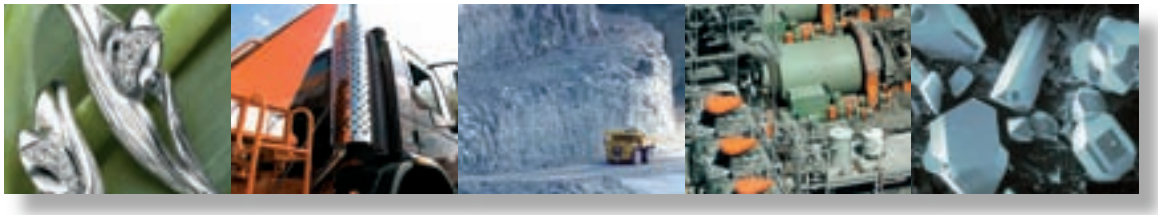
PLATINUM 2007



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ACKNOWLEDGEMENTS

Johnson Matthey gratefully acknowledges the contribution of many individuals and companies within the platinum industry in providing information for the compilation of Platinum 2007.

In particular, our thanks go to Denise Garwood, the members of the Johnson Matthey precious metals market research team and to Tanaka Kikinzoku Kogyo KK for their invaluable assistance in Japan.

Platinum 2007 is based for the most part on information available up to the end of March 2007.

Johnson Matthey Public Limited Company.
Precious Metals Marketing, Orchard Road, Royston, Hertfordshire, SG8 5HE, England

Design: Zygo Design Ltd., and Wonderberry UK Ltd.,
Print: Fulmar Colour Printing Co. Ltd

Printed in the United Kingdom.

ISSN 0268-7305

Beads made from a variety of metals including gold, platinum and palladium sold well in China ahead of the Chinese Year of the Pig.

PLATINUM 2007

by David Jollie

Special Features

Supply and Demand Tables

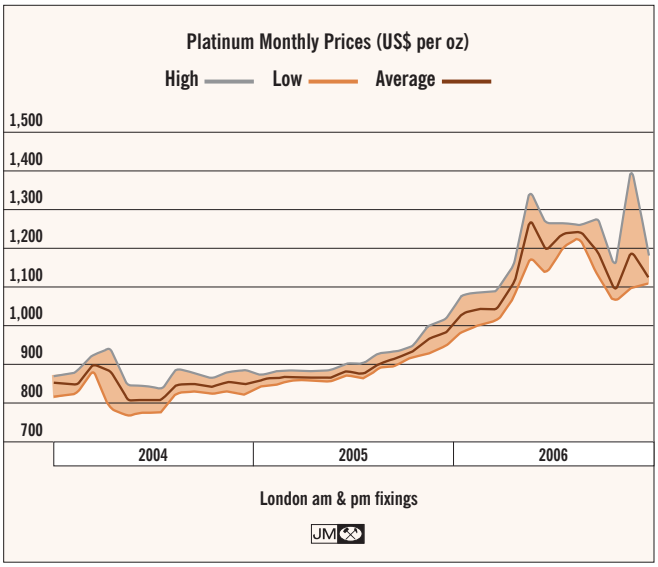
JM

Johnson Matthey

SUMMARY

PLATINUM

Global demand for platinum rose by 1.2 per cent to 6.78 million ounces in 2006, supported by an increase in the use of this metal for autocatalysts and a range of industrial applications. This growth more than offset a decline in new metal purchased by the jewellery sector. Supplies of platinum also climbed in 2006, rising at a slightly faster rate than demand, to reach a total of 6.79 million ounces. South African production expanded to 5.29 million ounces, boosted by the addition of new mining capacity, and was the main driver behind this growth. Overall, therefore, the platinum market was effectively in balance over the entirety of 2006, with a nominal surplus of only 10,000 oz.



Despite posting only a 14 per cent rise during 2006, the platinum price was high throughout the year and peaked at $1,390.

The automotive market represented the majority of demand (4.20 million ounces), up from 3.80 million ounces the year before. The continuing increase in the market share of the diesel engine has pushed platinum consumption in autocatalysts higher. In Europe, more than half of all new light duty vehicles are now diesel-powered and carry platinum-based aftertreatment. Stricter Euro IV emissions legislation came into force in January 2006 and increased the number of particulate filters being manufactured too. Both of these factors pushed platinum consumption in European autocatalysts to a record 2.16 million ounces, despite some palladium usage (in combination with platinum in every case) in diesel exhaust aftertreatment.

Global autocatalyst platinum demand would have been still higher if the price differential between platinum and palladium had not been so great. Since platinum started trading at a premium to its sister metal in 2001, auto makers have worked hard to minimise their precious metal costs. They have done so both by thrifting and by substitution of platinum by palladium on gasoline catalysts. Since this switching has been happening for several years, there is now more limited scope to reduce platinum requirements. However, the process did continue in 2006, reducing average platinum loadings everywhere, although the negative effect of thrifting on demand was outweighed by increased production of passenger vehicles in Japan and the Rest of the World.

Platinum Supply and Demand
'000 oz

		2005	2006
Supply			
South Africa		5,115	5,290
Russia		890	880
North America		365	345
Others		270	270
Total Supply		**6,640**	**6,785**
Demand			
Autocatalyst:	gross	3,795	4,195
	recovery	(770)	(855)
Jewellery		1,965	1,605
Industrial		1,690	1,870
Investment		15	(40)
Total Demand		**6,695**	**6,775**
Movements in Stocks		**(55)**	10

JM

Significant volumes of platinum - in excess of 200,000 oz - were also used in the heavy duty diesel market around the world. This represents rapid growth from 2005, with tightening environmental legislation in many countries the prime driving force.

Industrial demand for platinum grew too, rising 11 per cent to 1.87 million ounces. Although a high price encouraged thrifting of platinum in a number of applications, growth was seen in many sectors. A good example is the glass industry which took 30,000 oz of platinum more than in 2005, with expansions in LCD glass manufacturing capacity responsible for the increase.

The electronics sector had a good year, with annual sales of computers increasing by 10 per cent. With the number of hard disks in these and other devices rising, metal purchases by the hard disk sector climbed to 245,000 oz, 26 per cent up on 2005. The chemical sector also saw expanding demand for fertilisers, explosives and polymers, driving platinum demand higher. A high oil price and national concerns over energy self-sufficiency lifted platinum use in the petroleum refining sector by 21 per cent to 205,000 oz.

Platinum demand for global jewellery fabrication fell to 1.61 million ounces in 2006,

down from 1.97 million ounces the year before. The decline occurred in all regions, with purchases of new metal by manufacturers falling substantially.

A rising platinum price had little impact on consumer purchasing in China with retailers reporting higher turnover but a slight decline in the weight of metal bought. However, it had a much greater impact on the amount of recycling which reduced net demand by 13 per cent, to 760,000 oz, representing the lowest figure since 1998.

Chinese consumers are used to trading-in old jewellery pieces, usually in part exchange for new jewellery. High prices have encouraged this process. "Old" metal, including unsold stock returned by retailers, now represents perhaps a quarter of total metal requirements, with a corresponding decrease in purchases of new metal by manufacturers. Manufacturing volumes therefore declined by a much smaller percentage than the fall in demand. Pipeline stocks were also reduced, impacting upon new metal demand. Stocks are probably now close to their realistic minimum level.

In Europe and North America, the higher end of the market fared reasonably well. Cheaper, more fashion-orientated products sold less well, however, under competition from other white metals including white gold as high prices affected retailer profit margins. Platinum demand fell as a result.

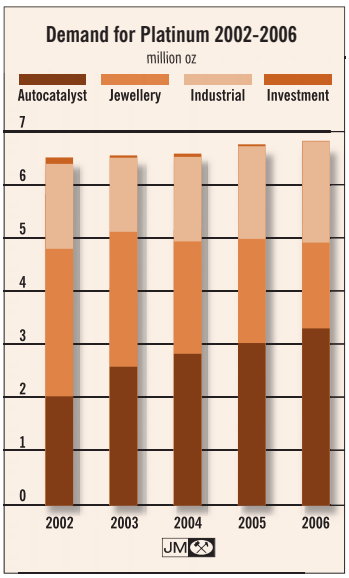
The Japanese jewellery market also saw demand fall: consumer sales have been dropping off for a number of years due to demographic changes (and slow economic growth) although an increased level of recycling of old rings and chain sold by the public was mainly responsible for the decline in 2006. So, while purchases of platinum jewellery fell, net demand was depressed further by the weight of metal returned to the market.

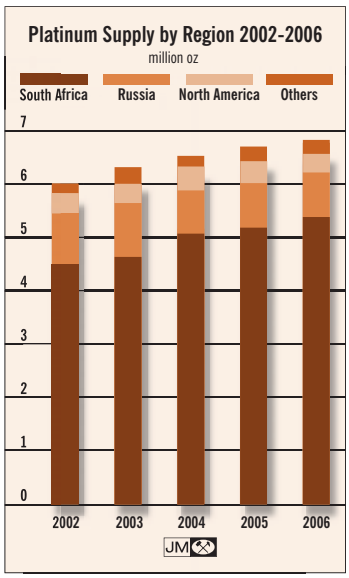
South African platinum supplies grew to 5.29 million ounces in 2006, with production raised by new mines at Everest and Two Rivers. A good performance from expansions and current operations at Anglo Platinum ensured an enhanced contribution of 2.82 million ounces from that company. Production of platinum by Impala fell slightly while Lonmin's sales were remarkably strong despite problems with its smelters. Although the primary producers took advantage of this increased production to replenish their stocks somewhat after years of market deficits, supplies of platinum grew, particularly in the second half of the year.

Russian supplies of platinum were almost identical to 2005 levels, at 880,000 oz. Although Norilsk Nickel moved to expand its base metal production, lower platinum content in the ore being mined meant that production was only maintained at the same level. Output from Russia's alluvial mines was slightly down.

The platinum price appreciated 14 per cent over 2006 and ended at $1,117. It hit record highs of $1,335 in May and $1,390 in November, but most of the price increase took place in the first half of the year, reflecting the supply-demand balance. With South African mining expanding, second half metal supplies were greater than those in the first half. High platinum prices also slowed various market segments including jewellery in the second half of the year. Although the last six months exhibited improved liquidity, the price spike (to $1,390) in November illustrated the residual tightness in the market.

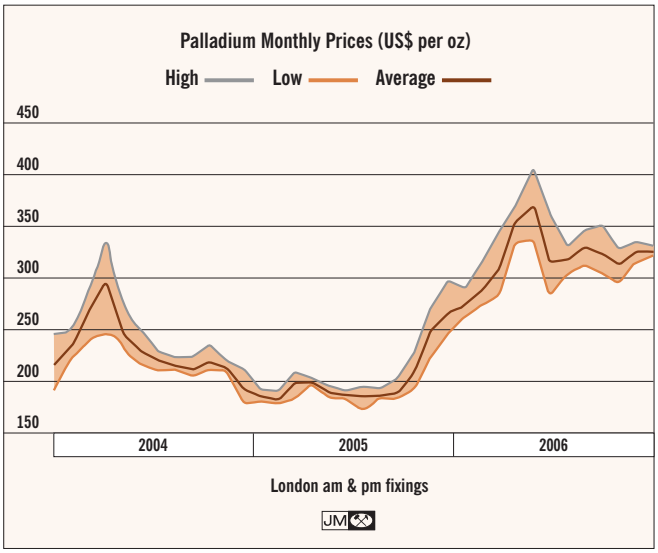
The investment community also had a significant influence on the price. Although long positions on NYMEX and TOCOM fell over the year, fund activity may simply have been displaced into over-the-counter (OTC) transactions and remained significant. There is no doubt that the price of gold and of other commodities were of great importance to the platinum market: it is no coincidence that as gold appreciated, platinum followed it higher, rising $135 over the year.





PALLADIUM

World demand for palladium fell by 10 per cent in 2006 to a total of 6.64 million ounces. Growth in the use of palladium in autocatalysts - to 4.02 million ounces from 2005's total of 3.87 million ounces - was supported by greater consumption of this metal by the electronics sector, where demand rose by 10 per cent to 1.07 million ounces. These positive trends were outweighed by a 30 per cent decrease in purchases of palladium in the global jewellery industry, where demand fell sharply to just below the one million ounce level. Demand for physical investment products also dropped substantially.



Movements in the palladium price were strongly influenced by the gold and platinum markets, showing the importance of fund investors to this metal.

Palladium supplies decreased compared to 2005, despite expansions in mining capacity in South Africa and higher output at Norilsk Nickel: this was partly due to lower sales of the metal from Russian state stocks. Despite the fall in supplies, the supply demand balance shows a weighty surplus of 1.43 million ounces for 2006.

Palladium production rose strongly in South Africa in 2006, climbing 11.5 per cent to 2.91 million ounces. Anglo Platinum increased its output to 1.54 million ounces, helped by growth in the mined volume of palladium-rich UG2 ore. Other mining houses contributed increased palladium output, including Lonmin, Aquarius and ARM. By contrast, palladium supplies from Impala and Northam both fell, due to the milling of ore with lower pgm content. Elsewhere, North American Palladium and Stillwater reported much improved output of palladium for the year, offsetting drops at Falconbridge and Inco which were acquired during 2006 by Xstrata and Companhia Vale do Rio Doce (CVRD) respectively.

Palladium Supply and Demand
'000 oz

		2005	2006
Supply			
South Africa		2,605	2,905
Russia		4,620	3,900
North America		910	985
Others		270	270
Total Supply		**8,405**	**8,060**
Demand			
Autocatalyst:	gross	3,865	4,015
	recovery	(625)	(800)
Dental		815	800
Electronics		970	1,065
Jewellery		1,430	995
Other		900	560
Total Demand		**7,355**	**6,635**
Movements in Stocks		**1,050**	**1,425**

JM

The weight of metal mined in Russia also increased. Norilsk Nickel reported a marginal increase in its palladium production to 3.16 million ounces. Much of the balance of Russian supplies in 2006 was made up of sales from state stocks. Large volumes of palladium were shipped from Russia into Switzerland at the start and end of 2006, we assume by Gokhran, the state depository. As the extraordinary December 2006 shipments of 1.29 million ounces were so late in the year, we think it unlikely that they were sold to consumers and therefore exclude them from our 2006 supply estimates.

2006 also saw the final sales of the stocks of metal which changed hands when Norilsk Nickel acquired Stillwater Mining. These sales totalled an additional 63,000 oz of palladium, sharply down on the 375,000 oz sold in 2005. Overall, this means that our estimate for 2006 Russian supplies is 720,000 oz lower than in 2005 at 3.90 million ounces.

On the demand side of the equation, the autocatalyst sector remains easily the most important contributor. Purchases rose again in 2006 to 4.02 million ounces worldwide - the highest level since 2001. The growing price differential between platinum and palladium over recent years has provided a financial incentive for auto makers to switch their catalyst formulations for gasoline vehicles from those based on platinum and rhodium to palladium-rhodium technology. Although this trend has been ongoing for several years, the switching process has not yet proceeded to its maximum extent and continues to drive palladium demand higher in most regions.

Although palladium consumption fell in the European market - due to thrifting and the growing market share of the diesel engine - it climbed elsewhere. Growth was particularly

strong in China, and in many other Asian markets, where production volumes are growing quickly. Automotive demand for palladium in the Rest of the World region (including China) rose by 11 per cent to 885,000 oz. Palladium purchases also rose 20 per cent in Japan on the back of strong domestic production.

Palladium is also beginning to gain a foothold, albeit a small one, in the diesel market. It is being used, to a limited extent, in diesel oxidation catalysts and particulate filters. In all such catalysts it is used in combination with platinum to help improve thermal stability and maintain platinum's catalytic performance at a lower overall cost. While palladium use in this application remains low, it rose steadily during 2006.

Demand for palladium in the electronics sector grew for the fifth successive year to 1.07 million ounces. The most important individual application remains its use in multi-layer ceramic capacitors (MLCC). With the consumer electronics markets still growing at more than ten per cent annually, MLCC production volumes are rising fast, outweighing any adverse effect from manufacturers switching from palladium-based to nickel-based MLCCs.

The major negative development for palladium demand came from the jewellery sector. Purchases of new metal plummeted from a global 1.43 million ounces to 995,000 oz. The Chinese market still remained the most important, but demand there fell from 1.20 million ounces in 2005 to 760,000 oz. Shipments of palladium into Hong Kong and China were much higher than this but we believe some of the large volumes imported in early 2006 were for fund investment purposes rather than to satisfy physical demand for the metal.

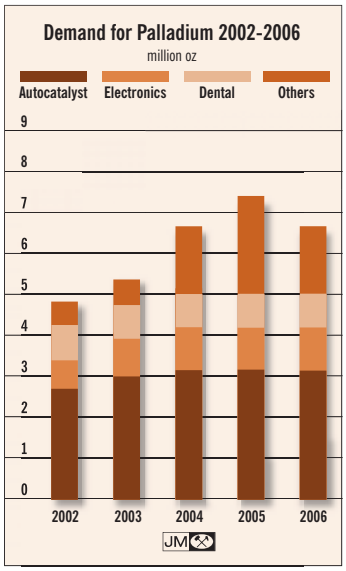
Demand for palladium from the jewellery sector is a relatively recent phenomenon in China, having only really become significant in 2004. Much of the demand for metal in 2004 and 2005 was for pipeline stocks: these allowed Chinese manufacturers to increase production in palladium and also enabled retailers to establish stocks. With the pipeline now full, the requirements for new metal were significantly lower in 2006 and, perhaps, more representative of consumer demand.

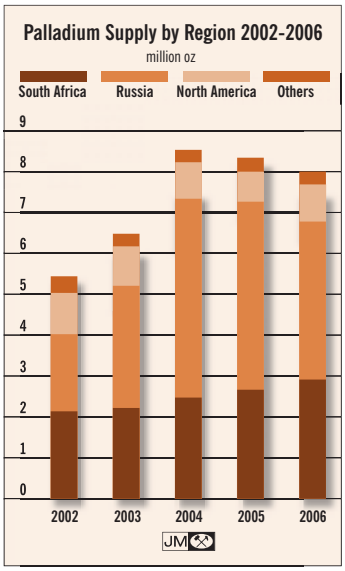
Much of the original stock manufactured was in the form of Pd950, a 95 per cent palladium alloy. This did not sell particularly well and almost all new manufacturing is in the higher-purity Pd990 alloy. The market saw large amounts of this unsold Pd950 jewellery returning to be refined and converted into Pd990 during 2006, reducing net palladium demand substantially.

The decline in the jewellery market can, however, be overstated. Despite a 30 per cent fall in 2006, global demand remains higher than it was in 2004 and very significant quantities of palladium jewellery are available on sale in Chinese secondary and tertiary cities. Outside China, interest in using palladium as a jewellery metal increased, with a small number of new products being seen in Europe and North America. Global palladium usage in white gold and platinum jewellery alloys remained almost unchanged from 2005.

The dental market performed relatively well in 2006, with demand almost level with 2005 at 800,000 oz. Palladium remained cheaper than gold and lost little market share in this end use. Demand for palladium in other applications fell sharply, mainly because of a decline in interest in palladium coins and small bars.

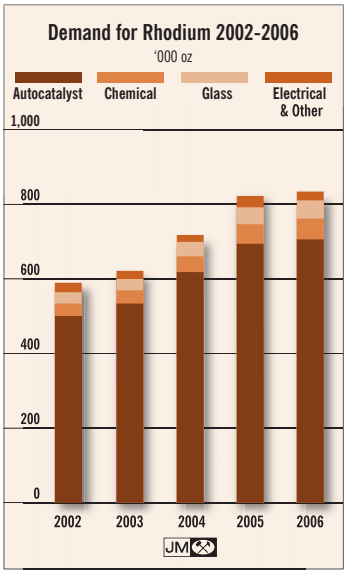
The palladium market therefore showed a surplus of more than one million ounces in 2006. However, the palladium price performed more strongly than might be expected on the basis of weak market fundamentals. It started 2006 at $261 and rose to $404, before ending the year at $324, still well supported by hedge funds and other large investors.





OTHER PGM

Rhodium



Net rhodium demand rose for the fifth successive year to 837,000 oz in 2006, 1.2 per cent above its 2005 level. While the glass sector consumed more metal than in 2005, sales to the automotive industry once more constituted the bulk of demand, at 868,000 oz. Reclamation of rhodium from spent autocatalyst also increased, hitting 170,000 oz for the full year. Supplies rose more quickly than demand but the market was again in deficit, resulting in a strong price performance.

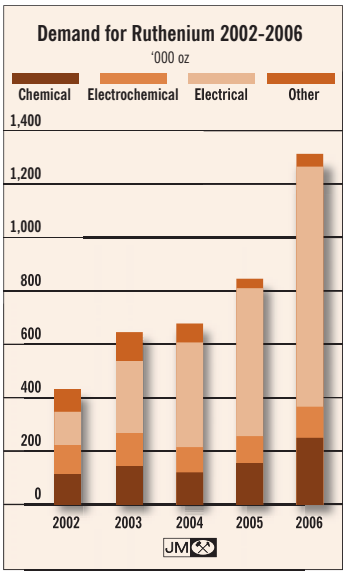
Although the global automotive industry bought more rhodium in 2006 than in the previous year, not every region contributed to this growth. Demand fell in Europe and North America where production volumes were relatively flat compared to previous year levels. The desire of the auto makers to limit the effects of a rising rhodium price by thrifting even outweighed the impact of new European legislation and caused a reduction in the rhodium content of an average autocatalyst there. Elsewhere, principally in Asia, the number of light duty vehicles being made grew, stimulating higher rhodium use.

Recycling of autocatalysts from damaged or scrapped cars continued to make a substantial contribution to secondary supply. At 170,000 oz, this was a quarter higher than in the previous year and should grow again in 2007, in line with increasing rhodium usage, particularly on vehicles sold in North America, during the 1990s.

Rhodium use in the glass industry rose 3,000 oz to 60,000 oz, in line with expansions in LCD glass manufacturing capacity. Other applications including electronics and chemicals were responsible for demand of 79,000 oz.

Supplies of rhodium also grew in 2006, rising by 9 per cent to 824,000 oz. South African expansions in mining capacity were largely responsible. These are mainly based on extracting UG2 ore which typically has a higher rhodium content per ounce of platinum than Merensky Reef. Supplies of rhodium from Russia also rose, reflecting what appears to have been sales from state stockholders.

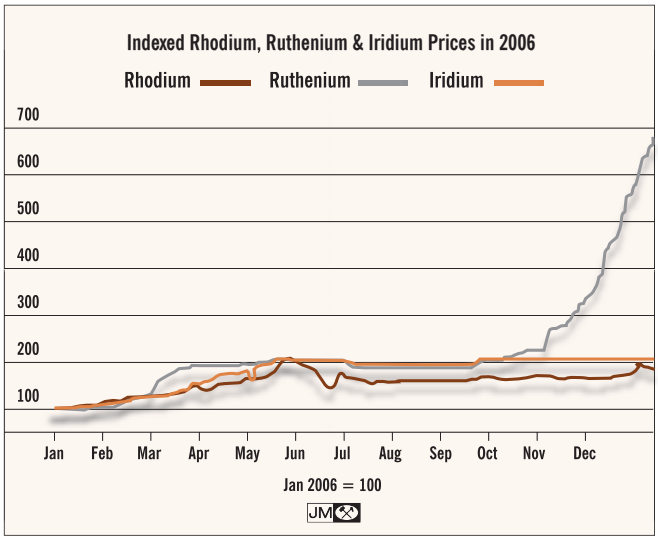
Rhodium's price was highly volatile throughout almost all of 2006. With demand still outstripping supply, it is not surprising, in retrospect, that the price averaged 121 per cent more than in 2005, at $4,550 for the year. However, although physical consumers of rhodium have become used to considerable price volatility, 2006 was as bumpy a ride as they had ever seen. In simple terms, market bids disappeared when the price rose too sharply, with virtually no metal changing hands. The price then dropped, allowing a period of two-way trading before it fell to a level at which offers dried up. Entirely predictably, the price would rise at this point and the cycle would then repeat. This behaviour was seen on numerous occasions in 2006 with speculator activities less important than those of participants in the physical market.



