The Platinum Age in Spain

"I hope that Europe will soon become aware of the valuable properties of this new noble metal whose worth is beyond all imagination and then that Spain, the sole possessor of this treasure, will reap useful benefits that only time will reveal."

PIERRE FRANÇOIS CHABANEAU

As we have recorded in Chapter 2, for many years platinum was regarded as worthless and as a troublesome impurity in the gold from the Spanish colony of New Granada. None the less the first researches on this newly discovered metal, collected together in Morin's book published in Paris in 1758, brought about some change of attitude among the authorities in Madrid. In the following year, for example, Juan Wendlingon (1715–1790), Professor of both Mathematics and Geography there and also the royal cosmographer for the Indies, instructed the Viceroy of New Granada to collect a substantial quantity of platinum from the heaps of discarded metal lying around the mints in Bogotá and Popayan and to despatch it to Madrid (1).

Again in 1765 the Royal Council of Commerce requested the Secretary of State for the Indies, Julian de Arriaga, to acquire further quantities and by the following January the Viceroy, Pedro Messia de la Cerdia, had replied that metal had already been shipped to Spain from the Chocó region and that it was abundant in that area (1).

A new era had opened in Spain in 1759 when Carlos III succeeded his half-brother Ferdinand VI on the throne. The new ruler was interested in promoting agriculture and industry as well as the sciences, and throughout his thirty-year reign there developed a much more enlightened and energetic atmosphere, in part under the influence of the French philosophers of the time. Among the King's initiatives were the establishment in 1771 of a Cabinet of Natural History in Madrid, based upon a large collection of mineralogical specimens formed and presented to the Government by Don Pedro Franeo Davila, and the appointment of the Irishman William Bowles to be its director. Among this collection were several specimens of platinum, and Bowles now gave more attention to its
properties and possible uses than he had in earlier years when he warned against
the dangers of its fraudulent potential. In a long footnote to his dissertation on
platinum he now concluded:

“Finally I emphasise that platina can be available for an infinite number of uses
and for making a multitude of utensils that would not be subject to rust or corrosion
since this metal, with various alloys, can be worked and further submits to forging
and welding like iron. See especially what M. Baumé has to say about that.” (2)

The Royal Monopoly in Platinum

Then in 1774 Don José Celestino Mutis wrote home from Bogotá describing the
two portrait medallions of Carlos III mentioned in Chapter 2, one made in
platinum and the other in a copper-platinum alloy, that had been made by Don
Francisco Benito in the mint and forwarded to the King. These were passed on
to Don Miguel Musquiz, the Finance Minister, and thence to the Council of
Commerce who proposed that Benito should be granted an award and that
details of his procedure should be obtained. The Viceroy in New Granada, Don
Manuel de Guirior, seems to have advised Benito, however, to keep his process
to himself, and there is in fact no reference to it whatever in the voluminous
archives of the Indies.

The consequence of this was the issue of an edict “that platinum should be
worked exclusively for His Majesty as was the case with gold”, and this was
followed in 1778 by instructions that all platinum must be handed over to the
King’s representatives but without payment. Not unnaturally very little metal
was brought in on these terms (3).

The event that was to have a major influence in changing this state of affairs
and of bringing about the so-called “Platinum Age” in Spain had taken place
some years earlier. This was the foundation in 1764, with the approval and
encouragement of King Carlos III and his chief minister Count Grimaldi, of a
society for the promotion of science, industry and commerce. Formed in the
three Basque provinces of Viscaya, Guipúzcoa and Alava by the nobility of the
region, and based in the small town of Vergara near San Sebastian, this was
known as the Real Sociedad Economica Vascongada de los Amigos del Pais (the
Royal Basque Economic Society of Friends of the Country) and was in fact the
forerunner of a number of similar organisations in the other provinces of Spain.

