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Gone Platinum: Contraband and Chemistry in Eighteenth-Century Colombia

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This article examines the strange career of platinum, an element first identified in colonial Colombia. Around the turn of the eighteenth century, a high-grade platinum alloy, nicknamed 'platina,' appeared alongside gold dust in the alluvial mines of Colombia's Pacific lowlands and quickly caused problems for mine owners, merchants, and the Spanish Crown. The silvery metal was impossible to melt with available technology, and was therefore considered useless, but since it was dense, shiny, and did not oxidize it could be passed off as low-grade gold to unsuspecting merchants. Crown officials lashed out at slaves and free people of color for using *platina* to debase gold dust in petty exchanges, but they were not the only ones. Records show that mine owners and itinerant traders regularly added raw platinum to gold ingots, creating difficulties at Bogotá's royal mint.

Crown attempts to forbid platinum mining and circulation grew more elaborate until the mid-eighteenth century, when scientists in England, Sweden, and other parts of Europe began to experiment with the mystery metal and publish results. They had reportedly received bits of *platina* mixed with gold dust from Spanish merchants in Cartagena de Indias, but more importantly via the contraband slave trade to the Atrato River, on Colombia's Caribbean coast near the Isthmus of Panama. The story of how platinum went from object of loathing to scientific sensation in the course of the eighteenth century illuminates some of the darker corners of the Spanish Enlightenment, both on the Peninsula and in the American colonies. It also shows how clandestine exchanges between subjects of clashing empires, including enslaved Africans and budding tinkerer-scientists, could have unexpected consequences at both ends of the 'commodity chain.'

The early history of platinum is frequently glossed by historians of science, but without noticeable interest in its shifting cultural significance or close ties to slavery and the transatlantic slave trade. Almost nothing is said of its Colombian context,

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either with regard to production or experimentation. Instead, platinum's 'discovery' is usually folded into the familiar story of the phoenix-like rise of Lavoisian chemistry from alchemy's ashes. (It was in fact Antoine Lavoisier who first fused platinum using an oxygen-enriched torch in 1782 thanks to Joseph Priestley's timely discovery of that gaseous element.) Platinum in this narrative was just one of nature's many puzzles, like smallpox or electromagnetism, to be solved piecemeal by laboratory-equipped Europeans, plus a few token 'Americans,' such as Benjamin Franklin. It was a heroic tale of individual perseverance and intense, race-like competition, but equally important was the circulation of published results that marked the emergence of a genuine, transnational scientific community. State sponsorship also played a key role in solving the platinum puzzle.

Some Spanish historians of science have lately attempted to highlight Iberian contributions to eighteenth-century platinum metallurgy (Capitán Vallvey 1999; Pero-Sanz et al. 1999; Romero 1995), but the documentary evidence reviewed below suggests that foreigners made the major breakthroughs, both in the colonies and in Spain. Only Colombian historian Rodolfo Segovia Salas (1960) has treated the story of platinum's European 'discovery' in the specific context of New Granadan mining and trade reforms. He considered it a glaring example of Spain's failure to capitalize on colonial resources and 'useful knowledge' in the late Bourbon era. Apparently unaware of this earlier work, Capitán Vallvey (1994) largely repeated Segovia Salas. In a different vein, historian William Sharp (1976) treated platinum mostly as an impurity plaguing New Granada's late colonial smelteries and mints, although he did examine gold mining and contraband trade in detail.

Documents in Colombia and Spain, along with contemporary published materials from England, Italy, and elsewhere, suggest the relationships among platinum, its (often enslaved) producers, the Spanish state, contraband traders, and European scientists were manifold and unstable. This article examines several of these shifting relationships in search of insights on global commodity exchanges in an era that witnessed both the florescence of experimental science and the emergence of neoclassical economics, with its radical critique of tariffs and monopolies. A less uplifting and perhaps intentionally ignored thread of the story regards slavery and the transatlantic slave trade. Platinum's comet-like appearance after 1700 owed much to the expansion of both institutions, not in the context of the Enlightenment search for knowledge in exotic, equatorial locations (Safier 2008), but rather in the more prosaic and desperate search for gold. Whatever we might make of platinum's links to slavery, the simple fact that it was enslaved Africans and their descendants who prospected for and mined one of the substances that reoriented Enlightenment science is itself worth acknowledging.

This essay also argues that platinum, precisely because it was new and unknown in an age torn between calculative reason and baroque social constraints, acted simultaneously as priced commodity and 'priceless' gift. As a gift, specifically as a unique product of nature drawn from the king of Spain's much-envied overseas patrimony, it served as an object of mutuality, or extension of friendship, rather than

market exchange. The king's generosity with such rarities as American platinum could only affirm his superiority among the monarchs of Europe. Although as will be seen some Spanish scientists and ministers disagreed, from the royal perspective the idea of selling platinum for profit in such a context of mutuality was crass anathema. Put bluntly, the king sought to collect 'his' platinum by fiat so that he could judiciously give it away.

Closer to platinum's American source, by contrast, contraband traders fought with agents of the Spanish state to transform the white metal into a marketable commodity like any other, one with a free-floating price rather than a fixed royal bounty. Even closer to the source, and as an unintended result of this struggle to meet and profit from growing demand, enslaved Africans began to collect platinum in order to 'illegally' purchase their freedom or that of their loved ones by trading it at a premium to contrabandists for silver coin. In the course of the eighteenth century, an increasing number of free people of color, including some of the colony's most expert prospectors, also traded platinum to outsiders on the sly. Partly in recognition of their special expertise as finders, Crown officials eventually allowed these free-lance prospectors, known locally as *mazamorreros*, to pay tributes in *platina*. By the mid-eighteenth century, many Colombian *mazamorreros* were free women of color. Some proved quite belligerent in the face of Crown mandates, and several in Antioquia Province participated in the Comunero Rebellion of 1781. It should be kept in mind that gold was similarly traded, and was always more sought after, yet platinum was unique in the eighteenth century in that no one could agree as to how much it was worth, or even what use it might have.

