The History of Matthey Bishop

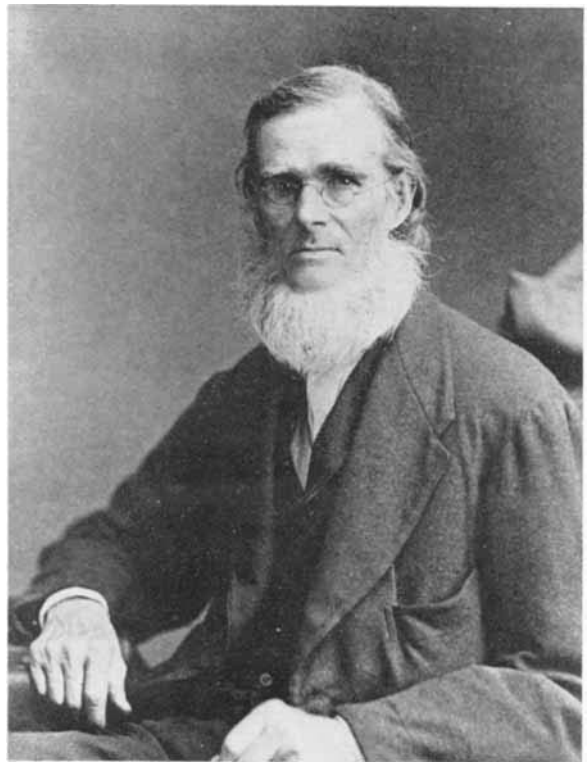
By Donald McDonald

Johnson Matthey & Co Limited

The completion of its new refinery and chemical complex marks the latest stage in the development of the first establishment in America for the refining and fabrication of platinum, originally set up by Joaquim Bishop in 1842. Before that, all pure and fabricated platinum was imported from Europe and distributed by agents of the English and French refining houses. In the main, the business concerned crucibles and similar laboratory ware, wires and foils, but as a growing demand for sulphuric acid emerged, enquiries arose for boilers for its concentration and these were met. But at that time no serious scientific work seems to have been undertaken anywhere which might have led to the setting up of refining, although, more or less by accident, important experiments were carried out on the melting of the metal.

These were made by Robert Hare (1781–1859), commencing in 1801, in which year he presented a paper to the Chemical Society of Philadelphia on an improvement on the ordinary air blowpipe. In this he was able to feed his burner with a continuous current of air or other gases from two storage vessels under hydrostatic pressure. This enabled hydrogen and oxygen to be used and therefore much higher temperatures were obtainable than had been possible before, and it became practicable to melt a number of substances which had hitherto been regarded as infusible. Among these was platinum and in due course a melted ingot of 28 ounces was produced.

In this work Hare was assisted by Joaquim Bishop, the son of English parents temporarily domiciled in Oporto, Portugal, where he was born in 1806. The French wars disturbed the family and in 1810 they emigrated to the United States, settling



Joaquim Bishop
1806–1886

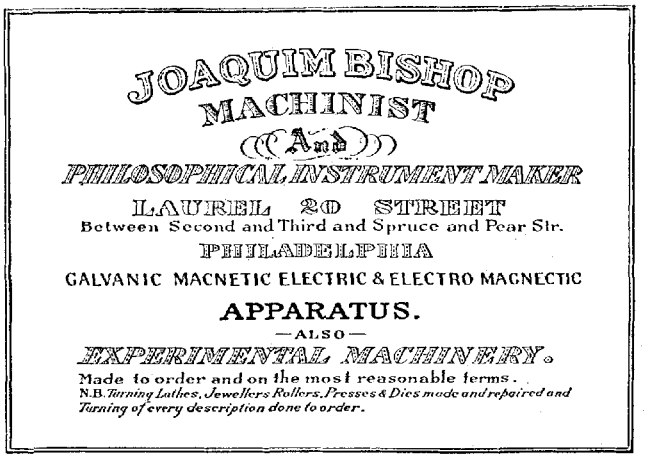
The founder of the company, Bishop was for some years employed as instrument maker to Dr Robert Hare at the University of Pennsylvania. In 1842 he set up in Philadelphia the first American establishment for melting and fabricating platinum, putting to commercial use Hare's discovery of the oxy-hydrogen torch

The recent opening of this new refinery and chemical plant in Winslow, New Jersey, provides Matthey Bishop with increased facilities for the production of the platinum metals and their compounds and for the recovery of spent catalysts and other materials containing these metals

first in Baltimore and finally in Philadelphia. In 1826 the boy apprenticed himself in the jewellery trade but left this to become a finisher in a brass foundry. These experiences with the working of metals were supported by some reading in the sciences so that, in 1832, he was able to secure the position of instrument maker in the University of Pennsylvania and assistant to Hare. As such he must have taken part in the latter's important electrical and electrochemical work, including of course the blowpipe. He also did some outside business, because there is an entry in The Philadelphia Directory for 1836 of "J. Bishop, manufacturer of machines". Then, in 1839, he left the University, it is said at Hare's suggestion, to become a "Machinist and Philosophical Instrument Maker" and opened premises in Philadelphia.

