Summary and Outlook

Platinum

- **1999 was a remarkable year for platinum, with record jewellery and industrial demand and an unprecedented supply deficit.**
- **Demand for platinum for jewellery fabrication was explosive, rising by 450,000 oz, the bulk of the increase coming from China.**
- **Autocatalyst demand fell by 11 per cent due to further switching from platinum to palladium and reduced purchasing for inventory.**
- **With Russian exports of platinum suspended for much of the year, total world supply fell to the lowest level since 1994.**
- **Reflecting the positive outlook for platinum, South African mines began a new phase of expansion, increasing their supplies by 6 per cent in 1999.**
- **The price of platinum ended the year at $443 after reaching a low of $342 in January 1999.**

Platinum Supply and Demand
'000 oz

	1998	1999
Supply		
South Africa	3,680	3,900
Russia	1,300	540
North America	285	270
Others	135	160
Total Supply	**5,400**	**4,870**
Demand		
Autocatalyst: gross	1,800	1,610
recovery	(405)	(425)
Jewellery	2,430	2,880
Industrial	1,230	1,355
Investment	315	180
Total Demand	**5,370**	**5,600**
Movements in Stocks	30	(730)

Overview

Total demand for platinum in 1999 rose by 4 per cent to 5.6 million oz. The most striking feature was a 19 per cent increase in consumption by the jewellery industry. At 2.88 million oz, demand for jewellery fabrication accounted for over half of total platinum demand. There was growth in demand from all regions, but it was strongest by far in China, where platinum sales rose by 53 per cent to 950,000 oz.

Autocatalyst demand fell by 190,000 oz to 1.61 million oz mainly due to further replacement of platinum catalysts by palladium systems, principally in North America. There was also little change in auto company platinum inventories, in contrast to the stockbuilding which took place in 1998. A 10 per cent rise in industrial demand for platinum, to 1.355 million oz, was largely due to growing use of platinum in computer disks and higher demand for platinum chemical catalysts. This increase did not quite compensate for a fall in demand for platinum investment coins and bars, which, at 180,000 oz, was at a ten-year low.

Supplies of platinum fell by 10 per cent to 4.87 million oz, the lowest level since 1994. Russian supplies were significantly reduced by a change in Russian legislation which prevented Norilsk from exporting platinum. We believe that most or all of the 540,000 oz of platinum sold by Russia last year came from central government stocks. A 6 per cent increase in sales from South Africa in 1999 to 3.9 million oz included output from new mine developments by Amplats and Kroondal Platinum, the first in a series of expansion projects planned by the South African mining industry.

The major shortfall in overall supplies left the market with a deficit of 730,000 oz. This was partly met by the sale of 215,000 oz of platinum from the US National Defense Stockpile. The remainder was drawn from market stocks and as these gradually tightened so did platinum prices and lease rates. During the last quarter of 1999 the cost of borrowing platinum for one month fluctuated between 25 per cent and 80 per cent. The price of platinum, after spending the first eight months of the year in a range of $340 to $380, reached a high of $457 in November before closing the year at $443.

Pgm wires for temperature and gas sensors

Supply

Exports of platinum from Russia in 1999 were affected by the notorious Clause 19 of an amendment to the Russian Budget which became law in December 1998. By stipulating that only specially authorised "state organs" would be permitted to export pgm, Clause 19 deprived Almaz, the Russian State marketing agency, of the right to make sales of platinum and rhodium (palladium exports were able to continue under a separate presidential decree). This prevented Norilsk Nickel from selling any of the platinum it produced in 1999.

Despite Clause 19, several large shipments of platinum from Russia did take place during the year. These must have come mainly from the government stockpile of platinum controlled by Gokhran, part of the Ministry of Finance, perhaps by means of special government or presidential decrees. If this was the case, then we must conclude that Russian state stocks of platinum, which were regularly used to boost sales during the 1990s, have now fallen to a very low level and will have little influence on the market in future.

There has been no satisfactory explanation for the introduction of Clause 19 or why it took so long to be repealed. Exports remained officially suspended even after the law was finally amended in the last week of 1999; export quotas were not signed by the government until late in February 2000, and export licences were not issued until the third week of April.