Ruthenium

Ruthenium demand soared by 45 per cent in 2006 to a record level of 1.29 million ounces. With purchases climbing so steeply, particularly for use in the electronics sector, supply was hard-pressed to keep pace and the price rose very rapidly throughout the year. 2006 saw the first signs of price sensitivity in a few applications (such as the use of ruthenium in platinum jewellery alloys) as the rising price encouraged end users to look at alternative materials or at thrifting of ruthenium.

On the demand side, ruthenium's main uses are in the chemical, electrochemical and electronics sectors. Substantial amounts of ruthenium have been used in the electronics industry for a number of years, particularly in the form of either sputtering targets or



The prices of all of the minor metals rose strongly in 2006. Ruthenium, however, showed the largest percentage growth, driven by strong fundamental demand.

ruthenium pastes and it is these various applications that showed the greatest increase in net metal demand during 2006.

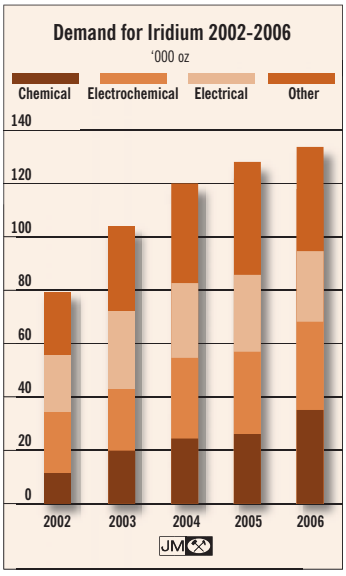
Ruthenium paste is used in the manufacture of flat screen plasma displays and this has been a significant source of demand over recent years. However, as the ruthenium price rose, the manufacturers were prompted to start a metal thrifting programme which reduced ruthenium demand slightly from 2005.

In contrast, in the hard disk sector net ruthenium requirements more than trebled to 388,000 oz. Ruthenium has previously been added to hard disks in order to increase the amount of data that can be stored. However, many manufacturers are now switching production over to a newer technology (perpendicular magnetic recording or PMR) which requires considerably more ruthenium. As this technology is new, thrifting opportunities, where they exist, are limited over the short-term and rapid growth in production of PMR disks sent demand spiralling upward.

The picture for metal demand was complicated by purchases of metal by the hard disk producers in order to fill pipeline stocks: much of the ruthenium used in a sputtering target is simply recycled and used in new targets. Although very large quantities of spent ruthenium targets were refined in 2006, we believe that the rate of growth in this sector was such that a backlog of unrefined scrap has built-up. This boosted demand above the amount of metal actually deposited on disks, with the market tightening as a result.

Most of the mining houses do not report data on ruthenium production, but analysis of recent market information suggests that annual South African output of this metal, at somewhere in the region of 800,000 oz, is higher than that of rhodium. A significant amount of metal was also sold from stocks held by the primary producers to meet physical demand in 2006.

Movements in the ruthenium price reflected the growth in demand. As ruthenium is now an important strategic material for manufacturers of hard disks, many of these companies moved to secure supplies. Fairly significant amounts of metal were tied up in the pipeline, being made into sputtering targets or being refined, tightening metal availability still further. Speculative purchasing of ruthenium also helped drive the price much higher throughout 2006, from $87 to a year-end $610. However, there were market rumours of sales of ruthenium stocks from some companies in early 2007, signifying an easing of the upward pressure on the price.



Iridium

Iridium demand edged 2.3 per cent higher in 2006 to a total of 131,000 oz. However, in fundamental terms, the market remains oversupplied with primary production above this level. No significant new applications for iridium were introduced in 2006. There was minor growth in the use of this metal in process catalysts (to 33,000 oz) and in spark plugs but much of this increase in demand was offset by a reduction in the use of iridium crucibles by the electronics industry to 28,000 oz.

Despite this metal surplus, the iridium price rose strongly throughout the first half of 2006. Having started the year at $195, reasonable levels of physical demand were accompanied by speculator purchasing and forced the price up to $400 by June, where it stayed for the remainder of the year.

OUTLOOK

PLATINUM

Platinum demand should continue its ten year record of continuous growth in 2007. The auto industry will consume more platinum in autocatalysts, with expansion in the European light duty diesel sector one of the key factors. Increasing Asian automotive production is also likely to raise platinum demand. The outlook for platinum demand from the jewellery sector is less clear, although an increase in metal purchases is feasible in 2007 given a more stable price.

Platinum supplies are also expected to grow in 2007. However, with Russian platinum exports interrupted in the first few months, the first half of the year is expected to be relatively tight in supply-demand terms. Expansions in South African capacity and processing of the backlog of material at Lonmin should progressively raise supplies during the year, leading to a more liquid market in the second half. Over 2007, should the mine expansions proceed to plan, the platinum market could move further into surplus.

In the light duty automotive sector, the market share of the diesel engine is expected to edge higher in Europe in 2007. If this proves to be the case, European platinum consumption in autocatalysts will rise once more. Diesel particulate filters are becoming more prevalent on light duty vehicles, which will raise the average platinum content of a vehicle's aftertreatment system even though no new emissions legislation is due this year in Europe. Palladium's introduction into diesel catalysts will have a minimal effect on platinum demand in 2007.

However, all major auto makers have been working for some time on replacing platinum with palladium in gasoline catalysts to realise substantial cost savings. 2007 will see this substitution process continuing in every region, as the car companies introduce new catalyst formulations which were approved in late 2006 or early 2007. These are expected to reduce platinum consumption in some regions, most notably North America. However, the effect will be outweighed in Japan and the rest of Asia by an increase in the number of light duty vehicles manufactured.

The pace of substitution is expected to slow in 2008, by which time a large majority of gasoline catalysts will be based on palladium. In our view, it is unlikely that platinum will be completely eliminated from gasoline exhaust aftertreatment on any timescale.

The heavy duty diesel market should see further growth in all regions. 2006 global demand was in excess of 200,000 oz due to the introduction of new emissions legislation in Europe and North America. 2007 will be the first full year in which the Euro IV European rules apply and demand will therefore rise again in that region.

The high platinum price clearly had a negative effect on demand in the global jewellery market in 2006. Consumer purchases were mildly affected by the rising price but this was less important than the very large amount of recycling of platinum jewellery occuring in China and Japan. The high metal prices encouraged the establishment of a much-improved recycling infrastructure for jewellery in Japan and this is likely to raise recycling volumes on an annual basis. There are very substantial volumes of metal in each country which could be returned over coming years in the form of old pieces of jewellery and recycling rates are likely to remain high in 2007. However, in the longer-term, the price performance of platinum will be key in determining the level of recycling.

Even if recycling remains at its current high percentage of overall metal consumption, we believe there are positive prospects for the jewellery market. New marketing which aims to sell platinum jewellery to retiring baby-boomers in Japan could help slow the decline that demographic changes have caused in that country. 2006 Chinese retail sales were little changed from the year before despite a year of rising prices. With domestic economic growth very strong, there is still much growth potential in that market. In fact, volumes of metal traded on the Shanghai Gold Exchange in the first quarter of 2007 were slightly above the figures for the corresponding period in 2006, showing signs of a market which could be strengthening.

Demand from the chemical and petroleum refining sectors may edge higher in 2007 and 2008. Global economic growth remains a key issue and, if this remains strong, demand for many bulk chemicals and oil will rise. This would drive construction of new chemical and petroleum refining capacity in 2007 and further into the future.

In some industrial applications, where price sensitivity is a greater issue (for instance in the dental

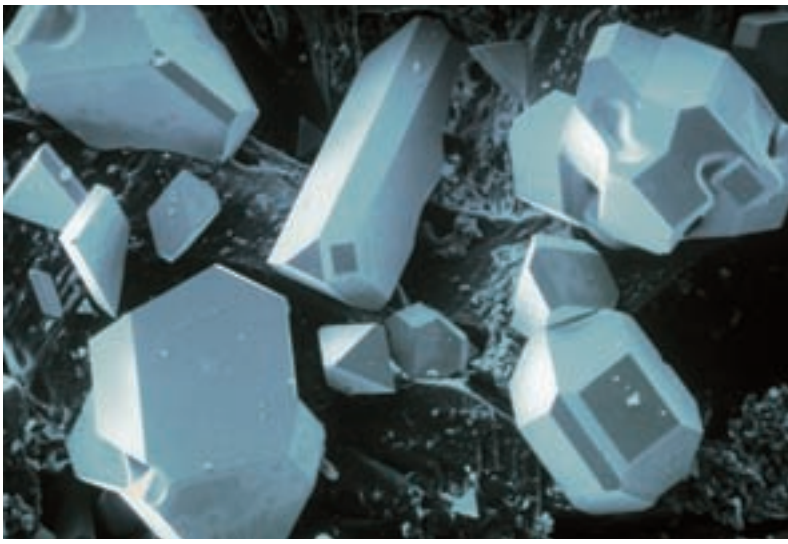
industry and in the process catalyst sector), the incentive to thrift platinum, at current price levels, from products and processes is strong for many companies. We therefore expect research into thrifting or substitution to take place over the medium-term.

2007 should see growth in platinum supplies, led by South Africa, where further increases in capacity will occur. If these expansions proceed according to schedule, sales of South African platinum could rise by more than 5 per cent from 2006 levels, a pace which would outstrip the growth in demand. However, any delays or interruptions in mining, such as from the industrial disputes seen in the first quarter of 2007 at Modikwa or the smelter rebuild at Marikana, would mean that supply and demand could be much more finely balanced.

Russian exports of platinum are forecast to fall slightly in 2007 (although this decline should be more than offset by rises in South African output). However, the first months of the year saw a major disruption in the shipping of platinum and rhodium from Russia (palladium was unaffected). New legislation was passed in January 2007 abolishing export quotas for platinum group metals. At the time of writing, the new regulations had not been finalised and approved by the relevant authorities. As a result, there were no platinum shipments in the early part of 2007; Russian contracts were being met from overseas stocks or metal leased or bought from elsewhere, with no indications of when shipments might be resumed.

Provided that the South African producers meet their production targets, and that the hiatus in Russian shipments is resolved, we expect the platinum market to be in surplus in 2007 but with particular tightness in the first half of the year. The launch of an exchange traded fund (ETF) was widely expected and had already provided some support to the platinum price. If the platinum ETFs are particularly successful in gathering investment, then they could apply further upward pressure to the metal price. With this in mind, we believe that platinum could reach $1,400 over the next six months. The price could rise further and show greater volatility if further significant supply disruptions occur or if fund positions were to change markedly.

However, fund activities could have a negative effect. Funds could become bearish towards commodities due to external factors such as the growing problems in the North American housing market, which could lead to a reduction in US consumers' savings rates. This would be likely to have the effect of encouraging funds to sell off some of their investments in commodities, something which would impact on platinum via its links to the gold price and to the US Dollar.



South African supplies of platinum should grow in 2007, as they have every year since 2001. With demand expected to rise as well, any supply disruptions could sway the balance of the market.

There is therefore some downside potential for the platinum price over the same six month period. However, were the price to fall as low as the $1,200 mark, the lower end of our forecast range, we believe this would revitalise consumer and speculative purchasing, supporting the price at this level.

PALLADIUM

Having fallen in 2006, global palladium demand is forecast to resume its growth in 2007. The automotive market is expected to consume more of this metal, replacing platinum in many, but by no means all, of the remaining gasoline autocatalysts where it is still employed. In the palladium jewellery market, as in platinum, there is considerable uncertainty as to the future trend in demand. Based on current market data and perceptions, a modest level of growth in purchases of palladium by Chinese jewellery manufacturers is not out of the question this year. The electronics sector will again be the third significant area of demand, with metal purchases expected to remain above one million ounces.

Supplies of palladium from South Africa will rise, roughly in line with the increasing production of platinum. Russian primary metal production may fall slightly but the sales of state stocks are expected to be large once more (including sales from shipments made into Switzerland in December 2006). Although the exact volume of palladium supplies to the market in 2007 is hard to forecast precisely, it seems likely that it will be higher than in 2006. In any case, we anticipate that the palladium market will show a substantial fundamental surplus this year, for the seventh year in a row.

Having risen in 2006 to its highest level since 2001, when the palladium price was at its all-time peak, demand for palladium from the autocatalyst sector shows good prospects for further growth this year. With the platinum price substantially above that of palladium, there is still a considerable economic incentive for automakers to switch to the latter metal. The majority of gasoline catalytic converter production has already been changed over to palladium (or was already using palladium in any case) but the process is continuing in 2007. We do not, however, expect this switching to displace all platinum from use in three-way catalysts.

This continuing move to palladium will ensure that purchases of palladium for autocatalysts will rise in 2007 despite any thrifting of platinum group metals which can be achieved. The number of vehicles manufactured is also likely to grow in 2007. The Asian markets, in particular, should exhibit healthy increases in production volumes, adding further momentum and driving palladium consumption higher.

Palladium is also set to play an increasing role in diesel aftertreatment. While platinum-palladium diesel autocatalysts were first fitted to vehicles in 2005, they are still used on relatively few models. Consequently, very little palladium will be utilised compared with the amount of platinum used in the light duty diesel vehicle sector. We do, however, expect to see palladium employed both on oxidation catalysts and on diesel particulate filters. It is important to note, however, that current technology only features palladium as a relatively minor precious metal component, always alongside platinum. Growth in the use of palladium will therefore only dampen the expansion in platinum consumption a little.

The consumer electronics market is expected to grow again in 2007. For instance, sales of computers are expected to rise 8 per cent above 2006 levels. This trend will boost requirements for all types of electronic components, of which the most important for palladium demand is the multi-layer ceramic capacitor (MLCC). Where there is a cheaper alternative to the use of palladium, there is an incentive for substitution or thrifting to take place. In the MLCC market, nickel will take more market share from palladium but MLCC unit growth will counter this. The precise balance of these trends in terms of palladium demand is hard to predict but we expect it to remain stable.

Where palladium is itself the alternative material in the electronics industry - whether as a cheaper replacement for gold or as an environmentally-friendly substitute for heavy metals - there is potential for growth in demand over the short to medium-term.

The prospects for 2007 are less certain for palladium in the jewellery trade. The rapid growth in demand from 2003 to 2005 was based only partly on rising consumer purchases of palladium jewellery. More importantly, Chinese manufacturers and retailers acquired very large amounts of metal (supported by extremely cheap financing rates for palladium) in order to build working and retail stocks. We judge that the pipeline is now full and that palladium demand in 2007 will more accurately reflect consumer purchases. However, some of this pipeline metal has come back for reprocessing already, depressing demand for

The Chinese market represents the majority of palladium jewellery demand. 990 parts per thousand has become the standard purity.

new metal. Some unsold Pd950 pieces still remain in the system which could be returned by retailers for recycling in 2007.

Prospects for consumer demand are also unclear. The availability and popularity of palladium jewellery is patchy even in similar cities in China. Small amounts of palladium jewellery are on sale in Beijing but have not sold well to date. In Shanghai, there are very few palladium pieces even on display. By comparison, palladium jewellery is found in quantity and sells well in many second and third tier cities. The outlook for consumer demand is therefore uncertain but with some positive signs. However, low manufacturing volumes of palladium jewellery in the final quarter of 2006 suggest that growth in jewellery demand in 2007 is likely to be limited.

Outside China, the weight of palladium bought for jewellery manufacture is likely to grow in 2007 but from a much lower base. New products have been seen in palladium, especially men's wedding rings, but this product development is at the test market stage. The amount of metal being used is increasing, however, as palladium begins to establish a market niche, and European and North American demand should rise accordingly.

The dental market is likely to decline again in 2007. As we have previously reported, demand in the key Japanese market depends upon the balance between the price of the Kinpala dental alloy and the government subsidy which is used to pay for it. Although the subsidy is regularly reassessed, it was below the level of the alloy's price in early 2007, with purchases of palladium for this application diminishing correspondingly.

As in the platinum market, supplies of palladium from South Africa are expected to increase again in 2007. However, the balance of the palladium market will be heavily dependent on the level of Russian state stock sales. We have assumed that the large shipments of palladium from Russia to Switzerland at the end of 2006 were made too late to be sold into the market last year. We expect these stocks to be liquidated this year, and therefore anticipate a large overall total of sales from this source, even if no further exports are made from the remaining state stocks.

The palladium price remained largely untroubled by weak supply-demand market fundamentals in 2006 and was instead supported by significant and growing fund positions in the metal and on the futures markets. With another surplus of palladium expected in 2007, fund support will remain of key importance.

If the funds continue to absorb the surplus, then the price of palladium could reach $420 over the next six months. ETFs have recently been launched for palladium as well as for platinum and, if sucessful, could reinforce the price. Conversely, a lessening of the appetite for palladium from hedge funds and other investors would weaken the price. Softening prices of precious metals or other commodities would also negatively affect the palladium price. However, unless fund selling is particularly dramatic, we do not expect palladium to trade below $320 over the same period.

OTHER PGM

2006 saw some evidence of price sensitivity from end users of rhodium and ruthenium. If prices of these metals remain elevated, this trend of thrifting or substitution could intensify in some sectors.

The car market will remain key for rhodium and the balance between continued thrifting and growing production volumes will vary in different regions. The European market is likely to see some decline in rhodium purchases with the diesel car's market share increasing as well. By contrast, demand in the Asian markets should rise as production volumes increase strongly yet again.

With rhodium production from South Africa expected to increase in 2007 and Russian supplies likely to fall (with lower sales by stockholders behind this latter change), the rhodium market could move closer to balance in 2007. This would imply an easing of the price although the difficulties in first quarter Russian rhodium supplies have provided support to date.

In the ruthenium market, we expect to see further growth in demand from the computer hard disk sector in 2007, as manufacturers continue to increase the proportion of their output which is based on perpendicular magnetic recording (PMR) technology. This will be offset to a degree by growing amounts of recycling of the backlog of spent ruthenium sputtering targets. Thrifting, in response to the elevated price, is likely to come into effect in this and other industrial applications over time to ease some of the price pressure.

SUPPLIES, MINING & EXPLORATION

SOUTH AFRICA

In 2006, sales of platinum into the market grew by a modest 3 per cent, to a total of 5.29 million ounces. In contrast, supplies of palladium and rhodium were above the level of refined production, increasing by more than 10 per cent to 2.91 million ounces and 690,000 oz respectively. Production in South Africa was boosted by new mines at Everest and Two Rivers, combined with a strong performance from Anglo Platinum. However, supplies of platinum rose more slowly than output, with producers adding nearly 200,000 oz to their year-end unsold stocks of refined metal.

Anglo Platinum

Anglo Platinum reported substantial growth in refined pgm output in 2006. Large releases of metal from the processing pipeline added nearly 180,000 oz to platinum production, which totalled 2.82 million ounces - an increase of 15 per cent on the previous year. Palladium output also rose strongly, reaching 1.54 million ounces, but rhodium production was stable at 326,000 oz, following the large pipeline release which occured in 2005.

Equivalent refined platinum production (the amount of metal produced in concentrate, adjusted for standard smelting and refining recoveries) was up 5 per cent, at 2.65 million ounces. Most of the group's mines contributed to this improvement, with only PPRust reporting a small decline in output. There was a recovery in pgm production from the flagship Rustenburg and Amandelbult operations, where a lack of available reserves and geological difficulties had hampered production in 2005; while Modikwa, BRPM and Kroondal all moved closer to achieving planned production rates.

PGM Supplies: South Africa
'000 oz

	2005	2006
Platinum	5,115	5,290
Palladium	2,605	2,905
Rhodium	627	690

JM

In addition, Anglo Platinum processed around 13,000 oz of platinum from each of two new operations: Marikana (the subject of a Pool & Share Agreement with Aquarius Platinum) and Mototolo (a joint venture with Xstrata plc). The latter came on-stream in late 2006 and is expected to produce over 100,000 oz of platinum in 2007, despite difficult near-surface ground conditions which hindered the initial ramp-up in underground production. At Marikana, concentrator capacity has been expanded via the addition of a dense media separation plant, and over the next 2-3 years, platinum output should nearly double from the 2006 level of 65,000 oz. The processing of concentrate from Marikana will be split between Anglo Platinum and Impala.

Two expansion projects were approved in 2006. In December, the group confirmed its decision to proceed with the R1.6 billion Amandelbult East Upper UG2 project, which will involve the redevelopment of existing Merensky infrastructure to exploit the UG2 reef. Capacity at the UG2 concentrator will be raised by 135,000 tonnes per month, lifting annual platinum output by 106,000 oz from 2012.

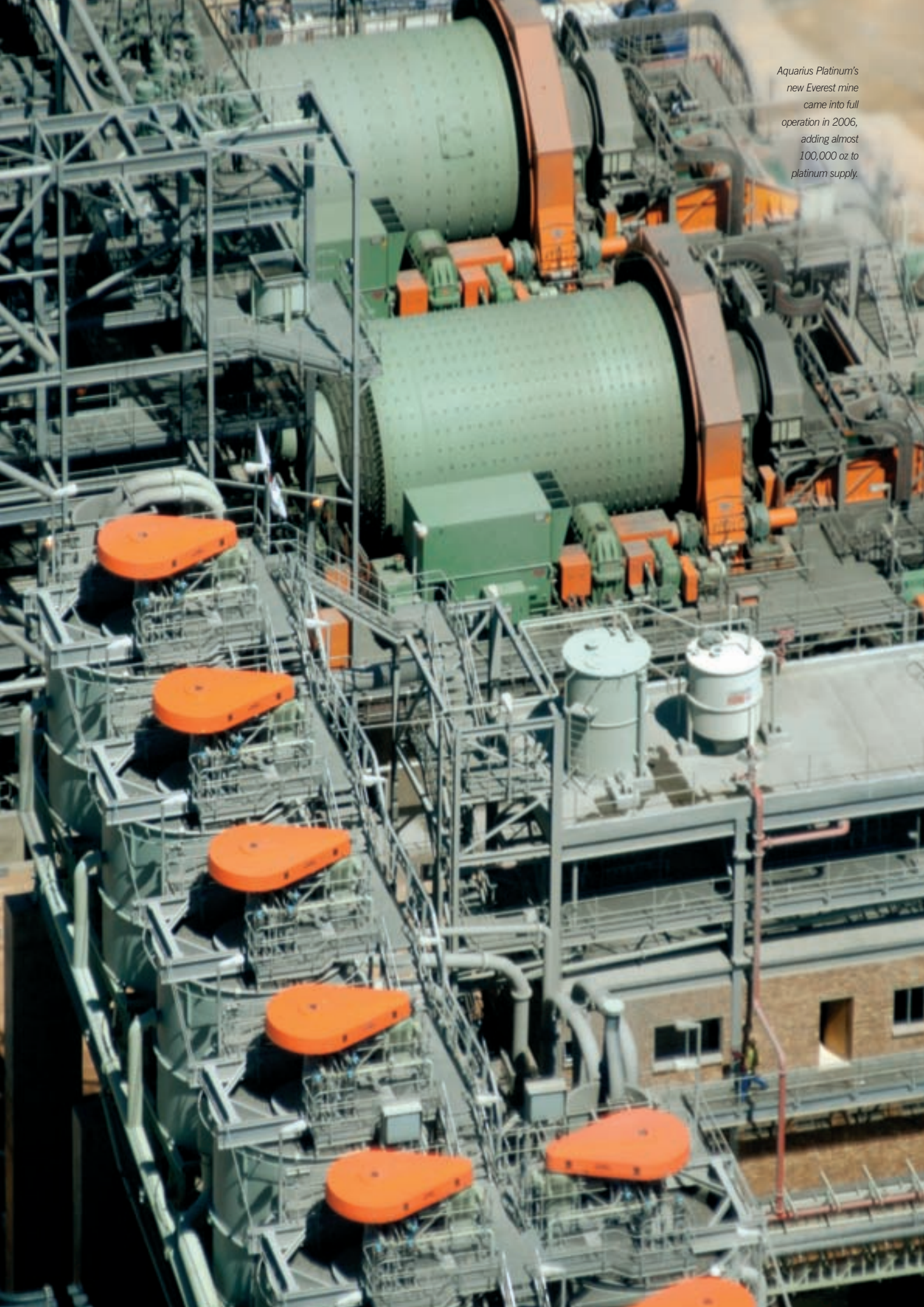
A R3.8 billion expansion at PPRust also received the go-ahead, and will add 230,000 oz of platinum annually from 2009. The development of the new PPRust North pit began last year, and a new concentrator, capable of treating 600,000 tonnes of ore per month, is on schedule for commissioning in 2008.

