

# The First Experiments on Platinum

## THE LIFE AND WORK OF CHARLES WOOD

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All writers on the history of platinum from 1750 onwards are agreed that the first effective introduction of this metal to Europe was at the hands of Charles Wood, who collected some samples of it in Jamaica and passed them to his friend, and later brother-in-law, Dr William Brownrigg who, as a Fellow of the Royal Society, was in touch with the leading scientists of the day. There is little doubt that earlier samples reached Europe in one way and another, especially through Spain, but beyond being regarded and recorded as a curious substance with some remarkable properties, no published

work was done on them. So Wood must be given the priority which, with very little doubt, he deserves, since his samples led to full scientific examination, identification and publication.

But the writers who have put him so effectively on the records knew little about the man himself, beyond noting the curious fact that from the beginning he was described as "an Assay Master of Jamaica". Now an Assay Master is usually visualised as the head of an Assay Office, such as is found controlling the precious metals in mints, hall-marking offices, refineries and mines. The

### Charles Wood 1702-1774

*Until now the story of the man who introduced platinum to Europe, and who was the first to carry out experiments on its nature and properties, has been virtually unknown. Described in the literature merely as "an Assay Master of Jamaica" he has remained a shadowy figure associated with his friend and later brother-in-law Dr William Brownrigg. As a result of the extensive genealogical researches of his great-great-grandson Mr M. H. Wood, it is now possible to put together the details of his life and of the background to his connection with our first real knowledge of platinum.*

*(Photograph from a portrait, artist unknown, in the possession of the family, by courtesy of Group Captain F. J. P. Wood)*



presence of such an institution in eighteenth-century Jamaica seemed unlikely but, no clue being available, the description was toned down to the more credible "an assayer" and was accepted. But recently the ignorance about the man has been enlightened by the researches of his great-great-grandson, Mr M. H. Wood, to whom the writer is most grateful for much information, and he emerges as a member of a distinguished family with more than one niche in the Dictionary of National Biography.

This family seems to have been established in the Wolverhampton area since at least the early part of the fourteenth century, although long credence has been given to a story, almost certainly untrue, that they were descended from sixteenth-century Huguenot refugees from France named Dubois. However that may be, there is no doubt that by the opening of the eighteenth century they had become notable iron-masters and workers in copper and other metals in the North Midlands. Such was the inheritance of William Wood (1671-1730), a man of great enterprise, energy and determination. Among his undertakings was the making of copper coinage for, probably with other countries, Ireland and the American Colonies. For this work he had to obtain a form of Government Contract that was then called a "patent", so that he has become known as William Wood the Patentee.

The obtaining of these patents was surrounded by Court influence and much bribery and corruption, and Wood became a victim of his association with this and is pilloried in the pages of history by a vitriolic attack on him by Jonathan Swift. It is not our responsibility here to express opinions on the rights and wrongs of that affair, but merely to note that he had a long and important career in developing the smelting of iron ore first with charcoal and then with coal and coke, and in alloying and working copper and tin for useful purposes. His name became attached to at least one of the alloys with which he worked; this was a hard

alloy of copper which he used for the American pence.

In 1690 he married Margaret Molineux and had fifteen children, of whom Charles was the seventh, born at Wolverhampton on August 22nd, 1702. We know nothing of his boyhood but are told that he was intended by his father to enter the family business and to superintend a new iron-works at Distington near Workington in Cumberland. This plan however failed and Charles had to shift for himself. We are told from another source that he had "a very good chymical education" and it was no doubt this that encouraged him to take an interest in the fundamentals of the metallurgy of the materials concerned in his business and to consider them from the scientific point of view. Among his father's many concerns was one in the West Indies, possibly inherited from his wife's family, and this led to his becoming in 1720 the "projector" of a company called The Mines Royall operating in Jamaica. The precise purpose of this enterprise is not clear. The standard history (1) of the island makes no mention of it but does say that two copper mines were opened at about that time near Kingston and were not remunerative. According to his descendant, Mrs Amice Lee (2), Charles' connection with Jamaica covered twenty years and therefore, as he finally returned home in 1741, he must have gone out there about 1721, presumably to preside over the mining work and, after its failure, to turn to other interests. There is documentary evidence of a proposal in 1730 that he should be appointed to a position in Nova Scotia as a surveyor of timber there, but evidently he did not proceed with this.

