



U.S. Bureau of Mines



MINERAL INDUSTRY SURVEYS

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Platinum, Quarterly

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PLATINUM-GROUP METALS IN THE THIRD QUARTER 1988

There were no major changes in the production, stocks, sales, or prices of platinum-group metals in the third quarter, according to the Bureau of Mines, U.S. Department of the Interior.

Two new platinum coins, the Australian Koala and the Canadian Maple Leaf, were marketed in North America. Both were 99.95%-pure platinum and considered legal tender. They were available in weights of 1 ounce, 1/2 ounce, 1/4 ounce, and 1/10 ounce.

An interesting article on catalytic converter technology appeared in the July/August issue of Materials Edge. The article mentioned that the four manufacturing centers for ceramic monoliths used in converters are in the United States, Japan, the Federal Republic of Germany, and Belgium. Corning Glass owns the plants in the United States and the Federal Republic of Germany, and NGK Insulators of Japan owns the plants in Japan and Belgium. While ceramic monolith supports are widely used, metal monolith supports are being studied because of their better resistance to thermal shock and higher mechanical strength. On the subject of autocatalyst coatings, the article mentions the increasing importance of rare earth metals such as cerium and lanthanum. Cerium and lanthanum are added along with platinum and rhodium to help with thermal stability and to improve the performance of rhodium in three-way catalytic converters. Lanthanum used with palladium is being studied as a substitute for platinum and rhodium in three-way catalytic converters by Toyota in Japan.

Table 1. - Platinum-group metals 1/ refined in the United States
(Troy ounces)

Period	Platinum	Palladium	Iridium	Osmium	Rhodium	Ruthenium	Total
1987:							
Nontoll-refined:							
First quarter--	40,360	74,341	31	---	414	160	115,306
Second quarter--	36,635	52,252	49	281	2,637	224	92,078
Third quarter--	38,555	48,983	5	125	471	750	88,889
Fourth quarter--	40,534	46,978	25	150	1,161	445	89,293
Total 2/-----	38,971	125,446	115	604	3,944	1,567	170,647
=====							
Toll-refined:							
First quarter--	200,049	90,992	5,605	380	10,846	8,070	315,942
Second quarter--	162,616	149,460	393	6	12,842	12,443	337,760
Third quarter--	166,508	138,143	1,154	220	11,859	5,505	323,389
Fourth quarter--	169,821	136,007	1,011	190	9,623	10,912	327,564
Total 2/-----	725,961	616,311	3,269	796	60,930	37,430	1,444,697
=====							
1988:							
Nontoll-refined:							
First quarter--	r/6,756	26,557	10	---	847	---	r/34,170
Second quarter--	10,094	50,623	89	12	1,459	14	62,291
Third quarter--	9,926	33,452	30	12	308	4	43,732
Toll-refined:							
First quarter--	199,008	151,623	1,378	190	21,459	1,490	375,148
Second quarter--	175,981	173,805	1,181	r/19	18,269	8,089	r/377,344
Third quarter--	194,374	167,419	2,263	244	17,221	2,768	384,289

r/Revised.

1/Typically, about 99.8% of the platinum and 99% of the palladium are secondary metal; the other metals are entirely secondary.

2/Includes data for companies reporting annually; quarterly figures not adjusted.