Small-scale mining is underway at two other projects, Pandora and Twickenham. Anglo Platinum's joint venture partner Lonmin is currently exploiting open pits and a small underground section on the Pandora lease area; ore is being sold to Lonmin, and is reported as part of that company's production (see page 14). At Twickenham, the early mining project at the Hackney shaft yielded 6,400 oz of platinum in 2006. Feasibility work on the larger-scale development of these mines is in progress, while the group also continues to evaluate projects at Styldrift, Ga-Phasha, Booysendal and Der Brochen.

Impala Platinum

At the Impala Platinum lease area, platinum production slipped by 7 per cent in 2006 to 1.08 million ounces - the lowest level in three years. Output of palladium and rhodium fell by over 10 per cent, to 469,000 oz and 116,000 oz respectively.

Although mill throughput was only marginally lower, at 16.4 million tonnes, grades and recoveries were depressed by inefficient mining practices and changes in the ore mix. A reduction in tonnage from the



Aquarius Platinum's new Everest mine came into full operation in 2006, adding almost 100,000 oz to platinum supply.

Merensky Reef was partly compensated by an increase in the mining of lower-grade open-cast UG2 ore, from which recoveries are typically lower. There was also a decline in the overall pgm grade of ore extracted from underground, which Impala attributed to excessive stoping widths and off-reef mining. The company has initiated a "back-to-basics" mining plan, focusing on improving grade control and mining efficiencies, with the aim of increasing platinum production to 1.15-1.20 million ounces per annum within 2-3 years.

In contrast, at Impala's Marula operation on the Eastern Bushveld the implementation of a new mining plan began to have a positive impact on operational performance. Over 1.24 million tonnes of UG2 ore were processed by the plant in 2006, up 60 per cent on the previous year, while production of platinum in concentrate climbed by 73 per cent to 54,000 oz. The mine is on schedule to achieve full production of 136,000 oz of platinum annually by 2009.

Impala also has interests in two platinum producers in Zimbabwe, Zimplats and Mimosa, discussed in more detail on page 19. In South Africa, the company is involved in the Two Rivers joint venture (with African Rainbow Minerals (ARM)), which produced its first pgm in 2006. Matte and concentrate arising from these operations is processed by Impala Refining Services (IRS).

IRS has concentrate purchase agreements with a number of other producers, including Aquarius and Barplats, as well as toll-refining significant quantities of pgm contained in secondary materials (principally autocatalyst scrap). In 2006, the company also treated reasonable volumes of pgm concentrate from Lonmin's operations, which were once again affected by smelter outages. Offtake agreements are already in place with other potential future producers, and Impala announced in February 2007 that it would construct a third smelter at Rustenburg, lifting total capacity to 2.8 million ounces of platinum annually.

Although Impala has significant expansion potential in Zimbabwe, it has only limited scope to raise production from its mines in South Africa. Historically the company's expansion strategy has been focused on concentrate purchase agreements with joint venture partners and third parties, but in February 2007 it moved to acquire a new project, with the announcement of a cash offer to buy out the London-listed company African Platinum (Afplats). The latter is the owner of the Leeuwkop project, downdip of Eastern Platinum and Pandora, on which a feasibility study was completed in 2006.

Expansion at Lonmin's Marikana division is being planned to boost long-term platinum output above one million ounces per year.

Lonmin

For the financial year ending September 2006, Lonmin reported a 3 per cent increase in platinum production to 948,000 oz (including metal toll-refined or sold as concentrate). Palladium output was up 8 per cent at 439,000 oz, while that of rhodium rose by 12 per cent to 133,000 oz.

At the Marikana division (formerly known as Western Platinum, Eastern Platinum and Karee), mill throughput grew by 5 per cent to 14.3 million tonnes. This includes ore mined from the Pandora lease area, where the UG2 reef is being extracted via existing shaft infrastructure and from a new open pit. Overall, the balance of production shifted away from open-casting and towards underground mining, with additional ore being mined from the Rowland and K3 shafts.

Starting in early 2007, two new deep vertical shafts - Hossy and Saffy - will come into production, while the K4 shaft will come on-stream the following year. All three are being developed as fully-mechanised operations using ultra low profile equipment. Output from these shafts will support a planned increase in Marikana division's platinum production to

1.18 million ounces by 2012.

During its first full financial year as part of the Lonmin group, the Limpopo division (formerly Messina) milled 901,000 tonnes of ore and produced 50,000 oz of platinum in concentrate. The ramp-up to 75,000 oz of platinum per annum fell about six months behind plan, due to poor ground conditions and the discovery of a large pothole which affected the build-up in developed reserves. Full production is now scheduled for the second half of 2007.

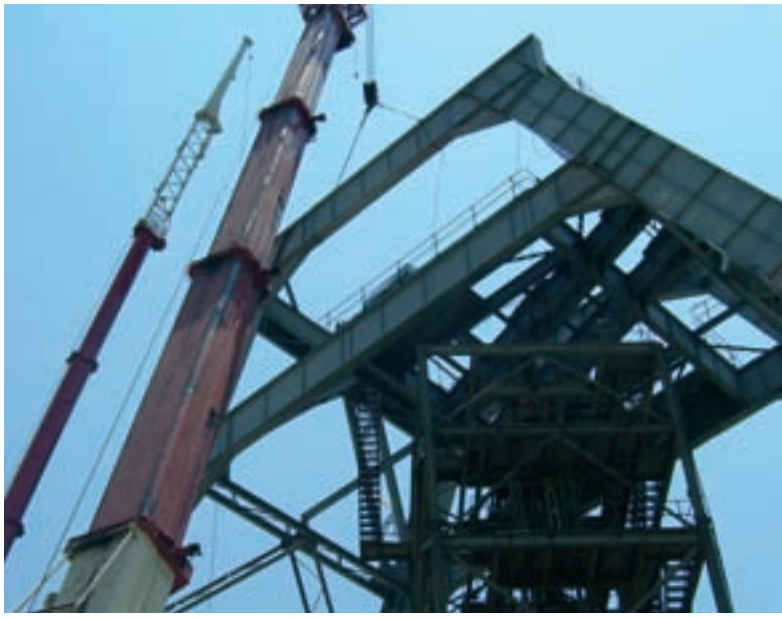
A planned rebuild of the No. 1 smelter, involving the replacement of the copper cooling waffles, was completed in February 2006 and was expected to allow the furnace to operate continuously for two years. However, in April a leak adjacent to one of the matte tap holes was discovered, resulting in a further 11 day shutdown. Eight months later, in mid-December, a more serious leak occurred, and the smelter was shut down for over four months while extensive reconstruction was undertaken.

During this period, substantial stockpiles of untreated pgm are thought to have accumulated, despite the operation of the company's three Pyromet furnaces and the sale or toll-refining of some concentrate. The old Merensky furnace has been rebuilt, with the intention of running it in parallel with the No. 1 smelter in order to process the backlog of concentrate during the second half of 2007. Lonmin has stated that it expects platinum sales for its 2007 financial year of between 980,000 and 1 million ounces (including metal toll-refined externally or sold in concentrate).

In mid-December 2006, Lonmin announced a cash offer for AfriOre, owner of a 74 per cent stake in the Akanani pgm deposit west of PPRust. The acquisition was completed in February 2007. Initial estimates are based on a 5 million tonne per annum underground mine producing 250,000 oz of platinum annually, with first production targeted for 2013; this would represent the first attempt to mine the Platreef underground.

Northam

Northam reported platinum production of 223,000 oz in 2006, scarcely changed compared with the previous year; in contrast, palladium output slumped 12 per cent to 96,000 oz, while that of rhodium surged 38 per cent to 30,000 oz. Mine output was supplemented by the purchase of Merensky concentrate, containing some 7,400 oz pgm, from an external source.



2006 development at Barplats' Crocodile River operations included the relocation of headgear from its Kennedy's Vale site.

Mill throughput was unchanged at 2.36 million tonnes of ore, but grades declined, partly due to a shift in the ore mix towards the lower-grade UG2, and partly due to increasing geological complexity on the Merensky Reef. Northam mines a number of different Merensky facies (reef types), of which the richest in pgm - the P2 facies - accounted for only 42 per cent of production at the year end, compared with a historical average of over 50 per cent. Mining conditions on the Merensky reef are expected to remain challenging in the near future, with the company forecasting that overall production in the first half of this year will decline by 15 per cent.

Aquarius Platinum

Production of platinum in concentrate from Aquarius Platinum's South African operations increased by 36 per cent to 435,000 oz in 2006, largely as a result of the successful start-up of the Everest project on the Eastern Bushveld. This new mine - the plant was commissioned in December 2005 - produced 99,000 oz of platinum in concentrate during its first full year of production. Initial feed to the concentrator came mainly from open-casting but as the year progressed, the mix shifted steadily towards underground ore,

which accounted for nearly 80 per cent of tonnes milled in the final quarter. By the end of 2007, the ramp-up in underground production should be complete, giving an annual output of around 125,000 oz of platinum.

Aquarius' two other South African mines are operated under Pool & Share Agreements with Anglo Platinum (see page 12). In 2006, Kroondal raised its output of platinum in concentrate by 7 per cent to 267,000 oz; this year it should operate close to full capacity (around 300,000 oz of platinum per annum). Production at Marikana was unchanged at 65,000 oz last year, but should increase significantly in 2007 following the expansion of processing and mining capacity under the P&SA.

ARM Platinum

With the commissioning of the Two Rivers mine in July 2006, ARM Platinum now has three pgm-producing operations in South Africa, the others being the Modikwa joint venture with Anglo Platinum and the Nkomati Nickel mine with LionOre.

Two Rivers (ARM: 55 per cent) milled 746,000 tonnes last year, yielding 55,000 oz of pgm in concentrate. A stockpile of 1.2 million tonnes of ore, built-up during two years of trial mining, permitted a rapid ramp-up to full production: the design milling rate of 225,000 tonnes per month was achieved in early 2007. Platinum output is expected to exceed 100,000 oz this year, this metal being refined by joint venture partner Impala.

Modikwa (ARM: 41.5 per cent) saw a 5 per cent increase in equivalent refined platinum production, to 135,000 oz, with a fall in mill throughput more than offset by a sharp improvement in grade. However, the mine continued to face challenges, including poor ground conditions at the South shaft and difficult labour relations. Employee discontent came to a head in early 2007, with production being halted for over three weeks in a dispute over seven day operations. ARM subsequently estimated that around 10,000 oz of platinum production was lost during the strike.

The existing underground mine at Nkomati (ARM 50 per cent) exploits the high-grade massive sulphide body (MSB), which contains around 2 per cent nickel and 4-6 grams of pgm per tonne. In 2006, the operation treated 361,000 tonnes of ore, yielding over 52,000 oz of pgm. The MSB mine is nearing the end of its life, with operations expected to cease in 2007; it will be replaced with an interim programme, which involves an expansion of concentrator capacity to 100,000 tonnes per month, and the construction of an open pit and underground mine exploiting the lower-grade Main Mineralised Zone (MMZ). This project, due to be commissioned in the second half of 2007, will maintain nickel and pgm production close to current levels.

Other

The redevelopment of Barplats' Crocodile River mine continued in 2006. A second primary mill was commissioned in September, doubling concentrating capacity to 160,000 tonnes per month; vertical shafts and declines at Zandfontein were dewatered, and additional conveyor capacity was installed. This contributed to an increase of over 80 per cent in sales of pgm in concentrate, to 86,000 oz. By 2010, the company plans to increase output from Crocodile River to around 250,000 oz of pgm annually. It is also undertaking feasibility work on its Kennedy's Vale project on the Eastern Bushveld, while Barplats' 69 per cent share holder, the Toronto-listed company Eastern Platinum, is investigating the nearby Spitzkop and Mareesburg prospects.

Two new platinum mines entered the construction phase in 2006: Eland Platinum's Elandsfontein project, East of Crocodile River, and Ridge Mining's Blue Ridge, at the Southern end of the Eastern Limb. At the R1.1 billion Blue Ridge project, the decline portals were completed in late 2006 and shaft sinking began in January this year. The plant is due on-stream in mid-2008, with full production of 125,000 oz of pgm annually scheduled for the following year; this metal will be refined by Impala.

Open pit mining got underway at Eland Platinum's Elandsfontein project in January 2007. A stockpile of ore will be built-up ahead of the commissioning of the concentrator, which is planned to take place in the final quarter of this year. Initial production will come entirely from open-cast mining, but the sinking of an underground mine will commence in late 2007, and this will account for 100 per cent of production by 2012. At full production, Eland forecasts that it will sell around 270,000 of pgm in concentrate annually to Anglo Platinum.

RUSSIA

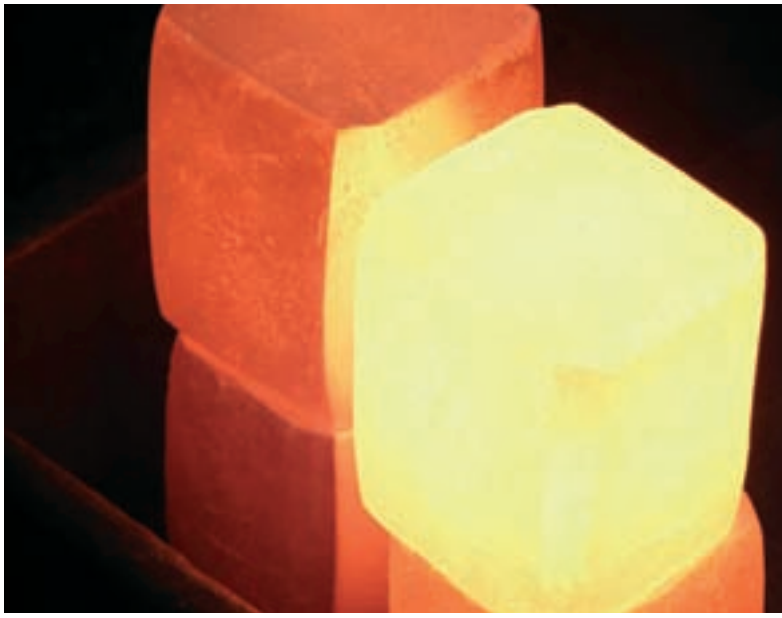
In 2006, supplies of palladium from Russia totalled 3.9 million ounces, a decline of 16 per cent compared with the previous year. This total includes 63,000 oz sold by Stillwater, representing the last of the stocks transferred during the acquisition of the company by Norilsk Nickel. Rhodium shipments were also up sharply, at 95,000 oz, as high prices encouraged the liquidation of rhodium stocks; supplies of platinum were stable at 880,000 oz.

Russian pgm supplies are composed of two elements: output from Norilsk Nickel and other pgm producers (principally alluvial miners in the Far East of the country), and sales from government-controlled stocks. In recent years it has been common for Gokhran, the state depository, to receive its palladium sales quota late in the year, often too late for all the metal to be shipped and sold before the year end. In January 2006, trade data shows substantial imports of Russian palladium into Switzerland; we believe this was part of Gokhran's 2005 quota.

It appears that Gokhran's 2006 quota was also granted very late in the year; December trade data shows the import of 40 tonnes (1.29 million ounces) of Russian palladium into Switzerland. In our view, it is unlikely that any of this metal was sold to consumers before the year end and we have therefore excluded it from our estimate of 2006 supplies.

Norilsk Nickel recorded a slight increase in pgm production in 2006, with palladium output rising by 1 per cent to 3.16 million ounces and that of platinum stable at 752,000 oz. This was some 7 per cent higher than the company's earlier forecasts for the year, a change which was attributed to improvements in recoveries and the release of metal from the processing pipeline. Nickel production was stable, while copper output fell marginally, with work to modernise hoisting capacity at the Komsomolsky mine on the Taimyr peninsula resulting in a decrease in output of copper-rich ore (which also has a high pgm content). The company's forecasts for 2007 allow for a slight reduction in pgm production, to around 3 million ounces of palladium and 700,000 oz of platinum.

In June 2006, Norilsk published its new long-term production strategy, the objective of which is to raise nickel production by 7 per cent in the period to 2015, while maintaining copper and pgm production at around current levels. As part of the plan, processing efficiencies will be increased, resulting in lower costs and an improved environmental performance. Ore mining volumes from the Taimyr peninsula operations (the source of almost all the company's pgm) will be lifted by 28 per cent, from 14.4 million tonnes in 2005 to 18.5 million tonnes by 2015.



Primary production of Russian platinum group metals was relatively flat in 2006 although palladium supplies were augmented by sales of state stocks.

Production of rich (massive sulphide) ore will be maintained at current levels of around 7.5 million tonnes, via the deepening of the Taimyrsky mine and the completion of the 3 million tonne per annum Skalisty mine (which will ultimately be the source of up to a third of all nickel produced on the Taimyr peninsula). By 2015, production of lower-grade ore will rise by 70 per cent from 2005 levels, while output of copper ore will grow 50 by per cent, largely due to increased mining of this ore type at the Oktyabrsky mine (where rich ore reserves are declining).

Norilsk also plans to invest heavily in upgrading its processing plant. Capacity at the Talnakh concentrator will be upgraded by 50 per cent, to allow the treatment of 10.5 million tonnes of ore annually, while an expansion will be undertaken at the Nadezhda smelter in order to allow the closure of the Nickel Plant. Together with the mining

PGM Supplies: Russia
'000 oz

	2005	2006
Platinum	890	880
Palladium	4,620	3,900
Rhodium	90	95

expansions outlined above, these developments will require capital spending of $800 million to $1 billion annually in the period 2007 to 2010, and around $450-500 million per annum thereafter.

The alluvial producers at Amur and Koryak reported combined production of 180,000 oz of platinum in 2006, slightly up on the previous year. Looking forward, output is likely to decline as the deposits are depleted and grades fall. The Amur operation plans to compensate for lower grades by increasing throughput more than threefold in 2007, but platinum output is still expected to be below last year's level. Koryak also predicts a decline in output.

NORTH AMERICA

Supplies of platinum from North America fell by 5 per cent to 345,000 oz in 2006, due to lower production from the former Inco mines now owned by Companhia Vale do Rio Doce (CVRD). In contrast, palladium shipments rose by 8 per cent to 985,000 oz; the start-up of a higher-grade underground section boosted output at North American Palladium, while Stillwater also reported an increase in sales.

Canada

After a difficult 2005, last year saw a much improved performance from North American Palladium, largely due to the start-up of a new underground section exploiting a high-grade zone below the open pit.

During 2006 we estimate that 675,000 tonnes of ore were extracted from the underground workings at an average palladium grade of over 5.5 grams per tonne. This ore was blended with open-cast material, giving an average mill feed grade of 2.18 grams per tonne - 30 per cent up on 2005. Palladium output climbed 34 per cent to 237,000 oz, while platinum production rose by 10 per cent to 22,000 oz; the company predicts further growth, to 290,000 oz of palladium in 2007.

PGM Supplies: North America
'000 oz

	2005	2006
Platinum	365	345
Palladium	910	985
Rhodium	20	20

JM

The remainder of Canada's pgm production occurs as a by-product of nickel mining in the Sudbury area and to a lesser extent in Northern Quebec.

North American Palladium expanded output in 2006 by adding underground mining to its open-cast activities.

In 2006, there were changes in ownership of both Canada's major nickel producers, with Falconbridge being acquired by the Swiss company Xstrata in August, and a takeover of Inco by the Brazilian Companhia Vale do Rio Doce (CVRD) being completed in October.

Canadian production of nickel by the CVRD-Inco operations rose 13 per cent to 164,000 tonnes in 2006; however, this gain came entirely from the start-up of the Voisey's Bay nickel mine, which does not contain pgm. In contrast, nickel output from the pgm-producing mines in Ontario declined by 4 per cent. This contributed to a decline in pgm production, to 152,000 oz of platinum (down 13 per cent) and 208,000 oz of palladium (down 6 per cent).

At Xstrata Nickel's Sudbury operations, mill throughput declined by 13 per cent to 1.89 million tonnes of ore in 2006, while base metal grades also fell; as a result, nickel and copper production declined by 17 per cent. Grades of pgm in Sudbury ores are very variable, ranging from insignificant levels in nickel-rich ores to several grams per tonne in some copper-rich deposits. We believe that Xstrata Nickel's 2006 pgm output was supported by production from the Fraser Copper deposit, which is comparatively rich in platinum group metals.

The exploitation of Xstrata's Nickel Rim South deposit, also in Sudbury, will augment pgm production in future. The ore is rich in copper, and contains significant quantities of pgm, with the average grade expected to exceed 4 grams per tonne. First

development ore from this project is expected in late 2008, with full production scheduled for 2010: by-products will include 89,000 oz of palladium and 73,000 oz of platinum annually.

At Raglan, Xstrata's nickel mine in Northern Quebec, plant throughput totalled 1.1 million tonnes of ore in 2006, up 14 per cent on the previous year. Milling capacity is being increased, which will lift production of nickel by 15 per cent from 2009. Production of pgm - principally palladium - should increase accordingly.

USA

At Stillwater Mining Company's pgm operations in Montana, a mine transformation programme - involving an increase in underground development as well as a change in mining methods - began to bear fruit in 2006. Sales of palladium increased 8 per cent to 466,000 oz, while shipments of platinum grew by 2 per cent to 138,000 oz.

Both the company's mines reported an improved operational performance, despite halting production on a number of occasions during the third quarter due to wildfires in the surrounding area. At Stillwater, there were gains in mill throughput and head grade, reflecting a shift towards more selective mining methods. The East Boulder mine saw an 11 per cent increase in tonnage sent to the mill, although this was partly offset by a slight drop in grade. Together, the mines produced 600,000 oz of platinum and palladium, a rise of 8 per cent on the previous year. Stillwater also reported data for rhodium for the first time; production of this metal totalled 4,000 oz in 2006.

In 2007, the company expects further gains in pgm output, which should total between 615,000 oz and 645,000 oz for the whole year. It also plans to begin an expansion of its metallurgical processing facilities in Columbus, Montana, with the addition of a second furnace; this will provide increased capacity for the company's secondary refining business, as well as processing output from the mines.

ZIMBABWE

The completion of the Wedza Phase IV expansion at Mimosa lifted platinum supplies from Zimbabwe by 6 per cent to 165,000 oz in 2006. Palladium and rhodium shipments rose to 142,000 oz and 14,000 oz respectively. Mimosa has now embarked on a further upgrade to its plant, while Impala has approved a 75 per cent expansion of pgm production at Ngezi.

At the Mimosa mine, a 50:50 joint venture between Aquarius Platinum and Impala, an upgrade of milling capacity to 150,000 tonnes per month was completed in the second quarter of 2006. As a result, plant throughput for the year rose by 18 per cent to 1.8 million tonnes, yielding 74,000 oz of platinum in concentrate.

In January 2007, the joint venture partners announced a further incremental expansion, known as Wedza Phase V, at a capital cost of $23.2 million. This will involve the installation of an additional mill to lift concentrator capacity to 175,000 tonnes per month or 100,000 oz of platinum annually. This expanded production rate will be achieved from July 2007.

PGM Supplies: Zimbabwe and Others
'000 oz

	2005	2006
Platinum	270	270
Palladium	270	270
Rhodium	17	19

JM

Mill throughput at the Ngezi mine operated by Zimplats (Impala: 86.9 per cent) was very little changed at 2.06 million tonnes in 2006, but the successful completion of the Portal 2 project led to a significant shift in the ore mix, with just under half of all material processed coming from underground. A resulting increase in grade led to a 6 per cent rise in production of pgm in concentrate, although shipments of pgm in matte were unchanged compared with deliveries made in the previous year.

In May 2006, Impala reached an agreement with the government of Zimbabwe: Zimplats will release a portion of its mining claims (comprising 36 per cent of the company's resource on the Great Dyke) in return for empowerment credits and either cash or a share in a future joint venture. In return, in September 2006, the government approved an extension to the company's Special Mining Lease to cover all of Zimplats' remaining mining claims. This provides the security of tenure required by Impala in order to proceed with its long-term expansion programme.

A Phase I expansion programme costing $258 million has now been approved. This will involve the development of two new underground shafts, and the construction of a concentrator at the mine site, resulting in an expansion of platinum production to 160,000 oz per annum from 2010.