As a result of the enforced suspension of its sales in 1999, Norilsk will in theory be in a position to sell double the amount of its yearly production in 2000 - assuming that no further obstacles are put in the way of Russian shipments. Although the market has been given no clear signals as to Norilsk's sales strategy, it does not seem likely that the company, having enjoyed the benefit of higher palladium and nickel prices in 1999, would be anxious to dispose of platinum in a way which would substantially undermine the price.

In South Africa, a new phase of expansion has begun. Amplats has announced a number of projects that will add just over 500,000 oz of platinum per year to its output, and has indicated its intention to further boost production by at least another 100,000 oz by 2003. Impala intends to reopen the Crocodile River mine, which was closed in 1992. Northam, in which Amplats has acquired a 26 per cent stake, has a UG2 expansion planned for 2001, while Lonmin will soon increase production at its Western Platinum site.

According to all of the plans announced to date by the existing producers and new entrants, annual platinum production in South Africa will increase by close to 1 million oz between 1999 and 2003. All of the extra metal is likely to be needed by the market. As well as the current growth in the jewellery and industrial sectors, there is an increasing possibility of renewed

Crocodile River is set to reopen

demand from the auto industry and for new applications such as fuel cells. These prospects, combined with the running down of Russian state stocks, will require substantially more platinum from South African producers.

The major South African mining companies are well placed to finance these expansions as they have a significantly improved cash position due to high dollar pgm prices and the weak rand. The new mining projects will also help to meet the South African government's objective of encouraging mining companies to develop their reserves. If left dormant there is a risk that the government would revoke mineral rights and transfer them to new ownership.

Demand

The use of platinum in autocatalysts in North America declined in 1999. A greater proportion of vehicles was fitted with palladium-based catalysts in order to meet low emissions legislation currently being phased in nation-wide. We also believe that US auto companies did not buy as much platinum for inventory as they did in 1998. These two factors caused platinum demand from the North American auto industry to contract by 31 per cent.

In other regions the demand for platinum rose slightly. European sales of diesel vehicles, which are all fitted with platinum catalysts, captured a record market share of 28 per cent. Average loadings of platinum increased because many of the diesel vehicles manufactured in 1999 were designed to comply with the more demanding Euro Stage III emissions standards which came into force in January 2000. However, there was a further reduction in the amount of platinum used on gasoline engine cars.

In 1999, platinum demand in Japan benefited from a sharp increase in sales of mini cars, as these tend to be fitted with platinum-based catalysts. Because legislation has been essentially unchanged in Japan for many years, catalyst designs have not changed to the same extent as in Europe and North America. However, tougher clean air legislation will be introduced from October 2000 and will boost pgm loadings.

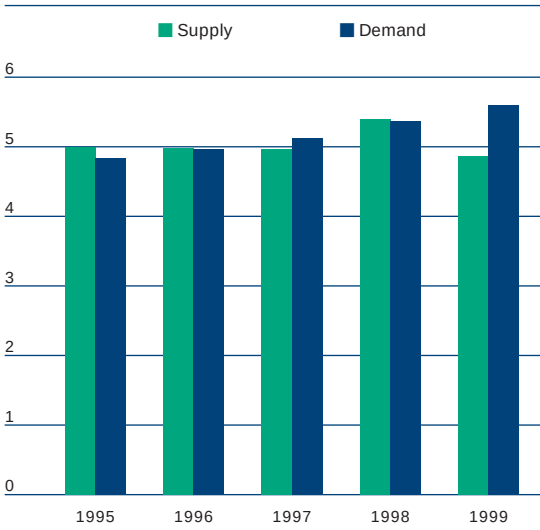
In Korea, passenger car sales increased by 60 per cent as consumer spending recovered after the 1998 economic slump.

Car companies are beginning to address the strategic need to use less palladium because of its inflated price and concerns about the reliability of supply from Russia. This objective can partly be met by reducing the loading of palladium on autocatalysts, but several companies have expressed interest in switching some of their catalyst systems back to platinum.

This has become a more realistic option because of advances in platinum catalyst technology. Recent research has shown that platinum can be used to meet emissions limits at similar loadings to palladium. A gradual increase in demand for platinum in the auto sector during the next few years now seems to be a possibility. This will be enhanced, in Europe at least, if there is successful development of lean burn gasoline engine technology for passenger cars because the catalysts for these vehicles are almost certain to contain platinum.

