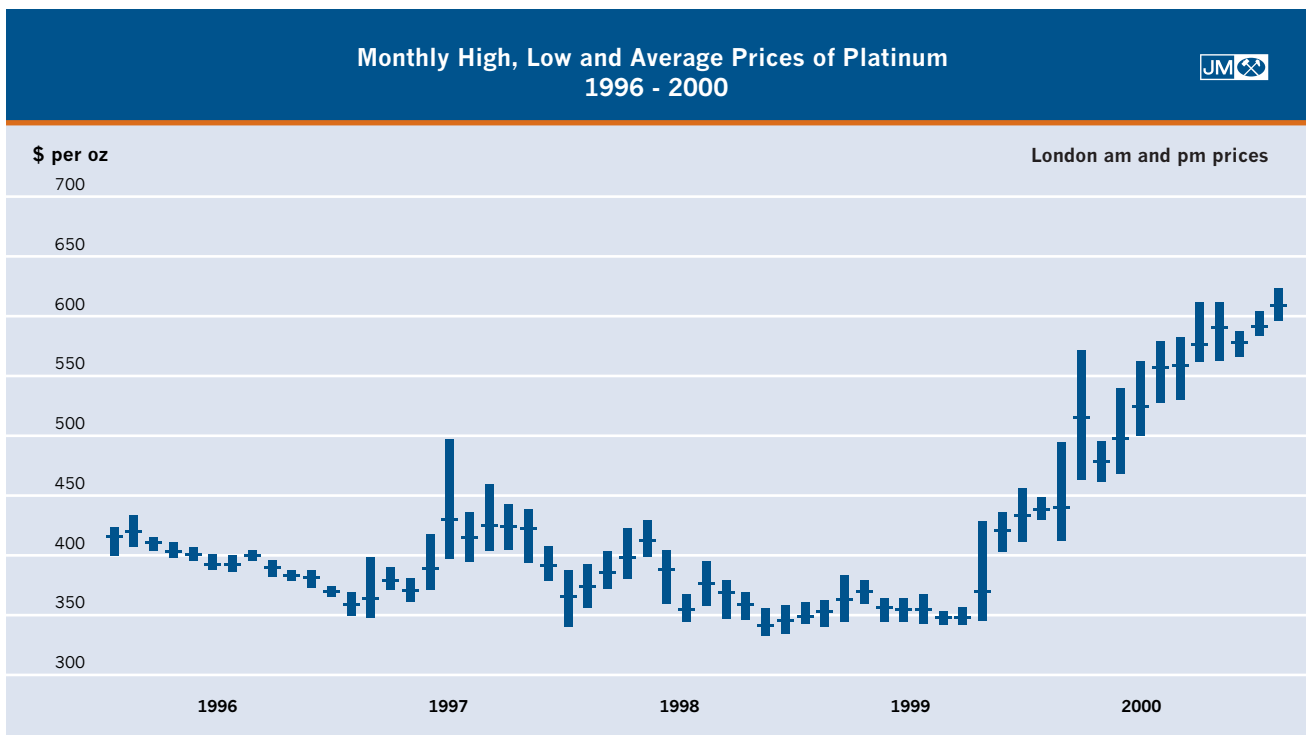
The outlook for jewellery demand in 2001 is less assured. The fashion for white metal jewellery seems certain to continue but the higher price of platinum over the past year has resulted in some demand at the cheaper end of the market moving to white gold. This is likely to be exacerbated in Japan by the continuing weakness of the economy and the decline in consumer spending.

Jewellery demand in China may also prove to be price sensitive and, additionally, is currently being negatively influenced by the level of tax inspections.

Despite this, there is evidence of a strong first quarter in China and if the price of platinum were to stay below the \$600 level there would be a good prospect of demand remaining around the 1 million oz level in 2001. Other jewellery markets, in North America and Europe, seem likely to be less affected by the issues of price and economic activity and consumption there is expected to grow modestly.

Western supplies of platinum should increase by up to 10 per cent as expansions in South African and North American mining capacity come on stream. Assuming they avoid the problems encountered last year, South African mines should produce at least 300,000 oz more than in 2000, with Anglo Platinum being the main contributor to the increase. The probable level of Russian sales is more difficult to assess. Platinum stocks held by the government may no longer be substantial, but Norilsk and the alluvial producers are thought not to have sold all of last year's production and, subject to the level of export quotas given, may be able to sell in excess of their current output in 2001.

