

The National Museum of Science & Industry, London

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The Science Museum is the flagship of Britain's National Museum of Science & Industry. It forms a group, with two other museums, the National Railway Museum in York and the National Museum of Photography, Film & Television in Bradford. In addition, the Museum holds collections at Wroughton Airfield in Wiltshire and in Olympia, London. Both these reserve collections are accessible to the public.

The National Museum of Science & Industry is founded by the British Government through the Secretary of State for Culture, Media and Sport, and governed by a Board of Trustees appointed by the Prime Minister. It forms one of the nation's major national museums of which the others are the British Museum, the National Gallery, the Tate Gallery, the Victoria & Albert Museum, and the Natural History Museum.

The circumstances that led to the creation of the Science Museum and to the immense diversity and richness of its collections are twofold; on the one hand there was concern to improve scientific and technical education in the middle years of the nineteenth century, on the other a desire to record and celebrate the great achievements of scientists and engineers. This tension, between the need to educate and instruct and the wish to preserve and record, forms a continuous thread throughout the history of the Science Museum.

If any one man could be said to be the father of the Science Museum it is His Royal Highness Prince Albert (1819-61), Consort of Queen Victoria. He was a leading light in the movement to improve scientific and

technical education. He was also the driving force behind the Great Exhibition of 1851, the world's first expo. He proposed that its profits, of L 186,436, be used to purchase land south of Kensington Gore and to establish there institutions devoted «to the furtherance of industrial pursuits of all nations». In a memorandum dated 20 August 1853, he set out «a general plan for the buildings it is proposed to erect on the newly purchased ground at South Kensington», including what were described as «Museums or Schools of Science and Industry». The other immediate outcome of this movement, also urged by the Prince, was the setting up by the Government of the Science and Art Department in March 1853. Lyon Playfair (1818-98), chemist and scientific administrator, was appointed Science Secretary. He was among those who recognised that Britain's world leadership in industry was due both to her natural resources and her head start, but that she would «recede as an industrial nation, unless her industrial population became much more conversant with science than they are now». The aim of the Science and Art Department was to «increase the means of industrial education and to extend the influence of science and art on productive industry». Its plans included «museums by which all classes might be induced to investigate those common principles of taste which may be traced in the works of excellence of all ages».

Those exhibits from the Great Exhibition that had been acquired for preservation were brought together at Marlborough House in 1852 to form, with others from the School of Design, the beginnings of a museum of ornamental art. In 1856 the collections were moved to South Kensington and housed in a corrugated-iron building, soon nicknamed the Brompton Boilers. There was a preponderance of art objects but the rest (more accurately described as non-art objects than the Science Collections by which they were generally known) were many and varied. They included models of machinery and industrial plant, collections illustrating foods and animal production, examples of structures and educational materials-books, models and apparatus for use in primary education. On 24 June 1857 the South Kensington Museum was opened to the public for the first time.

In 1864 the Royal School of Naval Architecture and Marine Engineering was established at South Kensington by the Admiralty and with it was inaugurated in the South Kensington Museum a shipping and maritime engineering collection. Although the collection consisted at first mainly of models lent by the Admiralty, it was further developed in the ensuing years by the acquisition of models obtained from engineering, shipbuilding and shipowning firms, and from Lloyds Register of British and Foreign Shipping. In 1873 the School left South Kensington and was transferred to Greenwich together with the Admiralty's own models. The

rest remained to form the core of what was to become today's outstanding collection of shipping, naval architecture and marine engineering.

In 1874 the Royal Commission on Scientific Instruction and the Advancement of Science produced its final report. It recommended the formation of a loan collection of scientific apparatus as well as an exhibition. A powerful committee headed by the Lord Chancellor and including the presidents of the professional institutions and learned societies was formed to advise. The collection was to include «not only apparatus for teaching and investigation, but also such a possessed historic interest on account of the persons by whom, or the researches in which, it had been employed». And the exhibition, which was opened in May 1876 by Queen Victoria, was to be international in scope; several European countries as well as the United States accepted the invitation to participate in the organising committee was augmented by their representatives.

In the early 1880s the curators of the science collections and the professors and students of the science colleges that had by then transferred to South Kensington were finding library provision inadequate. The Government remedied this in 1883 by setting up the Science Library (now the Science Museum Library). It was formed by merging the science books from the South Kensington Museum's science and educational collections and the library of the Museum of Practical Geology in Jermyn Street, developed from the original gift of Sir Henry de la Beche (1796-1855).