PLATINUM

AUTOCATALYST

Global demand for platinum in the autocatalyst market increased to a record level of 4.20 million ounces in 2006, 11 per cent more than in 2005. The main force behind this growth was the continuing success of the diesel engine in capturing market share from the gasoline engine in Europe, with platinum employed both on catalysts and on particulate filters fitted to light duty diesel vehicles. Outside Europe, rising vehicle production maintained platinum consumption on light duty vehicles at levels close to those of 2005, countering the ongoing trend to minimise platinum use in three-way catalysts by replacing it with palladium. Emissions control equipment fitted to heavy duty diesel vehicles also made a substantial contribution to metal demand in all regions.

Europe

European vehicle manufacturers purchased 2.16 million ounces of platinum for use in autocatalysts in 2006, 10 per cent more than in 2005. The number of cars sold in Western Europe increased by 0.6 per cent to 14.6 million units and production also grew by a similar amount. Sales were boosted at the end of the year by a strong German market where consumers responded to an impending tax hike by bringing forward their purchases of new vehicles, a factor which could impact sales in 2007. Most other major national markets saw a decrease in the sales of new cars because of a decline in consumer spending.

However, the most important force behind the increase in platinum demand was the continuing rise of the diesel engine. In 2006, diesel cars took a record 51 per cent of all European sales. The market share of the diesel engine has been growing in Europe for many years and is still rising. With auto manufacturers fitting catalysed soot filters (CSFs) as well as diesel oxidation catalysts, platinum consumption has grown further. At the same time, however, palladium has begun to be introduced into some catalyst formulations, replacing some of the platinum.

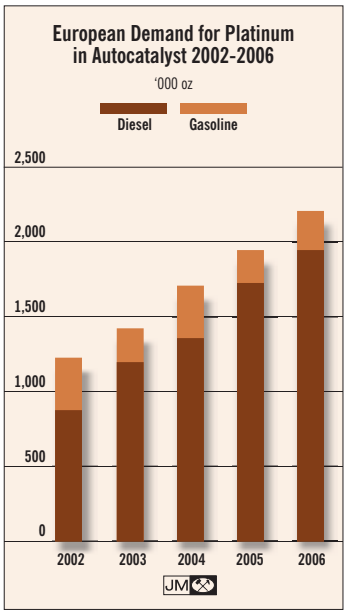
Platinum Demand: Autocatalyst
'000 oz

	2005	2006
Europe	1,960	2,160
Japan	600	595
North America	820	905
Rest of the World		
China	115	155
Other	300	380
Total	**3,795**	**4,195**

JM

With such a heavy emphasis on manufacturing diesel vehicles, the European auto companies have already largely switched to palladium, where feasible, in three-way catalysts in order to reduce costs. As a result, there was little replacement of platinum in gasoline applications.

The heavy duty diesel market also contributed to this record overall platinum demand. With the introduction of new Euro IV rules from the start of October 2006, some of these Euro IV-compliant vehicles use platinum in their exhaust aftertreatment (largely in diesel oxidation catalysts and filter systems).



Japan

Japanese autocatalyst demand for platinum fell by 5,000 oz to 595,000 oz in 2006, a smaller decrease than we had forecast in November. Domestic light vehicle production outperformed expectations for the final quarter, reaching an annual 11 million units.

This increase of 5.1 per cent on the previous year was mainly due to a strong export performance which outweighed relatively weak domestic sales. Most increases in capacity made by the Japanese car makers over recent years have been overseas. However, 2006 saw a rekindling of interest in expanding domestic manufacturing in the wake of strong global sales which could not be met from overseas plants. Domestic production volumes therefore rose, increasing precious metal consumption.

We have also seen the continuation of palladium replacing platinum in three-way catalysts. As previously reported, this process has been slower in Japan than elsewhere but the high prices (in Yen terms) of 2006 motivated the auto makers to accelerate this process. As a result, platinum use in gasoline vehicles fell despite the increase in vehicle production.

The light duty diesel market in Japan remained

Chinese consumer purchases of platinum jewellery remained relatively healthy in 2006.

The continuing rise of the diesel vehicle pushed European platinum demand higher last year to a total of 2.16 million ounces.

unimportant in terms of platinum demand. However, use of this metal on heavy duty diesel vehicles grew, reflecting the first full year of production after the introduction of new emissions rules during 2005.

North America

Platinum demand grew 10 per cent in North America, reaching 905,000 oz last year, with the use of catalysts on diesel vehicles the main factor in this growth.

Car sales increased in North America in 2006. However, this growth was more than offset by falling demand for light trucks, leaving the overall market at 16.6 million units, below the previous year's 17 million. These figures indicate a trend for North American consumers to look to downsize to smaller vehicles. If this continues, because of fuel efficiency concerns, it would negatively impact pgm consumption due to the lower catalyst volumes required for smaller engines.

Although this fall in production depressed platinum use on gasoline vehicles, a more important factor was the switch from platinum-rich three-way catalysts to palladium-based ones. This occurred throughout 2006 and is expected to continue in 2007.

2006 also saw the fitment of catalysts with significant precious metal content to many medium-sized diesel vehicles for the first time. Many of these are trucks which had previously fallen under legislation classifying them as commercial rather than passenger vehicles. This allowed them to meet less stringent emissions legislation and, although many were fitted with oxidation catalysts, these contained very little platinum. These large passenger trucks must now meet stricter passenger vehicle emissions limits and their platinum loading has increased sharply.

The heavy duty diesel market also took a significantly higher amount of platinum in 2006. In excess of 100,000 oz were used in oxidation catalysts and diesel particulate filters to meet new legislation on emissions from this type of vehicle. As 2006 was the first full year in which these rules applied, however, many purchases were delayed to avoid paying the extra capital costs of the catalytic aftertreatment.

China

Demand for platinum from the autocatalyst sector in China rose to a record 155,000 oz in 2006. With no new emissions legislation applying last year, this expansion in demand was due solely to the continuing rapid growth in the Chinese vehicle market.

In fact, Chinese light duty vehicle production outpaced the rest of the domestic economy, soaring by 29 per cent, and boosting the usage of platinum group metals as a result. All current gasoline passenger vehicles now feature catalysts based on thrifted versions of technology developed for other regions. As these formulations are already typically palladium-rich, platinum consumption was little affected by price.

Euro III limits will be imposed across China during 2007, leading to increased loading per vehicle. Although this will provide an opportunity to switch some platinum usage for palladium, it should also lead to the fitment of catalysts on many diesel vehicles, supporting platinum consumption.

Rest of the World

Autocatalyst demand for platinum in the Rest of the World region (excluding China) also grew in 2006, reaching 380,000 oz, an increase of 80,000 oz over 2005. This figure is lower than the forecast made in our 2006 Platinum Interim Review. The reduction relates to the average loading per vehicle in many of these disparate

markets, where thrifted versions of catalysts are more prevalent than we had previously believed.

Production increases were seen in many countries. For instance, the Korean market performed well, with vehicle production growing by a steady 4 per cent to 3.8 million units over the year, reflecting a healthy domestic economy and reasonable levels of export to Europe in particular. The Indian vehicle market also continued to see good growth (14 per cent in 2006) as did the markets of South America.

As in the Chinese market, most catalysts used are low-loaded. Although there was some replacement of platinum-based formulations by palladium-based alternatives, this was more than offset by production growth, and platinum uptake rose overall.

Autocatalyst Recovery

High metal prices had a minor but positive impact on the recovery of spent autocatalysts last year, with an increase of 85,000 oz in the amount of platinum reclaimed to a record level of 855,000 oz. However, perhaps surprisingly to some, the sustained high prices in the second half of the year did not boost recycling volumes any further, illustrating that most of the growth is simply due to an expansion in the collection and recycling network rather than to metal prices.

Platinum Demand: Autocatalyst Recovery
'000 oz

	2005	2006
Europe	(170)	(185)
Japan	(35)	(35)
North America	(505)	(575)
Rest of the World	(60)	(60)
Total	**(770)**	**(855)**

JM

Autocatalyst reclamation in Europe was boosted by the recent European End of Life Vehicle Directive which specifies minimum levels of recycling for scrapped vehicles. The number of catalysed diesel cars being scrapped is also increasing, leading to greater platinum recovery in this region.

In North America, high commodity prices and an increasingly effective collection system for used catalysts continued driving precious metal recovery rates higher. As a result, even though the average platinum content of catalysed vehicles fell towards the end of the 1990s, the amount of platinum recovered rose again in 2006, to a total of 575,000 oz.

Elsewhere, the average vehicle lifetime is longer and scrappage rates are lower. For instance, a growing number of used cars is exported from Japan to second and third tier markets for use there rather than being recycled in Japan. As a result, recycling rates for domestic vehicles remain low, restricting growth in autocatalyst recovery in Japan and in the Rest of the World region.

JEWELLERY

Purchases of platinum by the jewellery trade fell in 2006 for the fourth year in a row. Rising and volatile metal prices had a negative impact on the platinum jewellery market, cutting demand for new metal by 18 per cent from previous year levels to 1.61 million ounces, the lowest figure for 14 years.

Platinum Demand: Jewellery
'000 oz

	2005	2006
Europe	195	175
Japan	510	360
North America	275	240
Rest of the World		
China	875	760
Other	110	70
Total	**1,965**	**1,605**

JM

While consumer demand remained strong in the major geographical markets, manufacturers and retailers were keen to reduce inventory levels for financial reasons, with the result that around a quarter of the metal fabricated into jewellery was sourced from existing stock. The Asian markets in particular saw large amounts of recycling compared to 2005 levels. Consumers were prompted to return old jewellery by high local prices; in China many of the returned pieces were traded in for new jewellery, whereas in Japan most were simply sold.

Europe

European demand for platinum from the jewellery sector declined by 20,000 oz in 2006, compared to the previous year, to 175,000 oz. The major factor in this downward trend was the high price, relative to other materials, which made platinum less attractive for the fashion jewellery sector. However, the picture was not the same everywhere in Europe. UK sales performed well during the first nine months of the year but dropped off in the final quarter. In Germany the decline in manufacturing was steeper throughout the year.

In the UK, platinum is positioned firmly in the price-inelastic bridal sector and jewellery sales were little affected by metal prices. However, retailer profit

margins were affected and demand in the final months of 2006 weakened, leaving the market slightly down overall. Statistics showed a fall of 2.9 per cent in the weight of metal hallmarked over the year but a larger drop in the final quarter.

In Germany, demand fell despite an improvement in consumer confidence. The higher end of the market remained positive but competition from alternative white materials took some of platinum's market in 2006. Swiss fabrication was flat with steady production of platinum watches. The volume of metal consumed by Italian manufacturers dropped, with weak demand in the main export markets the major cause.

Japan

High metal prices and a weak Yen kept the platinum price at a high level in Japan (although well below its 1980s peak in Yen terms). This had two negative effects on demand: a reduction in industry purchases and a hefty increase in the amount of scrap jewellery being returned by the public for recycling. These trends combined to push demand for new metal almost 30 per cent lower than the year before.

The picture in terms of consumer purchasing was better as platinum maintained its strong position in the bridal market. However, in the fashion sector, although white metal remains attractive to young customers, the choice of metal is becoming less important, leading to competition between white gold and platinum. In all segments, demographic changes continue to drive the potential market lower. With economic growth and inflation still at low levels, the amount of money being spent on jewellery and other discretionary purchases remains quite restricted. Consequently, the weight of an average piece sold has decreased over recent years, contributing to this fall in demand from the Japanese marketplace.

More importantly, though, the volumes of metal returned as scrap increased dramatically in 2006. As platinum prices moved higher than for many years, pawn shops took positive steps to attract a greater amount of jewellery. As a result, large volumes of metal came back for refining and re-supply to the jewellery trade, in the form of rings and also neckchains which had been heavily sold in the 1980s and 1990s.

Japanese demand for new metal therefore fell substantially in 2006. It continued its long-term downward trend, falling 150,000 oz to 360,000 oz.

North America

The North American precious metal jewellery market struggled in 2006, with sales of all products more difficult due to rising prices. A large amount of rationalisation of the industry also took place. In this environment, purchases of platinum fell 13 per cent, to 240,000 oz. High prices and volatility prompted the jewellery trade to reduce the amount of inventory held. Some manufacturers also reacted by launching ranges utilising a number of other materials. Although rising prices might have been expected to provide a boost to lower percentage purity materials such as Pt585, little new product was seen in this alloy.

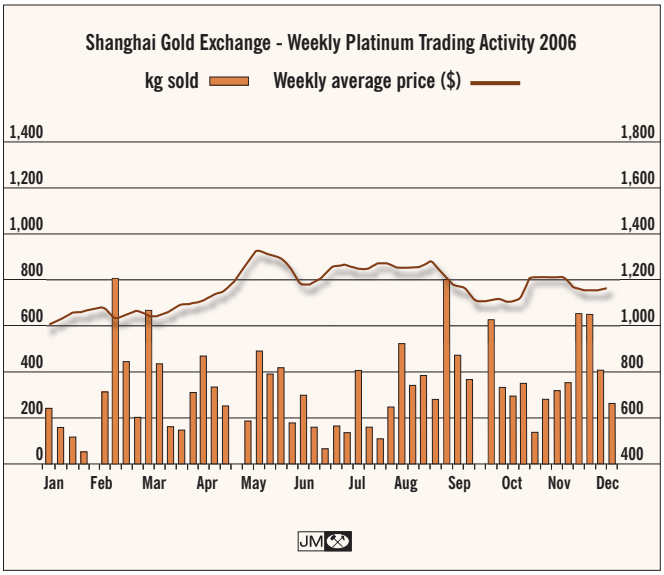
With the price moving higher, it proved difficult to offer attractive fashion products at price points which were competitive with other metals. As a result, platinum uptake for this segment fell, with white gold one of the beneficiaries. Nonetheless, platinum sales in other sectors of the market, particularly the luxury end and the bridal market, remained fairly strong, leading to a more limited overall fall in new metal demand in 2006 than would otherwise have been the case.

China

Demand for platinum from Chinese jewellery manufacturers contracted by 115,000 oz in 2006 to a total of 760,000 oz, the lowest for any year since 1998. The amount of platinum jewellery produced in China was as much as 300,000 oz higher than this because manufacturers recycled an increased amount of material from old stock.

Purchases of platinum on the Shanghai Gold Exchange (SGE) by the jewellery trade showed a strong negative correlation with the price. As this fell, metal purchases increased while trading conditions were very quiet at times of great volatility, principally in May and November. Although we forecast annual demand of 780,000 oz in our November report, consumption was a little below this. Over 2006, platinum purchases fell 13 per cent under this high price.

Nonetheless, consumer purchases of platinum jewellery stood up well in China, with retailers



Demand for new metal from Asian jewellery manufacturers was depressed in 2006 due to high platinum prices and large volumes of recycling.

reporting higher turnover but slightly reduced weight of metal sold. Platinum holds a central place in the bridal jewellery market, whether for diamond solitaire wedding rings or newer matching pair rings. White precious metals remain popular and where competition has been seen, for instance at the lower end of the gem-set segment, white gold has been the major alternative to platinum.

The amount of jewellery collected as scrap, both from the supply chain and from consumers trading in old pieces for newer designs, increased greatly. Much of this metal was recycled and refined before being sold back to manufacturers. Nonetheless, it is clear that the platinum price has had a negative effect on the industry in China, with a decline in the number of manufacturing employees and a significant drop in the amount of metal held as work-in-progress or retail stock. In our view, the pipeline for platinum is now very thin.

With prices at high levels, product and market development gathered some attention during 2006. Some manufacturers launched higher-purity metal only products (Pt999 as compared to the normal Pt950 or Pt990), trading on the consumer desire for high-purity materials. An increase was seen in the promotion of platinum pair rings (one for each partner) in an attempt to increase the weight of metal bought per wedding. It is, however, too early to report confidently on the progress of such activities.

One area, where a clear increase in demand was seen was the sale of considerable numbers of small beads. These share their name with the word "pig" in much of China and should therefore be lucky for the current Chinese Year of the Pig. Although these are made in a range of metals, including platinum, this single product contributed several thousand ounces of demand to 2006 and will do so again in 2007.

Rest of the World

Jewellery manufacturers throughout the Rest of the World region (excluding China) bought 36 per cent less platinum in 2006 than in 2005, with a total demand of 70,000 oz. Most platinum demand outside the major consumer markets is derived from manufacturing jewellery for export. A high metal price has negatively affected demand in all regions. With the quantity of finished jewellery being imported into the major economic regions falling, manufacture in the Rest of the World region also declined.

CHEMICAL

Overall demand from the chemical industry for platinum grew by 35,000 oz to a total of 360,000 oz in 2006, with its use in the production of paraxylene, silicones and nitric acid once more the key areas.

Demand for platinum gauze from the nitric acid industry remained largely flat. As previously reported, manufacturers of nitric acid have been reducing the metal content in their burners and the high price of platinum in 2006 did nothing to discourage that trend. However, after a flat year for fertiliser demand (one of the major destinations for the acid produced) in 2005, last year saw a return to growth, with expansions in production capacity in both North America and Asia.

Platinum Demand: Chemical
'000 oz

	2005	2006
Europe	100	100
Japan	50	50
North America	100	105
Rest of the World	75	105
Total	**325**	**360**

JM

Platinum catalysts are also used in the manufacture of purified terephthalic acid (PTA). The precious metal is used in the production of paraxylene which is converted in turn into PTA. Demand for PTA is growing at 7-8 per cent per annum due to its use in polyesters for clothing and polyethylene terephthalate for packaging.

Much of this growth is in Asia, and manufacturers have been adding plant capacity in China and elsewhere in the Rest of the World region, increasing platinum demand. This growth is expected to continue, as other new large scale paraxylene plants are being planned.

The most significant chemical application in terms of metal consumed is the use of platinum catalysts in the production of silicones for pressure release applications. In these, the platinum-containing catalyst is trapped within the silicone products formed and is therefore lost during the manufacturing process. Although this market (which is only a small part of the global silicone market) is growing, manufacturers continue to work on thrifting the metal content of the catalyst, with the effect of restraining net growth in demand for this application to a low level.

ELECTRICAL

Platinum demand from the electronics and electrical sectors was strong in 2006, rising by 18 per cent to 425,000 oz. Continuing rapid expansion in hard disk manufacturing was the most important factor, contributing 245,000 oz.

Platinum Demand: Electrical
'000 oz

	2005	2006
Europe	40	45
Japan	65	75
North America	95	100
Rest of the World	160	205
Total	**360**	**425**

JM

The consumer electronics industry had a good year in 2006, with computer sales rising 10 per cent, boosting the number of hard disks needed. Platinum use in the magnetic recording layer of hard disks rose in line with the volumes of hard disks shipped. These climbed by more than 15 per cent, to a global total of over 400 million. Manufacture of this technology is centred on Asia, with the majority of growth seen there. Hard disks using perpendicular magnetic recording technology have started to gain market share - these use similar recording media to conventional hard disks, maintaining the platinum content per disk.

As reported previously, the number of hard disks per device is rising, increasing the platinum content of an average consumer electronics product. On the negative side, smaller, 1 inch diameter, hard disks appear to be losing the fight for dominance in the portable device market to flash memory, limiting net growth rates.

Purchases of platinum for use in thermocouples in the semiconductor and glass industries also rose, supported by strong consumer electronics sales and continuing expansion of capacity for making flat screen displays. Electroplating of electronic components, often performed to provide corrosion resistance, also continues to represent a sizeable part of the electronic sector's demand for the metal.

Platinum consumption in the fuel cell sector increased in 2006 but remained at a relatively low level. The amount of platinum consumed in prototypes and early manufacturing grew in 2006. The first commercial direct methanol fuel cell products (DMFC), designed to power portable electronic devices and provide auxiliary power, have started to appear on the market, with some platinum demand derived from consumer sales for the first time.

GLASS

Demand for platinum from the glass industry increased by 30,000 oz in 2006, reaching 390,000 oz. Most of this growth was seen in Asia, with increases in production capacity for flat screen displays responsible for the bulk of demand.

The market for flat screen displays (both LCD glass and plasma display panels) continued its rapid growth in 2006. Although we commented in our 2006 Interim Review that there appears to be significant overcapacity in this market, Asian manufacturers are continuing to invest heavily in order to gain market share. They are therefore building more, and larger, plants than had been forecast. This has led us to upgrade our demand estimate for 2006 as there is considerable evidence that additional metal was purchased for this segment in Japan and the Rest of the World region.

Opposing this, the growing market penetration of flat screen technologies has had a negative impact on traditional cathode ray tube (CRT) manufacturing. A number of such facilities have closed, with platinum being sold back into the market, reducing net demand from the glass industry. However, this process is slowing as many factories had already closed and much of the available pool of metal had been sold.

Platinum Demand: Glass
'000 oz

	2005	2006
Europe	10	10
Japan	95	100
North America	5	10
Rest of the World	250	270
Total	**360**	**390**

JM

PETROLEUM REFINING

The petroleum refining industry increased its demand for platinum in 2006 by 35,000 oz to a total of 205,000 oz. With oil prices having risen almost constantly since 2002, refiners have been operating at full capacity, leading to high replacement rates for catalyst charges. There was also significant construction of new plant in South Asia where most of the growth in demand originated.

An important developing trend is the move towards increasing national energy security. With oil prices high and the chances of supply interruptions appearing to be greater than for many years, the petroleum companies are constructing new refining capacity worldwide. Perhaps most surprisingly, the first completely new US refinery for 30 years has been planned, reflecting a shift in American energy policy.

Platinum Demand: Petroleum Refining
'000 oz

	2005	2006
Europe	15	15
Japan	5	5
North America	35	40
Rest of the World	115	145
Total	**170**	**205**

JM

Much of the expansion in capacity elsewhere around the world is designed to process heavier oil fractions. This typically requires the use of precious metal catalysts (platinum in particular) for the reforming and isomerisation stages.

Of longer-term interest, 2006 (and early 2007) saw announcements on forthcoming gas-to-liquids (or GTL) projects, some of which will use platinum in downstream processing. Exxon has cancelled one major project but Shell is currently constructing a plant in Qatar and other smaller facilities are also being built.

OTHER

Demand for platinum in other applications rose 15,000 oz in 2006 to 490,000 oz.

Consumption of platinum in the European dental sector was flat in 2006, at 70,000 oz. Reforms made to the German healthcare system resulted in patients becoming responsible for a greater proportion of their treatment costs than previously. With a high platinum price, there has been a considerable incentive to reduce the use of platinum in this application. At the same time, the costs of all-ceramic components have been decreasing, providing more competition for precious metal alloys and taking some market share, a trend which seems set to continue if current metal prices are sustained.

In the spark plug sector, there is competition between base metal, platinum and iridium plugs. Pgm-based spark plugs continue taking market share due to their superior durability.

Platinum Demand: Other
'000 oz

	2005	2006
Europe	175	175
Japan	45	45
North America	220	225
Rest of the World	35	45
Total	**475**	**490**

JM

Demand for platinum in anti-cancer drugs and biomedical components rose by 3.5 per cent. Its use in turbine blade alloys also exhibited good growth in 2006. (For more details on these two applications, see last year's special feature in our Platinum 2006 market review.)

INVESTMENT

Net demand for physical investment products in platinum fell again in 2006 to a figure of -40,000 oz, with more metal returning to the open market than was bought by consumers. These figures do not reflect purchases or sales in platinum by funds and other institutional investors.

Net sales of platinum investment products, predominantly coins, fell in 2006, to 25,000 oz. Although consumer interest continues, more trade attention was focused on gold coins, with the gold price moving strongly ahead. Sales of the US Mint's bullion platinum American Eagle fell by a third to its lowest ever total of 13,500 oz. The Discover Australia series of coins issued by the Perth Mint added some small additional demand.

The situation in Japan is somewhat different. With a long history of investment in platinum products, there is a large pool of metal which can be returned for recycling under the correct price conditions, just as in the jewellery market. Although there were reasonable levels of investor purchasing of platinum, more metal was released than was purchased, leading to negative net investment over the entire year.