With supply a little easier and demand expected to be moderately higher, the market is expected to move closer to balance and, therefore, the price of platinum is not expected to change greatly from its current level. The sensitivity to price of jewellery demand is expected to set limits on both the upper and lower levels of price, which for the next six months we expect to remain in the range \$550 to \$625.



# Palladium

- Demand fell by 5 per cent as increases in the palladium price began to impact some market sectors.
- Auto industry purchases of palladium declined by 4 per cent as some auto makers used metal from stocks.
- Burgeoning demand for capacitors saw electronics demand rise 8 per cent, even though palladium lost share to base metals.
- Demand in dentistry and other applications fell by 21 per cent in response to the higher price.
- Total supplies declined by 3 per cent as Russian shipments fell back to 5.2 million oz and western sales were marginally lower than in 1999.
- A second successive large deficit drove the palladium price to a series of all-time records, culminating in a high of \$972 in December.

## Palladium Supply and Demand

'000 oz

	1999	2000
<b>Supply</b>		
South Africa	1,870	1,860
Russia	5,400	5,200
North America	630	635
Others	160	95
<b>Total Supply</b>	<b>8,060</b>	<b>7,790</b>
<b>Demand</b>		
Autocatalyst: gross	5,880	5,650
recovery	(195)	(230)
Dental	1,110	820
Electronics	1,990	2,140
Other	585	520
<b>Total Demand</b>	<b>9,370</b>	<b>8,900</b>
Movements in Stocks	(1,310)	(1,110)



## Overview

Demand for palladium last year was 5 per cent lower than in 1999, but this did not stop the price rising to unprecedented levels. A dramatic climb to \$800 in February on the back of a squeeze on TOCOM was followed by a retreat to \$600 after the exchange authorities imposed trading restrictions. However, the fundamental imbalance between mine supply and demand continued to exert pressure on the market. The price rose to a series of all-time highs and, towards the end of the year, approached \$1,000; a barrier that was subsequently breached in January 2001.

Despite the rise in the price demand remained strong, but more users switched from palladium to other metals in the electronics and dental sectors, and there were signs of likely future substitution in autocatalysts. The use of palladium in the auto industry increased significantly in 2000 but this was not reflected in purchases by auto companies due to changes in patterns of stock

building compared with the previous year. Although slightly down on the record level of 1999, demand last year, at 8.9 million oz, was the second highest ever. It seems probable, however, that it will fall more sharply in the current year.

Russia, the dominant supplier of palladium, has two sources of metal – fresh production by Norilsk Nickel and government controlled stocks. Norilsk has a ten year quota for exporting palladium and various spokesmen for the company have made it clear that exports were made steadily throughout 2000, a claim supported by trade data. Sales from government stocks were erratic and may have been influenced by a power struggle between the Ministry of Finance and Central Bank over control of the stocks and the level of sales in 2000.

Supplies of palladium from South Africa fell marginally, mainly due to reduced output at Anglo Platinum and Impala following flooding in the early part of the year, and a strike at Anglo in

the third quarter. North American supplies rose as output at Stillwater and North American Palladium increased, although a prolonged strike at Falconbridge offset much of the improvement. Elsewhere, the closure of Hartley Platinum in 1999 severely impacted supplies from Zimbabwe.

Two extra western sources of palladium were significant last year, just as they had been in 1999. The first was sales from the US Defense Stockpile by the Defense Logistics Agency (DLA) – in 2000 the DLA sold 185,510 oz of palladium. The second, which is more difficult to quantify, was sales from stocks built up by hedge funds in the mid 1990s. The most significant holder of such stocks is believed to have been the Tiger Management fund, which in March 2000 announced that it was to close. Although much of the palladium this fund had acquired was probably sold in 1999, we suspect that the residual metal it held was liquidated before the closure of the

fund at the end of March.

The DLA continues to run its stockpile down and if sales are maintained at the rate of the last two years, will have exhausted it by 2005. As ever, it is impossible to be sure how much palladium remains in Russian stocks and what government policy will be towards their sale.

