

Liebig Buys Platinum from Janety the Younger

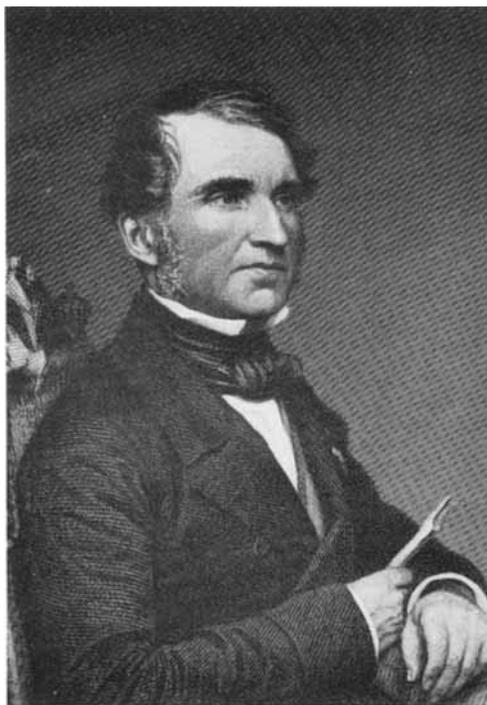
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In his standard work *A History of Platinum*, Donald McDonald has described the improvements made to the arsenic process for the purification and conferment of malleability on platinum by Marc Etienne Janety, or Jeanety (c.1750–1820) (1). The Swedish metallurgist Heinrich Scheffer had shown in 1751 that heated platinum melts in the presence of arsenic. By the 1780s the preparation of an arsenic-platinum mixture had been developed into a commercial process for working platinum by French goldsmiths and jewellers. In their arsenic process, the iron impurities present in South American native platinum were oxidised with “white arsenic” (arsenious acid), which also induced the platinum to

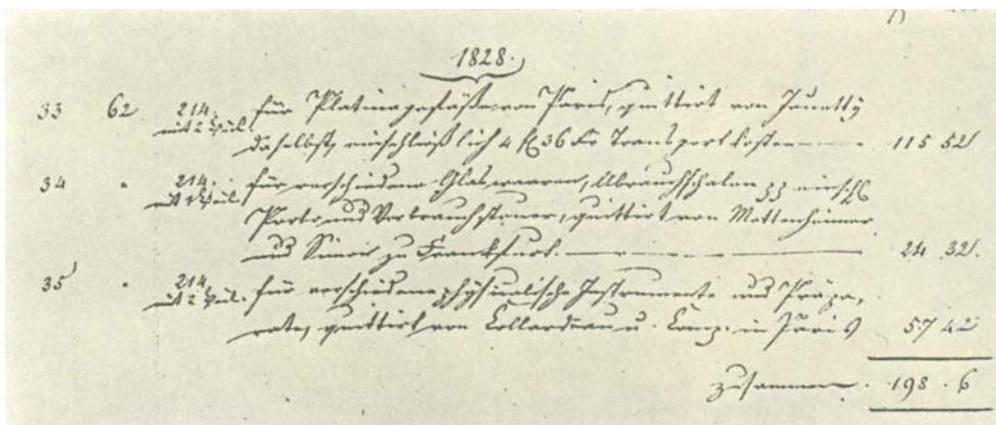
melt as a platinum-arsenic eutectic at an attainable temperature of 597°C. By skilful control of the temperature, the unwanted arsenic was volatilised as arsenious oxide, leaving behind a pure button of malleable platinum.

Janety, a French royal goldsmith, is probably best known for his preparation of the metric standards of weight and length in 1795; however, more important for the development of practical and quantitative chemistry was the way in which the techniques he developed enabled his firm to supply the growing demand from European chemists for platinum crucibles and other apparatus. The chemist and encyclopaedist



Justus von Liebig
1803 – 1873

The centenary of his death recalls the great part played by Liebig when, as Professor at Giessen, he established one of the first laboratories in Europe devoted to experimental instruction in chemistry – a laboratory later to become famous as “a factory for the production of professors”. Platinum apparatus was needed in the analytical methods established by Liebig, and this note records his purchases of vessels from Janety at a date later than had previously been assigned to the disappearance of his firm



An extract from the laboratory account book kept by Liebig recording the purchase of platinum apparatus from Janety in Paris in 1828

Sheridan Muspratt (2) was to write that:

“in the multifarious operations of fusion, solution, evaporation, and weighing, connected with the labours of the chemist, no other substance can bear comparison with platinum”.

Crucibles were, of course, important in the analysis of minerals by alkali fusion, and for quantitative analysis generally. Chemists especially admired Janety’s vessels for their reliability and cheapness.

Janety first became interested in platinum in 1786 when he had an establishment on the corner of the rue de l’Arbre Sec and the rue Bailleul, near the Louvre. Pelletier reported that within two years of entering the field Janety had succeeded in making platinum “in large amounts very pure and very malleable”. The French Revolution evidently hit his sales outlets badly for, as W. A. Smeaton has shown, Janety tried to find a market in England through Sir Joseph Banks, the President of the Royal Society (3). However, in 1790 he received the patronage of Lavoisier, and in 1792 the Academy of Sciences published a glowing report on Janety’s work by Berthollet and Pelletier.

