January 1st, 1817, is generally accepted as the date of the beginning of the business that is now Johnson Matthey & Co Limited. It was on this day that Percival Norton Johnson, in partnership with his younger brother, took over the assaying house of his father, John Johnson, in Maiden Lane, London. This arrangement only lasted a few months when the father returned and Percival really started his own separate office in the house next door. The parental business had bought and sold native platinum and he himself had done some research on its solubility in nitric acid when alloyed with silver and had published the results (1). But little was possible in the confined space of Maiden Lane and his interest was largely directed to the work of his friend, Thomas Cock, who had learned chemistry in William Allen’s famous laboratory at Plough Court, Lombard Street, and had assisted his employer in his work on platinum (2); he later worked out a method for making platinum malleable and published it (3). He and Johnson came together when they married two sisters and thereafter Cock, who was a man of means and became neither employee nor partner, helped Johnson towards the refining and fabrication of the metal. Little was or could be done until Johnson moved in February 1822 to larger premises at 79 Hatton Garden and from then on the work progressed.

At that time the only native platinum available came from the Choco district of Colombia, whence it was smuggled by speculators who found some sale for it in Europe. There had been successful conversion to malleable metal in Spain (1786–1804) (4) and a larger use in France, which was increasing (5). In London W. H. Wollaston was working on it scientifically and commercially but in secrecy (6). The demand was for scientific apparatus, for weights and measures and, started by Wollaston and carried on by the French, for boilers for concentrating sulphuric acid. Johnson, with the aid of Cock and later in partnership with the latter’s nephew, W. J. Cock, expanded his operations slowly in the various commercial directions just mentioned.

A new source of raw material became available about 1825 with the discovery of quantities of native platinum in the Russian Urals; this
quickly grew and displaced the Colombian product, which dwindled to a very small supply for some eighty years.

Apart from Johnson's small contribution, the French became the main source of fabricated platinum until the middle of the century, when they were challenged by young George Matthey and his partners who were about to succeed Johnson on his retirement in 1860. Matthey had been collaborating with the French scientists, Deville and Debray, who had invented a new and easier method of melting platinum by means of their oxyhydrogen blowpipe, and had very much improved the commercial methods of refining it. This led him to the invention of joining the metal by fusion welding which much simplified the problems of fabrication. In ten years his firm had supplanted the French as the principal world suppliers.

Supplies from Russia

The general position about 1860 was that the Russian mining interests were supplying all the native platinum that was required. The main refiners were Johnson Matthey in London, Desmoutis Quennessen in Paris and a new-comer (1851) in Heraeus in Germany. For a time (1826–1846) the Russians were refining at St Petersburg and turning the product into coins but, owing to currency difficulties, they gave this up, called in all the coins that they could get and stored the whole stock in the vaults of the Imperial State Bank. The other refiners continued to draw their supplies from the Russian mines, with occasional contributions from the stock. Vigorous attempts were made to persuade the Russians to sell this but all failed until 1872, when George Matthey's partner, John Sellon, managed to secure the whole lot, then amounting to 378,000 oz. This heavily overstocked the market for the next ten years and had two far-reaching effects. First, since its quantity was far too much for a single firm to finance and use, it was split among the three refiners and so helped to bring them together in a loose alliance. Second, it practically ruined the Russian platinum mining industry and drove those concerned to give thought as to how they could become less dependent on these foreign refiners.

This Russian reaction also worked in two directions. First, there was determination to set up means for study of the platinum metals and the methods of refining them, so that one day Russia would be able to staff a refinery of its own. This began in a small way but was kept up, so that by the turn of the century there was in existence a definite laboratory under Professor L. A. Chugaev teaching people the chemistry of the platinum metals. So, when the opportunity at last came in 1917, there was a man (Baraboshkin) available to take it. The second and more immediate reaction was to bring the Russian producers together, if possible into a single unit, and...
George Matthey
1825–1913

Joining Johnson in 1838 as a young apprentice, George Matthey was taken into partnership in 1851 and became senior partner in 1860. He combined a brilliant scientific understanding with sound business ability and made a great contribution to the company's success in the latter half of the nineteenth century. He too was elected a Fellow of the Royal Society (From a portrait painted at the age of twenty)

then to protect its operations by taxation and duties. This dithered for many years and eventually it became obvious that the necessary finance could not be raised in Russia. Recourse was had to Paris, and a French company was formed based on French and Belgian finance. This was called the Compagnie Industrielle du Platine and the wry result of the attempt to unite the Russian producers was the formation of an almost monolithic institution financed by the abhorred foreigner (9). This company continued to function, and controlled 90 per cent of the output, until the 1914 war cut off its supplies.