Several of the major companies in the auto industry are thought to hold significant inventories of palladium and these may currently be providing liquidity to the market through leasing deals. However, as these and other consumer stocks are gradually used for manufacturing, it seems clear that within a few years the palladium market will return to a more fundamental supply-demand situation, with supplies limited to the level of current production.

## Supply

Russia is the world's principal supplier of palladium and throughout the 1990s supplied metal both from new production and from stockpiles built up in earlier years. Uncertainties about the level of sales from these stocks and the quantities that remain have added greatly to the volatility of the metal's price, especially during the period of substantially increased consumption over the past five to six years.

Although the Russian stocks are generally regarded as being under government control the exact stewardship has changed during the last few years. Until the mid 1990s they were under the control of the Ministry of Finance. It is believed the metal was then transferred to the Central Bank. More recently, since the ascent to power of President Putin, the control of much of the stock appears to have reverted to the Ministry. Precise information is difficult to obtain as details of pgm holdings and movements remain a state secret in Russia.

In 1999, Norilsk Nickel was granted, by presidential decree, a ten year quota

for exporting palladium and various spokesmen for the company made it clear that sales were made steadily throughout 2000. It seems probable that Norilsk's production will be exported similarly this year, with much of the metal being shipped under long term contracts negotiated since the ten-year quota was agreed. The level of sales from government stocks is as difficult to divine as ever. In 2000, we estimate that total Russian sales were 5.2 million oz.

The early months of 2001 have seen some significant movements of palladium from Russia. In January the USA imported 874,000 oz of the metal, while in February the Swiss trade statistics recorded a total of 1.91 million oz as being imported into the country. At the time of publication of the latter figure the Swiss customs office was reported as saying that the metal had come from toll free storage in Zurich where it had been stored for a very long time. At short notice, and after briefly being in technical

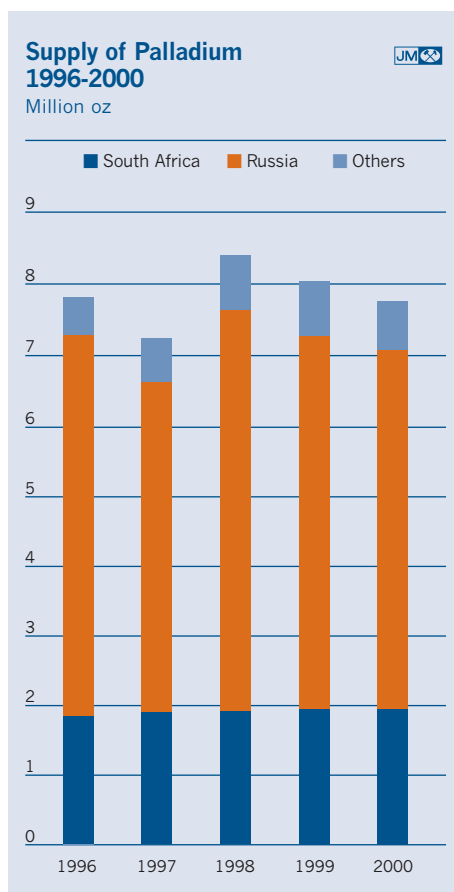
default, the Russia government made a large debt repayment to the Paris Club of international creditors at the end of February. It therefore seems possible that the need to raise funds quickly may have led to liquidation of stocks of palladium held in Zurich. Whether the Russian government will make further sales from its stocks in 2001 is difficult to judge.

Supplies from western mines had been expected to grow in 2000 as South African and North American miners progressed their expansion plans. In the event this did not happen, due to operational problems at mines in both regions. As a result, western supplies fell by 3 per cent to 2.59 million oz.

If the South African mines can avoid the problems of 2000, their supplies of palladium should rise by around 10 per cent this year, in line with their expected improvement in platinum production. Output should also increase sharply in North America, with North American Palladium planning to more than double its production in 2001 and extra metal coming from Stillwater, Inco and Falconbridge.

## Demand

Despite greater use of palladium in autocatalysts demand from the auto industry, in terms of purchases of metal, fell by 4 per cent last year to 5.65 million oz. In 1998 and 1999 many of the major auto makers had increased their stocks of palladium in anticipation of greater use to meet tighter regulations. In 2000, however, there was a more varied approach to inventories. In the first half of the year it appears that some companies that had built up stocks earlier decided to use some of this metal after the price of palladium rose sharply to reach \$800 in February at the time of problems on TOCOM. Delays in sales of palladium from Russian stocks may also have persuaded some companies to draw on their own inventories at that time in the expectation that more metal



would be available later in the year at lower prices.