The principal founder of this body, and its director, was Francisco Javier de
Munibe, the Count of Peñaflorida (1723–1785), who had been educated partly
in France. His elder son, Don Ramon Maria de Munibe (1751–1774), com­
pleted his studies with the society in 1768, and, in line with their policy of secur­
ing the most up-to-date knowledge from other countries, he was sent at the
society’s expense on a three-year tour of France, Germany, Sweden, Holland
and Italy in the care of the scientist Eugenio Izquierdo, the eventual successor to
William Bowles. They visited mines and iron works, attended lectures, learnt
assaying from Cronstedt, and sent back regular reports to the society, some of
these being printed as anonymous contributions from “A Travelling Member” in their journal, *Extractos de las Juntas Generales de la Real Sociedad*. One of these, published in 1775, after the young Munibe’s unfortunate death at the age of only twenty-three, contained a long account of the work of William Lewis on platinum and a review of the state of knowledge about it at that time. This awakened the interest of the society and supplies of the native metal were obtained from the government through the Marques de los Castillejos (4).

**The Seminario at Vergara**

The society had the intention to establish a school of university standard to make available to its members the best teaching of the time, but this naturally required several years to design and build. Their Real Seminario Patriótico finally opened its doors in the autumn of 1777, and Count Peñaflorida had some time earlier sought for suitable professors. On the recommendation of Izquierdo, who with the young Munibe had met them in Paris, the choice fell upon two very young Frenchmen, Pierre François Chabaneau (1754–1842) to teach physics and supplies of the native metal were obtained from the government through the Marques de los Castillejos (4).

**Fausto de Elhuyar**

1755–1833

Appointed Professor of Mineralogy in the Seminario at Vergara after a long tour of European centres of mining and metallurgy. Elhuyar took part in the research on platinum with Chabaneau but left to become director of mines in Mexico before the work was brought to a successful conclusion.

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and the better known Joseph Louis Proust (1754–1826) for the chair of chemistry, with very handsome salaries provided by King Carlos III. Proust was to play little part during his stay in Vergara and in 1781 he returned to France, although a later period he spent in Spain did have an influence. Chabaneau (usually spelt Chavaneau in Spanish), on the other hand, became the leading figure in developing the platinum industry in his adopted country but not until several years after his appointment, being occupied first in such tasks as the analysis of the mineral waters of the nearby spa at Cestona.

In 1781 the Seminario decided to establish a chair of mineralogy and to appoint as professor a young Spaniard, Don Fausto de Elhuyar de Zubice (1755–1833), who was apparently assisted on the metallurgical side by his elder brother Don Juan José (1754–1804). They came of a good Basque family, had been educated in Paris and had been travelling in Europe, just as had Don Ramon de Munibe, spending some time at the School of Mines in Freiberg in preparation for their work at the Seminario. The King had also arranged for the elder brother to go to New Granada to supervise mining and metallurgical operations there, and to this end he had spent some time under Bergman in Uppsala.

Their first research in Vergara was on tungstic acid, resulting in their being the first to isolate metallic tungsten, a discovery they announced in the Extractos of the society in 1783 and which brought them considerable attention from chemists throughout Europe.

The year before this Fausto de Elhuyar had added to his duties the chair of chemistry vacated by Proust and at some time after this he began work on platinum, together with his colleague Chabaneau, drawing upon the supplies of native metal that had been obtained from the Marques de Castillejos. They met with many difficulties and a great deal of frustration, but by March 1786 they were able to announce the successful production of malleable platinum to a meeting of the council of the society. Sadly Peñaflorida, the society’s main progenitor, was no longer alive to hear the news.

Not only was their procedure kept a closely guarded secret but the part which each of them played in this work is most difficult to establish, depending upon whether one relies upon Spanish or French sources, each of course according greater praise to their own compatriot.