The reaction of the three older refiners, then often referred to as the Allied Houses, to the operations of the CIP was also twofold. They were in a position of some strength since, at any rate until the latter built its own refinery, as they were the only available refiners and the only outlet for its product. They were therefore able to prevent it from entirely dominating the business. In 1912, in order still further to strengthen this position, they began to toy with the idea of erecting a joint refinery in Russia at Ekaterinburg (now Sverdlovsk) in the neighbourhood of the mines to secure the product of any miners disgruntled by the present situation. Heraeus was to supply a suitable resident engineer, Desmoutis was to arrange and collect the finance, and Johnson Matthey were to design the buildings and plant, to provide the know-how and to prepare and ship the equipment. The first local collaborator was the largest uncommitted mining concern in the field, the Nikolai-Pavdinsky Mining Co, and they were to find the site and build the refinery. Many delays occurred and it was not until after the outbreak of war in August 1914 that building began. Difficulties mounted, with the labour being called up for service in the Russian forces, while the equipment had to come in via Archangel, so that it was not until late in 1915 that refining began. In the meantime, the young man Baraboshkin had "presented himself to the builders and asked to be employed as manager". Under the circumstances, his offer was welcome and he took up the work for which some forty years of destiny had prepared him. In March 1917 the refinery was nationalised by the Kerensky Government of Russia and again in February 1918 by the Soviet Government, when it became the first unit of the infant Soviet platinum industry and passes out of this story for a few years (10).

### The American Market

The second reaction of the Allied Houses to the CIP was a decision to develop jointly the growing market for platinum in the U.S.A., and to keep the new-comer out of it. Until then each house had maintained its own mobile agent but the rate at which industrialisation was spreading made the idea of a joint organisation attractive. In 1894 Heraeus' agent and relative Charles Engelhard, who
The old houses in Hatton Garden from which the business of Johnson Matthey was conducted in the earlier years of its history

(From an engraving by Wilfred Lowe)

had been in America since 1891, had been appointed manager of the joint interests. In 1901 he acquired a small wire business and followed this in 1904 by taking over the larger firm of D. W. Baker & Sons, of Newark, New Jersey. In the new Baker & Co, the Allied Houses (as a unit) and the Baker family had 299 shares each while Engelhard had 100; the Directors were a Baker or two, a representative of Johnson Matthey, and Engelhard representing Heraeus and himself (the French did not appoint a Director). This arrangement continued until 1917, when the U.S.A. joined in the war and the Heraeus shareholding was sequestrated as enemy property. Engelhard, who in the meantime had become an American citizen, bought it. Later, in 1926, he was able to acquire the French holding as well and, in 1928 Johnson Matthey, not wishing to continue as minority holders, sold theirs to him as well. This gave him control of the company and henceforward he was a major factor in the platinum market.

Meanwhile there was great anxiety everywhere about the future of platinum supplies. This had begun long before and was to some extent another reaction of the market to the activities of the CIP as well as to an increasing demand from the chemical and electrical industries. At first almost the

Between 1828 and 1844 Russia made use of its platinum resources as a coinage metal and some 483,000 ounces of platinum were struck as 3, 6 and 12 rouble pieces but were later withdrawn. In 1872 John Sellon, George Matthey's partner, succeeded in securing the greater part of the stock of coins for refining by Johnson Matthey.
A hundred years ago—at the Paris Exhibition of 1867—Johnson Matthey demonstrated this platinum boiler, designed to handle five tons a day of sulphuric acid. Made by autogenous welding of the metal by direct fusion in a blowpipe flame, a process introduced by George Matthey, boilers of this type became a permanent feature of sulphuric acid plants until the introduction of the contact process after the turn of the century.

only significant result was a revival of interest in the original pre-Russian source in Colombia. Production there had fallen to a very low level in the hands of native prospectors but in 1907 there were enquiries for capital in London. These reached Consolidated Goldfields of South Africa who immediately approached their friends Johnson Matthey, with the result that a joint company, the Anglo-Colombian Development Co, was formed in 1911. This went to work very quickly but, for reasons first of economy and later for safety in war conditions, the growing product went direct to Baker & Co in New Jersey and this house equipped itself with a refinery to deal with it, at first, of course, on behalf of the Allied Houses. Unfortunately, however, as time went on the Anglo-Colombian company found itself in heavy competition with strong American interests and eventually had to give up and in 1922 was taken over by them. By that time the total output was a steady 40,000 oz per year.