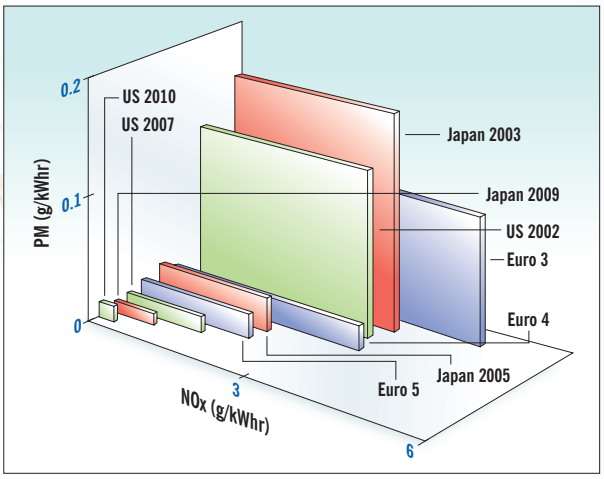
Platinum Demand: Investment
'000 oz

	2005	2006
Coins and small bars		
Europe	0	0
Japan	0	0
North America	25	20
Rest of the World	5	5
Large bars in Japan	**(15)**	**(65)**
Total	**15**	**(40)**

JM

HEAVY DUTY DIESEL: A GROWING SOURCE OF PGM DEMAND

The market for trucks and buses is quickly becoming an important one for the platinum industry. Although there have been widespread examples of regulatory control of vehicle tailpipe emissions since the mid-1970s, these have mainly focused on cars and other light duty vehicles. Only in more recent years has the legislative process expanded to impose limits on what can be emitted from the exhaust of many other internal combustion engines, from mopeds to freight trucks.



New emissions legislation for heavy duty diesel vehicles is encouraging the fitment of aftertreatment systems around the world.

Amongst these new areas, the sector of greatest interest in terms of precious metals is the heavy duty diesel (HDD) market. The vast majority of large vehicles use the fuel-efficient diesel engine to power them and many of these are being fitted with aftertreatment for the first time.

Unsurprisingly, the limits of what can be emitted to the atmosphere are tightening over time, just as in the light duty market. What is slightly different though is the emphasis on which substances are regulated. The key emissions are particulate matter (PM) and the various oxides of nitrogen (NOx). Each of these forms in a different way in the engine: NOx comes from high-temperature combustion, when nitrogen from the intake air reacts with oxygen; particulate, however, is produced in cooler spots where burning of the fuel is incomplete and soot is formed.

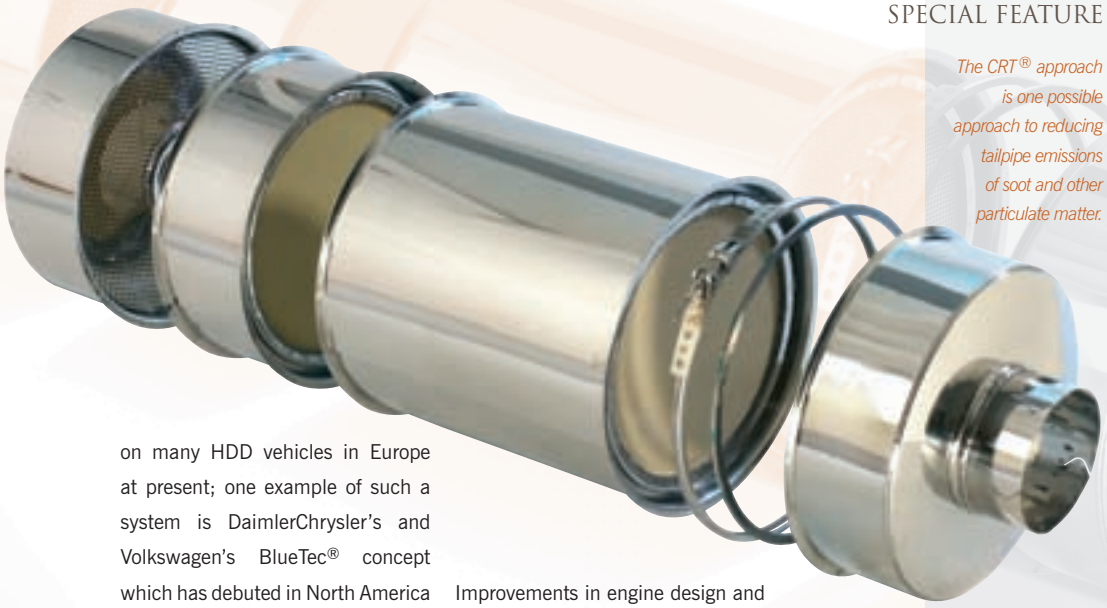
As a result, many changes in engine technology will reduce the level of one pollutant but increase the output of the other. Nonetheless, over time, the engine manufacturers have improved the ways in which fuel is fed to the engine and combusted (including swirl, injection timing, injection pressure and so on) such as to reduce the emissions of both PM and NOx.

Until recently, these engine improvements have in fact been enough to meet the rules imposed by legislators. Additional relatively cheap and simple technologies, such as exhaust gas recirculation (EGR), have been used to reduce the amount of NOx formed. Where catalysts have been fitted, this has mostly been as so-called retrofit, where a vehicle already in use has a filter or catalyst fitted to it in order to gain tax breaks, to meet local urban pollution rules or simply out of concern for the environment.

Now though, aftertreatment, much of it using platinum and some of the other pgms, is being fitted to many new vehicles as standard. With diesel technology, as explained above, it is possible to balance emissions to produce a greater proportion of either nitrogen oxides or particulate. Engine makers have therefore had the choice of minimising the output of one pollutant at the cost of producing more of the other and then focusing on using a catalyst to deal with only one substance. And, this is exactly what has been seen in the market.

Two major aftertreatment technologies are presently in play, in the form of selective catalytic reduction (SCR) and diesel particulate filters (DPFs) dealing with NOx emissions and particulate or soot respectively.

In the former case, the engine is calibrated to make more oxides of nitrogen but to meet the regulations on particulate in its raw emissions. A catalyst is then placed in the vehicle's exhaust (most often a base metal catalyst is used) and urea, ammonia or a similar chemical compound is added into the exhaust downstream of the engine. If the correct amount is injected, it will react with any NOx present to produce nitrogen and water and, most importantly, reduce the levels of NOx to within the legal limits. This is how NOx is being treated



The CRT® approach is one possible approach to reducing tailpipe emissions of soot and other particulate matter.

on many HDD vehicles in Europe at present; one example of such a system is DaimlerChrysler's and Volkswagen's BlueTec® concept which has debuted in North America on smaller vehicles.

The way in which a diesel particulate filter works is much simpler. A semi-porous filter is placed in the exhaust stream and, as the hot exhaust gases pass through this, any particulate is filtered out, leaving the tailpipe emissions within the regulated limits. An added complexity, though, is that as this soot accumulates the back pressure on the engine increases, causing it to work harder and become less efficient. So, some systems use electrical heating to periodically raise the temperature of the filter so that any carbon burns off, producing only carbon dioxide.

Another method is Johnson Matthey's Continuously Regenerating Trap technology (CRT®): this uses a platinum-based catalyst to oxidise any NO to NO_2 which can then react with the soot to produce carbon dioxide and nitrogen. A number of other filter systems sold use platinum, and sometimes palladium as well, for similar purposes. Many filter systems are being fitted to vehicles for the first time, one of the main factors behind the increase in platinum use in the automotive market during 2006.

These single technologies are able to meet today's regulations but can they meet tomorrow's? Improvements in engine design and control will help but most current thinking is that something new will have to be added.

Here again, the industry has a few options. We should still see the use of DPFs and the SCR system but cleaner fuels may allow a few more technologies to come into play. Although not the only two contenders, from the perspective of pgm uptake, the most relevant are NOx traps and combined DPF and SCR technologies.

NOx traps have already been used in lean burn gasoline cars for some years where they use a fairly inactive support material and a high-loaded platinum-rhodium catalyst. Any nitrogen oxides adsorb onto the catalyst's surface and the catalyst converts them into the more reactive NO_2. When the on-board systems calculate that the catalyst cannot store any more gases, a burst of hydrocarbons is sent through the catalyst in the form of a small amount of unburnt fuel. The NO_2 is released from the surface of the catalyst and reacts with this fuel, to produce nitrogen, water and carbon dioxide, with very low levels of other pollutants. At the moment, few companies are using this technology on diesel vehicles but the concept does work and as fuel quality continues to improve, it may become more attractive.

Alternatively, a diesel particulate filter can be used upstream of an SCR system so that any NOx passing through the first part is destroyed in the second. In this way, extremely strict emissions regulations can be met, albeit at the price of greater complexity on the vehicle and extra capital cost. In the very long-term, it is possible that a range of combined aftertreatment technologies will be used on every vehicle.

So, although forecasting which technology will dominate in the future is almost impossible, two trends are clear. The emissions from the heaviest of the road vehicles will continue to decrease and the platinum group metals will play a vital part in this process.

Fitting catalytic aftertreament may allow vehicles such as this to enter urban Low Emission Zones.

PALLADIUM

AUTOCATALYST

World demand for palladium for use in autocatalysts increased by 3.9 per cent in 2006, to a total of 4.02 million ounces. Although demand fell in Europe, due to lower sales of gasoline vehicles with palladium catalysts and also due to thrifting of precious metal, it was up in all other regions. New legislation in a number of countries was one contributory factor. More important was the cost-driven move to switch from platinum-rich catalyst formulations to ones containing more palladium for gasoline-fuelled vehicles.

Europe

Palladium demand in the European market fell in 2006 to 865,000 oz. The market share of diesel vehicles continued to grow, rising above the 50 per cent level. As overall production levels of light duty vehicles grew only slightly, the number of gasoline cars and commercial vehicles fitted with palladium-based catalysts was reduced.

The auto makers have the option of using different mixes of the platinum group metals in many of their vehicles' exhaust systems, particularly those with spark ignition engines. With the palladium price substantially below that of platinum, this strategic trend of balancing individual metal requirements and minimising total precious metals costs has been ongoing for several years.

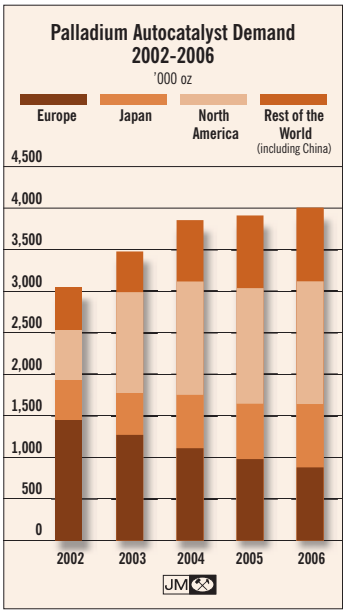
The introduction of new emissions legislation typically requires development of new catalysts and is the ideal opportunity for companies to replace previous platinum-based catalysts with palladium-based ones. The new Euro IV rules which came into use in early 2006 therefore drove this change more quickly than in previous years, increasing the number of palladium catalysts being manufactured at the expense of the number of platinum formulations. In much of Europe, palladium loadings also rose in order to meet these new stricter regulations.

Palladium Demand: Autocatalyst
'000 oz

	2005	2006
Europe	975	865
Japan	660	795
North America	1,430	1,470
Rest of the World		
China	165	220
Other	635	665
Total	**3,865**	**4,015**
Autocatalyst Recovery	**(625)**	**(800)**

JM

However, metal loadings were reduced in the German market. Many vehicles sold in Germany prior to 2006 already met Euro IV limits in order to qualify for domestic tax incentives. The German car groups were therefore able to thrift metal from formulations used previously, reducing their metal usage. With Germany accounting for a higher than expected proportion of European sales in the final months of 2006 due to impending consumption tax increases, this amplified the effect of thrifting, forcing palladium demand below our previous estimates.



Although the North American autocatalyst market continues to be the most important in terms of palladium demand, the fastest growth in metal usage in 2006 was seen in Asia.

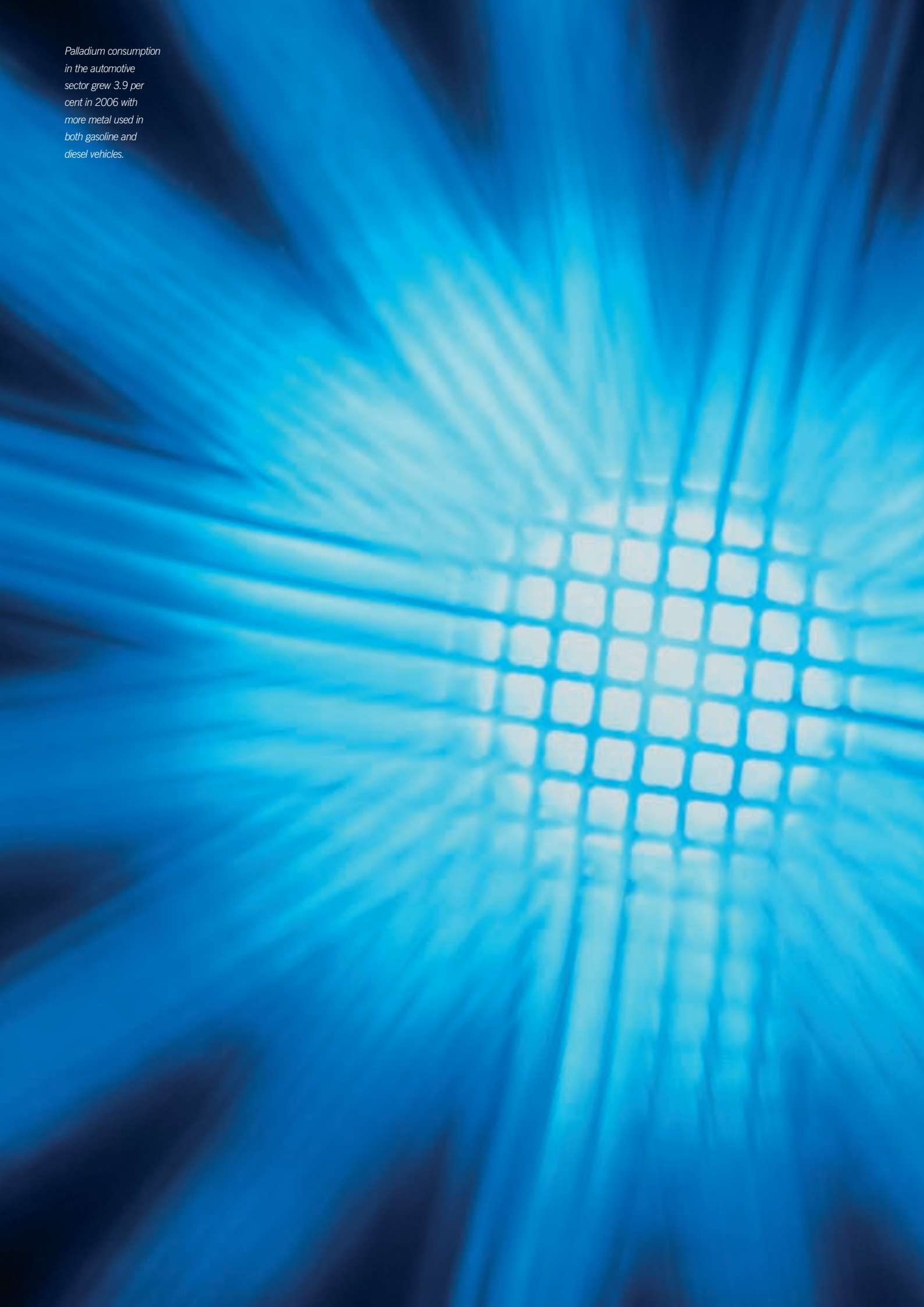
The early stages of a move toward palladium use in diesel catalysts marginally buffered this falling demand from gasoline vehicles. Palladium had not been used in any significant quantities in diesel catalysts prior to 2006, so growth here has been from a very low baseline.

In this application, palladium is used as a replacement for some of the platinum in a more conventional formulation. Although palladium does not exhibit good activity in the oxygen-rich exhaust of a diesel engine, when mixed with platinum it can be used to maintain catalytic activity and to enhance thermal stability at a reduced overall cost (at current price differentials between these two metals).

Japan

Japanese automotive palladium demand climbed from 660,000 oz to 795,000 oz in 2006. Although domestic light duty vehicle sales were little changed from the year before, annual production in Japan rose strongly, increasing by 5 per cent. With most of this additional output destined for export markets, much of the growth in manufacturing was from comparatively large vehicles, boosting the average amount of palladium required per car.

These trends were accompanied by a continuation in the shift from platinum-based three-way, or gasoline,



Palladium consumption in the automotive sector grew 3.9 per cent in 2006 with more metal used in both gasoline and diesel vehicles.

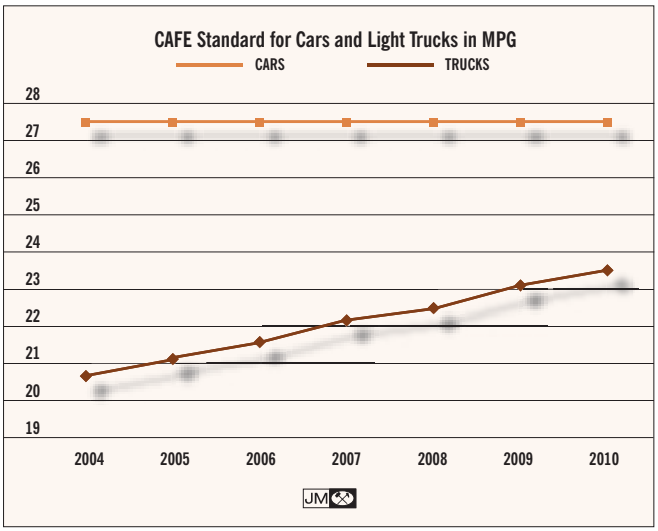
catalysts to their palladium-based analogues as the Japanese auto makers sought to reduce exposure to the more expensive metal. Record platinum prices may have accelerated this switching process to a degree but were only partly responsible for driving palladium demand 20 per cent higher over the year.

North America

1.47 million ounces of palladium were purchased for use in the North American automotive market during 2006, 3 per cent more metal than was used the year before. North America is primarily a gasoline-engined vehicle market where light duty diesel vehicles only represent a tiny percentage of sales. This focus on gasoline cars and trucks provides the auto makers with considerable freedom of choice between using platinum or palladium catalytic systems.

Due to the current price advantage of palladium compared to platinum, the vehicle manufacturers therefore continued switching many of their catalyst requirements to palladium technology during 2006, albeit at a lower pace than had been the case previously. Total palladium demand for this market has now risen to more than one and a half times the amount of platinum used.

American fuel economy has historically been lower than in other regions. However, recent proposed changes to CAFE standards should start to address this.



However, North American production weakened in 2006, with light duty vehicle production falling by 2.3 per cent to a total of 16 million cars and trucks. Additionally, US consumers have been buying progressively smaller vehicles. Although the strength of this trend can be overstated (engine sizes remain larger than in any other region), it is leading to lower catalyst volumes and hence to lower pgm content on average. These trends have counterbalanced the change in metal used, limiting growth in palladium demand in 2006 to only 3 per cent.

Over the longer-term, the US Federal Government appears increasingly likely to impose tighter CAFE (corporate average fuel economy) rules on cars and light duty trucks. This could have two possible effects on palladium demand: it could accelerate the move to smaller engines, which typically use less pgm for exhaust aftertreatment, or help promote diesel technology in which platinum is the main precious metal catalyst component.

China

As in many other sectors in China, the dominant influence in the autocatalyst market was simply that of economic growth. Domestic automobile sales rose by a weighty 34 per cent to 4.2 million in 2006. This extremely strong growth boosted palladium consumption, which rose by a quarter, or 55,000 oz, to 220,000 oz.

There were numerous changes within the marketplace, in particular relating to taxation. The Chinese Government has introduced higher taxes on larger cars in an attempt to limit its requirements for fuel imports. Despite strong overall growth in vehicle sales, the number of sports utility vehicles made and sold actually fell in 2006. A reduction in the consumption tax on cars with engines of below 1.5 litres capacity has, as yet, had little impact at the other end of the market.

With platinum prices far above those of palladium, there was an incentive to use palladium as the metal of choice for new catalyst formulations. The resulting increase in demand for this metal was therefore greater than for platinum.

Rest of the World

Autocatalyst demand for palladium also rose in the Rest of the World region, to a historic high of 665,000 oz, 30,000 oz more than in 2005. The major automotive groups have for several years been

investing in production facilities near to areas of consumer demand rather than meeting this demand by exporting. This has led to a continuing increase in the volumes of vehicles manufactured outside the three main regions. Again, the difference between relative pgm prices has also encouraged a certain amount of replacement of platinum on gasoline vehicles with palladium. Finally, every year sees new emissions legislation somewhere around the world, with 2006 no exception.

The Russian autocatalyst market provides a good example of all three trends. The major global auto companies are investing in Russian plant capacity and increasing output there. With plentiful local supplies of this metal, most catalyst formulations used in the Russian autocatalyst market are palladium-based, something we expect to continue as Euro III rules are introduced in 2008.

Autocatalyst Recovery

The estimated weight of palladium recovered from the recycling of catalytic converters grew by more than a quarter in 2006 to 800,000 oz. The bulk of this material was collected in North America where an efficient infrastructure for collection and processing of used catalysts has existed for a number of years. The significant growth in the amount of palladium being reclaimed is largely due to the increased amount of the metal which was used in the US autocatalyst sector in the middle of the 1990s.

Recovery volumes have also benefited to a limited extent from the high prices of other commodities including steel. The economics of the recycling of such auto components are heavily dependent on the price received for materials other than precious metals. The increase in value of the entire exhaust and aftertreatment system has therefore helped to raise the number of catalysts being removed from end-of-life vehicles and recycled.

European autocatalyst recovery also increased, reflecting the new legislation covering this area and, again, the amount of palladium fitted to vehicles in the previous decade. The volume of metal being reclaimed also increased marginally in Japan and the Rest of the World region but remains much lower than in Europe and North America.

The weight of palladium recovered from scrapped catalytic converters soared by 175,000 oz in 2006.

JEWELLERY

Net global purchases of palladium by the jewellery sector decreased by 435,000 oz from their 2005 peak to 995,000 oz in 2006. A fall in Chinese demand was the major contributor to this decline, with 440,000 oz less palladium purchased in 2006 than the year before. Outside China, palladium remains a much less important jewellery metal but interest in its use is increasing.

Palladium consumption from the Chinese jewellery sector fell by 37 per cent in 2006, with net demand of 760,000 oz. 2004 and 2005 saw a ramp-up not only in palladium sales but, perhaps more importantly, in stocks of raw materials and finished jewellery held by manufacturers, wholesalers and retailers.

It is therefore, perhaps, unsurprising that demand fell in 2006, as the requirement for injections of further metal into the supply chain diminished, for the time being at least. Although large quantities of palladium were imported into Hong Kong early in 2006, we believe that little of this metal has entered the jewellery sector and that it was instead sold as a medium-term investment.

Another factor in the lower level of palladium purchases was increased recycling of palladium. The first palladium jewellery products seen in the Chinese market were made from a 95 per cent palladium alloy, Pd950. However, current production focuses very heavily on Pd990, taking advantage of the Chinese consumer interest in metal purity, something which

is also seen in relation to gold. Although some Pd950 pieces can still be found in shops, many retailers have returned this metal for refining and remaking into newer product, depressing headline demand by an estimated 120,000 oz.

Manufacturing volumes fell dramatically in the second half of the year, having been healthy for the first few months, again suggesting that much of the previous demand had been used to fill pipeline stocks. Quite large amounts of material also returned in the form of unsold pieces for remaking into new jewellery, as mentioned above. However, even taking this metal into account, the volumes of palladium jewellery manufactured in China fell substantially over the last six months of 2006.

There were also a number of consumer issues which coloured the end customer's view of palladium jewellery. For example, a Chinese television report on palladium jewellery focused on some occasions where it had been misrepresented as the more expensive platinum. With quality problems such as discolouration and brittleness having been frequent in some of the original palladium jewellery sales, consumer perception is therefore not universally positive towards this material.

As yet, palladium does not have a clear market positioning and this has made its marketing particularly challenging. However, this does not indicate a simple picture of low consumer interest in this metal.

In many provincial or secondary cities, sales are healthy, with palladium's lower price making it an attractive option (although product availability differs widely between cities and towns of similar sizes around the country).

The processing of palladium jewellery requires modification of the techniques used to manufacture platinum jewellery.