The Eighth Metal

As historians of chemistry routinely note, the word 'platinum' derives from *platina*, a Spanish term meaning roughly 'silvery,' or 'little silver.' Though silvery in color, raw platinum grains also resemble iron, especially in hardness. In notary documents dating as far back as the sixteenth century, a common type of iron imported to Spanish America from the Basque Country was described as 'fierro en platina' or 'hierro platina' (e.g., ANE PN 1:9, f. 246, ACC Signatura 1622). Some of this may have been platen iron ('platinas de fierro,' ANE Popayán 59, 15-I-1734, f. 22), a specific type of flat bar still sold by steel manufacturers, but other 'hierro platina' from the eighteenth century was shipped in sacks, and appears to have been powdered or granular solder used by blacksmiths (e.g., ANE Popayán 39, 17-VI-1716, f. 40; ANE Popayán 232, 27-II-1785). Alluvial *platina* could be said to mimic un-oxidized granular iron, and it is sometimes ferromagnetic.

Origins aside, the word 'platina' was not applied to alluvial platinum until around 1700, at least according to surviving documents. An earlier name was 'Juan Blanco,' or 'John White,' a generic term for fool's gold, most often iron pyrite (Lane 2002, 169–72). The earliest unequivocal published reference to raw platinum, allegedly found in Spanish smelteries 'between Mexico and Darien,' appears in the writings of

Italian humanist and physician Julius Caesar Scaliger (1557, 134v). Scaliger, who probably never saw *platina* firsthand, wrote in Latin and used the classical term 'aurichalcum,' suggesting the lost white gold alloy of Atlantis. A similar term for platinum was 'oro blanco,' although this appears to have been commonly used only after 1750 or so, primarily in Europe (anon. 1758; Llano Zapata 1761–1764).

Platinum is next to gold on the periodic table of elements, and like gold, it does not readily oxidize and occurs in alluvial deposits in nearly pure form (usually with trace admixtures of so-called platinum-group metals such as rhodium and iridium, but sometimes also with up to ten percent iron). Platinum ore, or *platina*, appears as a silver (or iron)-like substance in the gold pan, and is not easily separated from gold particles by gravitational methods. Spanish scientists sometimes called it 'platina del pinto,' which was likely a borrowed miner's reference to its tendency to 'paint' alongside gold in the pan. The phrase 'se pinta en la batea' appears in eighteenth-century documents from the Colombian mines, and is still used in the Chocó today (the often-repeated claim that 'Pinto' refers to a river is not supported by the documents). Platinum is considerably scarcer than gold in the earth's crust, and appears to have been unknown in Antiquity (McDonald and Hunt 1982). Unlike gold, platinum is quite hard in its partly alloyed, alluvial state, and its melting point is more than 700°C higher than gold, at 1774°C.

Amazingly, pre-Columbian goldsmiths living along the Pacific coast near the present-day border between Colombia and Ecuador managed to fashion platinum-alloy masks and jewelry using simple blowpipe technology at least 2,000 years ago (Bergsøe 1937; Bray 1988; Scott 1992; Scott and Bray 1980, 1994). Their techniques, while falling short of genuine platinum fusion, were highly sophisticated. Many fine pieces, usually setting gold sheets or filigree work against the silvery platinum alloy, are housed in Ecuador's Central Bank Museum in Quito. No other ancient or medieval culture seems to have known or worked with platinum, and by the time the Spanish arrived in the largely jungle Chocó region of northwestern South America in the early sixteenth century, native American methods of platinum sintering (roughly, welding *platina* particles with gold and burnishing) were apparently lost.

Platinum's sudden appearance on the Atlantic stage after1740 can be traced to two seemingly unrelated trends: (1) the ballooning contraband slave trade along Colombia's Caribbean shores, mostly in the hands of English and Dutch interlopers based in Jamaica and Curaçao, and (2) the speedy advance of Enlightenment science, specifically modern chemistry, in Europe. The white metal's existence was first publicized by Antonio de Ulloa in his and Jorge Juan's widely translated *Relación histórica del viaje a la América Meridional*, and Ulloa is still widely credited with its 'discovery' (Juan and Ulloa 1748, 166; Moreno 1995). Despite this claim, the substance *platina* (which Ulloa thought a kind of corrosion or highly resistant coating found on certain types of placer gold, not a new metal) had been known in the colonies for many years. *Platina*, as will be seen, had already circulated among

curious colonial jewelers, mint-masters, and scientists, and notable experiments had been carried out.

But it was truly thanks to Ulloa that by 1750 European savants were arguing vehemently as to whether or not *platina* was—or contained in some refractory form—'the eighth metal' (or 'seventh,' not counting mercury). Deniers thought it electrum, or 'aurichalcum' (Scaliger's scholastic guess from the 1550s), or an unknown alloy of gold and iron (Howe 1897; Llano Zapata 1761–1764). Members of Europe's many royal societies and academies begged Spain's kings and ambassadors for samples of *platina* to supply their cabinets and laboratories, and as early as 1757 their requests were met, usually in exchange for mineral samples to fill Spain's own Royal Cabinet, set up in 1752 by Ferdinand VI (AGI Santa Fe 835). In the 1760s, experimenters proposed that platinum compounds might be used to make dyes, but Bourbon interest in *platina*'s potential utility—an empire-wide obsession by the time of Charles III—seems to have been largely muted by its already bad reputation for poisoning the Crown's lifeblood, its bullion supply.