Platinum & Palladium Production Toll-Refined Plus Nontoll-Refined

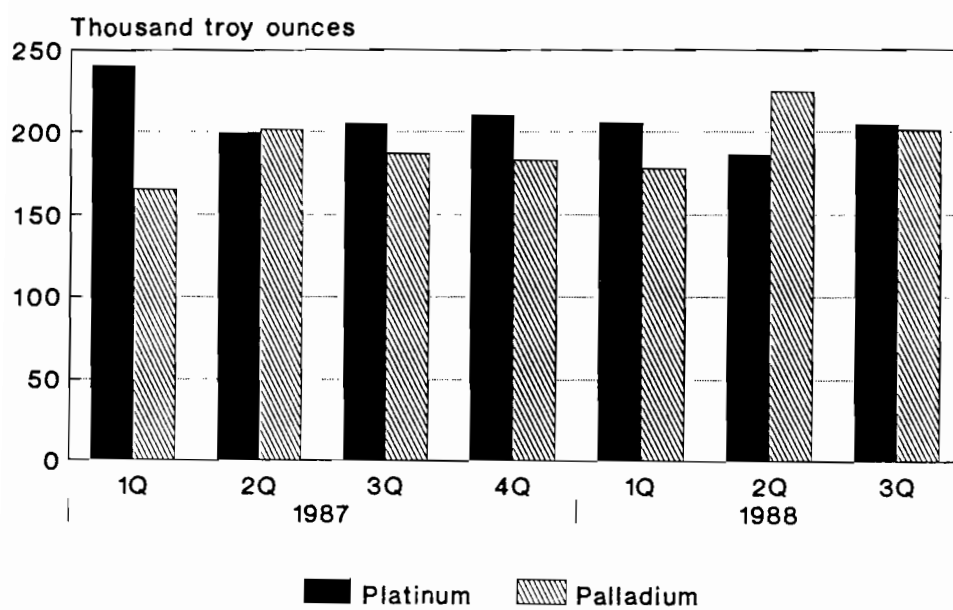


Table 2. - Stocks of platinum-group metals held by refiners, importers,
and dealers in the United States 1/
(Troy ounces)

Period	Platinum	Palladium	Iridium	Osmium	Rhodium	Ruthenium	Total
1987:							
Mar. 31-----	r/588,869	r/391,493	18,769	247	35,329	18,015	r/1,052,722
June 30-----	r/556,056	r/415,314	16,610	184	26,389	21,052	r/1,035,605
Sept. 30-----	r/590,204	r/407,830	17,259	59	26,865	18,255	r/1,060,472
Dec. 31-----	r/522,436	r/477,420	16,221	36	27,055	17,488	r/1,060,656
Yearend 2/----	611,000	558,005	16,275	36	32,018	17,653	1,234,987
=====							
1988:							
Mar. 31 -----	521,402	560,786	15,047	7	26,975	20,018	1,144,235
June 30-----	515,701	581,415	15,438	58	29,849	30,416	1,172,877
Sept. 30-----	457,435	579,421	16,818	140	29,695	18,987	1,102,496

r/Revised.

1/Includes metals in depositories of the New York Mercantile Exchange; on Sept. 3, 1988 comprised 179,050 ounces of platinum and 127,200 ounces of palladium.

2/Includes data from companies reporting annually; quarterly figures not adjusted.

Table 3. - Platinum-group metals sold to consuming industries in the United States
(Troy ounces)

Period and industry	Platinum	Palladium	Iridium	Osmium	Rhodium	Ruthenium	Total
1987:							
Automotive 1/--	605,000	160,000	55	---	63,000	---	828,055
Chemical-----	61,719	34,682	884	---	3,446	2,242	102,973
Dental and medical-----	15,387	333,601	3,252	919	334	341	353,834
Electrical-----	58,545	318,301	882	---	5,775	24,857	408,360
Glass-----	9,157	---	55	---	1,772	24	11,008
Jewelry and decorative---	5,706	7,099	626	---	7,391	259	21,081
Petroleum-----	23,773	41,344	---	---	---	---	65,117
Miscellaneous--	45,962	100,239	2,330	---	4,823	630	153,984
Year-----	825,249	995,266	8,084	919	86,541	28,353	1,944,412
=====							
1988:							
First quarter:							
Automotive 1/--	153,000	40,000	11	---	16,000	---	209,011
Chemical-----	7,074	4,052	110	---	629	650	12,515
Dental and medical-----	2,403	51,058	804	179	72	80	54,596
Electrical-----	17,580	68,323	135	---	552	8,418	95,008
Glass-----	2,154	---	11	---	379	6	2,550
Jewelry and decorative---	1,900	601	124	---	161	56	2,842
Petroleum-----	10,810	3,926	---	---	---	---	14,736
Miscellaneous--	18,182	24,294	288	---	1,037	22	43,823
Total-----	213,103	192,254	1,483	179	18,830	9,232	435,081
=====							
Second quarter:							
Automotive 1/--	172,000	45,000	408	---	19,000	---	236,408
Chemical-----	13,783	27,643	463	---	663	8,057	50,609
Dental and medical-----	2,065	63,381	11	59	33	35	65,584
Electrical-----	20,332	92,585	111	---	892	6,604	120,524
Glass-----	2,436	100	---	---	664	8	3,208
Jewelry and decorative---	2,404	1,849	152	---	1,607	95	6,107
Petroleum-----	7,629	1,101	1,000	---	45	---	9,775
Miscellaneous--	13,220	42,091	408	8	7,368	1,992	65,087
Total-----	233,869	273,750	2,553	67	30,272	16,791	557,302

See footnote at end of table.