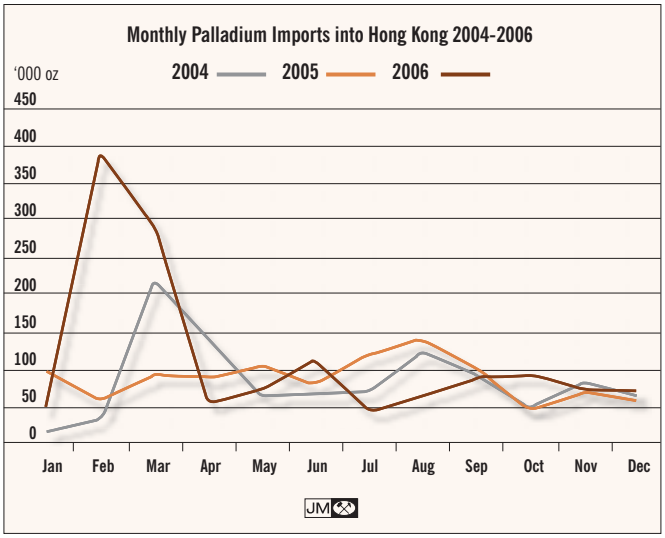
Diamond-cut metal-only pieces constitute a large proportion of the jewellery for sale. These are relatively hard for most consumers to distinguish from other white metals except on price and therefore compete with platinum and with white gold. A certain amount of gem-set jewellery is also available which typically competes directly with white gold.

In the major cities, particularly Beijing and Shanghai, availability of palladium products is low and the consumer promotion of palladium as a jewellery metal at the end of 2006 appears, so far, to have had relatively little impact on either the amount of stock being held or on sales in these cities.

Although these trends combined to depress demand for new metal in China in 2006, the underlying strength of the market is still difficult to gauge. Palladium jewellery is now being actively promoted and marketed and may be establishing itself in a secure market niche. Looking further into the future, the degree of consumer acceptance remains somewhat uncertain and will be key to the prospects for this developing market.

In North America, a number of manufacturers have investigated palladium and a wide range of other materials, such as tungsten carbide, as alternatives

Hong Kong import statistics can act as a guideline to the total volume of palladium shipped into China. We estimate, however, that Chinese jewellery purchases fell despite very high shipments in early 2006.



Palladium Demand: Jewellery '000 oz	2005	2006
Europe	35	40
Japan	145	130
North America	20	40
Rest of the World		
China	1,200	760
Other	30	25
Total	**1,430**	**995**

JM

to gold and platinum, as a consequence of high prices for these metals. Although product availability is currently still limited, an increasing number of companies are offering ranges of palladium products, particularly for men's wedding rings, and demand for palladium has consequently started to grow.

Although palladium has only a low market penetration in Europe, industry interest in this metal has also been slowly building, as in North America. Much of the European demand for palladium in 2006 was for use in white gold and other alloys where it is a minor component. Palladium purchases for this use remained flat. However, the number of palladium jewellery products available increased in 2006 and early 2007.

There are very few reports of any palladium jewellery being sold in Japan and its use is restricted to an alloy component in platinum and white gold jewellery. The decline in purchases of platinum by manufacturers, largely due to greatly increased levels of recycling of jewellery scrap, has accordingly depressed demand for palladium.

CHEMICAL

Total usage of palladium in the chemical sector was almost flat in 2006, rising by just 5,000 oz to 420,000 oz. Demand is composed of contributions from the production processes of a number of basic feedstock chemicals, including hydrogen peroxide, nitric acid, purified terephthalic acid (PTA) and vinyl acetate monomer (VAM). We have upgraded our estimates for both 2005 and 2006 demand to account for the construction of a European polymer manufacturing facility in 2006.

One of the most important process catalyst uses of palladium is in the manufacture of hydrogen peroxide. Supported palladium catalyses the hydrogenation stage of the anthraquinone process traditionally used to make hydrogen peroxide. This chemical is used in many bleaching processes and is cleaner than other alternatives. With environmental concerns constantly increasing, demand for hydrogen peroxide is rising, increasing the demand for palladium in this application in all regions.

Palladium is also used as a catalyst in making purified terephthalic acid (PTA) and in the manufacturing of vinyl acetate monomer (VAM). Both of these chemicals are common building blocks in the polymer industry and are used in the manufacture of products as varied as paints and fabrics. With global economic growth of just below 4 per cent in 2006, requirements for these commodity chemicals continue to grow, leading to high rates of replacement for catalysts already in use and to addition of manufacturing capacity around the world.

The economics of palladium demand for nitric acid production are somewhat different and depend on the price differential between palladium and platinum. Nitric acid is manufactured for use in fertilisers and in explosives, two applications which showed good growth in 2006, increasing the volumes of nitric acid produced. The platinum gauze which is used as the catalyst in the nitric acid process slowly degrades and palladium catchment gauzes are employed to capture platinum lost from the gauze for recycling. With platinum prices high, many manufacturers have made greater use of these catchments, boosting net palladium demand by 10 per cent.

Palladium Demand: Chemical '000 oz	2005	2006
Europe	155	165
Japan	25	25
North America	85	80
Rest of the World	150	150
Total	**415**	**420**

JM

DENTAL

Demand for palladium for use in the dental industry dropped 15,000 oz in 2006, to 800,000 oz. Purchases of metal in the Japanese market fell by 25,000 oz, while the North American market rose by 10,000 oz. European consumption remained flat. Historically, palladium has been widely used as a component of dental alloys for crowns and bridgework. In this area it traditionally competes for market share with gold. Although the palladium price rose significantly during 2006, it was outpaced by growth in the gold price and palladium therefore remained competitive.

The Japanese market consumed 450,000 oz of

Palladium Demand: Dental '000 oz		
	2005	2006
Europe	75	75
Japan	475	450
North America	250	260
Rest of the World	15	15
Total	**815**	**800**

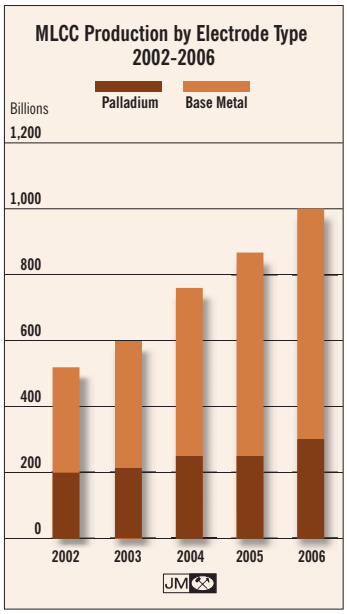
palladium largely in the form of Kinpala alloy (primarily palladium, gold and silver). This was a little below the 2005 figure. Usage depends heavily on the amount of subsidy paid by the government for an individual's treatment. Increasing palladium prices in the first half of the year pushed the cost of the dental alloys used above the level of this subsidy, leaving dentists to pay the excess, and causing demand to dip. The subsidy was finally increased for the last few months of the year. However, this rise did not match the increases in the alloy's price, leaving demand lower overall.

With no similar subsidy in North America for such dental treatment, demand is more influenced by simple price considerations. With the gold price almost double that of palladium for much of 2006, demand for the white metal was healthy and even rose marginally to 260,000 oz.

In the European dental sector, demand for palladium remained steady at 75,000 oz. Much of this metal is used in the Italian market, which is fairly conservative and with no price incentive to switch metal, palladium maintained its market share.

ELECTRONICS

Demand for palladium in the electronics sector grew for the fifth successive year, to 1.07 million ounces (net of recycling). Despite this growth, overall consumption of palladium represents only a little over 50 per cent of its peak level in the late 1990s. Palladium is used in a number of electronics applications, from plating of components to its use in multi-layer ceramic capacitors, and competition comes from a number of different technologies and materials.



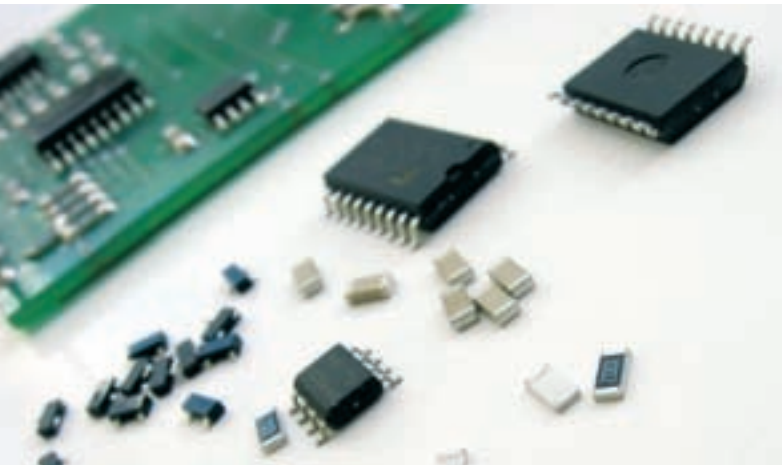
Paumanok Publications, Inc

Most importantly, palladium remains a key material in the production of multi-layer ceramic capacitors (MLCC), a passive component used in computers and other consumer electronics devices; annual demand for palladium for such capacitors is more than half a million ounces. Production volumes of all types of MLCC continue to grow at a great pace and exceeded one trillion in 2006. Nickel has been substituted for palladium in many types of MLCC in recent years. However, with plant utilisation rates high, few manufacturers had the opportunity to switch any more production from palladium technology to nickel and some even added palladium MLCC capacity, increasing overall palladium requirements from this sub-sector for the first time in six years.

Palladium usage in the plating of electronic components also fared well in 2006. This platinum group metal is an alternative to gold in this application and a sustained price differential between the two elements in favour of palladium encouraged use of the white metal where possible, boosting demand by 8 per cent. Palladium consumption in resistors also climbed by a similar percentage.

Environmental factors also had a significant effect on the uptake of palladium by the electronics industry in 2006. The pressure to move to cleaner manufacturing processes and to recycle a greater proportion of electronic products continues to grow all round the globe. In Europe, the Waste Electrical and Electronic Equipment (WEEE) directive came into force in 2006. This legislation has two aspects: first a reduction in the use of toxic metals such as lead (Pb) and, second, a requirement for greatly increased recycling rates. Other

Palladium demand in the electronics market continued its five year recovery. Sales of all kinds of devices continued to grow.



Palladium Demand: Electronics '000 oz		
	2005	2006
Europe	80	100
Japan	265	280
North America	195	190
Rest of the World	430	495
Total	**970**	**1,065**

JM

countries are also considering implementing similar rules in the near to medium-term.

As a result of these limitations on the use of heavy metals, manufacturers are looking to phase out the use of Pb solders where possible. Knock-on changes to other components are often required in such situations and palladium has found some use as an alternative plating material on lead frames for this reason. This effect was not seen simply in Europe but in other regions where goods for sale in Europe are manufactured.

The requirement for increased recycling rates also had some limited impact in raising the number of electronic and electrical devices recycled. Nonetheless, palladium and other platinum group metal content is very low in this waste stream, both in weight and in value terms. This in turn means that the economics of recycling these materials are less attractive than in the automotive industry. As a result, the volume of palladium reclaimed globally has been relatively low to date but is rising.

OTHER

Demand for palladium from other applications fell sharply to 140,000 oz in 2006, from 485,000 oz in 2005. A combination of stationary source emission control, titanium alloys and a range of other end uses contributed a slightly greater amount of demand than in 2005. However, the weight of palladium required for the production of physical investment products showed a dramatic year-on-year fall.

Following a strong year in 2005 in which the physical investment market saw an off-take of 400,000 oz of palladium, 2006 was much weaker. Demand, which is almost solely due to the North American market, fell to 50,000 oz, a drop of 88 per cent. The increase in the palladium price over 2006 made initial sales more difficult and stimulated disinvestment of some products bought over recent years.

The performance of the gold price also impacted upon this market. As gold moved to record highs, it received widespread publicity and investment demand focused on coins made from the more familiar metal. Palladium investment products are typically subject to a wider bid-offer spread than those in gold or silver, making it easier for investors to make a profit in these latter two metals.

A few new palladium products were introduced such as the 2007 Royal Canadian Mint Maple Leaf bullion coins and Great Bear/Little Bear series. However, with no other new coins being minted, opportunities for investment were limited. In these circumstances, palladium investment products were largely ignored and demand fell substantially.

Palladium Demand: Other '000 oz		
	2005	2006
Europe	20	20
Japan	10	10
North America	435	85
Rest of the World	20	25
Total	**485**	**140**

JM

A number of other applications accounted for small quantities of palladium in 2006. Stationary source emission control is a growing market, where regulations require the use of catalysts to minimise emissions from factories. After several quiet years, this sector is expanding once more and using palladium in some of the systems built.

High ruthenium prices encouraged the use of titanium alloys containing palladium in place of ruthenium for corrosion-resistant piping used in the petrochemical and other industries. Elsewhere, although palladium usage in biomedical applications has traditionally been insignificant, small but growing amounts of the metal are being used in anti-microbial coatings for catheters.

The Royal Canadian Mint issued a set of new designs of the Ursa Major and Ursa Minor constellations in palladium late in 2006.

OTHER PLATINUM GROUP METALS

RHODIUM

Net rhodium demand grew by 1.2 per cent in 2006 to a record level of 837,000 oz, boosted by increasing uptake of the metal for use in automotive exhaust catalysts. Demand for rhodium from other applications, principally its use in the manufacturing of glass, rose marginally too. Although supply from South Africa climbed by 10 per cent and more rhodium was recovered from end-of-life vehicles than in 2005, the rhodium market remained in deficit.

Autocatalyst

Demand for rhodium in autocatalyst production rose to 868,000 oz in 2006; a significant increase in Asian demand outweighed decreases in metal purchases in Europe and North America. We believe that a small number of manufacturers also added to their rhodium stocks, boosting demand to this level.

Rhodium Supply and Demand
'000 oz

		2005	2006
Supply			
South Africa		627	690
Russia		90	95
North America		20	20
Others		17	19
Total Supply		**754**	**824**
Demand			
Autocatalyst:	gross	829	868
	recovery	(137)	(170)
Chemical		48	48
Electrical		10	9
Glass		57	60
Other		20	22
Total Demand		**827**	**837**
Movements in Stocks		**(73)**	**(13)**

JM

Rhodium consumption in the European autocatalyst sector dropped to 167,000 oz last year. 2006 saw the introduction of the new Euro IV emissions legislation to all new light duty vehicles, something which might have been expected to raise rhodium use. However, high metal prices encouraged a wary attitude towards this metal and the industry worked hard to reduce loadings. As importantly, the diesel engine's success continued to squeeze the number of gasoline-fuelled vehicles being made. The number of rhodium-containing three-way catalysts being produced decreased, dragging rhodium consumption 4.5 per cent lower.

The North American market saw a similar contraction in rhodium purchases. Weak final quarter production saw manufacturing volumes fall slightly over the year. Average catalyst size fell too with the consequence that rhodium demand dropped to 287,000 oz.

Significant growth in rhodium purchases in Asia offset this. Japanese light duty vehicle production rose in 2006. Many of these automobiles were destined for export and had larger engines on average than those built for domestic sale. The growing number of catalysts and the rise in their average size increased rhodium demand by 18 per cent to 260,000 oz.

In other regions, vehicle production grew at a much faster rate than in the traditional manufacturing areas, forcing rhodium consumption higher. Double digit growth in China, now a major market in its own right, continued to draw in more rhodium for autocatalyst manufacture. Tighter legislation in other markets also raised rhodium autocatalyst loadings.

The amount of rhodium recovered from spent autocatalysts increased by a quarter to 170,000 oz in 2006. Although a high rhodium price is financially attractive to recyclers, the prices seen in 2006 had only a small positive effect on rhodium recovery. Other factors were more important: the number of vehicles recycled and the rhodium content of the catalysts on these vehicles both increased compared to 2005.

The scale of recovery of autocatalysts in Japan continues to be limited by the export of second-hand vehicles to other Asian countries. However, the amount of rhodium reclaimed in Europe and North America is rising, largely due to higher catalyst loadings on cars built in the mid-to-late 1990s. The net effect was an increase of 33,000 oz in metal returned to the market.

Other Demand

Demand from the glass industry was stronger in 2006 than we had previously expected, rising by 3,000 oz to 60,000 oz. This was for flat panel display glass and although there appears to be overcapacity for LCD glass manufacture, 2006 still saw significant expansions with new plants being constructed in Asia, driving rhodium demand higher. The market share of flat panel displays for televisions and computers continues to increase and we expect further commissioning of glass furnaces for these products in 2007, adding to rhodium demand.

In the chemical sector, rhodium is used as a catalyst, including in the manufacture of acetic acid, a commodity chemical used in the production of a number of polymers and other products. 2006 saw some limited expansion, adding slightly to demand.

RUTHENIUM & IRIDIUM

Following a year of strong growth in 2005, ruthenium demand grew again in 2006, rising 45 per cent to a record level of 1.29 million oz. The iridium market was rather slower moving and demand only grew by 2 per cent to 131,000 oz.

The electronics industry generated most of the increase in ruthenium demand, with substantial uptake for use in chip resistors, flat screen displays and hard disks. Net electronics demand for metal shot 78 per cent higher to 689,000 oz as a result.

Ruthenium Demand by Application
'000 oz

	2005	2006
Chemical	164	222
Electrochemical	96	137
Electronics	582	874
Other	49	55
Total Demand	**891**	**1,289**

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Ruthenium paste is used in chip resistors and also in flat screen plasma display panels (PDP). Although sales of the latter have been growing rapidly, manufacturers have moved to minimise ruthenium usage, leaving metal consumption lower.

In contrast, the use of ruthenium in the manufacture of hard disks has become significant. Although ruthenium has been used in disks before, it is deposited on newer types of hard disks to increase memory storage capacity. The major producers switched much of their production over to this new technology in 2006, leading to a surge in demand for ruthenium.

A large proportion of the metal used in the hard disk manufacturing process is recycled for re-supply to the hard disk producer and our demand estimate takes account of this. More information on the use of ruthenium in computer hard disks can be found in the special feature on pages 40-41.

We have upgraded chemical sector demand to reflect usage in a small number of processes including acetic acid manufacture and polymer production. Demand rose from 164,000 oz in 2005 to 222,000 oz last year.

Iridium Demand by Application
'000 oz

	2005	2006
Chemical	26	33
Electrochemical	28	34
Electronics	32	28
Other	42	36
Total Demand	**128**	**131**

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In other applications, there has been sensitivity to the increased price of ruthenium. It is used as a minor component in some platinum jewellery alloys and the high price encouraged North American manufacturers to minimise the use of this metal, particularly at a time of record platinum prices.

Iridium demand rose slightly during 2006. Its use in process catalysts, again including the production of acetic acid, climbed to 33,000 oz. In contrast, purchases for a range of electrochemical processes were flat. Demand for iridium crucibles to produce high-quality crystals for electronics fell back to 28,000 oz.

Outside these major segments, the use of iridium in automotive spark plugs continued to rise, sending demand in this application slowly higher as iridium took an increasing share of the top end of the market. The use of iridium in a range of other minor end uses, including thermocouples, fell slightly in 2006.

RHODIUM SUPPLIES

Global rhodium supplies grew by 9 per cent in 2006, reaching 824,000 oz. Most of the increase in primary production was due to the expansion last year in South Africa. A greater proportion of platinum extraction was from the exploitation of UG2 ore which typically has a higher rhodium and minor pgm content than Merensky reef. This growth came despite the significant release of pipeline stock by Anglo Platinum in late 2005, which added to that year's rhodium supplies.

We believe that production of rhodium at Norilsk rose marginally, in line with the increasing amounts of palladium produced in 2006. There are strong indications that this total was augmented further by some sales of Russian State stocks to give an annual supply of 95,000 oz of rhodium from Russia, 5,000 oz above the 2005 figure. Rhodium supply from other regions including Zimbabwe rose marginally too.

RUTHENIUM & IRIDIUM SUPPLIES

The increasing output of platinum from South Africa was accompanied by a rise in primary ruthenium and iridium production. Although not all primary producers report production or sales figures for these metals, it is clear that some of the ruthenium currently being supplied is from stockpiles built-up over previous years. Primary production of iridium, by comparison, is sufficient to meet industrial demand and price increases may have been due to speculative activity.

MEMORIES ARE MADE OF THIS

Since the coming-of-age of the personal computer, or PC, there has been a drive towards ever-increasing performance of these machines. Moore's law that computing power doubles roughly every eighteen months still holds remarkably true and as the performance of a typical PC improves, so do its memory requirements. From the 1980s when several kilobytes of data stored in a random access memory was considered to be fairly serious computing, internal memory storage has moved on to other technologies capable of storing hugely more data.

Growth in the consumer electronics market has combined with ever greater average numbers of hard disks per device to drive pgm usage higher in this sector.

As the demand for memory has increased, the technologies used to provide this have advanced, through floppy disks to hard disks and more recently to include other newer techniques such as flash storage. However, presently, the technology in widest use is the hard disk drive, something that has implications for the pgm market.

Hard drives themselves are an old technology in computer terms (they were developed in 1956) but they have become the industry-standard method of storing data. Amongst their advantages is that it is possible to read and re-write data huge numbers of times and, because the information is stored in the form of magnetic domains on the disk (small areas of parallel magnetisation), when the power is turned off, data is retained. Hard disks are now used in all personal computers and in a host of other devices. However, nothing in the IT industry remains untouched by progress and the hard disk has had to improve in performance and decrease in cost to keep its place.

Technological improvements on hard disks have mainly related to increasing rotational speed (the time taken to read and write data) and increasing the areal density (the amount of data that can be stored in a given area on the disk). However, over time, the performance of hard disks has approached a physical limit: as more and more data is written onto each square centimetre of disk, the magnetic domains tasked with storing this information decrease in size.

As the domain sizes get smaller, they become less stable and are prone to spontaneously changing their magnetisation (the superparamagnetic effect), leading to this information corrupting all too easily. In practical terms, this means that there is a limit to the amount of data that can be reliably stored on a disk. Electronics designers have taken a pragmatic approach to solving this problem: while they have researched new technologies, they have also simply increased the number of hard disks used per electronic device.

The first important development for the platinum group metals is the use of platinum in a number of the magnetic alloys used to store data. Mixing platinum with chromium alters the magnetic properties of this layer. Specifically, it increases the magnetic anisotropy (or directionality) of the media. This gives smaller domains, which are more stable, and therefore higher storage density hard disks. It also provides the opportunity for manufacturers to minimise the size of the technology, allowing it to fit into ever smaller form factors and miniaturised devices, something that has helped the hard disk to fit into cell phones and iPods.

The universal use of platinum in hard disks has combined with increasing sales of consumer electronics each year and the trend toward greater numbers of disks per product, to drive platinum demand higher for this application.

However, there are limits on how much data can be stored using even these methods. One of the next steps to improve performance

Ruthenium sputtering targets like those shown above are used in large numbers in the manufacture of new PMR hard disks.

was when IBM announced its "pixie dust" technology. This technology has been in production for several years and gives better areal densities than conventional hard disks.

Very thin layers of ruthenium are used as the filling in a sandwich of magnetic media. The benefit of these antiferromagnetically-coupled media (AFC) is that the ruthenium layer is the correct thickness to link two physically-separated magnetic layers. This coupling makes the read and write heads in the hard drive "see" a thicker, more stable layer. Each magnetic domain can take up a correspondingly smaller area of the disk surface while maintaining its volume and stability, and more data can therefore be stored.

However, this approach is fast being pushed out of the market by another newcomer: perpendicular magnetic recording (PMR). Again, the secret to this technology is to have each magnetic domain taking up as little of the surface of the disk as possible. In order to achieve this while keeping the domain large enough to prevent it spontaneously changing its magnetic state, the domain instead stretches into the disk, with magnetisation perpendicular rather than parallel to the disk's surface.

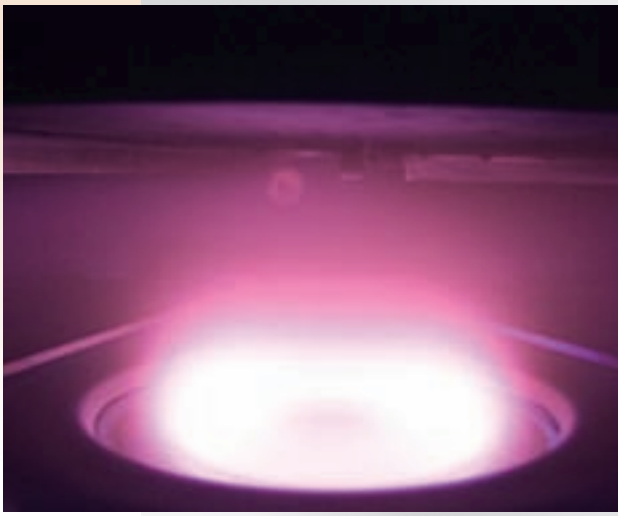
While the magnetic layer is made of much the same materials as in other more conventional hard disks (often an alloy of platinum and chromium) much of the magic is in how these layers are deposited. To this end, ruthenium layers, and a host of other materials, again come into use. Although the ruthenium layers are non-magnetic they act as spacers and seed layers for the rest of the structure, and are becoming widely used by many of the leading hard disk manufacturers. These layers are typically thicker than the so-called pixie dust.