Chabaneau’s Malleable Platinum

Before the work was completed, Elhuyar had left the Seminario in September 1785 in order to visit Hungary to study the improved amalgamation process for gold devised by Baron von Born before going to Mexico as director of mining. This led to Chabaneau taking over the chair of chemistry in addition to that of physics and to his carrying on the work alone. Before Don Fausto left for Mexico, however, he paid a brief visit to Vergara in the spring of 1786, finding that considerable advances had been made, and fortunately he recorded what he
The Seminario, a school of university standard established by the Sociedad Vascongada at Vergara near San Sebastian in 1777. The first two professors appointed were both from France, Pierre Francois Chabaneau to the chair of physics and Joseph Louis Proust to that of chemistry. Proust remained only two years and was succeeded by Fausto de Elhuyar who, together with Chabaneau, began work on platinum. In 1785 Elhuyar was sent to Mexico and Chabaneau carried on alone, successfully producing malleable platinum in the following year.

Photograph by courtesy of Professor Francisco Aragon de la Cruz

found in two letters to his brother who was by now settled in Bogotá. Even more fortunately, Don Juan José made copies of these letters "for the interest they aroused and in case they prove useful to New Granada in the future", and these copies went into the files of his chief, José Celestino Mutis. Twenty-five years later, when the liberation revolution broke out in Colombia, these files were rescued, brought to Spain and lodged in the Botanical Gardens in Madrid as the Mutis Collection. Working on them in 1911 in connection with the compilation of his biography of Mutis, Professor A. F. Gredilla, the Director of the Botanical Gardens, came upon the two copies of Don Fausto’s letters and he published their contents in his book (3). Their value is unique since, as soon as it was known that an important discovery had been made about making platinum malleable, the Minister issued the strictest orders to Chabaneau that on no
account was he to publish his methods. Chabaneau told the Minister that he had already informed Don Fausto about the process and the latter then received similar orders. These were duly transmitted to Don Juan José and presumably the original letters were destroyed. The letters revealed that Chabaneau had successfully used a powder metallurgy process based upon those of Sickingen and Milly. The first begins:

"Vergara, March 17th, 1786. In my former letter I told you that I was going to Hungary on behalf of the Minister for the Indies, in order to learn about the new method of amalgamation. . . . As you must already know, when I went away to Madrid, Chabaneau took charge of the work on platinum to complete the research that I had promised to the Minister and he has now made some very important discoveries. The method is similar to that of von Sickingen in so far as the reduction of the precipitates and salts is concerned but in other respects it is much better. Sickingen used Prussian alkali to precipitate the aqua regia solution which is the very worst means for freeing the platinum from iron and one might almost say that it is the surest means of obtaining a mixture of the two. Chabaneau has employed the method of the Count de Mylli [sic] which consists in precipitating the said solution by sal-ammoniac, by which no iron is deposited. By this means he has obtained large precipitates and from them some very fine pieces of platinum."

Don Fausto goes on to say that Chabaneau also discovered a more economical method of dissolving the native platinum, namely, by attacking it by means of nitric acid and common salt. There follows some rather confused matter from which one gathers that they sometimes precipitated by means of other alkalis, and it is known that later on Chabaneau used potash instead of sal-ammoniac as another measure of economy. But however the platinum was separated, there is no doubt about what happened afterwards.