Then, in 1884 came a major influx to the science collections, namely the Patent Museum, a collection of «patent models» consisting both of the replicas for instructional purposes and, more importantly, actual specimens of celebrated machines, built up by Bennet Woodcroft (1803-79), Assistant to the Commissioners of Patents from 1852 and founder of the Patent Office Library.

Bennet Woodcroft was born at Heaton Norris near Stockport. He became apprenticed to a silk weaver and spent his first forty or so years in the North of England apparently devoting much of his time to invention in fields as diverse as textile machinery and marine propulsion. In 1845 a screw propeller to a design by Woodcroft was fitted to I K Brunel's new iron steamship *Great Britain* which had just completed its first return passage to the United States. At about the same time Woodcroft was working on a variable-pitch propeller and later, in the 1850s, he was one of those who shared the £20,000 award voted by Parliament to a group of engineers whose development of the screw had benefited the Royal Navy. Woodcroft was clearly well regarded by his engineer contemporaries, notably Fairbairn, Eaton Hodgkinson, Whitworth and Nasmyth, and in 1847 he applied successfully for the Mechanical Principles of En-

gineering at University College, London. In recommending him John Graham, the Manchester chemist, wrote, «He is extensively acquainted with the history and uses of machines». It was not a statement that could have been made of many engineers then or now.

Woodcroft's position at University College was shortlived. His background in invention led him to a position on the Society of Arts committee on patent reform, then at a crucial stage in its work, and in 1852 he was appointed Assistant to the Commissioners of Patents and effectively head of the first office for handling the technical side of patents to be established in England.

In this capacity Woodcroft became involved in the debate, after the 1851 Exhibition, on the setting up of a museum. When he arrived at the Patent Office in 1852 he already had a large collection of «models» —later reported as numbering some 900— and in 1856 they were described as forming the nucleus of a «National Collection of Models of Invention». This was the Patent Office Museum and it found a home in buildings adjoining the newly opened South Kensington Museum.

Woodcroft was a relentless but selective collector. At first the idea of a patent museum was linked with the models submitted as part of the process of patenting, as was the established practice in the United States. But it is clear that it was the historically significant invention and educational demonstration of principles that were his prime concerns. In his farsightedness Bennet Woodcroft occupies a position of profound importance in the origins of the Science Museum's collections.

It was at his insistence that both *Puffing Billy* and Stephenson's *Rocket* were preserved. He pursued and successfully captured Symington's marine engine and, in 1864, arranged for the contents of James Watt's home workshop to be collected, his idea being «to build a room which should be the very «counterfeit presentment» of the classic garret, and to replace every article in the precise position which it occupied at Heathfield». Woodcroft also collected portraits under the title of «The National Gallery of Portraits of Inventors». Finally, in 1884, some five years after Bennet Woodcroft's death, the collection of the Patent Office Museum passed to the South Kensington Museum. To quote the official history, «the Museum might then be said to have begun to assume the form of a national museum of science and industry». In collecting celebrated machines, and thus immortalizing their inventors, Woodcroft made a major contribution to the development of museums and although the concept of *in situ* preservation is more recent, his assiduity in the recovery of classics of industrial development entitles him to be called one of the founders of industrial archaeology.

The arts and science collections, although still together in the same building, had gradually been assuming separate and distinct identities and this was recognised in 1885 by naming the latter the Science Museum. In 1899 Queen Victoria laid the foundation stone for the new Art Museum on the east side Exhibition Road. She ordained that the new museum should be named the Victoria & Albert Museum. For a while this named was applied to the South Kensington Museum as a whole, embracing both art and science. However, with the opening of the new buildings by King Edward VII in 1909 came a formal separation of the Science Museum and the Art Museum, the latter taking the title of the Victoria & Albert Museum all to itself.

By now the site for a building to house the science collections had been identified on the west side of Exhibition Road between the Natural History Museum and the Royal College of Science. Having fought off a threat to build a new art gallery there (this was eventually to become the Tate Gallery) and with the Victoria & Albert Museum safely in its new buildings, it was time to turn to the proper housing of the Science Museum.