The fabrication of platinum into jewellery in Japan rose slightly in 1999, a muted recovery following the pressures on the jewellery industry from 1996 to 1998. During this period credit lines to the jewellery trade were reduced by banks and trading houses, leading to bankruptcies and large-scale trimming of inventories. Credit is still restricted and inventories continue to be carefully managed, but there were fewer failures in 1999 and the trade in Japan appears to have gained a sounder footing.

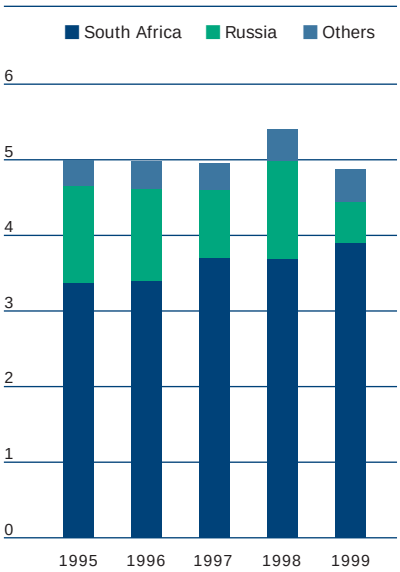
Supply and Demand for Platinum 1995-99
Million oz



However, because of a general lack of confidence in the Japanese economy, consumer spending has remained depressed. In the platinum jewellery sector this was reflected in reduced retail sales of platinum rings, particularly engagement rings, and a growth in demand for very light weight neckchains. Without the long awaited improvement in Japan's economy, consumer purchase levels and fabrication demand for platinum are unlikely to change.

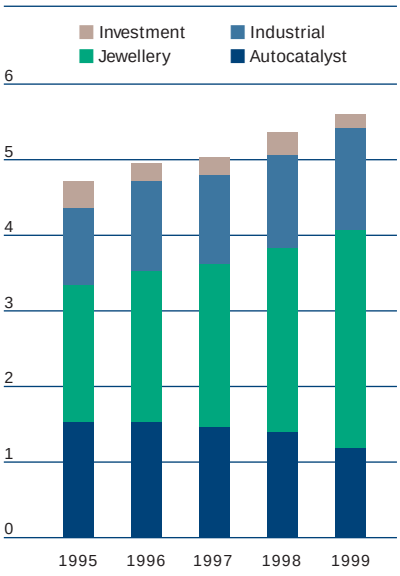
It would not be altogether a surprise if demand from the Chinese platinum jewellery industry were to overtake

Supply of Platinum 1995-99
Million oz



Demand for Platinum 1995-99

Million oz



demand from Japan in the near future. There now exists in China the manufacturing base to produce affordable and fashionable platinum jewellery on a large scale. This capacity has been developed to meet the phenomenal growth in demand as the popularity of platinum has spread throughout China. Two or three years ago there was comparatively little platinum jewellery on sale outside Shanghai and Beijing. Rapid economic development has brought increased wealth to many of China's regional conurbations and with it an appetite for the fashions developed in the principal cities.

Although the success of platinum jewellery in China is partly connected to the global trend to white metal jewellery, platinum is perceived to carry an attractive, modern image while at the same time the high precious metal content (a minimum of 90 per cent platinum) appeals to Chinese consumers.