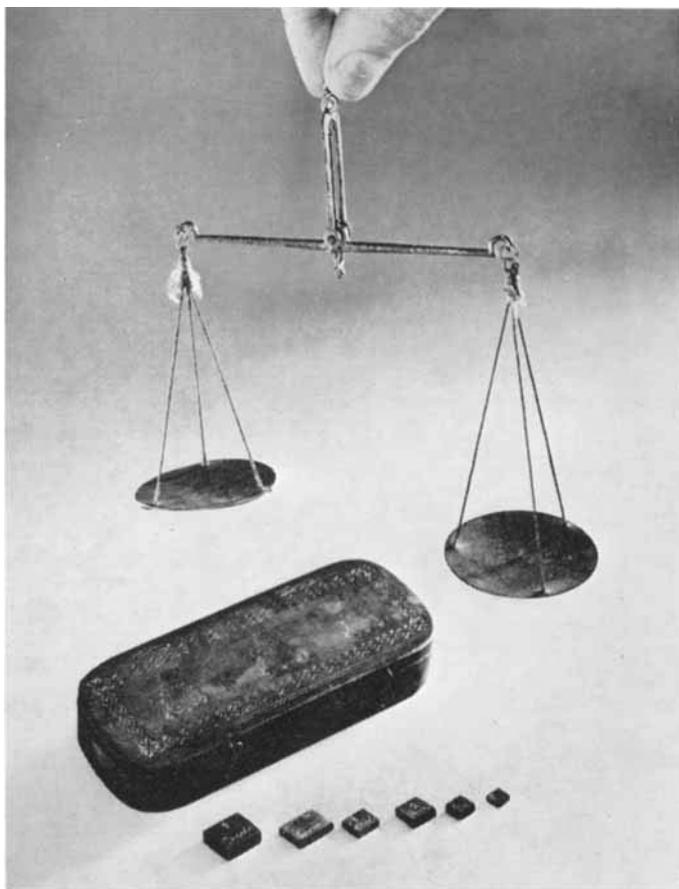
To understand the position in Jamaica in those days it is necessary to go back to the founding of the great Spanish Empire in America which, at its greatest, extended down the Pacific coast from what is now Oregon to Cape Horn and back up the Atlantic coast to Florida, with the sole exception of the Portuguese Empire of Brazil. The wealth, actual and potential, of this vast area was

enormous, particularly that in gold and silver in the provinces of New Spain (Mexico), Peru and New Granada (Colombia). By Royal Decree all trade with the Empire was reserved to the Spanish Crown and no one from other countries was allowed to take part in it. So a continuous flow began across the Atlantic to the ports of Spain. The facts of geography channelled this entirely to the Caribbean ports of Vera Cruz, Porto Bello and Cartagena. The regular convoys from these ports drew upon themselves in wartime the navies of the greater maritime nations, the English, the French, the Dutch and even the Danes, and in time of peace these were merely replaced by pirates from the same nations.

The great chain of islands that stretches across the mouth of the Caribbean from Bermuda to Trinidad was a godsend in these operations and all the nations concerned provided themselves with depots and *pieds-à-terre* by seizing them from the Spaniards until only Cuba and Puerto Rico were left. The English, with Jamaica as their headquarters and a resident Governor, had the islands that are still the British West Indies as well as mainland foot-holds at Demerara and Belize; the French were at Hispaniola, Martinique and Guadeloupe with land colonies at Cayenne and New Orleans; the Dutch had seized the Curacao Islands and Surinam; and the Danes were in the Virgin Islands at St Thomas. The new colonies, as soon as established, became the headquarters not only of the naval operations and the piracy but also of vast smuggling business consequent on the denial of genuine trade. Towards the end of the seventeenth century the worst of the piracy was suppressed but the smuggling continued and there began to grow up the trade in slaves imported from Africa for the benefit of the now wealthy islanders, who were then able to take up successful sugar planting and the manufacture of rum. So, by the time Charles Wood arrived in Jamaica, its condition was very active and prosperous.