The market share of this technology has recently been growing, with many new PMR products released in 2006. As a result, ruthenium consumption in hard disks has increased greatly over a short period.

The use of platinum group metals doesn't end there though. New designs of read heads, used to get information from a hard drive, contain iridium, alongside manganese and chromium. These heads are more sensitive and better at reading information. Although only tiny amounts of iridium are used in each, this does illustrate the usefulness of the platinum group metals throughout the area of memory storage.

Although hard disks are now clearly the dominant technology, the computer industry continues to develop quickly. USB flash drives, a rather different approach to data storage, are decreasing rapidly in price and the hard disk will have to improve to fight this threat to its dominance. Already, there is competition between these in some applications and this is likely to intensify. Other new technologies are on the distant horizon too. Nonetheless, almost all industry participants believe that the humble hard disk has a huge amount of potential yet. Hitachi, for example, sees improvements being made to PMR technology for many more years. And, with the platinum group metals used widely and for a range of purposes, there is every reason to forecast their continuing use.

The sputtering process physically deposits layers of materials such as platinum, ruthenium or base metals to form the complex structures required in a modern hard disk.



PRICES & FUTURES MARKETS

PLATINUM

The platinum price was subject to extraordinary volatility during 2006, with spells of frantic trading activity, particularly in May and November, alternating with periods of relative calm. The price opened in London at $982, which proved to be the low point, and ended at $1,117, only 14 per cent higher, despite briefly achieving a spot price of $1,400 in Tokyo in November. Considerable speculator and investor interest, combined with a finely-balanced physical market, produced this strong performance and significant price spikes.

There were high levels of interest in many commodities, fuelled by continuing Chinese economic growth and increased hedge fund and other investor activity. As so often, many movements in the platinum price were prompted by shifts in the oil or gold markets. Continued weakness of the US Dollar also played a part in allowing metal prices to rise. However, platinum was, in price terms, a comparative underperformer amongst metals in 2006, showing a lower percentage increase than copper, nickel and even palladium.

Starting at $982, the platinum price rose throughout **January** on the back of speculative buying on both NYMEX and TOCOM. The psychologically-important $1,000 level, which platinum had approached at the very end of 2005, did not present a significant barrier in early 2006, and platinum fixed at an all-time record of $1,049 on the 16th, $1.50 higher in absolute terms than the previous record set in March 1980.

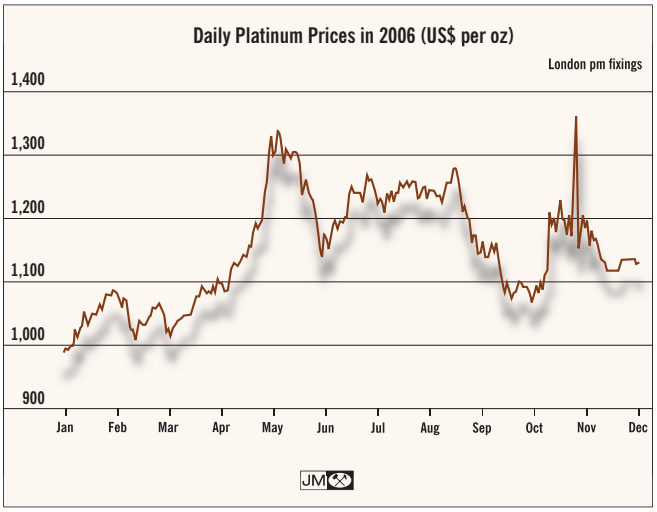
In late January, a sudden strengthening of the US Dollar against the Yen encouraged general public investors onto TOCOM and provided an opportunity to push platinum over ¥4,000 per gram. As contracts equivalent to more than one million ounces changed hands on the 30th, platinum reached ¥4,059 for the December 2006 contract and provided the impetus for a month-end London fix of $1,072. The platinum price averaged over $1,000 for the month, something it did throughout 2006.

The gold price wilted in **February,** due to profit-taking from investors, and platinum followed. Selling in a range of commodities coincided with the Chinese New Year, removing some physical demand from the platinum market and causing the price to dip to $997 on the 16th, the last point of 2006 when it was in triple figures. Many funds viewed this as merely a correction in the bull run in commodities. Fund short covering and Chinese jewellery purchasing soon combined to drive the price back higher to $1,063 on **March** 3rd.

However, a weaker gold price drove fund long liquidations in platinum. The price of the latter drifted down to test $1,000 in mid-March. Chinese physical demand provided support as the jewellery trade restocked after the major sales period of the Chinese New Year. For once, the silver price came into play. As this surged ahead, platinum rose to a record of $1,084 on the 30th before the predictable profit-taking came, cutting a few dollars from the price.

In **April**, a weak Dollar and increasing fund activity took gold toward $600, its highest price for 20 years. This reignited interest in precious metals amongst TOCOM investors, who pushed platinum to $1,095 before the quiet Easter period. When the other markets returned on the 18th, platinum moved over $1,100 and continued climbing in line with a range of commodities. Lonmin announced the temporary closure of a smelter at its Marikana property, applying further upward pressure to the price which rose to $1,130 on the 20th.

Platinum continued to hit a series of new record prices throughout the month, yet the markets took a fairly relaxed view, with lease rates remaining low, indicating little trouble with physical availability of the



The platinum price continued climbing into 2006 and reached all-time record peaks of $1,335 in May and $1,390 in November.

Average PGM Prices in $ per oz

	2005	2006	Change
Platinum	897.02	1,141.84	27%
Palladium	201.47	320.37	59%
Rhodium	2,056.18	4,551.59	121%
Ruthenium	74.59	193.42	159%
Iridium	169.49	348.87	106%

Platinum and palladium prices are averages of London am and pm fixings. Other pgm prices are averages of Johnson Matthey European base prices.

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metal, and large volumes trading on the fix. Tellingly, speculative long positions on NYMEX increased by 85,000 oz to 301,000 oz during April, suggesting that many investors believed there still to be good potential for price growth from this point.

Further support for the price in early **May** came from rises in the gold price. Many fund investors were clearly keen to test the $1,200 barrier (and also €1,000) for the first time. With this sharp price rise, physical buyers were sidelined but speculative buying carried the price through this level and platinum fixed at $1,206 on the 9th and $1,259 only 24 hours later.

As gold continued to appreciate amid similar excitement, reaching $725.75, platinum hit a new peak of $1,335 on May 12th. After a few days of retrenchment, the price softened to $1,275 before weakness in the US Dollar provided an opportunity for Asian investment. Investor buying there ensured that platinum reached $1,335 again on the 17th before profit-taking caused the price to subside to $1,280 by the month's end.

As most commodity prices fell from their highs, the platinum price crumpled to $1,125 in the second week of **June.** Net long positions on NYMEX dropped 160,000 oz to an anaemic 80,000 oz, signifying an end, for the moment, to the speculative feeding frenzy. During the rest of the month, the price moved back higher, helped by an announcement that Implats' annual production was to be lower than expected by 70,000 oz. At the end of June, poor US domestic economic data weakened the dollar and sent gold soaring. Platinum reached $1,226 before the market exuberance diminished, leaving it to trade between $1,200 and $1,260 throughout **July** and **August.** Some of the spur for this strong performance came from the New York futures markets where platinum long positions rebounded from a June low of below 80,000 oz to top 300,000 oz.

Platinum Prices in 2006
London am and pm fixings, $ per oz

	High	Low	Average
January	1,074.00	982.00	1029.00
February	1,080.00	997.00	1,041.40
March	1084.00	1,006.00	1,041.50
April	1,149.00	1,063.00	1,101.60
May	1,335.00	1,164.00	1,264.35
June	1,258.00	1,125.00	1,188.90
July	1,258.00	1,196.00	1,229.00
August	1,251.00	1,216.00	1,233.75
September	1,268.00	1,127.00	1,184.65
October	1,150.00	1,053.00	1,083.75
November	1,390.00	1,086.00	1,182.90
December	1,175.00	1,102.00	1,121.35
Annual	**1,390.00**	**982.00**	**1,141.84**

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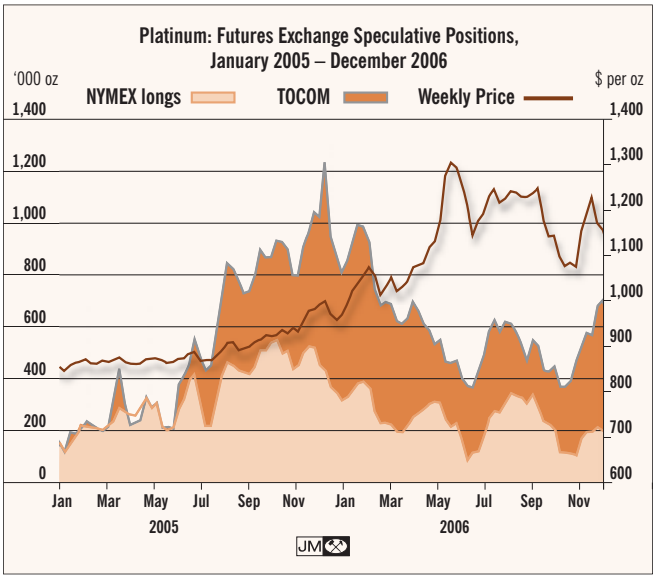
At the start of **September**, the price firmed and successfully challenged the top of this range, fixing at $1,268 on the 6th, driven by a mix of technical buying, fund purchases and minor disruption in Lonmin's projected sales due to a fire at its refinery.



NYMEX and TOCOM positions represent only a portion of fund and investor open interest but still exert a strong influence on the platinum price.

External events intervened, with speculation in the financial markets that the so-called "commodity super-cycle" might be at an end. This led to sales of significant volumes of all classes of commodities. Platinum was not immune and tumbled to $1,127 over the following weeks despite good levels of purchasing on the Shanghai Gold Exchange, as Chinese jewellery manufacturers took advantage of a softer metal price. A thaw in Iran's stance on its nuclear programme drove oil prices down, deepening the price spiral. Even with the dollar weakening, platinum could not recover ground and it traded the month out in a new range of $1,120-$1,150, with long positions on NYMEX falling.

The price dipped suddenly below this range at the start of **October**. With the Chinese markets closed for the National Day holidays, the opportunistic buying that had appeared on price dips throughout the year was missing, allowing the fall to continue. Fund long liquidations drove the price sharply down before short covering provided support. On the reopening of the Shanghai Gold Exchange on the 9th, the level of pent-up jewellery demand was shown by 270 kg of metal changing hands in one day. Further fund sales of metal (illustrated by reductions in long positions on NYMEX which fell from 196,000 oz to 100,000 oz over the month) drove the price down to a low of $1,053 on the 24th, demonstrating the importance of investors within this market. Elsewhere, general public interest in gold

EXCHANGE TRADED FUNDS

Exchange traded funds (ETFs) already exist in a number of commodities, including gold, with the aim of simplifying consumer investment in them. In essence, shares in an ETF are traded on stock markets just as for conventional companies but the value of the shares is backed by allocated stocks of the physical commodity concerned. If a platinum ETF were to be launched along the same lines as some of the gold ETFs, this would be likely to require the purchase of a significant amount of the metal beforehand, with the effect of reducing metal liquidity. In a relatively closely-balanced market, this would have the potential to cause greatly-increased price and lease rate volatility.

The market therefore reacted apprehensively to the November rumours that an ETF might be launched. With prices falling rapidly back from their brief foray to $1,400, comments by a number of analysts and industry participants calmed the excitement. With no sponsor forthcoming for such a fund and no evidence that any party had bought sufficient physical metal to back one, the prospects of an ETF rapidly receded and the price softened. However, the announcement by the Zuercher Kantonalbank of its plans to launch platinum and palladium ETFs caused considerable market nervousness in April 2007.

and platinum on TOCOM started to revive with long positions building in size.

High intra-day volatility illustrated a sense of nervousness in the market in early **November**. Platinum began the month at $1,086. A weak dollar helped the gold price to rise and allowed platinum to break through its ceiling of $1,100 on the 2nd, reversing any bearish sentiment and causing many traders to look at $1,200 as the next challenge. Later that day, speculator buying on NYMEX saw the price shoot higher and platinum fixed at $1,207 in London on the 3rd, amidst rumours of the possible launch of a platinum exchange traded fund (ETF).

Investors on TOCOM were caught out by this sudden movement but had caught up by the 9th, allowing profit-taking to take the price back down to $1,164. This volatility rekindled the Japanese public's interest in platinum, taking open positions on TOCOM back over 400,000 oz for the first time since April, albeit significantly below their January peak.

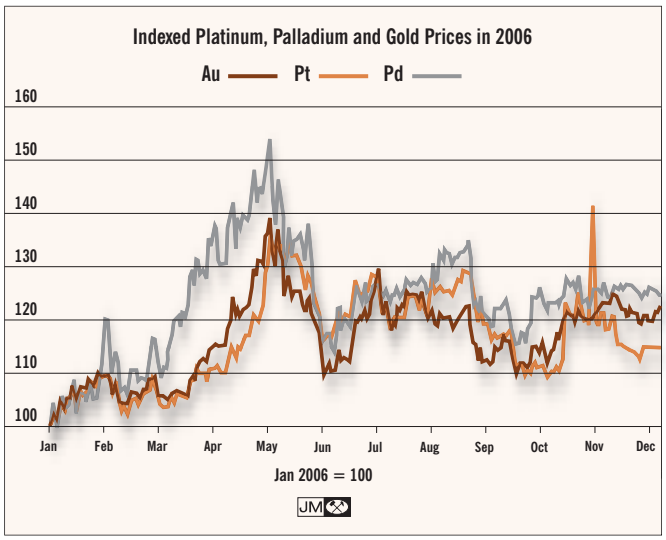
With very large volumes of platinum changing hands on the afternoon fix of the 9th, the price gained $28, followed by a similar move on the 10th. The market regained its composure until the 20th when platinum raced higher, from $1,155 the previous morning, to $1,262. Although market speculation attributed this rise to the ETF rumours, the real reason appeared to be the maturation of a number of call options at the end of November where physical delivery of metal was requested, something not easily achieved with stocks at low levels. Amidst this temporary tightness, one month lease rates soared to 30 per cent and Swiss ingot traded at a substantial premium to sponge prices.

The extraordinary price movements continued in Tokyo as the spot price briefly exceeded $1,400 before fixing at $1,390 in London on the 21st. Lease rates also rose, moving to well over 100 per cent before both the price and lease rates fell, as quickly as they had risen, to $1,160 and 25 per cent respectively on the 22nd. This represented a remarkable fall of 17 per cent in the price over a 24 hour period. With these options settled, platinum ended the month at $1,171 with lease rates still easing, eventually returning to normal levels.

December started with the price firming in Asia and weakening later in Europe. Platinum threatened to slip under $1,100 but purchasing in Shanghai came to the rescue with 200 kg of metal traded on the 8th. Market conditions were quiet over the rest of the month, with no appetite for more volatility in the price. Stuck in a holding pattern between $1,100 and $1,125, platinum ended the year uncharacteristically quietly at $1,117.

PALLADIUM

The palladium price outperformed that of platinum in 2006 despite weaker fundamentals, climbing 24 per cent from $261 (the year's low) to a year-end $324. An active first six months was followed by a quieter second half when the price moved little. Long positions held by funds on NYMEX decreased over the year but it seems likely that funds switched some of their open interest to the large volumes of metal shipped into Switzerland and Hong Kong, maintaining significant positions in palladium.



The general impact of the continuing commodity price boom is reflected in the similar price behaviour of gold, palladium and platinum in 2006.

The platinum price soared to historic highs in **January** diverting attention from palladium which traded largely between $260 and $280 with minor changes in fund positions. The last day of the month saw fund buying spill into palladium and push the price to $290, encouraging investors to target the psychologically-important $300 point.

With palladium still considered to be undervalued (by comparison with other metals and its historical peaks) long positions on NYMEX rose above one million ounces. They melted away a little as profits were taken when palladium climbed sharply to $315 on **February** 3rd. With a sell-off taking place in gold, heavy selling of Russian metal over the fix drove the price into reverse, sending it scurrying down to a low of $273 on the 16th. Palladium traded the month out between $280 and $290 while the market digested statistics showing imports of 500,000 oz of palladium into Switzerland in January.

However, at the start of **March**, a buoyant gold price lifted all of the pgms and palladium rose to $305, providing an opportunity for funds to crystallise some of their profits. The price softened to a monthly low of $283 but good physical demand and residual speculator interest drove palladium strongly onward from that point to $345 on the 30th before the next bout of profit-taking. NYMEX positions resumed their slow growth, indicating the extensive investor appetite for this metal, peaking at 1.1 million ounces in **April**.

Palladium Prices in 2006
London am and pm fixings, $ per oz

	High	Low	Average
January	290.00	261.00	273.55
February	315.00	273.00	289.30
March	345.00	283.00	309.65
April	370.00	334.00	353.10
May	404.00	336.00	369.05
June	361.00	282.00	315.65
July	330.00	304.00	318.20
August	346.00	312.00	329.05
September	351.00	303.00	323.25
October	327.00	295.00	313.05
November	334.00	314.00	324.70
December	331.00	321.00	325.95
Annual	**404.00**	**261.00**	**320.37**

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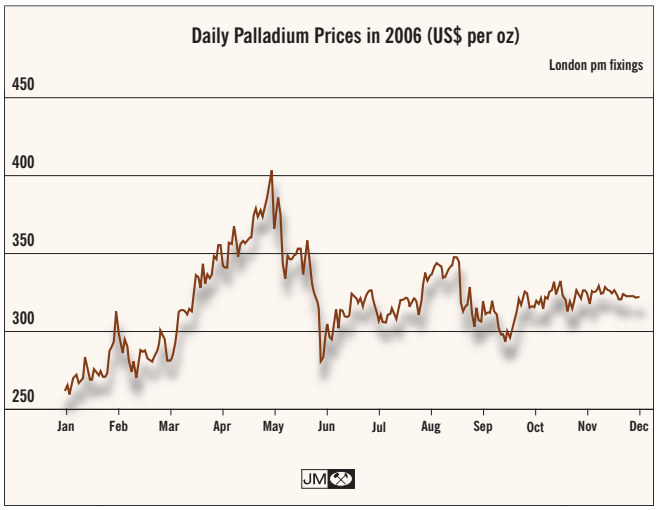
The pattern of a rising price followed by long liquidations continued, dominated by fund buying and selling. Gold and platinum prices pushed onward. Palladium rose in sympathy, reaching a monthly peak of $370, 31 per cent above March's low. NYMEX positions continued to lengthen, demonstrating a certain disregard for the short-term supply surplus by some of the investment community.

After reaching $370 on April 20th, a short-term correction in gold saw the palladium price fall into a range of $345-$365 as NYMEX positions were slowly unwound by investors. The month's final fix was relatively neutral at $362.

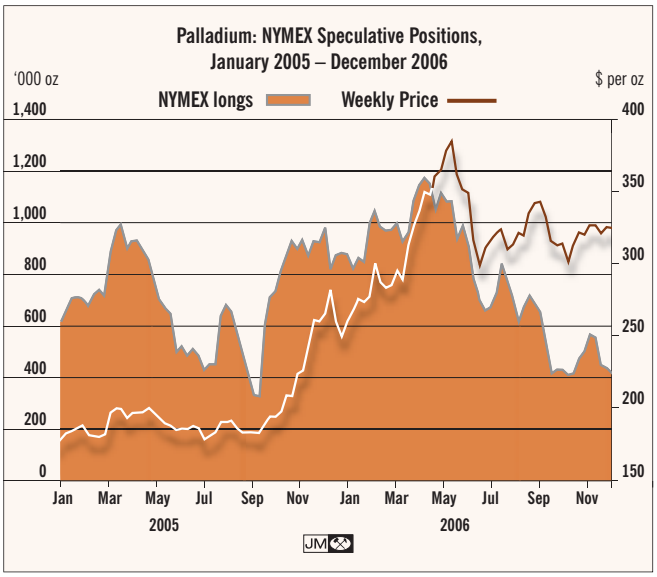


The palladium price was influenced by rising gold and platinum prices. However, after moving over the $400 level, it retreated to below $350 for the second half of the year.

Palladium started **May** with upward momentum, leaping to $378 on the first trading day. Platinum broke through $1,200 on the 9th and palladium technical traders started eyeing the $400 mark. As platinum hit an all-time high on the 12th, the price of palladium reached $404, the highest point for four years, and as it transpired, the peak for 2006. Although speculative NYMEX positions remained above the million ounce level, the price slipped with low intra-day volatility indicating a simple excess of market offers over bids. Investors seemed happy with the gains made and the price continued sliding to $355, $23 lower over May.

Movements in palladium showed a direct link to those of platinum throughout **June**. The price stayed firm for the first few days before the markets were unnerved by a number of funds liquidating long positions. A slide in commodity prices, including gold, undermined palladium and saw it tumble. It finally pulled out of its dive at $282 on the 13th, having fallen 30 per cent from its peak in just over a month. At the same time, long speculative positions on NYMEX fell sharply to 700,000 oz. Commodity prices stabilised and palladium recovered to end the month at $312.

Palladium traded between $300 and $330 during **July**, with support from geopolitical events. Test-firing of a missile by North Korea took oil to a record high on the 6th but did not invigorate the palladium price. The invasion of Lebanon by Israel sent oil higher again but palladium responded only sluggishly. Slipping from a monthly peak of $330, it fell to $304 but physical buying



Fund positions on NYMEX declined from the early 2006 peaks, although it seems likely that institutional investors maintained large speculative positions in palladium.

re-emerged. Palladium ended the month at $309.50. Perhaps surprisingly, NYMEX long positions grew over the month from 630,000 oz to 770,000 oz.

The first half of **August** was quiet with palladium stuck between $310 and $330. A ceasefire in Lebanon weakened oil, bringing palladium to a low of $312 on the 14th. Residual fund interest prompted a leap into a new range of $330-$350. The price ended August 9 per cent up at $341.

With Montana's Stillwater and East Boulder mines closed in early **September** due to wildfires nearby, the price moved above $350 on the 7th. With commodities weakening on the 8th, palladium was hit hard, dropping 7.5 per cent in 24 hours. The decline continued as it dropped to $307 on the 13th. It tested the $300 resistance level but industrial purchasing helped it rebound to $330, with very large volumes being traded on the fix and heavy purchasing to cover investor short positions. Palladium challenged $300 again but bounced back from a monthly low of $303 and ended the month trapped between $310 and $325.

This roller coaster pattern was seen again in the first half of **October**. Despite rising long interest on NYMEX, softer oil and gold prices dragged palladium down. The price drifted below $300 before tension in the Korean peninsula prompted a recovery. Long futures positions increased and a positive investment sentiment, inspired by technical trading, pushed palladium back to where it had been in September.

November was remarkably quiet considering the activity in the platinum market with palladium trading between $310 and $335 and a monthly gain of only $3. With speculator attention focused elsewhere, the palladium price played out a very uneventful month, failing to respond to platinum's new record price on the 21st. **December** was even less exciting although very large quantities of metal were exported from Russia to Switzerland. There appeared to be no investor appetite for buying or selling in palladium. It started the month at $326 and edged up to $331on the 5th before settling as many NYMEX positions were closed in advance of the year end. As these dropped from 436,000 oz to only 388,000 oz, the price did not stray too far and closed the year at $324, 24 per cent up on its starting point.

OTHER PGM

The rhodium market was subject to considerable volatility throughout 2006. Having started the year at $3,000, it ended 85% higher at $5,550, having peaked at $6,275 in mid-May, representing the third successive year of strong price growth.