Elsewhere in Europe, in part thanks to Ulloa's brief observation, it was New Granadan *platina* that helped turn the tide of Enlightenment science in favor of elemental chemistry. Prodded by native sons who had studied abroad, Spain's kings eventually adopted the state-sponsored 'research and development' model of applied, imperial science found elsewhere. A platinum laboratory, or *casa de la platina*, was established in Madrid in 1786, in the last years of Charles III's reign, and in the last years of the French Revolution, the newly isolated and purified metallic element was used to manufacture the similarly new standard meter and kilogram. In the first decades of the nineteenth century, platinum was produced and sold by British and North American entrepreneurs for use as a catalyst and as a material for making corrosion-resistant crucibles, mirrors, flash-pans (for guns), and watch parts. New deposits of raw *platina* were finally discovered in Russia in 1819, ending Spain's unofficial monopoly.

Like many minerals, platinum is a product of the periphery, defined here first as the Americas in a Eurasia-centered world-system, and secondly, as a backwater within the colonies themselves. Platinum was found only in a few sparsely populated riverbeds in jungle lowlands wetter than the Amazon. Fearing malaria, dysentery, and other diseases, as well as snakebites, even low-ranking government officials were loath to visit these diggings. Platinum was found, in short, at the periphery of the periphery. To go further in the direction of Immanuel Wallerstein's original definition of peripheries as dependent, single-commodity, 'southern,' forced labor zones (Wallerstein 1974), platinum was produced until the mid-nineteenth century in the lowland tropics of Colombia by enslaved African mineworkers and their descendants. Yet platinum mining was not quite 'monoculture.' No one appears to have specialized solely in platinum mining. It was instead recovered alongside gold, which remained far more desirable. Even so, platinum was a 'typical' colonial product in that it was a primary, or raw, commodity produced by forced laborers at the tropical fringe.

Platinum Production

Francisco Pizarro was only one of many Spaniards to founder in the vast Chocó region that stretches from eastern Panama to northern Ecuador. Indeed, thanks to fierce indigenous resistance and rugged, densely forested terrain, the conquest of Colombia's Pacific lowlands was delayed by more than a century. Spanish interlopers, most of them highland creoles, first broke through in the south, not far from the Ecuadorian border, in the first decades of the seventeenth century. Settlers in search of what one expedition leader called 'ríos de oro' invaded the Pacific lowlands from highland towns such as Pasto, Popayán, and Cali (AGI Quito 16:38). Medellín was not yet a place of significance, although nearby Santa Fe de Antioquia served as a base for numerous seventeenth-century *entradas* into the northern Chocó (West 1952; Williams 2005). A jurisdictional dispute between Antioquia and Popayán, both seats of royal governorships, was resolved in Popayán's favor by the 1680s, with the result that the Chocó's riches mostly accumulated among the elites of Colombia's southwest, seated in the cities of Popayán and Cali. (Several of the republic's early presidents subsequently came from this conservative, slave-owning, gold-mining class.)

The basic pattern of Pacific lowlands conquest in Colombia resembled that of contemporary northern Mexico, another Spanish colonial mining frontier, only here on South America's Pacific rim the objective was gold rather than silver, and the physical environment was considerably wetter and more disease-prone. Colombia's mining frontier also differed in that Africans and their descendants outnumbered indigenous peoples within a few decades of conquest. First to be tamed and transformed from 'Indian country' to 'African country' was the Barbacoas district west of Pasto. After several decades of hard-won fights and one large-scale rebellion by a native group known as the Sindaguas, creole conquerors and indigenous allies established a permanent base at Santa María del Puerto, at the upper tidal limit of the Telembí River, by 1635 (Bryant 2006; Calero 1997; Lane 1996). Platinum occurs here in small amounts, but it is curiously not mentioned in the documents prior to the eighteenth century. It may have been treated, like iron oxide, as a standard miner's nuisance. Next in line for exploitation were the several gold-bearing rivers flowing into the Pacific near the port of Buenaventura, each conquered in turn by the elites of Cali and settled with substantial numbers of enslaved Africans beginning in the 1660s (Romero Vergara 1995, 1997).

Despite very early *entradas* from the Atlantic coast dating to the time of Pedrarias Dávila, the last Pacific rain forest region to fall to highland neo-conquistadors was northeast of Buenaventura, namely the rich San Juan and Atrato headwaters that make up the heart of the modern Department of Chocó (AGI Santa Fe 362; Sharp 1976; Williams 2005). Unlike Barbacoas, which developed its own creole elite class, most of the northern Chocó's conquerors' families remained in Cali and Popayán, where they used gold mining revenues to expand slave-staffed sugar plantations and cattle ranches (Colmenares 1975; 1979). These estates, some of them quite large by

the mid-eighteenth century, differed from those of the Caribbean basin in that they supplied internal rather than export markets. These were not plantations, per se, but rather haciendas and ranchos; gold remained the only significant export, colonial Colombia's sole lifeline to the outside world (Barona 1995).