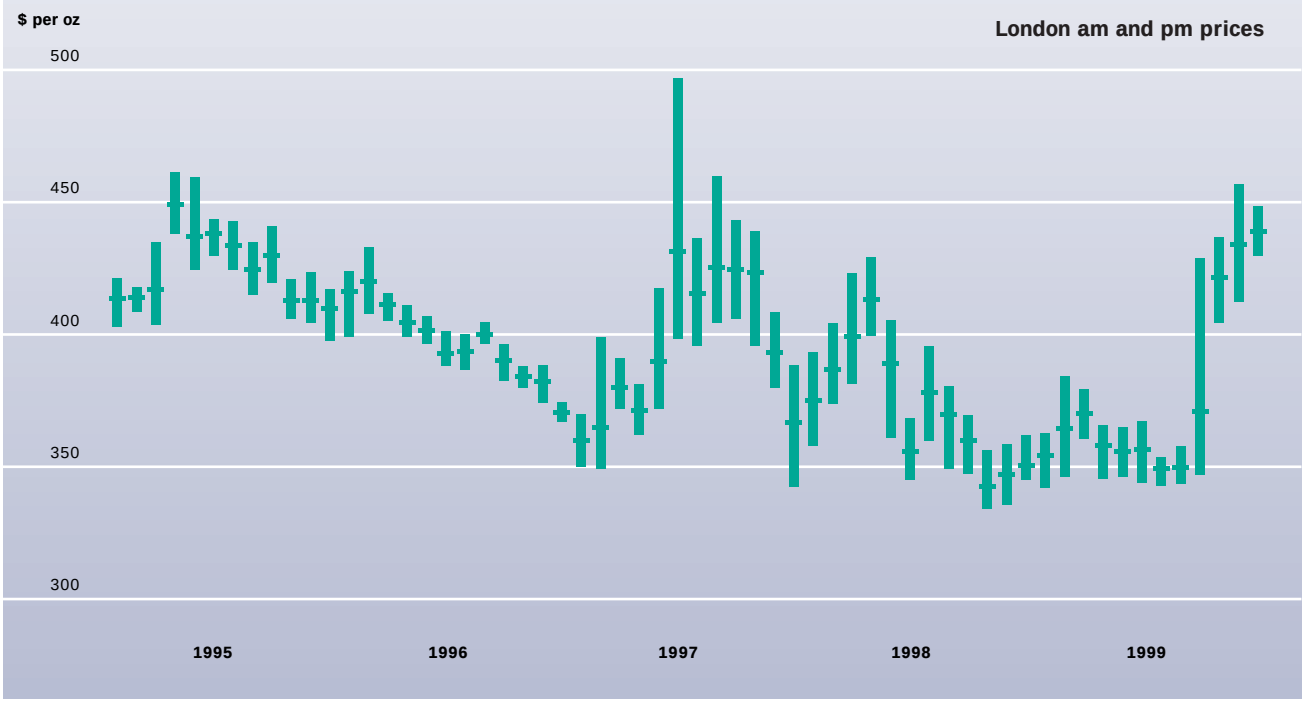
Wealth levels in China are still lower than in other major jewellery markets, so the platinum jewellery on sale in China is generally light in weight and without precious stones. Most of it is produced in the many large factories that have been built to meet the growing demand for platinum jewellery and to take advantage of the profit margins on platinum, which, although very low in comparison with other markets, are higher than those for gold.

Because of the low margins prevailing in the Chinese jewellery trade, Chinese manufacturers have been more sensitive to fluctuations in the market price of platinum than their counterparts in Europe or America. Buying of platinum notably diminishes during price surges and reappears on price dips. However, despite a significant rise in the price of platinum, consumer demand and purchases by manufacturers continued to increase during the first quarter of 2000.

Demand for platinum jewellery continued to expand in the United States. Although consumption was mainly in rings for the bridal sector, it was noticeable in 1999 that chain stores were stocking an increasing variety of platinum products, such as light-weight chains and other fashion accessories. Demand for bridal jewellery was also a feature of the market in the United Kingdom, where the number of pieces hallmarked soared by 68 per cent. Italian, German and Swiss manufacturing levels all increased, responding to the trend towards white jewellery.

There was an overall 10 per cent

Monthly High, Low and Average Prices of Platinum 1995 - 1999



increase in demand for platinum for industrial applications in 1999. The largest increases came from the use of platinum in hard disks and from investment in new chemical plants containing platinum process catalysts.

The consumption of platinum by the chemical industry rose by 13 per cent, due to higher production of speciality silicones and investments in new plant for the manufacture of paraxylene and benzene.

In the electrical sector there was a remarkable 30 per cent increase in demand for platinum. This was due to higher consumption of platinum in computer hard disks. The proportion of disks that contain platinum rose from around 60 per cent of total production in 1998 to 80 per cent last year.

Overall demand for other industrial applications was flat, with reductions in the glass and petroleum industries being balanced by increases in demand for smaller uses such as spark plugs, oxygen sensors and medical devices.

Demand for platinum investment products declined to its lowest level since 1989, accounting for just 3 per cent of total demand. Purchases of coins and small bars fell steeply and net sales of large investment bars in Japan were also down, though by a smaller margin.

Platinum benefited from the trend towards white metal jewellery in 1999

Outlook

Supply of platinum is expected to increase in 2000. As ever, we cannot be confident of Russian sales levels, but there will certainly be higher output from South Africa and North America, offset slightly by a reduction from Zimbabwe.