We have no details of what he did during his first few years on the island but, either late in 1734 or early in 1735, he came home to England and while there, on May 20th, 1735, at Harrington Church near Whitehaven, he married Ann Peel, the 20-year old daughter of John and Mary Peel of Buttermere. She returned with him to Jamaica, or followed him shortly after, since their first daughter Elizabeth was born there on May 15th, 1739. His own return took place early in 1736 to take up a position of supervisor of the working and smelting at a lead mine in the island. Nothing more is heard of this and his appointment to it may have overlapped that as the Government's Assay Master. Mrs Lee (2) says that he was given this post about 1735 (in which year he was certainly in England) and this would lend support to the statement made by his granddaughter Mary Howitt in her memoirs (3), that the office was given to him by Sir Robert Walpole "as further compensation for the losses which the family had incurred by the withdrawal of the Irish (coinage) patent". The Assay Office had probably been formed in the days when conquest and piracy were bringing in considerable stocks of gold and silver looted from the Spanish convoys and continued with imports connected with the smuggling, the slave trade and the early stages of respectable commerce. There were opportunities here for personal profit but Charles does not seem to have taken them since Mrs Lee (2) reports that, though many of his predecessors had come home rich men "no bribe or perquisite was ever his and during the twenty years he remained in Jamaica he only acquired a moderate fortune". In the ordinary course of his work he would have come upon stories of the platina, the "little silver", that was causing so much trouble to the gold miners in the placers of the Choco district, deep in the forests beyond Bogotá. This, being heavy, concentrated with the gold that they washed from the gravels and could only be removed from it laboriously by hand picking. It

*The assay balance and weights used by Charles Wood and still in the possession of his family*



therefore detracted considerably from the value of their product.

Some samples of this material reached Wood from Cartegana, presumably from a smuggler, and he was able to examine it. He found that the metal part was present in small white shot-like grains mixed with black magnetic sand and that it could only be melted after mixing it with more fusible metals like copper, silver, gold and tin. The Spaniards had recognised this fact and had used it to make articles from the

mixture. Wood also submitted the native metal to cupellation with lead and found that neither it nor its weight were altered by this process. Equally it resisted a twelve-hour digestion with nitric acid. He had been told that the metal was heavier than gold but was not able to establish this, even after consolidating it by hammering; further, a mixture made by melting together equal parts of the two metals showed the same specific gravity as gold. This work was presumably carried out in his laboratory at Kingston (4, 5).

He gave up his appointment in 1741 and returned with his family to England. He seems at once to have gone back to the old family line of business by setting up, with others, a forge at Low Mill, near Whitehaven, and himself settled down on an estate near Keswick. Through this last circumstance,

or by means of his Low Mill associates or both, he came into contact with the neighbouring family of Brownrigg, living at Ormathwaite Hall under Skiddaw, and found among them Dr William Brownrigg (1711–1800), a doctor practising in Whitehaven (6). Brownrigg, like Wood himself, had been attracted to science and had published the results of a number of researches on subjects varying from a study of the gases found in minerals and waters to the purification of common salt. But he was a man of retiring nature and hesitated to leave his country practice to appear in public to expound his work. Friends presented his papers to the Royal Society and it was sufficiently impressed to elect him to the Fellowship in 1742.

It was natural that Wood, having become

acquainted with Brownrigg and his knowledge of and position in the scientific world, should bring to his notice his samples of platinum and the work that he had done on it. Brownrigg was interested at once and wished himself to repeat Wood's experiments. There is, however, no evidence that he ever did so, except the one on cupellation. Wood had found no loss in weight by platinum after being subjected to this process, although in conversation later he seems to have admitted an impression of gain rather than loss in weight, possibly owing to the retention of a little lead or other metal, but Brownrigg, in his repetition of the experiment, found a definite loss of weight of one-fifth (7). Later commentators have suggested, however, that he took for his test some of the melted material which undoubtedly contained an alloyed metal (8).

The specimens that Wood brought home with him were well chosen to show the essential facts about the metal. They consisted of:

- 1 Platinum grains mixed with black sand (magnetite).
- 2 Native platinum grains separated from the sand.
- 3 Platinum that had been fused (after alloying).
- 4 A piece of such fused metal fashioned into part of the pommel of a sword.