Highland creoles, often younger men with dim inheritance prospects, petitioned Popayán's and Antioquia's governors and the Audiencias of Quito and Bogotá for licenses, then marched and paddled with slaves and indigenous auxiliaries into the jungle lowlands. After many setbacks, these paramilitary-style intruders learned to more or less efficiently kill, capture, or reduce to encomiendas the numerous indigenous peoples of the rain forest, and to locate principal goldfields. Missionaries, especially Franciscans, were active in the northern Chocó district (Williams 2005), but it appears that only *one* Jesuit was involved in the conquest of Barbacoas, and thereafter even diocesan clerics (*doctrineros*) were rare anywhere south of Buenaventura. A number of regular and secular clergymen ran gold mines in the northern Chocó by the first decades of the eighteenth century, usually on behalf of relatives or widows, and a few priests show up in documents from the Barbacoas and Raposo districts. Amerindians held in encomienda initially mined gold, but were soon replaced by enslaved Africans purchased on credit. Surviving native peoples became suppliers of food, transport, and wooden artifacts, including gold pans and canoes, usually tied into their encomienda obligations (Lane 2000).

Enslaved Africans were supposed to enter the Chocó goldfields via overland routes linking up with the Magdalena and Cauca River systems, which together empty into the Caribbean near Cartagena de Indias, Spanish America's largest official slave market. The other, more obvious point of entry, the Atrato River, was officially closed until 1783, and unofficially controlled until that time by unconquered native groups such as the Cuna Cuna and Citará. Documents show that slaves and merchandise still entered the Chocó this way, however, initially in the hands of quasi-legal French traders and their accomplices during the War of the Spanish Succession (ANE Popayán 37, 12-IV-1715). Another point of entry was eastern Panama, and it was through labyrinthine contraband networks exploited by the English from Portobelo after the 1713 Treaty of Utrecht that many enslaved Africans, most transshipped from Jamaica, entered the Chocó (ANE Popayán 56, 21-X-1731). One maroon community reported near Barbacoas was even known as 'la Nueva Jamaica' (ANE Popayán 53, 13-XII-1728; 78, 22-V-1745, f. 116).

The whole Chocó region, rich in gold and accessible by water from both the Atlantic and Pacific and isolated from all highland and coastal administrative capitals, was a magnet for contraband trade. In simplest form, the trade was gold dust for slaves (Williams 2005, 160–62). The risks were considerable, but the profit potential—for those on both sides of the exchange—was tremendous. A Franciscan present in the upper Atrato region for twenty-one years reported in 1724 that foreigners paid twenty silver reales per *castellano* (4.6g) of gold when the Bogotá mint offered only sixteen—after taxes, which amounted to about six-and-a-half percent (AGI Santa Fe 362). Foreigners could well afford to offer such favorable rates of exchange. Demand for all

sorts of goods, including cloth and iron, plus hardened steel tools, was high, and prices were further inflated by the ready availability of gold. Yet by far the biggest gains were to be had trading enslaved Africans. In the bonanza years, healthy adults sold for as much as 500–600 silver pesos, roughly twice the price paid by Caribbean sugar planters. The scale of contraband trade was only likely to grow with the expansion of the goldfields, and it was in large part this uncontrollable commerce that persuaded Crown officials to separate the Chocó from the governorship of Popayán in 1726, subjecting it directly to rule from Bogotá. It was the problem of Caribbean smuggling more generally that led to the creation of the Viceroyalty of New Granada in 1739.

Platinum got into this rough-and-tumble 'frontier' picture only accidentally. Platinum occurs in alluvial deposits alongside gold all the way from Esmeraldas, Ecuador, to just north of Quibdó, modern capital of Colombia's Chocó Department. Its frequency is highest near Nóvita, on the upper reaches of the San Juan River, at a point where a canal could feasibly link Atlantic and Pacific waters. (Such a project was in fact proposed in the early eighteenth century.) In some stretches of the Condoto, Opogodó, and Iró Rivers, all tributaries of the San Juan, platinum is more concentrated than gold by a margin of three to one. As nature would have it, the mountains containing the original ores decayed long ago, making it very difficult to trace the primary matrix (Scott and Bray 1994, 288; West 1952, 63–64). Colonial miners were perplexed, but since platinum always occurred in deposits containing gold, some observers presumed it must be gold in an 'unripe' form (Restrepo 1888, 83).

The first complaints about platinum came from the Crown smeltery in Popayán and the royal mint in Bogotá. Soon after 1700, ingots of Chocó gold were showing up in both locations 'seeded' with grains of placer platinum, a clever ruse since their specific gravities are so close as to fool anyone using Archimedes' method of volume displacement to check density (ACC Sig.2707). Platinum, or rather, *platina*, was bothersome not only because it was not gold, but also because its hardness damaged the mint machinery used to make thin gold rails for coin blanks. When a merchant from Antioquia tried to have gold bars smelted in the Middle Magdalena silver mining town of Mariquita in 1725, he was told several were 'adulterated with the said mixture,' hard evidence of the spreading 'abuso de platina' (AGNC Minas de Tolima 5:1, 15). Numismatists have noted that even without intentionally introduced platinum, gold escudos from the Bogotá mint up to about 1715 have an unusually light color due to the presence of iridium, a platinum-group metal (Craig 2000, 56). Some gilt platinum counterfeit escudos from the reigns of Charles III and IV (usually with Madrid or Popayán mintmarks) have also been described and illustrated (e.g., Romero 1995).

To stop the fraud, the Crown leveled harsh penalties on both merchants and miners who failed to separate platinum from gold before bringing it to market. Before long, significant quantities of platinum accumulated at the Bogotá mint anyway, and accounts from 1722–1725 show that gold dust arriving from the Chocó as *quintos reales* contained as much as seventeen percent *platina*, 'que vale menos del hierro' ('which is worth less than iron'). The Santa Fe mint assayer at the time, José

Sánchez de la Torre, testified that even gold dust from districts not known to produce platinum were 'viciadas,' or 'adulterated,' with as much as ten percent of the white nuisance, clear evidence of fraud. Bars tested in Cartagena were found to contain as much as one-fourth *platina*, and the cost of removing it with high concentrations of acid (not easily manufactured in those days) was extraordinary. De la Torre claimed that numerous acid baths were required 'on account of the great rebelliousness and resistance the said *platina* has in being separated or consumed.' Mercury was then used to separate remaining gold and silver from 'calcined' *platina* and residual nuggets. These early platinum experiments, though motivated by purely practical ends, have not been properly acknowledged by historians of science. Crown officials were saddled, the assayer claimed, with the unpleasant task of 'the extermination of the platinum metal' ('el exterminio del metal platino,' AGNC Minas de Tolima 5:15).