With the expansion of jewellery and industrial demand, the possibility of a resurgence of platinum in the auto industry and the ever improving prospects for substantial use of platinum in fuel cells before the end of this decade, the platinum demand outlook is more positive than for many years. The South African mines expansion programme is therefore timely.

In the immediate future there is bound to be some reaction in the price to the return of Norilsk to the market. But even if Norilsk were to sell all its accumulated stock as well as its current production in 2000, the need to replenish market stocks, the appetite for platinum in the jewellery industry, particularly in China, and further growth in industrial applications should be great enough to absorb the extra supply.

Under pressure from the lack of Russian sales, the price of platinum hit an 11-year high of $573 in February. Once Russian supplies resume we expect softer prices, but we believe that current levels of demand are robust enough to support a trading range of $450 to $520 for the next six months.

Palladium

- **Palladium demand in 1999 reached a record level of 9.37 million oz, 9 per cent higher than the previous year.**
- **Purchases of palladium by auto companies rose by 20 per cent, due to greater use in autocatalysts coupled with a substantial amount of stockpiling.**
- **Demand for electronics fell by 5 per cent as companies switched further to base metals in capacitors.**
- **The use of palladium in dental alloys fell by 10 per cent in response to the higher metal price and reductions in state support for dental treatment.**
- **Supplies of palladium declined by 4 per cent to 8.06 million oz, mainly due to a 7 per cent fall in Russian shipments.**
- **The price of palladium rose steadily from $334 at the beginning of January to $444 at the end of the year.**

Palladium Supply and Demand
'000 oz

	1998	1999
Supply		
South Africa	1,820	1,870
Russia	5,800	5,400
North America	660	630
Others	120	160
Total Supply	**8,400**	**8,060**
Demand		
Autocatalyst: gross	4,890	5,880
recovery	(175)	(195)
Dental	1,230	1,110
Electronics	2,075	1,970
Other	580	605
Total Demand	**8,600**	**9,370**
Movements in Stocks	(200)	(1,310)

Overview

The dramatic changes that have affected the palladium market in recent years continued into 1999. Demand reached a new record level of 9.37 million oz, with purchases by auto companies soaring to 5.88 million oz. Some of this increase was due to the need to meet tighter emissions standards in Europe and North America, but there was also a substantial amount of stockbuilding by some of the major auto makers against expected higher future demand and uncertain Russian supplies.

In contrast, the rising price began to take its toll on demand for palladium in electronics and dental alloys, although the decline in each of these sectors was relatively modest in 1999. There has been further substitution of palladium by base metals in multi-layer ceramic capacitors (MLCC), the main application for palladium in electronics. However, the growth in the market for MLCC has been such that although palladium's market share fell to around two-thirds of total production in 1999, the number of palladium-based MLCC manufactured last year actually increased marginally.

Supplies from Russia were again erratic, with overall sales down 400,000 oz at 5.4 million oz. Shipments by Norilsk Nickel from fresh production were again supplemented by sales from state stocks. Russian sales of palladium were not affected by the Clause 19 issue that hindered other pgm, but the timing of shipments was influenced by the imposition of an export tax by the Russian authorities.

South African output increased modestly, but there was a decline in supplies from North America as Stillwater Mining experienced production problems at its mine in Montana. Total supplies of palladium in 1999 fell by 4 per cent to 8.06 million oz.

As a result, demand exceeded supplies by 1.31 million oz, by far the highest deficit on record. This movement in stocks was met from two main sources. First, the US Defense Logistics Agency (DLA) sold just over 340,000 oz from the government's strategic stockpile, the first sales of palladium for many years. Second, we believe there was substantial selling of palladium by funds that had invested in the metal two to three years ago; much of this metal is believed to have moved into the hands of the major auto companies.

Having started the year at $334, the price of palladium moved up and, at $384, exceeded that of platinum by $20 in mid April, before it plunged to $284 by early May in response to heavy Russian sales. The price rapidly recovered from this low level and over the last four months of the year it rose steadily, overtaking platinum again in late December to end the year $1 higher than its sister metal, at $444.

Supply

Over the last six years demand for palladium has more than doubled, but supplies have kept pace with this increase because there have been substantial sales of palladium from stocks held in Russia. During this period Russian sales from reserves have amounted to around 16 million oz. As all information on pgm production and stockpiles in Russia is still a state secret, it is difficult to assess how much longer metal in excess of fresh production can be supplied to the market.