A New Source in Canada

During the first decade of the century there came the beginning of what later became a very important source of platinum and indeed for a time the main supplier of the world. The English Mond Nickel Co had started to work an enormous deposit of nickel-copper ore at Sudbury, Ontario, and soon discovered that there were traces of the platinum group metals in it. These concentrated with the nickel in the smelting operations and, after the application of the Mond refining process, remained in a solid residue to the extent of several per cents. As Johnson Matthey had done all the early assaying it was natural that they should be asked to undertake the extraction. In 1909 a contract was made and this was renewed periodically until 1919 when the Mond Co took over the work themselves and in 1923 opened their own London refinery at Acton, which later also took over an output from the International
Nickel Co, a neighbour of Mond at the Sudbury mines. In 1919 also, in view of the growing importance of the American market, the selling of the products was transferred from Johnson Matthey to Engelhard and thereafter took place in New York.

The outbreak of war in August 1914 practically stopped the regular supply of Russian platinum to the Western countries. A few shipments got through in 1915 and in 1916 and even a last one in July 1917, but the Soviet nationalisation of the mines put a final stop to these. From then on for about seven years the world had only the Colombian and Mond outputs plus a few oddments from Australia and the turning-over of its own scrap. Fortunately this just sufficed. Meanwhile great speculation went on as to what would happen after the war. The news from Russia was thought to be too bad to be true and anyhow sooner or later the Soviets would need foreign currency. Nothing was known about Baraboshkin and the Nikolai-Pavdinsky refinery and all that was left was hope.

The first contact between the West and the Soviets came in 1921 when negotiations about an exchange of prisoners of war began. On behalf of Johnson Matthey, A. B. Coussmaker met Maxim Litvinov, the chief negotiator, and learned that the Russians were fully aware of the value of their platinum and intended to work it for themselves and to refine and fabricate it. Three years later they were in need of foreign currency and offered refined platinum of excellent quality in ingots. Johnson Matthey having through Coussmaker obtained their confidence, took up this business and between 1924 and 1926 negotiated three contracts covering 130,000 oz of metal in all. This they distributed to Engelhard, Heraeus and the French according to their respective requirements. In 1926 the Russians decided that they wanted to do their own selling and set up an organisation (the Edelmetalle Vertriebs AG) in Berlin for this purpose. The operations of this had a very serious effect on the market already suffering from marked lack of demand owing to the widespread world depression in trade and to strong rumours of the discovery of a new source in South Africa. The price of platinum fell and fell until in April 1931 it reached its nadir at £4 13s per ounce.

**The Stable Price Policy**

At this point it is desirable to pause for a moment to consider the influence of various factors on the platinum market. At the beginning of the present century, when an industrial demand for the metal first became evident, it also began to attract the attention of speculative buyers, whose operations caused severe fluctuations in its price. At that time Coussmaker, already Johnson Matthey’s chief adviser on the subject, urged that the future of the metal was likely to depend more on its industrial use than on the speculative, and that users would be discouraged if the price that they obtained for their scrap was much less than the price at the time of buying because of variations caused by speculation. From then onwards it was always Johnson Matthey’s policy to do their best to keep the price steady. This brought them into conflict with their great rival, Charles Engelhard, who believed that it was in the best interest of everyone if the price was allowed to move according to supply and demand, wherever the latter came from. Johnson Matthey’s policy, therefore, could not be fully implemented until 1958, when their suppliers became the principal factor in the market and gave them the supplies to maintain it.

Another point to be mentioned here before resuming the main course of the story is that after the end of the war the French platinum industry had all but disappeared. By 1910 the old business of Desmoutis Quennessen had become very weak and by 1918 it was in the hands of its bankers. In 1926 it went into liquidation and the relics were taken over by a younger and more energetic company, the Comptoir Lyon Alemand. They gradually rationalised the platinum situation in France and then did the same for the bullion business.
so that, by the outbreak of war in 1939, a lively industry was again active in French and continental markets in both of these fields.

The name of A. B. Coussmaker has already been mentioned and now a second resolution of his must be brought forward. He always took the view that Johnson Matthey's position before 1914 was a weak one of dependence on the goodwill of the CIP for its supplies and he persuaded the company to make great efforts to find alternative sources. The only result before the war was the Colombian development already described and then there followed the complete cutting-off of the Russian supplies and in 1921 the end of hopes that their refining might one day return. Coussmaker then made his great resolution that he would work tirelessly in the search for new sources until he had restored to Johnson Matthey the position that they had held in the platinum market a generation before.