Table 3. - Platinum-group metals sold to consuming industries in the United States (continued)
(Troy ounces)

Period and industry	Platinum	Palladium	Iridium	Osmium	Rhodium	Ruthenium	Total
Third quarter:							
Automotive 1/--	132,000	35,000	---	---	14,000	---	181,000
Chemical-----	32,725	31,038	1,829	---	1,092	7,283	73,967
Dental and							
medical-----	3,107	64,846	7	405	33	38	68,436
Electrical-----	37,104	96,165	3,499	---	1,112	6,091	143,971
Glass-----	6,150	250	---	---	731	17	7,148
Jewelry and							
decorative---	4,883	2,893	190	---	1,764	173	9,903
Petroleum-----	9,199	380	2	---	---	---	9,581
Miscellaneous--	23,037	45,602	129	2	7,277	1,058	77,105
Total-----	248,205	276,174	5,656	407	26,009	14,660	571,111

1/Platinum, palladium, and rhodium sales to the automotive industry are estimated based on U.S. light truck sales and U.S. automobile production.

Platinum & Palladium Consumption Sales to Industry

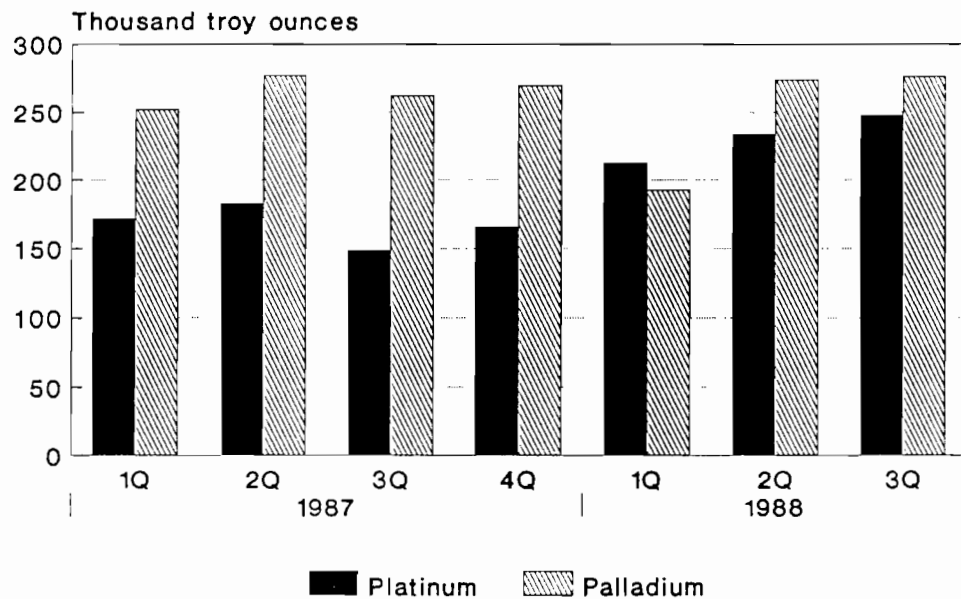


Table 4. - U.S. imports for consumption of platinum-group metals
(Troy ounces and thousand dollars)