These price movements were caused simply by the shifting balance between market bids and offers. With fundamental demand for rhodium continuing at a high level, a supply-demand deficit drove the price higher throughout this period. In this environment, purchasers paid great attention to the short-term price behaviour, flooding the market with bids on dips in the price and disappearing as the price rose, bringing more offers of metal into play. As a result of this bargain-hunting the rhodium price was also subject to very high volatility throughout most of the year.

In retrospect, **January**'s $400 rise from $3,000 was unremarkable and **March** saw the first big movement of the year. Solid physical demand was not matched by availability of metal in the open market and prices rose by $850 to a fifteen year high of $4,350. Offers increased in number, bids became scarcer and the Johnson Matthey base price turned around almost as quickly, falling to $4,000 in early **April**. At this level, there was strong physical buying in Asia. The price rebounded with dealer interest driving a dizzying climb of $900 in a week to the year's highpoint of $6,275 on **May** 22nd.

With no purchasing at all at these levels, the price slid to a mid-**June** low of $4,175. The thin conditions were exemplified at the Comdaq fix on June 9th where

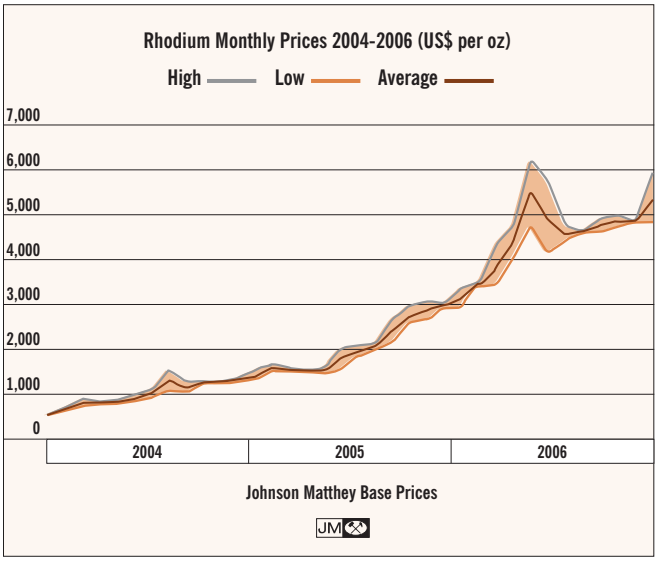
the price dropped by $800 with a few small offers unmatched by bids and no metal changing hands. The cycle then repeated, sending rhodium back above $5,000 before it drifted lower, spending **August** at $4,650. The rest of the year saw much calmer market conditions. Although the rhodium price reached the $5,000 level several times, it fell back each time, helped by rumours of sales of significant volumes of rhodium from automotive scrap. The underlying tension was displayed once more in **December** as the year ended with another volatile month. Constant bidding drove the price up to $6,000 on the 20th before the quiet trading environment pre-Christmas allowed everyone to relax, with a few offers satisfying the market and the price softening to end 2006 at $5,550.

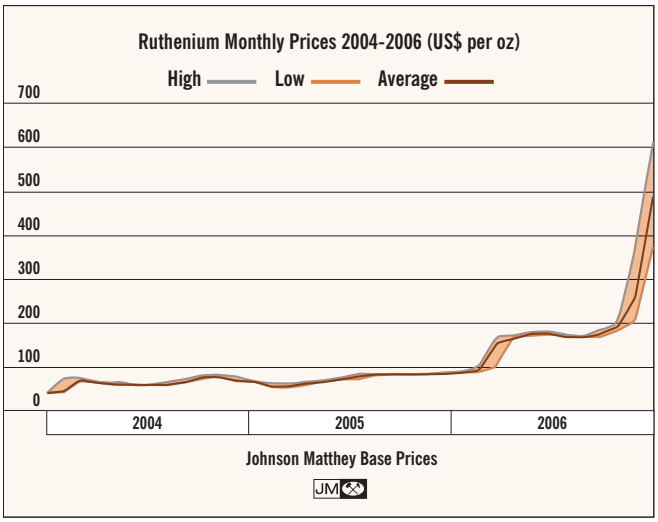
The **ruthenium** price rose inexorably throughout the year, driven by physical demand from the electronics sector in particular. Starting at $87, it closed at $610, a remarkable climb of more than 600 per cent in 2006.

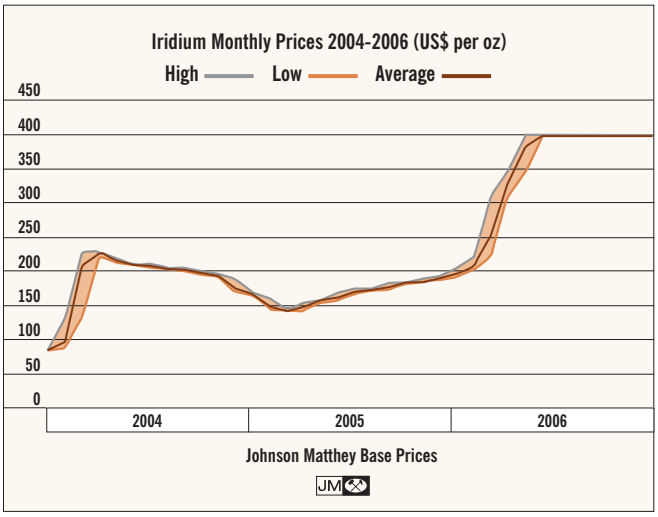
January was quiet with an increase of only $3 but the Johnson Matthey base price climbed to a four year peak of $105 in **February**, driven by physical demand. From **March**'s high of $165, the following months were uneventful. Healthy bidding interest steered the price to $180 in **May** before it softened to $170 in **July**.

The price settled here before rising in **September** to an all-time record of $185, consumer purchasing again providing the impetus. With ruthenium in uncharted territory and bids outnumbering offers, the price broke the $200 mark on **October** 12th. It kept on rising as a certain amount of panic enveloped industrial consumers, forcing the price sharply higher to $375 by the end of **November**, a leap of 80 per cent in only one month. **December** was similar, with another 63 per cent jump, as the ruthenium price leapfrogged that of iridium for the first time ever, to close at $610 with keen buyers still evident in the marketplace.

Although the **iridium** price more than doubled in 2006, from an initial $195 to $400, the price movements were less exciting. Iridium accompanied ruthenium higher for the first six months. It rose $20 in **February** to $225, its highest since 2004. **March** saw this climb accelerate: strong physical demand forced the Johnson Matthey base price onward to $350 by the end of **April**. The price rose to $400 by the middle of **May**. All excitement then disappeared from the market and the price remained flat at $400 throughout the rest of 2006.

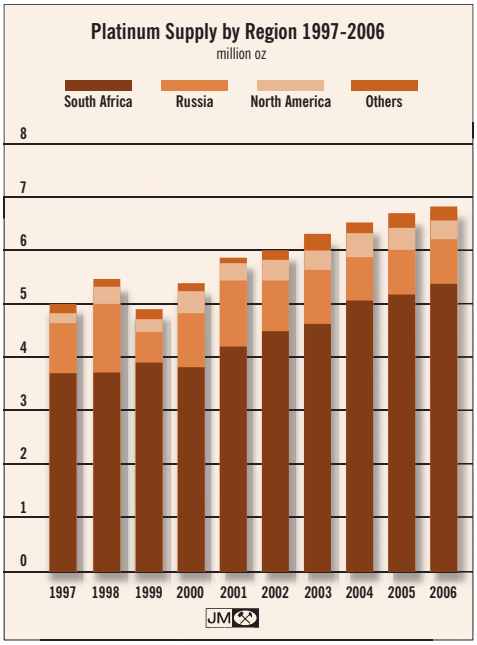


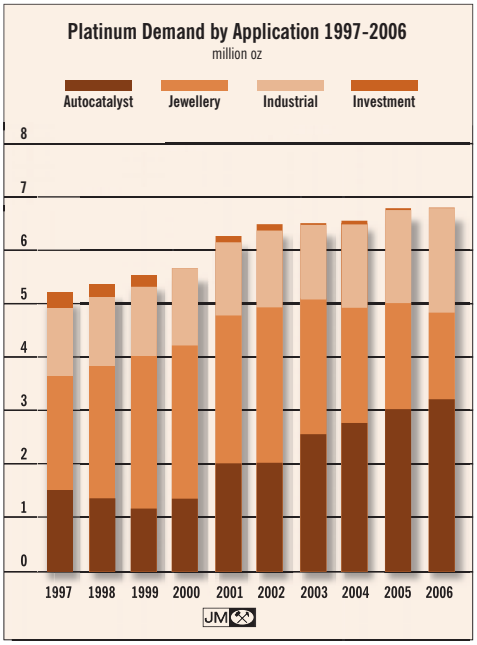




Platinum Supply and Demand

'000 oz	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Supply										
South Africa	3,700	3,680	3,900	3,800	4,100	4,450	4,630	5,010	5,115	5,290
Russia	900	1,300	540	1,100	1,300	980	1,050	845	890	880
North America	240	285	270	285	360	390	295	385	365	345
Others	120	135	160	105	100	150	225	250	270	270
Total Supply	**4,960**	**5,400**	**4,870**	**5,290**	**5,860**	**5,970**	**6,200**	**6,490**	**6,640**	**6,785**
Demand by Application										
Autocatalyst: gross	1,830	1,800	1,610	1,890	2,520	2,590	3,270	3,490	3,795	4,195
recovery	(370)	(405)	(420)	(470)	(530)	(565)	(645)	(690)	(770)	(855)
Chemical	235	280	320	295	290	325	320	325	325	360
Electrical	305	300	370	455	385	315	260	300	360	425
Glass	265	220	200	255	290	235	210	290	360	390
Investment: small	180	210	90	40	50	45	30	30	30	25
large	60	105	90	(100)	40	35	(15)	15	(15)	(65)
Jewellery	2,160	2,430	2,880	2,830	2,590	2,820	2,510	2,160	1,965	1,605
Petroleum	170	125	115	110	130	130	120	150	170	205
Other	295	305	335	375	465	540	470	470	475	490
Total Demand	**5,130**	**5,370**	**5,590**	**5,680**	**6,230**	**6,470**	**6,530**	**6,540**	**6,695**	**6,775**
Movements in Stocks	**(170)**	**30**	**(720)**	**(390)**	**(370)**	**(500)**	**(330)**	**(50)**	**(55)**	**10**
Average price (US$)	**396**	**372**	**377**	**545**	**529**	**540**	**691**	**846**	**897**	**1,143**



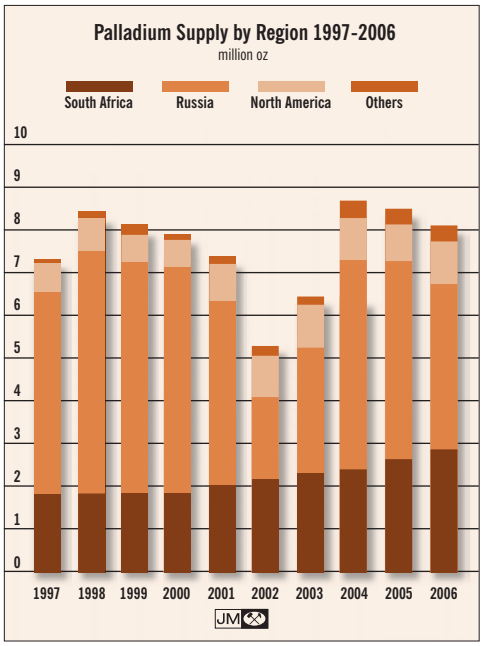


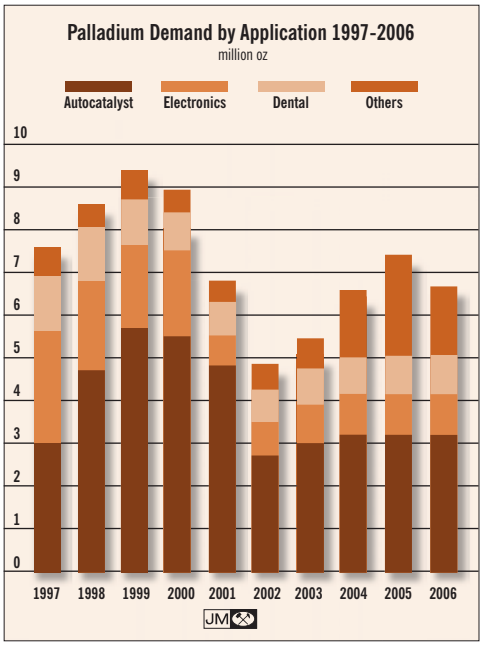
Platinum Demand by Application: Regions

'000 oz	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Europe										
Autocatalyst: gross	510	545	560	680	1,060	1,210	1,455	1,680	1,960	2,160
recovery	(25)	(30)	(30)	(40)	(70)	(90)	(115)	(145)	(170)	(185)
Chemical	70	60	80	100	105	115	105	115	100	100
Electrical	45	45	70	80	65	40	35	40	40	45
Glass	20	25	20	20	10	10	10	5	10	10
Investment: small	5	5	5	0	0	0	0	0	0	0
Jewellery	150	160	185	190	170	160	190	195	195	175
Petroleum	15	15	15	15	15	15	15	15	15	15
Other	85	85	90	105	155	190	185	190	175	175
Total	**875**	**910**	**995**	**1,150**	**1,510**	**1,650**	**1,880**	**2,095**	**2,325**	**2,495**
Japan										
Autocatalyst: gross	255	240	250	290	340	430	500	615	600	595
recovery	(50)	(55)	(60)	(60)	(55)	(55)	(60)	(55)	(35)	(35)
Chemical	20	20	20	20	25	30	40	40	50	50
Electrical	65	55	75	90	80	55	40	50	65	75
Glass	85	80	65	65	85	60	85	90	95	100
Investment: small	25	25	20	5	5	5	5	0	0	0
large	60	105	90	(100)	40	35	(15)	15	(15)	(65)
Jewellery	1,390	1,290	1,320	1,060	750	780	660	560	510	360
Petroleum	5	5	5	5	5	5	5	5	5	5
Other	30	30	35	35	35	55	40	40	45	45
Total	**1,885**	**1,795**	**1,820**	**1,410**	**1,310**	**1,400**	**1,300**	**1,360**	**1,320**	**1,130**
North America										
Autocatalyst: gross	800	775	535	620	795	570	885	800	820	905
recovery	(290)	(310)	(315)	(350)	(370)	(380)	(420)	(435)	(505)	(575)
Chemical	80	80	95	100	100	100	95	90	100	105
Electrical	100	105	120	145	120	100	85	90	95	100
Glass	45	20	25	50	35	30	(30)	(10)	5	10
Investment: small	145	175	60	35	45	40	25	25	25	20
Jewellery	160	270	330	380	280	310	310	290	275	240
Petroleum	50	40	40	35	40	45	40	35	35	40
Other	160	170	190	210	250	265	215	205	220	225
Total	**1,250**	**1,325**	**1,080**	**1,225**	**1,295**	**1,080**	**1,205**	**1,090**	**1,070**	**1,080**
Rest of the World (inc. China)										
Autocatalyst: gross	265	240	265	300	325	380	430	395	415	535
recovery	(5)	(10)	(15)	(20)	(35)	(40)	(50)	(55)	(60)	(60)
Chemical	65	120	125	75	60	80	80	80	75	105
Electrical	95	95	105	140	120	120	100	120	160	205
Glass	115	95	90	120	160	135	145	205	250	270
Investment: small	5	5	5	0	0	0	0	5	5	5
Jewellery	460	710	1,045	1,200	1,390	1,570	1,350	1,115	985	830
Petroleum	100	65	55	55	70	65	60	95	115	145
Other	20	20	20	25	25	30	30	35	35	45
Total	**1,120**	**1,340**	**1,695**	**1,895**	**2,115**	**2,340**	**2,145**	**1,995**	**1,980**	**2,080**

Palladium Supply and Demand

'000 oz	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Supply										
South Africa	1,810	1,820	1,870	1,860	2,010	2,160	2,320	2,480	2,605	2,905
Russia	4,800	5,800	5,400	5,200	4,340	1,930	2,950	4,800	4,620	3,900
North America	545	660	630	635	850	990	935	1,035	910	985
Others	95	120	160	105	120	170	245	265	270	270
Total Supply	**7,250**	**8,400**	**8,060**	**7,800**	**7,320**	**5,250**	**6,450**	**8,580**	**8,405**	**8,060**
Demand by Application										
Autocatalyst: gross	3,200	4,890	5,880	5,640	5,090	3,050	3,450	3,790	3,865	4,015
recovery	(160)	(175)	(195)	(230)	(280)	(370)	(410)	(530)	(625)	(800)
Chemical	240	230	240	255	250	255	265	310	415	420
Dental	1,350	1,230	1,110	820	725	785	825	850	815	800
Electronics	2,550	2,075	1,990	2,160	670	760	900	920	970	1,065
Jewellery	260	235	235	255	240	270	260	930	1,430	995
Other	140	115	110	60	65	90	140	290	485	140
Total Demand	**7,580**	**8,600**	**9,370**	**8,960**	**6,760**	**4,840**	**5,430**	**6,560**	**7,355**	**6,635**
Movements in Stocks	**(330)**	**(200)**	**(1,310)**	**(1,160)**	**560**	**410**	**1,020**	**2,020**	**1,050**	**1,425**
Average price (US$)	**178**	**284**	**358**	**681**	**603**	**337**	**201**	**230**	**201**	**320**





Palladium Demand by Application: Regions

'000 oz	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Europe										
Autocatalyst: gross	1,100	1,370	1,530	1,900	1,730	1,370	1,220	1,105	975	865
recovery	(5)	(5)	(10)	(15)	(30)	(45)	(70)	(110)	(165)	(220)
Chemical	70	65	65	95	65	70	65	70	155	165
Dental	260	210	180	100	50	55	70	80	75	75
Electronics	340	270	255	265	35	85	85	115	80	100
Jewellery	50	50	50	45	35	35	35	35	35	40
Other	25	25	25	20	20	15	20	25	20	20
Total	**1,840**	**1,985**	**2,095**	**2,410**	**1,905**	**1,585**	**1,425**	**1,320**	**1,175**	**1,045**
Japan										
Autocatalyst: gross	245	480	600	510	505	520	550	635	660	795
recovery	(45)	(50)	(55)	(50)	(40)	(40)	(40)	(40)	(30)	(30)
Chemical	20	20	20	20	20	20	25	25	25	25
Dental	620	590	545	470	475	505	515	520	475	450
Electronics	1,390	1,060	980	990	260	140	225	235	265	280
Jewellery	110	105	105	150	140	165	160	155	145	130
Other	10	10	10	15	10	10	5	10	10	10
Total	**2,350**	**2,215**	**2,205**	**2,105**	**1,370**	**1,320**	**1,440**	**1,540**	**1,550**	**1,660**
North America										
Autocatalyst: gross	1,680	2,820	3,490	2,805	2,375	640	1,205	1,445	1,430	1,470
recovery	(105)	(115)	(125)	(155)	(200)	(260)	(270)	(345)	(390)	(500)
Chemical	70	70	75	65	75	75	70	85	85	80
Dental	415	390	350	230	190	215	225	235	250	260
Electronics	550	460	405	485	250	210	215	185	195	190
Jewellery	10	10	10	10	10	10	10	10	20	40
Other	55	55	50	5	15	45	95	230	435	85
Total	**2,675**	**3,690**	**4,255**	**3,445**	**2,705**	**925**	**1,540**	**1,845**	**2.025**	**1,625**
Rest of the World (inc. China)										
Autocatalyst: gross	175	220	260	425	480	520	475	605	800	885
recovery	(5)	(5)	(5)	(10)	(10)	(25)	(30)	(35)	(40)	(50)
Chemical	80	75	80	75	90	90	105	130	150	150
Dental	55	40	35	20	10	10	15	15	15	15
Electronics	270	285	350	420	125	325	375	385	430	495
Jewellery	90	70	70	50	55	60	55	730	1,230	785
Other	50	25	25	20	20	20	20	25	20	25
Total	**715**	**710**	**815**	**1,000**	**770**	**1,000**	**1,015**	**1,855**	**2,605**	**2,305**

Rhodium Supply and Demand										
'000 oz	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Supply										
South Africa	377	400	410	457	452	490	544	587	627	690
Russia	240	110	65	290	125	90	140	100	90	95
North America	16	16	18	17	23	25	26	17	20	20
Others	3	4	8	3	4	10	14	16	17	19
Total Supply	**636**	**530**	**501**	**767**	**604**	**615**	**724**	**720**	**754**	**824**
Demand by Application										
Autocatalyst: gross	418	483	509	793	566	599	660	758	829	868
recovery	(49)	(57)	(65)	(79)	(88)	(99)	(124)	(140)	(137)	(170)
Chemical	36	31	34	39	44	39	39	43	48	48
Electrical	9	6	6	7	6	6	6	8	10	9
Glass	43	34	35	42	41	37	26	46	57	60
Other	10	10	9	10	10	10	13	14	20	22
Total Demand	**467**	**507**	**528**	**812**	**579**	**592**	**620**	**729**	**827**	**837**
Movements in Stocks	**169**	**23**	**(27)**	**(45)**	**25**	**23**	**104**	**(9)**	**(73)**	**(13)**
Average price (US$)	**299**	**617**	**907**	**1,998**	**1,604**	**838**	**530**	**986**	**2,056**	**4,552**

NOTES TO TABLES

Supply figures are estimates of sales by the mines of primary pgm.

With the exception of the autocatalyst sector, **demand** estimates are net figures: demand in each sector is total purchases by consuming industries less any sales back to the market. Annual totals therefore represent the amount of primary metal that is acquired by consumers in a particular year. We continue to report Russian supply figures net of Russian and ex-CIS states' demand. **Movements in stocks** in a given year reflect changes in stocks held by fabricators, dealers, banks and depositories but excluding stocks held by primary refiners and final consumers. A positive figure indicates an increase in stocks; a negative figure indicates a rundown in stocks. **Gross autocatalyst demand** is purchases of pgm by the auto industry for manufacture of catalytic converters. **Autocatalyst recovery** is pgm recovered from scrapped catalytic converters and is allocated to the region in which the converter was scrapped. **Investment: small** refers to the long-term holding of metal in the form of coins and bars weighing 10 oz or less. **Investment: large** is in the form of 500g and 1 kg bars in Japan and includes platinum held on account for subscribers to accumulation plans.

GLOSSARY

BEE	*Black Economic Empowerment*
CIS	*Commonwealth of Independent States*
CO	*Carbon Monoxide*
CSF	*Catalysed Soot Filter*
DMFC	*Direct Methanol Fuel Cell*
DOC	*Diesel Oxidation Catalyst*
DPF	*Diesel Particulate Filter*
ETF	*Exchange Traded Fund*
g	*Gram*
HC	*HydroCarbons*
HDD	*Heavy Duty Diesel*
HIC	*Hybrid Integrated Circuit*
kg	*Kilograms*
LCD	*Liquid Crystal Display*
Merensky	*A platiniferous ore body in South Africa*
MLCC	*Multi-Layer Ceramic Capacitor*
NOx	*Oxides of nitrogen*
NYMEX	*New York Mecantile Exchange*
OBD	*On-Board Diagnostics*
oz	*Ounces troy*
PDP	*Plasma Display Panels*
PEMFC	*Proton Exchange Membrane Fuel Cell*
PET	*PolyEthylene Terephthalate*
pgm	*Platinum Group Metal(s)*
Platreef	*A platiniferous ore body in South Africa*
PM	*Particulate Matter*
PMR	*Perpendicular Magnetic Recording*
ppm	*Parts Per Million*
ppt	*Parts Per Thousand*
PTA	*Purified Terephthalic Acid*
SCR	*Selective Catalytic Reduction*
SUV	*Sports Utility Vehicle*
TOCOM	*Tokyo Commodity Exchange*
ton	*Short ton (2,000 pounds or 907 kg)*
tonne	*1,000 kg*
TWC	*Three-Way Catalyst*
UG2	*A platiniferous ore body in South Africa*
ULEV	*Ultra Low Emissions Vehicle*
VAM	*Vinyl Acetate Monomer*

NOTE ON PRICES

All prices are quoted per oz unless otherwise stated.

R	*South African Rand*
£	*UK Pound*
$	*US Dollar*
¥	*Japanese Yen*
€	*Euro*
RMB	*Chinese Renminbi*

PICTURE CREDITS

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