In or about 1749 Wood and Brownrigg

decided that the latter should arrange for these samples to be presented to the Royal Society together with a report of Wood's experiments and his own views on the material and its occurrence. Brownrigg's friend William Watson, a physicist and a Fellow of the Society, was asked to undertake the presentation and this he brought about by means of a paper read on December 13th, 1750 (4). This, coupled with letters written by Watson to friends on the Continent, constituted effective publication of the existence and fundamental properties of platinum and set several scientists to work on it. Within ten years most of its important properties were established and well known.

In the meantime Wood's wife had died and on February 25th, 1750, he married Jemima Lyndon, the widowed sister of his friend William Brownrigg. There were six children: William, Mary, Jemima, Charles, Dorothy and Ann. The youngest, Ann, married Samuel Botham and their second daughter, Mary, married William Howitt. The Howitts became prominent figures in early Victorian literary circles, Mary creating that once well-known Victorian character Little Arthur.

In 1765 the family moved from Cumberland to South Wales, where Charles Wood, with a Cumberland partner Anthony Bacon, built a house and iron-works at

This Semi-metal was first presented to me about nine Years ago, by Mr. Charles Wood, a skilful and inquisitive Metallurgist, who met with it in Jamaica, whither it had been brought from Carthagera in New Spain. And the same Gentleman hath since gratified my Curiosity, by making turt er Inquiries concerning this Body. It is found in considerable Quantities in the Spanish West Indies (in what Part I could not learn) and is there known by the Name of Platina di Pinto The Spaniards probably call it Platina, from the Resemblance in Colour that it bears to Silver. It is bright and shining, and of a uniform Texture; it takes a fine Polish, and is not subject to tarnish or rust; it is extremely hard and compact; but, like Bath-metal, or cast Iron, brittle, and cannot be extended under the Hammer.

*A passage from the paper on platinum written by Dr William Brownrigg and read by Dr William Watson to the Royal Society on December 13th, 1750, referring to Charles Wood as "a skilful and inquisitive metallurgist"*



*Wood's friend, and later brother-in-law, William Brownrigg lived at Ormathwaite Hall near Keswick. The building at the rear of the house, on the right of the photograph, was used as his laboratory and here Brownrigg repeated some of Wood's experiments on platinum*

Carfarfa near Merthyr Tydfil. This works grew in importance and became the largest of its kind and its time in Wales. Cannon for the war in America were made there and important people came on visits. As the business prospered Mrs Wood, an excellent hostess, kept open house and the children went to fashionable schools. In this atmosphere Charles Wood lived his last years and died in 1774.

But before this account of his life is closed there must be reported a curious isolated incident that has recently come to light from an entirely unexpected source, namely, The Memoirs of Casanova. The reference is to a visit paid by Casanova in 1757 in Paris to a wealthy woman, the Marquise d'Urfé, who was interested in alchemy and the occult and had expressed a wish to meet him. In the course of the visit she took him to her alchemical laboratory and showed him a vessel containing some *platine del Pinto* which she was about to convert into gold . . . "C'était M. Vood en personne qui lui en avait fait présent l'année 1743". He was

shown the platinum resisting the action of sulphuric, nitric and hydrochloric acids separately but yielding to aqua regia. She was melting it by means of a burning-mirror, saying that alone it could not be melted otherwise, which showed it to be superior to gold. She also showed him how it was precipitated by sal-ammoniac, "which has never been able to precipitate gold". No further explanation of these statements has so far emerged but the fact must be borne in mind that Casanova did not actually write his memoirs until 1792 and by that time most of the facts about platinum were known and had been widely published (9).

#### References

- 1 W. J. Gardner, *The History of Jamaica*, 1873 and 1909
- 2 Amice Lee, *Laurels and Rosemary*, 1955, p. 10
- 3 Mary Howitt, *An Autobiography*, 1889, p. 16
- 4 W. Watson, *Phil. Trans.*, 1749-50, XLVI p. 584-596
- 5 (Morin), *La Platine*, Paris, 1758
- 6 J. Russell-Wood, *Platinum Metals Rev.*, 1961, 5, 66
- 7 W. Watson, *loc. cit.* p. 594-595
- 8 (Morin), *loc. cit.* p. 31 (footnote)
- 9 *Platinum Metals Rev.*, 1962, 6, 28