"The whole precipitate is placed in a crucible on an enclosed fire, when the contents diminish in size and lose their aqua regia. When crushed with an iron pestle it soon loses its brownish-grey colour, which changes to a beautiful silver-white, and with pressure gains consistency and becomes concentrated. When the precipitate has sintered, it is removed from the crucible, hammered very lightly to unite the particles and then annealed and hammered alternately until it is really firm. This mass is then exposed to more intense heating in a crucible in order to evaporate the salt occluded in its interior and is then annealed and hammered again. Finally it is exposed to the fierce heat of a forge for half an hour, when it is removed from the crucible, heated on an iron forge, forged and drawn into bars, commencing by striking very lightly in order to unite all the particles not previously affected. This is the method used by us in an operation completed today, when in a single operation we have obtained a piece weighing 13 ounces which we are going to send to the Minister in the form of a bar. Just as we have been able to correct in the course of this operation defects previously noted, so we have observed defects in this procedure which will be obviated on future occasions. It has been noticed during the last heating up and drawing of the bar that a glassy crust forms on the surface of the metal and which seems to sweat through from the interior, and we believe that this is caused by residual unreduced salts. If at the outset care is not taken to destroy those unreduced salts, the mass will crack and quickly break up into small pieces. This defect has been remedied in part by an additional treatment which consists in putting the hot casting in water. If these last
traces of salts are completely removed, this metal is more easily drawn into bars than silver, and one might even say that anything can be done with it! During the first operations, that is before beginning to compress the mass in the crucible, it should be well stirred with an iron bar in order to facilitate the evaporation of the salt and thus avoid inconvenience later when forging. I shall keep you advised of any further progress we may make, but it would be as well if you started to carry out experiments yourself in order to be fully prepared to install appropriate plant there, for although there is every possibility that a more economical method will be discovered, this one of course would serve very well. We estimate that the expenses would be less than 4 pesetas (8 reales or 1 Spanish dollar) per pound and we believe that the metal will find a ready market at a much higher price than that of silver. ... I am enclosing, wrapped in paper, a small piece of platinum and although it is not the best possible sample, it will allow you to form an idea of the colour of the metal and how well it can be polished."

The second letter, addressed from Paris on May 19th 1786, again refers to the need for secrecy:

"Chavaneau sent to the Minister for the Indies some bars of platinum produced by the method I wrote to you about in my recent letter, and he has asked him not on any account to make known his discovery before receiving instructions. He has also sent Chavaneau more native platinum with which to continue his investigations. In his reply Chavaneau had to inform the Minister that he had confided details of his new process to me, and as a consequence I later received orders not to make known to any one the secret in which I shared.

My reply, as that of Chavaneau, has been to the effect that I had already written to you about the discovery, since as you are already in the country where large quantities of the mineral can be obtained, you are therefore well placed to carry out useful work on it."

In this important correspondence it is obvious that, although Don Fausto gives most of the credit for the discovery to Chabaneau, there is very definite indication of his own participation in the work. It is also interesting that in Don Fausto’s first letter there is confirmation of the Count von Sickingen’s statement that de Milly sent particulars of his process to Spain.

The discovery of the way to make platinum malleable marks the end of Chabaneau’s stay at Vergara. The King, wishing to have him in Madrid, created for him a special Chair there of Mineralogy, Physics and Chemistry in the School of the Natural History Museum, where Bowles had been until his death in 1780. He also installed him in one of the royal palaces with an annual salary of 2,200 Spanish dollars, in addition to a life pension of 2,800 dollars a year provided he remained in Spain, and a medal specially struck for him in platinum. He was also made Director of a Chemical Laboratory maintained by the Treasury and situated first in the Calle de Horteletza and later moved to a part of a glass warehouse in the Calle del Turco in Madrid. This was devoted to the refining and fabricating of platinum and was managed by one of Chabaneau’s old assistants, Don Joaquim Cabezas (4).

Before all this took place, however, Chabaneau had been taken off to Paris in 1786 by his patron the Count of Aranda who, after a period as prime minister,
The first object made in Spain from Chabaneau’s malleable platinum was this chalice, made by his silversmith Francisco Alonso, and presented by Carlos III to Pope Pius VI in 1789. It is thirty centimetres in height and weighs almost two kilogrammes.

The inscription on the plinth reads:

CARLOS III HISPANET IND REX PRIMITIAS HAS PLATINAE A FRANCISCO CHAVANEAU DUCTILIS REDDITAE PIO VI P.O.M.D.D. *

[Charles III, King of Spain and the Indies, gives as a gift the first fruit of platinum made malleable by Francisco Chavaneau to Pius VI. Supreme Pontiff of all the World (Pontifici Omnium Maximo Dono Dedit)]

Inside the cup another inscription reads:

HISPAN ELABORAVIT ANN. R. J. MDCCCLXXXVIII FRANCISCUS ALONSO

[Francisco Alonso the Spaniard fashioned (this) in the year A.D. 1788.]