**The South African Discoveries**

He made personal prospects in Canada, Australia and New Zealand, but nothing important came to light until 1925, when Dr Merensky discovered the platinum-bearing rock complex in South Africa that bears his name. This is part of an enormous system and outcrops over about forty miles on its eastern side (Lydenburg) and seventy miles on its western side (Rustenburg and Potgietersrust). At once he went to investigate and in 1926 he made an exhaustive examination of the whole of the outcrop and designated the localities which he considered to hold out the best prospects. It has so happened that those which he named then are the only ones where mining has subsequently taken place successfully. The deep-seated ore is a complex nickel-copper sulphide carrying the platinum metals as arsenide and other compounds and, at the actual outcrop and for a certain distance below it, this had weathered and lost most of its copper and nickel. It was therefore at first relatively easy to collect and handle and a boom of small prospectors got to work in 1926. But the weathered material was soon exhausted and the boom petered out; by 1928 only two mining companies were still at work, and conditions became more and more discouraging to them as the market price of platinum continued to fall. Those two surviving mines were owned by two strong companies, Consolidated Goldfields of South Africa Ltd and the Johannesburg Consolidated Investment Co Ltd, and the two men chiefly concerned were J. A. Agnew, the Chairman of the former, and J. G. Lawn, the mining expert of the latter. Coussmaker was by now fully convinced that South Africa could offer the supplies of platinum that were necessary to put Johnson Matthey back into their former position in the market.
With the formation of Rustenburg Platinum Mines in 1931, with Johnson Matthey as its technical advisers, smelters and refiners, a process for treating the output was developed and a smelting works in which to carry it out was built at Brimsdown.

To implement this he must keep these two companies in action and persuade them to combine to form a single producer in their two neighbouring mines in preparation for the better days which his experience told him would surely come. He succeeded in communicating his faith to Agnew and together they persuaded Lawn, so that in September 1931 the jointly-owned Rustenburg Platinum Mines Ltd was formed and got to work, with Johnson Matthey as its technical advisers, smelters and refiners, with responsibility for marketing all the platinum metals it produced. Coussmaker was on the road to honour his brief.

But meanwhile the handling of the South African product had not been free from difficulties. The oxidised material at first available presented much the same sort of problems as had the Mond Nickel Co’s concentrate of twenty years before. Johnson Matthey soon produced a process for treating it and put up a works on the eastern outskirts of London at Brimsdown in which to carry it out, but a number of failures took place elsewhere. The commencing output of Rustenburg Mines was to be 91,000 tons milled per annum, but they were hardly allowed a full year of it. The state of the market was such that both mines and treatment plant had to be shut down in April 1932, a state of affairs that lasted until August 1933. This was not entirely a bad thing because it coincided with the fact that before long Rustenburg would have come to the end of their oxidised zone of mineral and would be confronted with the unchanged sulphide ore. This called for new and different methods of concentration, smelting and refining, since there were now quantities of copper and nickel to be recovered and marketed as well as the values. The shutdown gave opportunity for the necessary research and planning both in South Africa and at Brimsdown, so that when everything did reopen, progress was uninterrupted and the South African platinum industry moved...
In 1934 a new source of platinum appeared when dredging began at Goodnews Bay in Alaska. A. B. Coussmaker secured the refining of the output from this operation for Johnson Matthey's American subsidiary J. Bishop & Co steadfastly forward to great success. That it did so at so early a period is without doubt due to Coussmaker's initiative, Johnson Matthey's technical experience, the faith of Agnew and the mining resources of his and Lawn's companies. Undoubtedly the industry would have been developed at some time, but it would have been much later, probably during or after the 1939–45 war, and at the hands of other people.

The prolonged depression in the platinum market with its continuous fall in the price had of course given rise to great anxiety among the producers, particularly those who had recently made heavy investments in their works. Coussmaker had been energetically putting forward his views about the need to maintain a steady and reasonable price to encourage a wider use of the metal in industry. To see if there was any possibility of arriving at a common policy, a meeting of producers took place in the summer of 1931 in London and there he was supported by R. C. Stanley, the President of the International Nickel Co, who had similar views about the price of nickel. As a result of this, in October 1931 a small company was formed in London called Consolidated Platinums Ltd, with a capitalisation of £1,000 in ten shares of £100. The Chairman was Lord Brabourne, of Consolidated Goldfields and the Directors J. G. Lawn, D. Owen Evans, of the Mond Nickel Co and J. E. Jansen, of Edelmetalle Vertriebs AG representing the Russians. There was a Committee of Management, all producers' men, and three distributors (Johnson Matthey, Baker & Co and Edelmetalle Vertriebs AG), each dealing on behalf of the principal with whom he normally worked. Initially the price of the metal was fixed at $30 (say £7) per ounce and the system worked reasonably well for about a year. Then, in October 1932, trouble began with the appearance in America of considerable quantities of so-called “secondary” platinum. The Americans insisted in selling this at a lower price and the whole arrangement broke down in the free-for-all that followed.