Period and country	Unwrought									
	Platinum grains and nuggets	Platinum sponge	Palla- dium	Iri- dium	Os- mium	Osmiri- dium	Rho- dium	Ruthe- nium	Unspecified combinations	PGM from precious metal ores
1987:										
First quarter	11	328,761	391,072	2,728	394	5,800	54,665	17,264	1,645	139
Second quarter	419	213,759	347,020	1,439	1,043	---	38,512	26,249	3,007	818
Third quarter	62	266,949	368,861	5,033	370	---	60,375	16,947	644	120
Fourth quarter	329	314,549	422,208	2,614	241	---	57,914	23,939	2,687	712
Total	821	1,124,018	1,529,161	11,814	2,048	5,800	211,466	84,399	7,983	1,789
1988:										
First quarter	874	309,579	372,186	2,863	400	---	44,856	19,810	---	25
Second quarter:										
Belgium	---	16,050	37,704	---	---	---	323	---	---	---
Canada	---	30	15,092	---	---	---	20	---	---	---
Colombia	3,300	3,600	---	---	---	---	---	---	---	---
Germany, Federal Republic of	---	20,154	4,779	16	---	---	513	240	---	---
Hong Kong	---	1,964	21,350	---	---	---	570	---	---	---
Japan	---	---	3,537	---	---	---	---	---	---	---
Mexico	---	---	---	---	---	---	---	---	---	---
Netherlands	---	5,717	8,196	---	---	---	1,213	---	4	---
South Africa, Republic of	---	236,835	138,835	1,770	400	---	27,641	44,241	---	---
Sweden	---	---	---	---	---	---	---	---	---	---
Taiwan	---	---	4,500	---	---	---	---	---	---	---
United Kingdom	---	54,303	55,629	---	---	---	3,084	439	---	---
U.S.S.R.	---	5,261	65,063	---	---	---	5,042	---	---	---
Other	64	2,000	280	---	---	---	191	50	14	---
Total	3,364	345,914	354,965	1,786	400	---	38,597	44,970	18	---

Table 4. - U.S. imports for consumption of platinum-group metals (continued)
(Troy ounces and thousand dollars)

Period and country	Unwrought Sweepings, waste and scrap	Semimanufactured					PGM in materials not elsewhere specified	Total	
		Plati- num	Palla- dium	Iri- dium	Rho- dium	Unspecified combinations		Quantity	Value
1987:									
First quarter	173,381	7,194	33,917	---	---	3,875	20	1,020,866	\$336,397
Second quarter	99,024	13,522	31,011	36	669	---	208	776,736	252,309
Third quarter	181,954	13,739	27,358	---	160	3	---	942,575	330,535
Fourth quarter	170,557	11,349	59,213	29	---	---	29	1,066,370	320,843
Total	624,916	45,804	151,499	65	829	3,878	257	3,806,547	1,240,080
1988:									
First quarter	126,105	3,647	43,383	1,300	---	5	60	925,093	283,919
Second quarter:									
Belgium	911	---	---	---	---	---	27	55,015	15,639
Canada	35,291	891	---	103	---	---	---	51,427	13,129
Colombia	---	---	---	---	---	---	---	6,900	1,649
Germany, Federal Republic of	101	---	---	---	---	---	---	25,803	13,859
Hong Kong	24,886	---	---	---	---	---	---	48,770	5,582
Japan	---	---	---	---	---	---	---	3,537	597
Mexico	61,188	---	---	---	---	---	---	61,188	353
Netherlands	---	---	---	---	---	---	---	15,130	4,803
South Africa, Republic of	---	---	---	---	---	---	---	449,722	181,832
Sweden	5,369	---	---	---	---	---	---	5,369	3,813
Taiwan	12,943	---	---	---	---	---	---	17,443	2,051
United Kingdom	11,045	14,676	25,054	980	13	1	---	165,224	55,784
U.S.S.R.	---	965	14,700	---	---	---	---	91,031	19,806
Other	4,670	---	500	---	---	---	---	7,769	2,008
Total	156,404	16,532	40,254	1,083	13	1	27	1,004,328	320,905

Source: Bureau of the Census.