Russian shipments of palladium were strong in the first quarter of 1999. Some of the metal was reported as being shipped under an extension of the 1998 export quotas, an unusual, if not unprecedented, circumstance. Throughout the first quarter there was uncertainty about whether quotas for 1999 had been approved, despite the fact that in early March it was announced that Boris Yeltsin had signed a presidential decree giving Norilsk Nickel a ten year export quota.

In both 1997 and 1998, the final quarter of each year saw a surge of exports of palladium by Russia followed by a cessation of supplies early the following year. The granting of the ten year export quota for palladium to Norilsk Nickel was expected to help avoid this rollercoaster at the end of 1999. It does appear that Norilsk exported steadily throughout the last quarter of 1999 and the first quarter of 2000. However, despite the fact that the other principal holder of palladium in Russia – the Central Bank – is also believed to hold a multi-year export quota, at the time of writing this report it appears not to have sold any significant amount of metal in 2000.

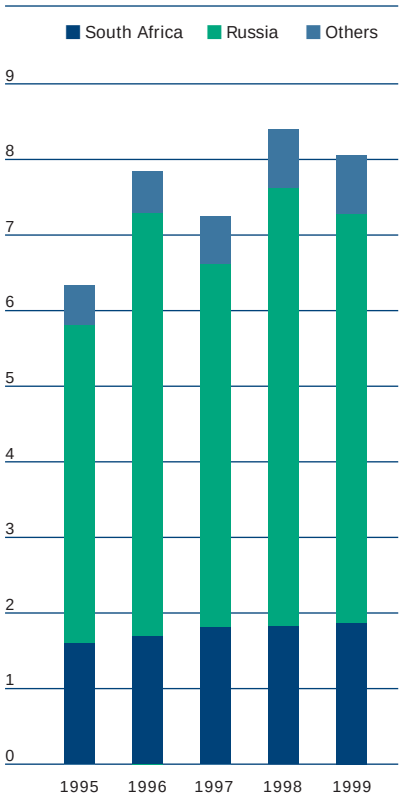
A number of possible explanations have been put forward to explain the Central Bank's lack of activity so far this year. First, the Bank may not have been granted the required export licence to ship its agreed quota. Second, it has been suggested that at least some of the Bank's palladium has been tied up in collateral deals with western banks.

More recently, there have been rumours of a struggle for control of the metal within Russia. For many years the palladium produced at Norilsk but not exported to the West was owned by and stored at Gokhran, the Russian state stock of precious metals and gems that is part of the Ministry of Finance. In the mid 1990s it is believed that much of Gokhran's palladium was sold to the Central Bank to raise funds for the government. It has been suggested that, following recent changes in the Russian government, the Ministry of Finance may regain control of the palladium held by the Central Bank. Should the Ministry be successful, it is not clear what its sales policy would be. We must therefore expect that uncertainty over Russian supplies will remain a feature of the palladium market this year.

The prospects for supplies of palladium from western mines are more secure. Expansions in platinum mining already underway in South Africa will deliver more palladium as a by-product over the next few years, especially as much of the extra metal will come from developments in the Eastern Bushveld where the palladium to platinum ratio is higher than in existing mines. In North America, expansions are underway or planned at Stillwater and North American Palladium. Despite some continuing problems in the build up of production at Stillwater, within three to four years these two mines should together provide in excess of 1 million oz of palladium annually, more than double the current output.

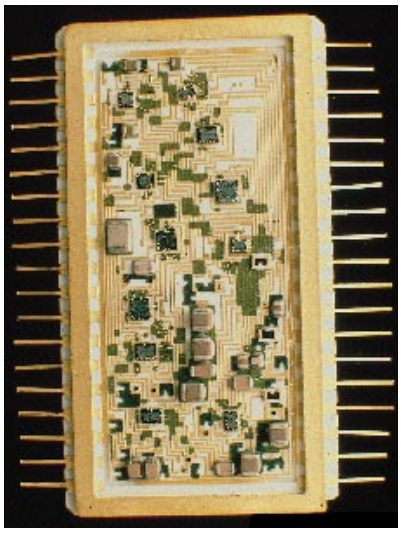
Last year, the DLA sold 150,083 oz of palladium from the US strategic stockpile in the period June to September as part of its 1999 fiscal year Annual Materials Plan, and 193,807 oz in the period October to December from its 2000 plan. A further 6,538 oz were sold