His work on platinum began in 1842, when he was urged by his friends to take it up, using the blowpipe in the process, and this is generally regarded as the foundation of the business that became J. Bishop & Co Platinum Works. Already in 1845 he was awarded a silver medal by the Franklin Institute of Pennsylvania for "skill and ingenuity in the manufacture of platinum scientific instruments". It is unlikely, at this stage in his career, that he did any refining, although we know that he did study the subject and make himself familiar with the work of Cloud, Wollaston and Tennant, all of which was available in the U.S.A. as early as 1809. His own operations probably never went further than the cleaning and separating of scrap, and reliance on getting platinum sponge and sheet of fair quality from the agents of the English and French refiners.

In 1858 he moved out of town to Radnor and again, in 1865, to Sugartown, where he bought an estate of 43 acres, remodelled the house and built a workshop. There he set up one larger and two smaller rolls, a draw



Joaquim Bishop's business card dating from 1839 when he left the University of Pennsylvania to set up as an instrument maker in Philadelphia. Three years later he began his work on platinum

bench, a smith's shop for forging, and a melting room with receivers for producing hydrogen and oxygen. The metal was melted in 20-ounce ingots and small laboratory apparatus was produced from them, there being no evidence of larger-scale work. The quality and workmanship was said by users to be excellent and "from the beginning its several steps were crowned with remarkable success". The staff was only two or three in number and Bishop was his own craftsman, salesman and traveller. A description exists of how, at the age of 67, he would come to town with the week's product of crucibles in a market basket slung over his arm and dispose of them to his various customers, while taking orders for the next week. He seems at an early stage to have replaced the joining of platinum by gold-soldering by inventing the process of fusion-welding and to have been very surprised when told in 1880 that George Matthey was credited in England with the invention of this technique "which I have been performing for the last 20 years or more".

In 1876 he was awarded a bronze medal for an exhibit of platinum at the Philadelphia Centennial Exhibition and he continued to be active in the business until about two years before his death in 1886. His assistant, and later partner, Edwin Cox, carried on the work until 1889 when Bishop's grandson and heir, J. B. Matlack, came of age. In January 1903 the workshop and refinery, with all their records, were completely destroyed by fire. But the business continued, with Matlack as President and Charles H. Kerk, who had come in on Cox's death on purchase of his interest and became Secretary and Treasurer. A new works was built and powered with electricity and steam, and in 1909 the Company was definitely

The silver medal awarded to Bishop in 1845 by the Franklin Institute of Pennsylvania for his work in the fabrication of platinum

The second plant established by Bishop in 1865 at Sugartown, Chester County, Pennsylvania, with the founder (left) and his small staff. The plant included a melting shop with means for producing hydrogen and oxygen, a forge, one large and two small rolling mills, a draw bench and a chemical laboratory

incorporated as J. Bishop & Co Platinum Works.

But in the meantime, conditions in the platinum business in the U.S.A. were beginning to change. In 1875 a small competitor with Bishop, named Daniel W. Baker, started at Newark, New Jersey, first as a manufacturing jeweller and later taking up the fabricating of platinum. By the early 1890s he was issuing a proper catalogue of crucibles, and a little later another small business was started, also in Newark, by Charles W. Croselmire who sold platinum in wire and sheet. But the largest changes followed the arrival in the U.S.A. in 1891 of Charles Engelhard as agent of the European firm of Heraeus, and he, in 1894, was appointed American representative of the newly-formed European Syndicate for the Protection of the Platinum Industry, sponsored by the three European refining houses. Engelhard immediately embarked on a policy of expansion, acquiring the business of Croselmire in 1901 and that of Baker in 1903 on behalf of the Syndicate; so, from then onwards, the Bishop business was confronted by an energetic and well-supplied competitor, and must have become dependent on its old scientific friends in and around Philadelphia. That it was able to build and equip its new works in 1903 at Malvern shows that it still had some considerable support and it appears that Matlack and Kerk were able to keep it going against ever increasing competition. The European participation in the Baker business ended after the 1914–18 war and Engelhard took over full charge of it and was able to secure adequate supplies of platinum originating in the American continents from the workings of the International Nickel Company and the revived production of Colombia. Life at Malvern cannot have been easy, and indeed there is evidence of real and mounting difficulties in the later 1920s.

At this stage Johnson Matthey began to

take an interest in the idea of allying themselves with Bishop in order to help their New York office to become a more effective outlet for the platinum which would one day be available to them. In 1927 they purchased a small interest in the Bishop company and gave them an agency for sales in the United States. In 1931 this was followed by a more comprehensive arrangement. At that time J. B. Matlack retired and C. H. Kerk became President, while his son Paul Kerk, who had been an employee since 1922, was made a Vice-President. Two years later the elder Kerk retired and the younger succeeded him as President; in the meantime Johnson Matthey had purchased the holdings of Matlack and Charles Kerk and so acquired control of the Company.