In one astonishing moment in July 1731, Crown servants loaded a mule with sacks of raw platinum grains and then ceremoniously dumped them into the Bogotá River at the north end of the city. Mint officials testified that the amount deposited was 'too heavy to be carried by one peon' (AGNC Monedas VI:26, f. 974; Restrepo 1888, 76). Miners from Barbacoas to Quibdó were ordered to dispose of their platinum immediately in local rivers so as not to infect the gold supply, and several proudly testified that they did so. Others collected *platina* separately and recorded it in their account books as early as the 1720s (AGNC Minas del Cauca 5:5) Yet platinum still crept back into the gold supply, causing new trouble at the capital's mint. When in 1741 Bogotá mint officials called in all available gold bars from merchants to quickly strike doubloons to pay Cartagena's beleaguered troops (then under siege by Admiral Vernon during the War of Jenkins's Ear), many were found to contain platinum when tested with acid and had to be withheld (AGNC Monedas VI:13, ff. 543–69).

As early as 1719, gold dust circulating in the Chocó had been denounced as badly adulterated with *platina*, 'with which they truly falsify the coin of this province' (AGI Santa Fe 362). By 1721 it became clear that some mines near Nóvita, especially one called Ebordó, along a creek of the same name, produced significantly more platinum than gold. Crown treasury officials in Bogotá ordered the mines closed and the site abandoned. Owner Francisco Perea López had his slaves burn their barracks as ordered, but they failed to produce gold at a new concession some distance away. He petitioned the audiencia for a license to return to Ebordó with his slaves, promising to 'desplatinar,' or separate gold from platinum through mercury amalgamation, and then to toss the unwanted silvery metal into the San Juan River. Perea López was given permission in 1726 (AGNC Minas del Cauca 1:1; Minas de Tolima 5:15). Another mine owner on the Ebordó, the priest Nicolás de Inestrosa, abandoned his claim for another mine on the Tadó River due to the high concentrations of *platina* he encountered. Inestrosa was investigated in 1731 for violating a royal decree prohibiting priests from extracting precious metals (AGNC Minas del Cauca 6:17),

but as Caroline Williams has shown, priests routinely operated slave-staffed gold mines in the Chocó despite official prohibition (Williams 2005, 170–73).

Despite this growing '*platina* problem' emanating from the Nóvita district, gold production in the greater Chocó soared into the hundreds of thousands of pesos annually, stimulating demand for enslaved Africans to work the mines (Sharp 1975). Having won the slave trade *asiento*, or monopoly, after the War of the Spanish Succession, it was English South Sea Company ships that were bringing the majority of enslaved Africans to Cartagena de Indias and Portobelo in the decades after 1713 (McFarlane 1993, 75–77). Yet English company merchants were not the only ones. As Lance Grahn, William Sharp, Wim Klooster, and others have shown, there were numerous contraband dealers working around the edges of this legal trade, as well, some of them taking their chances on sailing and paddling directly up the Atrato (Grahn 1997; Klooster 2009; Sharp 1976). The traffic grew so heavy despite redistricting, coast guard patrols, and other maneuvers that by 1750 the Spanish Crown began considering mine owners' pleas to make this direct trade with foreigners legal (though by no means 'free'—it was to be taxed and closely monitored). In the interim, Crown officials dispatched a deputy to a fort near the Atrato mouth to act as buyer-intermediary and plans were drawn up to conquer the last indigenous 'rebels' of the lower Atrato and eastern Panama (AGNC Minas 1:21).

Platinum Science

Although it was Antonio de Ulloa's fleeting 1748 mention of Chocó *platina* that most fired the imaginations of Europe's chemists and tinkerers, it was in fact via the vibrant and largely illegal slave trade to New Granada from Jamaica—not Ulloa's 'discovery'—that platinum first drew the attention of scientists on the other side of the Atlantic. In 1741 an English ironmonger working lead mines in Jamaica named Charles Wood noticed that a hard metallic substance was mixed in with gold brought from New Granada via the slave trade. Merchants complained that whole bars of the stuff were now in circulation, covered in gold. Some such bars reached the Royal Mint in London from Jamaica between 1742 and 1743 (McDonald and Hunt 1982, 20).

Whatever it was, the silvery substance seemed not to match the characteristics of any of the known metals. It proved resistant to all but the most concentrated and combined acids, was unchanged by lead cupellation (a standard means of refining silver), and was barely fusible when combined with copper or gold. The best Wood could get was a brittle alloy. Wood sent samples of this curious metal to William Brownrigg, a friend in London who was also a fellow of the Royal Society. Brownrigg and William Watson carried out experiments of their own, and Watson suggested using the new, apparently non-corrosive metal to fashion telescope mirrors. It also seemed appropriate for making highly resistant crucibles, as needed for acid manufacture. Wood, Brownrigg, and Watson have not been widely credited with 'discovering' platinum (except among historians of metallurgy) due to the fact that Watson only began publishing the group's correspondence and research findings in

1750, two years after Ulloa first described raw *platina* by name in print (Hunt 1985; McDonald and Hunt 1982).