The chalice is still on public view in the Treasury of St. Peter’s in Rome.

had been appointed Spanish Ambassador to France in 1773. This was in order to visit the Royal Goldsmith to Louis XVI, Marc Etienne Janety, who, as described in Chapter 5, had successfully manufactured many articles in platinum by means of the arsenic process. Vicente Restrepo (3) quotes a letter from Janety recording this visit:

“The King of Spain sent one of his chemists to Paris in 1786 with 44 marcs (about 350 ounces) of very malleable platinum bar. His Ambassador the Conde Aranda honoured me by accompanying him to my home for the purpose of carrying out certain experiments together. We made these experiments: we made coffee pots, plates, watch-chains, mustard pots, tea pots and dress coat buttons in my home, so many in soldered form with half an ounce of platinum in one marc of pure silver.”

During the visit, Janety tried hard to elicit Chabaneau’s procedure from him but failed to do so. None the less a comment by Guyton de Morveau in 1787 records:
“Many sorts of useful vessels are now being made in Paris by the method of M. Chabaneau for the King of Spain in which this metal is so pure that its specific gravity is 24.” (5)

On his return to Spain Chabaneau trained his own silversmith, Don Francisco Alonzo, in the working of platinum to make jewellery and instruments and provided him with a room in the laboratory in the Calle de Turco. The first object made here was a large chalice for King Carlos III, who, as recorded on the plinth, presented it in 1789 to Pope Pius VI. The chalice remained among the private possessions of the Popes until some time in the last century when Pius IX presented it to the Vatican. It is still on public view in the Treasury of St. Peter’s.

Chabaneau’s secret was well kept for more than a century. In 1795 he read a paper on platinum to the Royal Medical Academy in Madrid to which he had recently been elected and this was published as a pamphlet and later, in 1797, in

RESUMEN
DE LAS PROPIEDADES DEL PLATINO
Y SUS APLICACIONES A LAS ARTES,
IMPRIMIENDO
EN EL PRIMER TOMO DE LAS MEMORIAS
DE LA REAL ACADEMIA MEDICA DE MADRID.

Por Don Francisco Chabaneau, Catedratico de Chica
Y Mineralogia, en el Real Laboratorio de la Calle
Del Turco, e Individuo de dicha Academia, &c.

In 1795 Chabaneau at last presented a paper on the properties and potential applications of platinum but without giving the least details of his procedure in rendering it malleable. This shows the title page of his eight page pamphlet, preserved in the Bibliothèque Nationale in Paris. It did not appear in the Memorias de la Real Academia Medica de Madrid until the first issue of the journal was published in 1797.
the first issue of the Academy’s proceedings (6). In this communication he stated that he was still unable to describe his method of obtaining malleable platinum because a royal command issued in 1787 had forbidden him so to do. He gave only an account of the principal properties of the metal — already of course well known — and drew attention to its potential uses. Its infusibility he thought might make it a suitable substance for measuring high temperatures, while its resistance to corrosion should lead to its use in navigational and astronomical instruments. Platinum crucibles he considered might be used, as well as for analysis, for the manufacture of optical glass needed for the best telescope lenses, and he also suggested that vessels could be made of copper clad with a thin sheet of platinum. He had, in fact, already found that platinum and copper could be united so intimately that the composite material could be hammered into any shape without the two metals separating.