Exports of palladium by Russia did increase in the last four months of the year but the price continued to rise. It seems likely that some auto makers had by then become uncomfortable about their level of inventories compared to expected future use and decided to rebuild stocks in this period. Despite this, we estimate that, over the year, stocks of palladium held by auto companies fell by 340,000 oz in 2000.

Actual use of palladium in autocatalysts fitted to cars and trucks increased by 24 per cent last year as the legislation controlling emissions from vehicles was tightened in all the major regions.

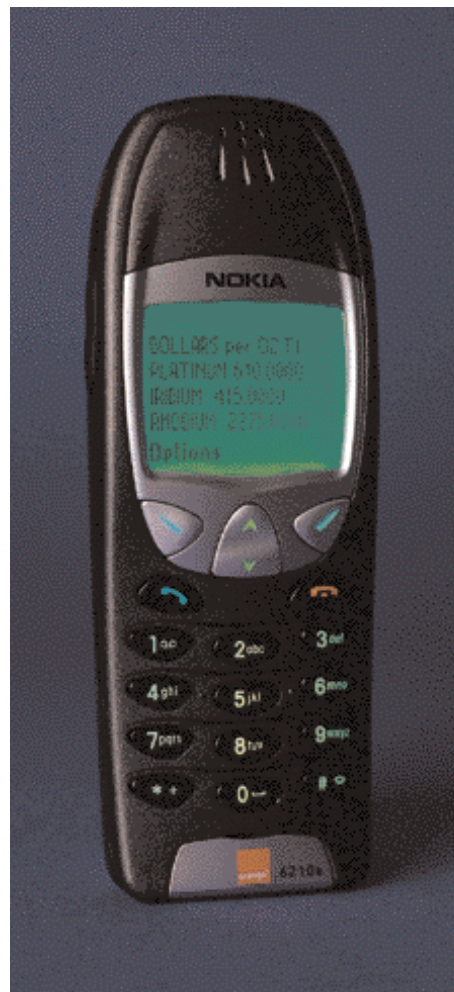
In Europe, the Stage III EU legislation came into effect for all new models from January 2000; while, in Japan, the introduction of Japanese Low Emission Regulations (JLEV) commenced in October

2000. In the USA, the proportion of vehicles sold meeting LEV standards increased significantly and a small number were sold complying with the even more demanding ULEV limits. In all three regions the new regulations restrict the emissions of unburned hydrocarbons (HC) severely and most auto makers have adopted catalysts with heavier loadings of palladium to meet these standards.

Demand for palladium in the electronics industry recovered to exceed 2 million oz again in 2000. At first sight this was a surprising result as the electronics industry has been working hard to substitute palladium with base metals in the largest electronics application – multi layer ceramic capacitors (MLCC). Since base metals were first introduced in the mid 1990s the proportion of MLCC manufactured using palladium has steadily fallen and it declined from 62 to 46 per cent last year. However, the production of MLCC in 2000 rose by 47 per cent and to meet this demand all available capacity for manufacturing capacitors, both base metal and palladium, was required. As a result, demand for palladium in the electronics sector rose by 8 per cent to 2.14 million oz.

The steady increase in the penetration of base metal technology across the full range of capacitor manufacture, and the construction of more factories capable of manufacturing MLCC with base metal electrodes, makes palladium demand in this market particularly vulnerable to a future downturn in production activity. The electronics industry is notoriously cyclical and statistics on the production and sales of electronics goods in early 2001 indicate that this year is likely to see sharply reduced activity; this could in turn result in a substantial decline in palladium offtake by the industry.