Nevertheless, no doubt because the Republican atmosphere was unfavourable to his title of King’s Goldsmith, Janety retired to Marseilles in 1794 where he began to make metal parts for clock mechanisms. But the following year he was called back to Paris by the Government in order to prepare the

platinum standards of length and mass for the new metric system.

During the Revolution, the abbey of St. Germain-des-Prés had been turned into a factory for the production of saltpetre. Following the nationalisation of church lands in 1796, Janety was given a plot of land belonging to the former abbey, his neighbours being the chemists Fourcroy, Vauquelin and Deserves, to whom he sold a portion of the land on 1 October 1801 (4). Janety’s workshop at 19 rue de Colombier (now the rue Jacob in St. Germain des Prés) was continued by his son, who worked platinum by the less dangerous powder-metallurgy method that had been developed in Spain by Pierre François Chabaneau and Fausto de Elhuyer (5).

In 1812 Professor Jean d’Arcet reported in glowing terms to the Société d’Encouragement (6) on the platinum work carried out by Janety the younger, who had presented the society with “platinum vessels of such large dimensions and perfect workmanship that they had charged their chemical committee to examine these new products of an industry that had been developed much further in France than in other countries”. Almost all foreign chemists, d’Arcet continued, had come to France for their platinum apparatus, and M. Janety was the only supplier of this metal to the required standard.

In the absence of any precise information to the contrary it has been supposed that the Janety business continued only to about 1820 (7). However, evidence from Liebig's famous teaching and research laboratory at Giessen in Germany suggests that the firm went on supplying crucibles to chemists until much later. Liebig's laboratory accounts for the period 1824 (when he was first appointed Professor of Chemistry at Giessen) to 1833, show that he purchased apparatus not merely locally, but from as far afield as Paris and Prague (8). Quality, or speciality, were surely not the only factors here; probably it was cheaper sometimes to import apparatus from abroad than to buy locally.

Liebig had studied in Paris for two years (1822-24) and no doubt had come to know the special *forte* of Parisian instrument makers, including that of Janety *fil.* It is of interest, too, that in 1829 Liebig investigated the spongy platinum which had been prepared previously by Edmund Davy (9). Davy, Dobereiner and Zeise had all prepared it by different methods, and discovered its remarkable properties of absorbing oxygen from the air and its subsequent ability to oxidise hydrogen to water, or ethyl alcohol to acetic acid. However, Liebig showed that none of his predecessors had prepared what he named *Platinschwartz* (platinum black) in pure form. This he prepared by boiling platinic chloride with potash and precipitating the platinum black with alcohol. He found, after careful washing and drying routines, that it would absorb up to two hundred and fifty times its volume of oxygen and spontaneously ignite combustible gases. However, although he thoroughly documented its highly absorbent properties and the diluting effect of absorption on its oxidising powers, the significance of platinum black for the theory and practice of catalysis remained for others to explore. It appears that Liebig's exceptionally pure preparation was known for many years among chemists as "Liebig's Platinum Black" (10).

At this time Liebig was poised for his great innovation in, and improvement of, organic analysis by directly weighing the products of organic oxidation with copper oxide. This method, and the general grounding in qualitative and quantitative analysis which each of his students received, were to be the hallmarks of his success as a chemical teacher and pioneer biochemist.

In 1828 Liebig's laboratory accounts record the following purchase:

für Platinagefäße von Paris, quittiert von Jaunetty [*sic*] daselbst, einschließen 4 fl. 36 kr. Transportkosten, 115 fl. 52 kr.

that is, platinum vessels (possibly crucibles which, however, would be explicitly *Tiegel*) made by Janety in Paris cost approximately £10.40, including about 40p for transport. (In 1842, £1 = 11 florins 6 kreuzer.) The date proves that the firm of Janety was still in existence some eight years later than was previously believed.

Unfortunately, no other purchases from Janety are recorded. It may be significant that the only other purchase of platinum apparatus from Paris in these accounts (*Platinadrath*, presumably a scribal error for *Platinadraht*, platinum wire) was made in 1830 from a different firm, Courtin. We may suggest tentatively, therefore, that Janety's firm disappeared between 1828 and 1830.

References

- 1 D. McDonald, *A History of Platinum*, London, 1960, pp. 53-57, 96, 127-129; *idem*, *Platinum Metals Review*, 1968, 12, 142-145
- 2 S. Muspratt, *Chemistry Theoretical, Practical and Analytical*, 2 vols., Glasgow, 1857-1860, vol. 2, p. 716
- 3 W. A. Smeaton, *Platinum Metals Rev.*, 1968, 12, 64
- 4 G. Kersaint, *Revue d'Histoire de la Pharmacie*, 1959 47, 1-6. I am grateful to Dr W. A. Smeaton for this reference concerning Fourcroy's fine chemicals factory at 21 and 23 rue de Colomnier
- 5 McDonald, *op. cit.*, pp. 62-68
- 6 J. d'Arcet, *Bull. Soc. d'Encouragement*, 1812, 11, 207
- 7 McDonald, *op. cit.*, p. 131
- 8 W. H. Brock, *Ambix*, 1972, 19, 47-58
- 9 J. Liebig (*Poggendorff*) *Annalen der Physik und Chemie*, 1829, 17, 101-114
- 10 Muspratt, *op. cit.*, p. 720