The affair of Consolidated Platinums, associated with the devaluation of sterling, and followed by the New Deal in the U.S.A. and then a breath of rearmament, brought about a turn of the tide in the platinum market and a slow and fluctuating climb back to the pre-slump prices until by 1934 the figure was steady at £7 15s per oz. In the meantime
Johnson Matthey had been quietly consolidating their interests in the United States in face of the strong position occupied by Charles Engelhard and Baker & Co, who had at their disposal not only the steady output of the Colombian mines but also the rapidly increasing output of platinum from the Mond Nickel Co and the International Nickel Co (since 1929 merged under the latter’s name), resources which gave them a virtual control of the market, with the Russians almost the only other supplier.

In 1919 Johnson Matthey had formed a small buying-and-selling company in New York (Johnson Matthey & Co Incorporated) but it had no refining or fabricating resources until 1930 when they bought a controlling interest in the old established American company, J. Bishop & Co Platinum Works of Malvern, Pa. This was of very great value to them in face of later events. In the meantime, however, their sources of raw material were very meagre. There was a small one in Ethiopia which went on for several years at about 6,000 oz per year and, of course, after 1933 the South African product began to be significant. In 1934, however, a new source appeared in Goodnews Bay, Alaska, and, in face of strong American competition, Coussmaker was able to obtain for Bishop the refining of this output which, by 1938, had reached 38,000 oz per year.

**Growth of Industrial Uses**

The revival of the demand for platinum after 1933 was firmly based on industrial uses. The speculators had vanished and the jewellery use continued to be small. The need for chemical apparatus increased with the growth of research, both academic and industrial, and in the thirties the demand for electrical parts, particularly wires and contacts, kept the workshops busy. But increasingly important was the catalytic use, especially that for the production of nitric acid for artificial fertilisers, and this was to grow rapidly and force the expansion of resources. It soon became apparent that the American supply was reaching its peak, before a possible decline, but that the South African production was capable of very great expansion. The first step in that direction was taken in 1938 when the milling capacity of the Rustenburg mines was raised to 1 million tons per annum and some of the preliminary operations at Rustenburg Platinum Mines have been extended many times over the last thirty years and now provide the largest source of the platinum metals in the world. Further expansion plans recently announced will increase output to approximately 750,000 ounces of platinum a year.
In 1937 a rebuilding plan was started for Johnson Matthey's administrative headquarters. This head office building now incorporates the site of the original houses from which P. N. Johnson and his junior partners worked to establish themselves as platinum refiners.

Smelting operations were transferred from Brimsdown to Rustenburg. But when the war came in 1939 there was still not enough and an entirely new works had to be designed, built and equipped at Brimsdown. This was to replace the old one but, in the event, the latter had to continue working as well for many years.

In 1947 an entirely new mine was opened some sixty miles north of Rustenburg, on a

Further expansion in platinum refining activity resulted in 1956 in the building of a completely new refinery at Royston. In this part of the plant, platinum and palladium are taken into solution, leaving rhodium, ruthenium, iridium and osmium as insoluble residues to be treated separately.
This section of the Royston refinery—the largest of its kind in the world—handles the precipitation, re-dissolving and re-precipitation of platinum and palladium. It is arranged on the cascade system to facilitate the movement of solutions.

site designated by Coussmaker in 1926 as next most favourable to Waterval and Potgieters-rust, by a new company, The Union Platinum Mining Co. This worked the mine independently for two years and then, in 1949, merged with the Rustenburg company.

New Refineries

These extensions put a great strain on refining capacity; the methods had been considerably improved but the seams were bursting. Final relief did not come until 1956, when a completely modern refinery, equipped with the latest devices in chemical engineering, was opened at Royston in Hertfordshire. And it was this latest expansion of output that finally put Rustenburg Mines and Johnson Matthey into the position of being the largest suppliers of platinum in the world and enabled them at last to carry out their joint policy of an industrial price without interference by anybody.

It remains to mention one vital factor in the great increase in demand for the metal which actuated these great expansions, and that was the fact that in 1952 the mineral oil business discovered the power of platinum to reform the hydrocarbons of their crude oil with the production of high-octane petrol, a discovery which revolutionised the enormous business in that commodity. In 1954 Johnson Matthey entered into partnership in a joint company with Universal Oil Products of the U.S.A. who owned the main patents concerned. This undertook the production of the necessary catalysts for the whole of the sterling area, work which is still expanding at a rapid rate.

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