Chabaneau remained in charge of the platinum work until 1799 when, largely on account of poor health, he left Spain, forfeiting his pension, and retired to his native Nontron in the Perigord where he lived quietly until his death in 1842 at the age of 88. His work remained largely unknown to the scientific world, but in 1857 a local resident, Jules Delanoue, who had known him only in his declining years, published a 16-page pamphlet with the title “Notice sur Chabaneau, Chimiste Perigourdin”. This was reprinted in 1862 and both editions are in the Bibliothèque National in Paris, but apart from securing a brief mention in the article on platinum by Henri Debray in Wurtz’s Dictionnaire de Chimie in 1876, where he spells the name Chabanon (7), and another in 1906 in Moissan’s Traité de Chimie Minérale (8) no attention was paid to it until a copy of this rare pamphlet came into the hands of Louis Quennessen, the head of the Paris firm of platinum refiners. Quennessen had earlier provided the notes for Moissan, and in 1914 he published a summary of the pamphlet in Paris and also brought it to the notice of Professor J. Lewis Howe, the American bibliographer of platinum. Professor Howe then achieved wider publication by contributing an extensive summary to Popular Science Monthly from which it was reproduced in The Chemical News of London (9, 10).

Unfortunately, this rather over-eulogistic little work contains a number of obvious errors of both fact and chronology, as well as attributing all the credit for the production of malleable platinum to Chabaneau with no mention at all of Fausto de Elhuyar. One episode that has the ring of truth, however, relates that the Count of Aranda, making one of his frequent visits to the laboratory

"Found Chabaneau in a frenzy engaged in throwing out of the doors and windows his dishes, flasks, and ores as well as all the solutions of platinum which he had prepared with so much trouble and difficulty, saying ‘Away with it all! I’ll smash the whole business; you shall never again get me to touch the damned metal’; and in fact he broke up all the apparatus of the laboratory."

Nevertheless, the work did go on and Delanoue records that only three months later Chabaneau showed Aranda a large cube of platinum measuring 10 cm along the sides, and weighing about 750 ounces Troy.
The Spaniards paid little attention to the work for even longer and it was not until well into the present century that comments began to appear. The first was in an address on “The Chemists of Vergara” delivered to the Spanish Academy of Sciences in June 1909 by the prominent chemist, Don Juan Fages y Virgili (4). The second arose from the discovery in 1911 by Professor A. F. Gredilla of a full account of the research in copies of two letters from Don Fausto to his brother already described. Then in 1933, the celebration of the centenary of the death of Don Fausto de Elhuyar brought forth two other papers, the first by A. de Galvez-Cañero y Alzola in the Boletín del Instituto Geologico y Minero de España (11), and the other a section of a Symposium in the Anales Sociedad Española de Física y Química mostly contributed by the same author (12). Both dealt with Don Fausto’s career and, as in all of these Spanish papers, there is a tendency to decry the ability and contribution made by Chabaneau and to hold up Don Fausto as the major factor in the platinum work, although Fages (4) admits “not only the certainty of Chavaneau’s discovery but also that it was he who gave it practical application, and converted it into a practical fact useful to the progress of the sciences and arts, and certainly lucrative for himself”.

The Second Royal Monopoly
The success Chabaneau had achieved in producing malleable platinum in some quantity immediately prompted the Spanish government to order the Viceroy of New Granada – now Antonio Caballero y Gongora – to collect all the platinum he could obtain while keeping its new value a secret. About 150 pounds of native metal were shipped to Spain, this time the miners being paid two or three reales a pound. Further shipments necessitated the price being raised to four reales a pound, and the authorities in Madrid recommended the importation of many more negro slaves to work the deposits and approved a scheme for the importation of tools for sale to the workers in the hope of increasing output. In 1788 it was decreed that platinum was to be sold only to the crown and penalties were established for anyone detected in hoarding the metal. By the end of that year more than three thousand pounds of platinum had been despatched from the Chocó to Cartagena for shipment to Spain, but great quantities were still smuggled out of the Chocó to be sold to other purchasers prepared to pay much more (13).