Supply of Palladium 1995-99
Million oz



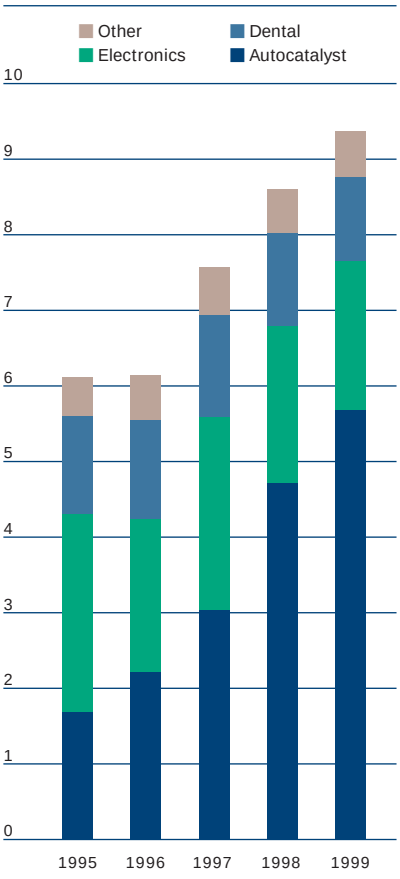
in January 2000 to complete, and slightly exceed, the fiscal year 2000 allocation of 200,000 oz, leaving just under 900,000 oz of palladium in the stockpile. In April 2000, the DLA applied to Congress to sell a further 100,000 oz before the end of the current fiscal year in September 2000. It remains to be seen if approval for these extra sales will be given.

The quantity of palladium held in the



Palladium demand in electronics fell slightly in 1999

Demand for Palladium 1995-99
Million oz



US National Defense Stockpile is in the public domain. The amounts held by investment funds are much more difficult to assess. However, Tiger Management, the hedge fund that has without doubt been a large holder of palladium in recent years, announced on 31 March 2000 that it was closing down in response to major losses suffered in stock and currency markets over the past two years. Although Tiger never publicly quantified its holdings of palladium, it is believed to have held at least 1 to 2 million oz at its peak. It is likely that much of this metal was sold in 1999, with the remainder being liquidated in early 2000: the belief is that it moved, directly or indirectly, into the hands of auto companies.