Table 5. - U. S. exports of platinum-group metals
(Troy ounces and thousand dollars)

Period	Ores and concentrates	Waste, scrap, and sweepings	Metal not rolled			Metal rolled			Total	
			Platinum	Palladium	Other platinum-group	Platinum	Other platinum-group	Quantity	Value	
1987:										
First quarter-----	1,111	50,532	12,873	23,535	30,231	4,491	10,642	133,415	\$41,458	
Second quarter-----	266	82,861	13,765	46,814	49,223	1,861	3,260	198,050	71,841	
Third quarter-----	1,343	87,732	16,016	65,818	27,050	427	2,189	200,575	54,381	
Fourth quarter-----	2,810	50,072	39,695	47,830	33,605	1,080	1,165	176,257	57,285	
Total-----	5,530	271,197	82,349	183,997	140,109	7,859	17,256	708,297	224,969	
1988:										
First quarter-----	650	44,985	98,364	105,523	21,352	2,821	760	274,455	85,569	
Second quarter:										
Australia-----	---	---	14,400	---	---	---	72	14,472	10,207	
Belgium-----	---	4,992	---	432	1,196	---	---	6,620	2,254	
Canada-----	1,521	5,271	8,969	1,948	1,430	1,105	1,680	21,924	9,701	
China-----	---	---	3,008	1,382	214	---	117	4,721	1,991	
Dominican Republic-----	---	---	6	---	---	1,493	---	1,499	313	
France-----	---	838	---	56	104	200	53	1,251	240	
Germany, Federal Republic of-----	---	4,596	18	2,422	7,453	12	1,169	15,670	5,323	
Hong Kong-----	---	---	---	361	283	26	2	672	153	
Israel-----	---	---	---	38	121	---	2	161	31	
Italy-----	---	---	---	---	510	---	---	510	194	
Japan-----	225	724	47,051	11,538	3,904	---	1,436	64,878	29,190	
Korea Republic of-----	84	---	---	221	792	25	---	1,122	260	
Netherlands-----	---	---	---	7,791	39	---	---	7,830	1,765	
Singapore-----	---	---	---	801	102	---	---	903	223	
Sweden-----	---	1,581	---	32	534	---	---	2,147	661	
Switzerland-----	---	---	---	426	2,217	---	48	2,691	1,581	
Taiwan-----	---	---	---	3,428	749	---	---	4,177	1,294	
United Kingdom-----	37	38,307	3,410	19,007	6,674	---	300	67,735	16,603	
Other-----	---	102	13	706	3,410	100	52	4,383	508	
Total-----	1,867	56,411	76,875	50,589	29,732	2,961	4,931	223,366	82,492	

Source: Bureau of the Census.

Table 6. - Monthly average producer and dealer prices of platinum-group metals 1/
(Dollars per troy ounce)

	Platinum		Palladium		Rhodium		Iridium		Ruthenium	Osmium
	Pro- ducer	Dealer	Pro- ducer	Dealer	Pro- ducer	Dealer	Pro- ducer	Dealer	Dealer	Dealer
1987:										
January-----	600	515	150	123	1,200	1,124	600	397	74	650
February-----	600	515	150	120	1,200	1,180	600	394	71	650
March-----	600	525	150	123	1,200	1,157	600	384	71	650
April-----	600	585	150	136	1,200	1,201	600	375	72	626
May-----	600	605	150	145	1,200	1,245	600	384	72	625
June-----	600	565	150	137	1,220	1,225	600	379	72	625
July-----	600	568	150	140	1,275	1,230	507	345	67	632
August-----	600	608	150	140	1,275	1,273	600	350	68	650
September-----	600	586	150	137	1,275	1,272	420	354	68	650
October-----	600	564	150	129	1,275	1,270	420	332	68	650
November-----	600	494	150	111	1,275	1,246	420	330	67	600
December-----	600	500	150	121	1,275	1,243	420	335	67	590
Average-----	600	553	150	130	1,239	1,222	532	363	70	633
1988:										
January-----	600	492	150	124	1,275	1,187	420	333	67	602
February-----	600	452	150	119	1,275	1,238	420	326	65	610
March-----	600	491	150	121	1,275	1,235	420	310	62	603
April-----	600	492	150	124	1,275	1,230	420	315	62	509
May-----	600	545	150	122	1,275	1,231	420	310	60	580
June-----	600	576	150	127	1,275	1,266	420	309	61	590
July-----	600	543	150	124	1,275	1,185	420	304	65	625
August-----	600	529	150	124	1,275	1,214	420	302	45	625
September-----	600	529	150	124	1,275	1,218	420	305	67	625
Average-----	600	517	150	123	1,275	1,210	420	313	60	597

1/Average prices calculated at the low end of the range and rounded to the nearest dollar.

Source: Metals Week.