Joseph Louis Proust
The brief period of Proust’s holding the chair of chemistry in Vergara has already been mentioned. He returned to France in 1781, but five years later, on the recommendation of Lavoisier to Count Aranda and on the invitation of Carlos III, he again came to Spain, first of all lecturing and carrying out research in Madrid and then in 1788 moving to the Artillery School at Segovia as professor of chemistry. His laboratory there was equipped, at the expense of the

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Joseph Louis Proust
1754–1826

Born in Angers the son of an apothecary, Proust spent three years at Vergara, returned to France and then in 1786, at the invitation of the King of Spain and on Lavoisier’s recommendation, came again to Spain and in 1799 succeeded Chabaneau in charge of a laboratory in Madrid equipped with an immense amount of platinum apparatus. Here Proust continued and extended the work on platinum fabrication until in 1808 his laboratory was destroyed by a mob during the siege of Madrid by Napoleon’s forces.

Photograph by courtesy of the Wellcome Trustees.

new King Carlos IV, with great luxury and an extraordinary amount of platinum apparatus, and he remained there until Chabaneau’s departure from Spain in 1799 when he took over the latter’s laboratory in Madrid. Here one of his first activities according to Fages y Virgili was to improve still further his equipment and he asked through his director for forty pounds of pure platinum and twenty-five pounds of the native metal in grains. This was granted, the metal being provided by Don Joaquin Cabezas, but on condition that he continued his experiments on platinum.

He had already carried out a long series of researches on native platinum while at Segovia, using relatively large quantities in his experiments, mainly concerned with the dissolution of platinum in aqua regia. The insoluble residue he described as “nothing less than graphite or plumbago”, failing to grasp that it contained other metals of the platinum group. These results he published in the very first issue of the Anales de Historia Natural in 1799 under the title “Experimentos hechos en la Platina” and his paper was reproduced in translation in both French and English (14). Proust promised at the end of this communication to present a further contribution on platinum but this was never forth-
coming, apart from a short letter to Vauquelin written from Madrid in 1803 that was of no great significance (15).

Apart from the chalice presented by Carlos III to Pope Pius VI and the use of so much platinum apparatus in Proust’s laboratory there is little evidence of serious applications of the metal in this period in Spain. There is a brief reference in the Archives of the Indies to the need for platinum to make a table service for the King and to use the metal in the royal chapel, while later a set of standard weights was made in a new workshop set up by Carlos IV to establish the art of making scientific instruments in Spain. As in Colombia, the counterfeiting of gold coins with platinum flourished among dishonest workers in the mints, first using solid platinum with a thin gilding and later a copper core with a thin layer of platinum, also followed by gilding. The production of these spurious pieces continued for many years. But the Napoleonic wars were now causing major disturbances; in the first French invasion of 1794 the Seminario at Vergara had been burnt and the Sociedad Vascongada had been broken up. The reign of science in Spain was coming to an end.

The Platinum Room in the Royal Palace

There, however, was a last flamboyant fling to the Platinum Age. For many years there had been a royal palace at Aranjuez, some fifty kilometres south of Madrid. This had been enlarged or embellished by successive monarchs and in 1802 Carlos IV decided to build the so-called Labourer’s Cottage in the grounds, in imitation of the Petit Trianon devised by Louis XV at Versailles. Napoleon’s famous architects, Charles Percier and Pierre François Fontaine, who had designed a number of elegant buildings in Paris, were called upon by the King to design the interior and to provide the richest possible decoration. The architects record with some distaste the display of ornate embellishment “contrary to the simplicity of the name of the building”, consisting of mirrors and medallions not only in bronze and gold but also in platinum (16).

The second invasion of Spain by Napoleon’s forces in 1808 brought about the abdication of Carlos IV. The presence of a French garrison in Madrid stirred the Spaniards to revolt and on the famous 2nd of May the crowds rioted and among other acts destroyed the laboratory in which Proust worked, leaving him destitute so that he was forced to sell his collection of minerals in order to live and then to make his escape back to France.