In 1931 business conditions in the U.S.A. were in a state of slump and, in addition, Johnson Matthey had little or no platinum to spare to send there. Bishop's American competitors, on the other hand, had all the metal they needed. The Company lost money for the next few years but Mr A. B. Coussmaker, after 1933 the Director responsible for Johnson Matthey's interests in North America, declared that, despite the depression in the U.S.A., and the losses Johnson Matthey must stay in the business because they could not afford to be squeezed out of the North American continent.

In these circumstances, conditions for the management and staff must have been very discouraging, but they seem never to have lost hope and there is much evidence of inventive and creative work under the enthusiastic leadership of Paul Kerk. In 1914 they had taken up the manufacture of spinnerets for the spinning of what was then called artificial silk (rayon). These were then made from hardened platinum and had to be

In 1934 a new American source of the platinum metals was established when dredging operations began at Goodnews Bay in Alaska. From the beginning the refining and marketing of the output has been undertaken by Bishop

Today the refining and fabricating activities of Matthey Bishop are backed by the immense resources of Rustenburg Platinum Mines of South Africa. Production of platinum alone is scheduled to reach 1,000,000 ounces a year by 1971 and to rise to 1,200,000 ounces by the end of 1972. Total reserves of platinum have been estimated at over 200,000,000 ounces

pierced with large numbers of small holes with no burrs.

At about that time too they were making fine capillary tubing, also of hardened platinum and platinum-gold alloy, used for hypodermic needles. In 1928 a British competitor appeared for these needles made of stainless steel and Bishop rose to this challenge very keenly. By 1931 they were making satisfactory tubing in this material in growing quantities, the first producer of it in the United States. In 1934 they went into the manufacture of the hypodermic needles themselves, and by 1935 they were turning out 1½ million a year of "the best needles in the U.S.A.". In 1938 the plant had to be enlarged but unfortunately the market was by no means freely open and Bishop reaped little benefit financially until the 1941–45 war came to open the floodgates of demand.

But the tubes had played an essential part in keeping the business going until a new and significant development took place on the platinum side. This arose out of the discovery in 1934 of valuable deposits of native platinum at Goodnews Bay, Alaska, the output of which had by 1938 reached 38,000 ounces a year. From the beginning Johnson Matthey secured the refining and marketing of this against very strong American competition. Bishop were of course quite unable to tackle the refining of such a quantity, and it all had to be shipped to London for that purpose. From the start, Coussmaker saw that sooner or later Bishop would have to be equipped with a refinery large enough to deal with this indigenous American product. Eventually the blockade of England after the outbreak of their war in 1939 forced the issue and with the help of the British Government the refinery was built and put into action in 1940. This ensured that the Goodnews Bay metal was kept in the family during the war and after.

Vincent W. Makin

President of Matthey Bishop since 1964 and a Director of Johnson Matthey

Under war conditions the needle business flourished and expanded into the making of the glass parts of the syringes as well. This continued until the end of the Korean war in 1953, but by then another new development on the platinum side had made its appearance when the petroleum industry set about up-grading its products into high octane gasoline by means of re-forming on a platinum catalyst, from which the platinum had to be recovered after use. The space previously devoted to needle production was hurriedly converted to this purpose. This work was related to a great deal of research on the catalytic properties of platinum and a strong lead was given in this direction to other and older parts of the Johnson Matthey organisation. Meanwhile the Tube Departments, after drastic reductions in 1956, continued to flourish in new and modernised plants set up in 1959 to 1960, while the platinum sections, now well supplied with raw material from the increasing output of Rustenburg Platinum Mines and Johnson Matthey, played a full and important part in an up-to-date and enterprising business.

In 1964 Vincent W. Makin joined Bishop as President, bringing with him a deep understanding of the precious metals industry. Unconstrained by involvement in the company's long traditions, he none the less adapted them to his own concepts of progress and created an atmosphere in which the innate energies of his team were put to maximum advantage.

The Company celebrated 125 years of operation in 1967 and changed its name to Matthey Bishop Inc to underline the close working relationship with the U.K. operations of the Group. For some time it had been apparent that continued success in the tube business would require a concentration of effort and capital resources that could not be spared from the ever increasing demands made by Matthey Bishop's growing status in the expanding field of the platinum metals. It was with great regret that the tube business was disposed of in 1969 as part of the strategy to optimise the Company's opportunities in the platinum business.

The year 1970 is one in which the new chemical and refining complex will begin to play its part in still further developing Matthey Bishop's important role in the platinum field, while a new centre for melting and fabricating has also just been completed on the outskirts of Malvern, the headquarters of the Company from its very early days.