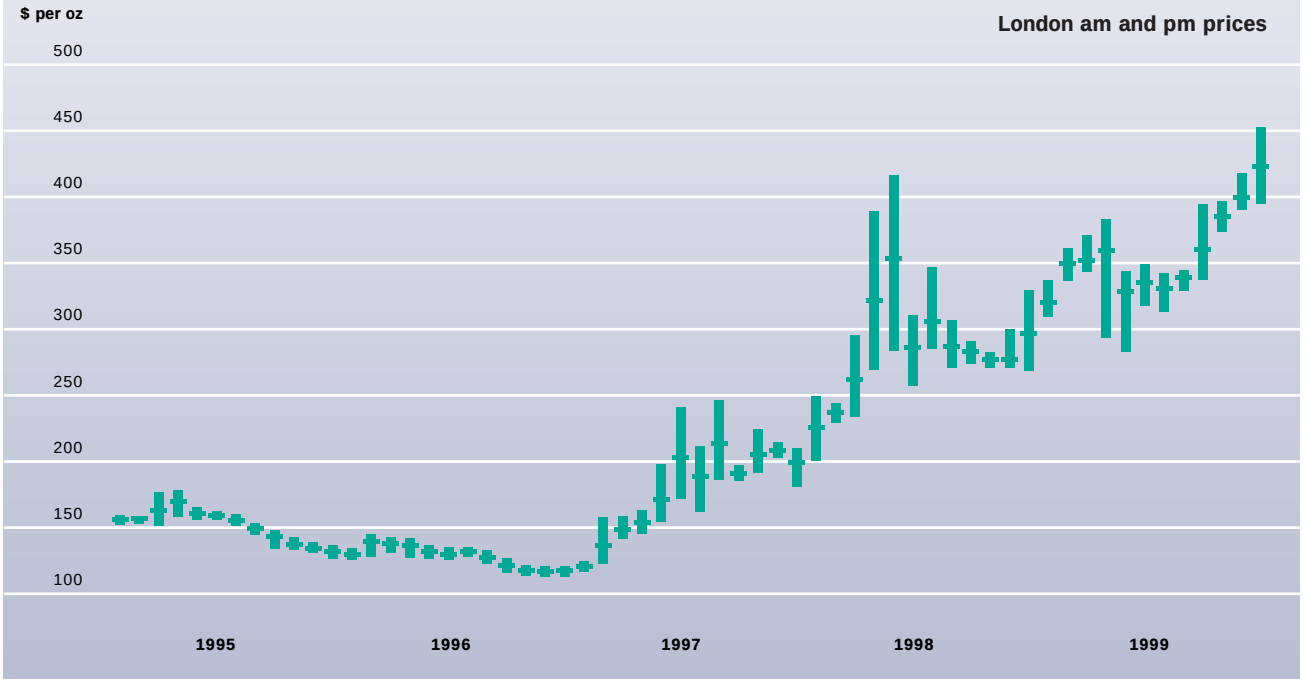
Demand

Palladium demand in 1999 was boosted by substantial stockbuilding by several of the major auto companies, both as a response to increasing consumption in autocatalysts and as a protection against future disruption in Russian supplies. It is not clear if these companies will use such stocks at times of high palladium prices, or if they will retain them as a security buffer against future shortages.

Palladium is a very good catalyst for the control of hydrocarbon (HC) emissions from auto engines and with increasing pressure being put on control of HC throughout the world, the use of this metal in autocatalysts is likely to continue to increase. However, the steeply rising price of palladium since 1997 and the ongoing uncertainties about Russian supplies are undoubtedly causing some auto companies to seek alternative catalyst formulations to limit, or even reduce, their consumption of palladium. This may result in greater use of platinum and rhodium in catalysts in the future.

Advances in technology are also important to the electronics industry as it tries to reduce its use of palladium in multi-layer ceramic capacitors (MLCC). In recent years the industry has begun to use base metals, primarily nickel, as an alternative material for the conductive layers of MLCC. Substantial investment

Monthly High, Low and Average Prices of Palladium 1995 - 1999



Molten matte containing palladium and platinum being poured at the Stillwater smelter

in new plant is required to effect such a change: this has been undertaken in many parts of the world, especially in Japan, which is the leading producer of such devices.

Despite this, the rapid growth in demand for MLCC has meant that production of palladium-based components has been maintained, although most new capacity for producing MLCC has been designed to use base metals. It is also believed that palladium electrodes are still preferred for the most demanding applications of MLCC, and may remain so for some time. Consequently, despite the high price of palladium, the decline in its consumption in the production of MLCC has been modest to date.

The third largest application for palladium is in dental alloys. Although there are lower cost alternatives to high palladium content alloys, such as high gold or base metal products, there appears to have been only limited substitution to date despite the high price of palladium. In Japan especially, where the main dental alloy contains only 20 per cent palladium, the approval of alternative materials that qualify for state insurance schemes is likely to be slow.

Outlook

The overall outlook for palladium is for a small decrease in demand in 2000. Consumption in autocatalysts will remain high but use in electronics, dental alloys and other applications will decline in response to the higher prices seen over the past three years.

Mine output of palladium will increase from all three major producing regions – as the principal product from Stillwater Mining and North American Palladium, and as a by-product of platinum or nickel mining (in South Africa and Russia respectively). The greatest uncertainty about supply concerns the level of Russian stocks and the policy that will be adopted by Russia for the sale of this material. This uncertainty about Russian supplies provides for continuing speculative interest in palladium, as was demonstrated in February 2000 when the price reached an unprecedented level of $800.

It is not clear how the market will cater for such speculative interest in future following the serious problems that occurred on the Tokyo Commodity Exchange (TOCOM) in February. The TOCOM authorities found it necessary to impose severe restrictions on trading when it became clear that speculators could not close out short positions and a substantial number of bankruptcies were threatened.

Forecasting the price of palladium has become increasingly difficult over the past three years. Erratic Russian sales patterns have led to greater volatility and a wider range of prices each year, but for the next six months we think that the core range will be $500 to $650. As always, any significant changes in Russian sales policy could cause the price to fall outside this range.