Conclusion

The rise and fall of the Spanish platinum industry were historically important because the metal produced seems to have been the best in quality made available up to that time. Also the quantities involved were much greater than had been the case in earlier work, as is exemplified by the 750 ounce ingot shown to Aranda. But nevertheless the whole affair was merely an episode in the history of
A contemporary engraving of the Platinum Room at Aranjuez. Designed by the leading French architects Percier and Fontaine for Carlos IV and his Queen Maria Luisa, the extremely ornate decoration of the otherwise simple "Labourer's Cottage" in the grounds of the royal palace included medallions and plaques made of platinum and engraved with mythological subjects and Italian landscapes. The room may still be seen by visitors to the palace.

platinum. Most of the researches, and all the technique that resulted from them, were shrouded in secrecy and knowledge of them disappeared with the scattering by the Napoleonic Wars of those who employed them. They had no effect whatever on later practice, which had far out-distanced them by the time they had again been brought to light.

Chabaneau's great hopes, quoted at the head of this chapter, were not to be fulfilled. The episode, however, had one result of lasting importance, since it brought native platinum to public notice and caused it to be sought after and to acquire a value. The metal became at once an article of trade, and when the Spaniards tried to monopolise it the brisk smuggling prospered and took supplies to other countries. This continued on an increasing scale until the
departure of the Spaniards from New Granada, when the Republic of Colombia took over the Chocó. Despite the researches of Chabaneau, Elhuyar and Proust, and the output from Colombia running to some 500 kilograms a year as estimated by Humboldt during his visit in 1819–1820, very little use was made of platinum during this period, and when peace returned after the disturbances of the Napoleonic wars the new government of the restored King, Ferdinand VII, found a great accumulation of unrefined metal on their hands. Some part of this, as will be seen in Chapter 10, served as a basis for the further development of the platinum industry in France.

References for Chapter 6

1 Archivo General de Indias, Seville, Santa Fé, 835
2 William Bowles, Disertacion sobre la platina, Introduccion a la Historia Natural y a La Geografia fisica de España, Madrid, 1775, 155–167
3 A. F. Gredilla, Biografía de José Celestino Mutis, Madrid, 1911, 157–158; V. Restrepo, Estudio sobre las Minas de Oro y Plata de Colombia, Bogotá, 1884, 208–214
4 J. Fages y Virgili, Los Quimicos de Vergara, in Discurso del Ilmo, Madrid, 1909, 41–43; 57–61
5 L. B. Guyton de Morveau, Chem. Ann. (Crel), 1787, (1), 333
7 A. Wurtz, Dictionnaire de Chimie pure et appliquée, Paris, 1876, 2, 1034
8 H. Moissan, Traité de Chimie Minérale, Paris, 1906, 5, 661
9 L. Quennessen, Rev. Sci., 1914, 52, 553–557
11 A. de Galvez-Cañero y Aizola, Bol. Inst Geol. y Min. Esp., 1933, 53, 377–629; Apuntes Biografíeos de D. Fausto de Elhuyar
12 An. Soc. Esp. Fis. Quim., 1933, 31, 115–143; El Primer Centenario de D. Fausto de Elhuyar
13 Archivo Historica Nacional de Colombia, Bogotá, 1786–1788
16 C. Percier and P. F. Fontaines, Residences des Souverains, Paris, 1833, 235–236

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Jan Ingen-housz
1730-1799

Born in Breda in the Netherlands, Ingen-housz studied medicine and came to England to practise in 1765. Three years later, having played an important part in the early days of inoculation against smallpox, he was appointed court physician to the Empress Maria Theresa in Vienna. Here he carried out experiments on platinum and later, travelling between there and Paris and London, he encouraged other scientists to interest themselves in the subject. In his later years in England he habitually displayed a set of three platinum waistcoat buttons made for him by Matthew Boulton.