In the decade following Ulloa's 'noticia,' Spanish Crown officials generously sent samples of *platina* to various academies, including those of Sweden, France, and the Netherlands. Like the English in Jamaica, Dutch traders had almost certainly collected platinum via the contraband trade to northeastern New Granada from their base at Curaçao. Brownrigg, who took an M.D. from the University of Leiden in 1737, claimed that his famous Newtonian physics professor, Willem Jacob s'Gravesande, had displayed *platina* to his students (Russell Wood 1951). It is highly likely that s'Gravesande or his instrument makers, Jan and Petrus van Musschenbroek, experimented with the substance in their extensive work on electricity and magnetism, although I have been unable to confirm this after examining the catalogue of s'Gravesande and van Musschenbroek papers now housed in the Boerhaave Science History Museum in Leiden.

In 1751 Swedish scientist Hendrik Scheffer disproved Buffon's claim that platinum was not an eighth metal but rather a natural alloy of gold and iron. Scheffer's experiments with copper and arsenic fusion came closest to making platinum a workable metal (Griffith 2009; Hunt 1980). In its raw, 'American' form, *platina* was simply hard as nails, and no furnaces at the time could reach the temperatures necessary to smelt it. Cleansing native *platina* of trace amounts of iron and roughly six (then unknown) platinum-group alloys proved extremely difficult, but eventually several methods—none of them simple—were developed by scientists working all over Europe. Once the majority of published savants agreed that platinum was an element rather than a mineral, its name became masculine, in Spanish *platino*. Just prior to the Seven Years War, the Spanish Crown ordered New Granada treasury officials to stop dumping raw platinum in rivers and to start collecting it in earnest for the Royal Cabinet.

In the 1750s and 1760s, Spain's Royal Cosmographer, the Jesuit Juan de Wendlingen, was in charge of fielding and meeting requests for raw platinum from London, Paris, Stockholm, and other capitals. Wendlingen displayed his ignorance of the metal's origins when in 1755 he sent a subordinate to Quito to collect 400–500 cwt. (c. 20–30 tons) of platinum ore. Quito treasury officials were puzzled, as they had apparently not heard of the material (it is not mentioned in any Quito *real caja* or *real hacienda* papers housed in the National Archive, although some of it had no doubt circulated in gold dust transactions coming from Popayán or even Esmeraldas). Officials in Bogotá wrote to explain that although *platina* was indeed found in more than a few Pacific coast jungle riverbeds, there were not quite tons of it lying around. In most places it was much rarer than gold. Thanks to Bogotá's unwillingness to pay for collection and shipment (perhaps understandable given the intervening Seven Years War), it was not until 1766 that the cosmographer's request was finally filled in the New Granada capital, and it only reached Cádiz in May 1767, when Wendlingen and his fellow Jesuits were packing up for exile (AGI Santa Fe 835; Sharp 1976, 52).

Enlightened, reformist urges, even in the energetic era of Charles III and his gregarious Minister of the Indies, José de Gálvez, appear not to have much raised the pace of colonial bureaucracy. The urge to make money in trade, however, proved as sharp a prod as ever, and contraband exports from New Granada seem to have continued rising, perhaps only slowed during the U.S. War of Independence (1776–1783). Official Spanish *platina* shipments eventually became quantitatively significant, and records of them grew more consistent. The largest single recorded delivery, which reached Madrid in 1789, amounted to some 1630 kg of *platina* in forty-one crates. It was accompanied by ten sacks of Darién cacao and 'un leopardo,' presumably a Chocó jaguar, for the king's amusement (AGI Santa Fe 835; AGNC Minas de Santander 1:57; Capitán Vallvey 1996). By 1790, special skiffs were dispatched from Cartagena de Indias to the Chocó's regional capital of Quibdó specifically to retrieve raw platinum.

It was precisely during the period of U.S. independence that Charles III, advised by Gálvez, approved a number of mining-related scientific missions to the Indies, including that of Juan José Elhuyar to New Granada. Elhuyar's main job was to revive faltering silver mines along the middle Magdalena River near Mariquita, but he also visited emerald and gold mines and collected samples of everything from copper to iron ore (Keelan 1990). Elhuyar and his younger brother Fausto had honed their skills as metallurgists in Sweden and Germany, and had also worked since 1781 as professors in the royal Seminario, or teaching laboratory, of the Basque Sociedad de Amigos del País in Bergara, deep in the iron-producing region of Guipúzcoa.

Working in the Bergara laboratory in 1783, Fausto found his own metallic element: tungsten. As for the refractory *platina*, the younger Elhuyar joined forces in early 1786 with a young French chemist named Pierre-François Chabaneau, who had been recruited from Paris by the sponsor of the Basque Society, the Count of Peña Florida. Just as Fausto Elhuyar was preparing to take up his new post as Mines Director in Mexico in the summer of 1786 at Gálvez's request, Chabaneau, after many frustrating setbacks, made a remarkable discovery. In blending controlled chemical methods (mostly acid baths) with old-fashioned blacksmithing carried out by local iron-workers under his supervision, Chabaneau managed to purify platinum to such a degree as to render it workable by goldsmiths (Howe 1914). Stripped of admixtures and then compressed under high heat from powdery masses into ingots, platinum's natural ductility and malleability were at last revealed.