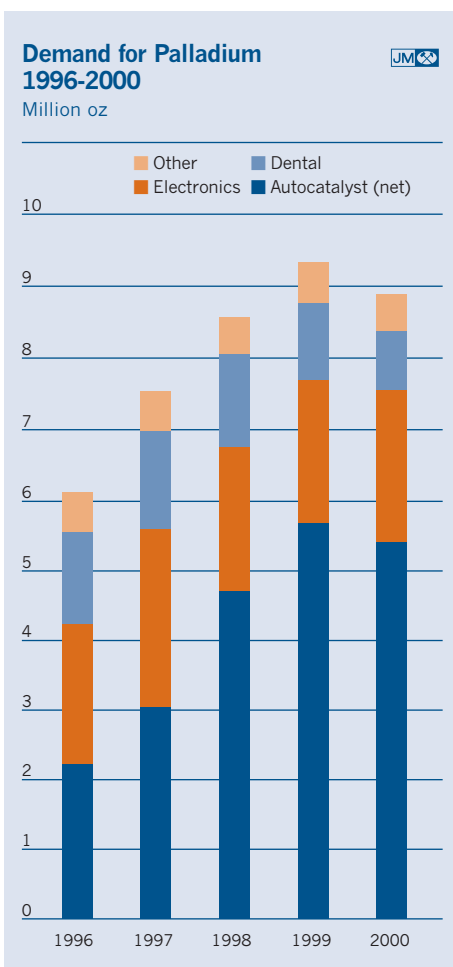
The dental sector experienced a 26 per cent decline in palladium consumption in 2000 to 820,000 oz and a further fall can be expected this year. Palladium



*Palladium demand benefited from strong sales of mobile phones in 2000*

alloys first became popular in Europe and the USA in place of higher priced gold materials but the price relationships have significantly altered in the last 2-3 years with the result that the use of palladium has begun to decline sharply.

In Japan, a government-backed health insurance scheme supports the use of a dental alloy containing 20 per cent palladium. In response to the increasing palladium price, the system was altered in April 2000 to allow for half yearly adjustments to the level of subsidy paid, to reflect actual precious metal prices over the preceding six months. However, at times when prices are rising, as happened for much of last year, the new system can still result in the cost of materials exceeding the government subsidy; this has caused some alloy manufacturers to switch to alternative materials.



Demand for palladium in other applications fell by 11 per cent last year to 520,000 oz. There was a 15 per cent decline in the jewellery sector as manufacturers strove to reduce the palladium content of both platinum and white gold alloys. In the petroleum industry demand fell even more sharply as the use of palladium in hydrocracking catalysts was superseded by base metal alternatives. Partly offsetting declines in these two sectors was an increase in demand from the chemical industry for a palladium catalyst used to make vinyl acetate monomer.

## Outlook

During 2000 the rising price of palladium began to have a negative impact on demand for the metal. Substitution with other metals gained ground in the electronics and dental sectors in particular and many auto companies stated publicly their desire to reduce their dependence on the metal. The rate at which this substitution proceeds will have a major impact on the long term outlook for the palladium market.

Once the largest application for palla-

dium, the electronics sector showed a somewhat surprising increase in demand in 2000 despite a further loss in market share for palladium in MLCC production. With signs that the electronics goods market has encountered one of its cyclical downturns, component manufacturers are cutting back production. It therefore seems likely that demand for palladium from this sector will fall sharply in 2001.

Last year saw a 21 per cent fall in the use of palladium in other non-automotive applications. A further decline is to be expected in 2001, although possibly not as steep as last year as those uses that are most price sensitive have already seen significant substitution of palladium.

Supplies from western mines are expected to increase, as expansions in South African and North American mines come on stream. Sales of palladium by the DLA in the first three months of 2001 were 180,100 oz and exhausted its plan for fiscal year 2001, leaving its residual stockpile at 542,000 oz. The DLA plans to sell a further 300,000 oz in the fiscal year starting October 2001.

The total level of supplies in 2001 will, as ever, depend primarily on the

level of Russian sales. Norilsk Nickel is believed to be supplying palladium steadily from its ten-year quota for sales of palladium, but uncertainties about the ultimate level of sales from government controlled stocks have again been a major feature in the first quarter of 2001. This helped drive the price to \$1,094 in January and then, after extra Russian metal appeared on the market in March, back down below \$700.

The decline in price since the high of January may help to slow down the move away from palladium in some sectors, but it seems certain that much of the substitution now underway is irreversible. At the same time as demand is falling, production at western mines is accelerating. The substantial gap between consumption and fresh production that has existed for the past five years is therefore likely to close. However, the market still needs extra supplies from Russian government stocks and remains highly susceptible to changes in Russian sales policy. That policy is difficult to predict, but if sales are steady we expect the price to trade in the \$550 to \$750 range for the next six months.