As a result of Chabaneau's surprise breakthrough, a new royally sponsored laboratory was established in Madrid, the Casa de la Platina. Its stated reason for existence was to purify New Granadan *platina* into platinum in order to facilitate the manufacture of a chalice for the pope, among other specifically requested items. Whether or not they believed this to be the best use of the 'eighth metal,' Chabaneau and his assistants were sworn to secrecy regarding the new purification method. Platinum had already been successfully fused by Lavoisier in Paris in 1782, an event witnessed and relayed to Joseph Priestley by Benjamin Franklin, but the technology was still too primitive and expensive to handle substantial amounts of this refractory material

(nearly eighty years would pass before Johnson Matthey's fusion method replaced Chabaneau's powder technique; Griffith 2009). Despite a few leaks, the essential details of Chabaneau's process were apparently kept secret up to 1808 (Segovia Salas 1960, 101–2). The 'compressed powder' method appears to have been re-invented by Englishman William Hyde Wollaston, who sold industrial-grade platinum made from contraband New Granadan *platina* on the open market by 1808 (Usselman 1978), just as the British navy began to suppress the transatlantic slave trade.

As documents in the Archive of the Indies amply demonstrate, Chabaneau was kept busy producing workable platinum for over a decade after the Casa de la Platina opened in 1786 and also fielding requests for both platinum and *platina* from foreign dignitaries and scientists. He and his much less talented successor, Joaquin Cabezas, left a trail of receipts for books, journals, laboratory equipment, graduate student stipends, and supplies that goes all the way to the 1808 Napoleonic invasion (AGI Santa Fe 835). Incoming New Granadan *platina* is well accounted for in these twenty-two years, and it appears that deliveries fell off precipitously after 1790, only to recover slightly after the war with Republican France ended in 1802 (Capitán Vallvey 1996). In the National Archive in Bogotá, there is a parallel record of requests for platinum to supply the royal laboratory in Madrid, along with the usual whining complaints about delays and the Crown's constant refusals to pay bills in cash instead of worthless *vales reales* (AGNC Minas del Cauca 5:17, 19).

Partly as a result of the Madrid laboratory's chronic lack of resources, new advances in platinum science seem to have occurred everywhere but in Spain. In 1787 Chabaneau dutifully sent platinum to a French clockmaker attempting to build a timepiece to measure longitude with greatest accuracy, while he himself was mostly occupied with supplying Spanish goldsmith Francisco Alonso enough platinum to fashion saltcellars and other baubles for the royal family. Platinum purified by Chabaneau's special process was used by Alonso to fashion the requested chalice for Pope Pius VI, completed and sent in 1789 (now displayed in the Vatican Treasury). Meanwhile, French and English chemists, among others, were making all the new discoveries, even though they had not yet hit upon a comparable purification process (most common was arsenic fusion). In 1790, an exasperated Chabaneau sent platinum to scientists in Poland as he himself struggled to carry on his own work for lack of funds. By 1793, the French and English were reporting their incorporation of Spanish American platinum in telescope mirrors, thermometers, and 'perpetual pendulums.'

In 1796, Chabaneau received a request from prominent citizens of Republican France for a considerable amount of platinum to fashion the standard meter and kilogram—brand new measures based on nature's own gradients. Despite the usual delays and bureaucratic snags, the platinum was eventually sent. Meanwhile, in Chabaneau's Spanish laboratory, fellow French chemist Louis Proust was charged with trying to draw platinum into wire to hem garments. Chabaneau was succeeded in 1797 by the inept Joaquin Cabezas, who sent platinum to Russia in 1798 before initiating a decade of quarrels over travel reimbursements. The Casa de la Platina's

troubles multiplied in the years leading up to the Napoleonic invasion of 1808, when the laboratory was sacked by French troops, never to reopen.

Conclusion

This brief narrative would suggest that European science took over the story of platinum quite early, but in fact experiments in Bogotá had yielded interesting results as early as the 1720s. The use of acids, calcination, and other means of separating gold from platinum have already been mentioned, but documents from the Santa Fe mint also note that a 'químico,' or 'chemist,' by the name of Juan Clausules de Meder successfully fashioned a platinum hilt and buckles on the orders of a treasury secretary in 1722 (AGNC Monedas VI:26, f. 983). Who exactly this German-sounding chemist was, and why he was in Bogotá, remains to be explained, but in any event he was said to have smelted two marks, or about a pound, of the white metal, and managed to refound the hilt after it broke. Bogotá's mint master claimed to have independently developed a smelting method by 1774, when he sent a medallion of 'platina dulce,' or 'sweet platina,' with the king's bust to Spain along with another of platinum-copper alloy (Segovia Salas 1960, 97–98). In 1788 a French chemist living in Popayán said he had developed a method of fusing platinum, too, although surviving documents offer no details (AGNC Minas del Cauca 5:23, f. 871).

As for contraband, by 1783 the Atrato River was officially open to foreign trade, although royal officials hoped to control it with garrisoned forts and indigenous alliances (AGNC Minas del Cauca 6:9). The Crown by this time encouraged platinum recovery with tax incentives on tool and slave sales. By 1788 enslaved mineworkers themselves managed to purchase freedom, then pay perennial head-taxes, with platinum recovered from dumps and mines, even though its price was kept arbitrarily low at two silver pesos per pound—one peso below the official cost of mercury in both Popayán and Bogotá (AGNC Monedas VI, f. 297; Real Hacienda 37:26).

The royal bounty was not intended to compete with private traders, but rather to encourage loyal subjects to comply with the king's wishes. In other words, rendering platinum to Crown officials at the new smelteries of Quibdó or Nóvita was mandated, not requested. Free colored panners failing to render *platina* to its rightful owner, their king, could expect to be steeply fined, then sentenced to four years' hard labor in the 'Fuerte del Caimán' on the lower Atrato (Minas del Cauca 5:19; Sharp 1976, 51–54). Unlike gold or silver, platinum was declared 'privativo metal de la Real Corona,' the king's exclusive property, and it was even proposed that a royal mine be established, staffed by 'negros del Rey.' In one scheme, these 'royal slaves' were to be purchased by selling hitherto unappreciated New Granadan brazil-wood at Riohacha and Santa Marta to the same Dutch and English foreigners then accused of contraband trading (AGNC Minas del Cauca 1:21, 5:17).

But like so many Bourbon monopoly schemes from this period, the platinum plan fizzled. The Crown's artificially low price for *platina*, which was, after all, quite rare,

practically promoted smuggling. By way of comparison, placer gold dust was trading in the Chocó at well over 100 times the official value of *platina* (c. 4.35 reales/g vs. 0.035 reales/g) despite the fact that in all but a few riverbeds gold was far more common. Already in the 1790s, royal officials complained that less and less *platina* (the term now consciously used to distinguish the raw material from purified *platino*) was available to send to Spain thanks to foreign, contraband demand along the Caribbean coast (AGNC Minas del Cauca 5:4). The bounty was so low that slaves continued to discard *platina* in the isolated mines of Playa de Oro, deep in Ecuador's Esmeraldas Province, in the first decade of the nineteenth century (Stevenson 1825, 420–25). They did so because they had no contraband trade outlet. In 1804, one of the Chocó's lieutenant-governors, Ventura Salzas Malibrán, penned a letter to New Granada's viceroy, asking: 'Is *platina* a precious metal or not? If it is, why isn't a proportionate price offered for it? If not, then why is commerce in it prohibited by so many penalties? Why would the king monopolize it?' (quoted in Restrepo 1888, 79). Here in a nutshell was the platinum paradox as seen from the periphery. How was a distant government to stop the trade in a substance so valued by foreigners by offering virtually nothing for it, not even the long-promised slaves for mine owners?

If there is a silver (or at least silvery) lining to this story, it regards folk miners. As early as 1731, Crown officials in Bogotá confessed that the Chocó's 'innumerable blacks, mulattoes, Indians, and mestizos in the mines' were most responsible for the circulation of contraband raw platinum (AGNC Monedas VI:26, f. 967; on Amerindians trading *platina* c.1723, see AGNC Minas del Cauca 2:30). It was they who collected it in the diggings and traded it on the sly as 'oro de rescate,' or 'trade gold,' to gullible merchants, such as those who ended up taking it to Jamaica, where it was 'discovered' by the ironmonger Wood. From the workers' point of view, perhaps, this initially useless, gold-like substance was not useless after all. Instead it offered a kind of discount on suffering if properly handled—especially if one knew where one of those early dumps was located. After mid-century, a folk miner could render some *platina* to the king or royal officials to win favor, perhaps, but then reserve the lion's share for contraband traders willing to offer a more just, 'Atlantic' market price. Just after independence in 1823, Scottish visitor Charles Stuart Cochrane stopped at Quibdó on the Atrato and had this to say of the trade in raw platinum: 'As British merchants here offer eight or ten dollars a pound for it, about five sixths are obtained by them, and smuggled to Jamaica' (Cochrane 1825, 421). Platinum, like modern narcotics, would continue to be produced where possible and shipped to where it was most appreciated regardless of official demands to the contrary.

What of platinum's twin nature as commodity and gift in the late eighteenth century? It was only with the development of Enlightenment science that platinum became 'precious' (and a bona fide metal) in the first place. Contraband trade in slaves via Jamaica served as midwife to this radical transformation. Though still not 'inherent,' perhaps, platinum's value by 1800 was more clearly tied to utility rather than the decorative arts. Though still used to fashion watch chains and other such items, it was fast becoming an industrial commodity like tungsten or rubber,

increasingly used in the manufacture of scientific instruments—and increasingly firearms—in England, France, and the fledgling United States.

In the more volatile period between 1740 and 1799, however, when the French finally forged their standard meter and kilogram, Spain's unique access to platinum was primarily used as a means to extend friendship across national, or rather, imperial boundaries—it was an object of gift exchange, or mutuality, even in the midst of and after the French Revolution. Despite the complaints of those working in the Casa de la Platina in Madrid, the king's ministers seem to have known very well how platinum could serve to bring prestige to Spain for its generosity to competitor nations 'in the name of science.' To deny fellow inquiring minds access to a newfound piece of nature's great puzzle was in the Enlightened Age a novel sort of sin—one strangely at odds with, indeed diametrically opposed to, the older and perfectly rational impulse toward secrecy, hoarding, and dissimulation. Paradoxically, having exclusive access to the purification method developed by the foreigner Chabaneau only made the Spanish gift of *platina*, and now genuine platinum, more meaningful.

Thus, in the last years of Spain's Old Regime, platinum, 'the eighth metal,' served as both a quasi-industrial commodity in an emerging free market economy and a scientifically 'fetishized' gift in a fading economy of royal mutuality. Platinum's discovery and 'development' after 1700 did not simply mark the steady advance of modern chemistry from art to science, as most writers have argued, but instead remained entwined within the overlapping skeins of social, political, and economic relationships, both metropolitan and peripheral, that periodically twisted—often as a result of war—to reshape the Atlantic world in the eighteenth century. At any given moment, platinum meant different things to scientists, slaves, and kings. It may be fitting to end by noting that a huge, three-quarter-kilo nugget of *platina* from the Quebrada de Condoto, near Nóvita, was sent to the restored Ferdinand VII by the infamous Spanish general Pablo Morillo as he attacked New Granadan rebels in the late 1810s (Heuland 1818; Restrepo 1858). The massive nugget had been given to Morillo by Chocó mine owner Ignacio Hurtado de Herrera, who in turn had received it from its finder, a slave named Justo. Justo was apparently not freed for his efforts, but at least we know his name.

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