The government appointed a committee under the chairmanship of Sir Hugh Bell, prominent in the iron and steel industry, to consider the aims of the Museum and how they might best be achieved. The Bell Committee completed its report in 1912 and its recommendations were accepted. The report began with a section entitled «Purposes the Science Museum should serve». This is such an admirably succinct statement, which in its essentials is as cogent today as when it was written, that it is worth quoting in full:

So far as is possible by means of exhibited scientific instruments and apparatus, machines and other objects, the Collections in the Science Museum ought to afford illustrations and exposition of the various branches of Science within its field and of their applications in the Arts and Industries. The Museum ought also to be a worthy and suitable house for the preservation of appliances, which hold honoured place in the progress of Science or in the history of invention. Where objects that fall under these various categories are suitable arranged and displayed, visitors of widely different types find advantage in examining them. Young students who are prosecuting definite studies may derive much benefit from systematic examination of special sections or groups of objects. So too the Museum should serve others who on particular occasions wish to obtain from the Collections information regarding recent advances in Science or in Industries, or about some subject which, at the moment, is either of general public

interest or of professional importance to themselves. Again the objects exhibited or otherwise preserved in the Museum should be accessible for close inspection by accredited visitors who are engaged upon investigations related to Science or invention. A large proportion of those who visit a Museum have, however, no such definite enquiries in view, and it is of much importance that objects should be so selected and exhibited as to arouse the interest of these visitors, and to afford them in as simple and attractive a form as possible an opportunity of obtaining at least general ideas on the subjects which the Collections illustrate.

The Bell Committee proposed that the Museum should be built, on the west side of Exhibition Road, in three large blocks. Work started on the East Block of the new building in 1913. With the shell of this new building complete, the First World War prevented it being taken up for Museum purposes. But in 1920 Sir Henry Lyons (1864-1944) took over as Director and it was under thirteen years of his inspired leadership that the Science Museum rose to world stature. The new Museum was formally opened by His Majesty King George V in 1928. By then a number of other recommendations of the Bell Committee had already been implemented. Temporary exhibitions became a feature of the Museum's programme, notably one in 1919 marking the centenary of the death of James Watt, and in 1924 a guide lecturer service was inaugurated. In 1931 the Children's Gallery was opened. This was to become one of the most popular features of the Museum and helped to raise the number of visitors to an estimated million and a quarter by 1933, more than any other museum in Britain, and exceeded in Europe only by the Louvre.

The Science Museum closed shortly after the outbreak of the Second World War; the objects were evacuated to places of safety and many of the staff transferred to war service. Only the Library remained open, satisfying wartime demand for scientific literature. With the coming of peace the Museum opened again in February 1946. It was at last decided to erect the second stage of the building envisaged by Bell and by 1951 the Centre Block was partially complete, just in time to accommodate the Science Section of the Festival of Britain. It was not finally completed however until 1961. Then began a period of twenty years of steady expansion with further space being added in the 1970s. In 1980-1 the objects from the Wellcome Museum of the History of Medicine, which the Wellcome Trust had placed with the Museum in 1976, were put on display. This outstanding collection relating to medical history, a subject new to the Museum, was one of the most important acquisitions in its history and

significantly broadened its portfolio of activities which today span the physical and medical sciences, as well as engineering and industry.

The Library too was given a new direction during the 1970s. It had lost its national lending function in 1962 and during the 1960s its neighbour, Imperial College, had considerably developed its own library services. In 1971 the Government directive that led to the establishment of the British Library indicated that the Science Museum Library should be developed as a national reference library of the history of science and technology, with particular emphasis on supporting the work of the curators in the other departments of the Museum. The Science Museum Library moved into new accommodation contiguous with the Lyon Playfair Library of Imperial College and there is now a close working relationship between the two.

To date the Museum's public activities had been concentrated within its building in South Kensington although substantial reserve collections were housed in warehouses elsewhere in London. In the early 1970s, however, another significant development took place. Under the terms of the 1968 Transport Act the collections of railway material that had been built up under the auspices of the British transport Commission since 1951 were transferred to the Department of Education & Science, of which the Science Museum was by then a part. It was decided that a new national museum should be developed to house this incomparable railway collection and after prolonged debate about its location it was decided to convert the North Motive Power Depot at York, which had recently closed as a result of the change-over from steam to diesel-electric traction. York was a good choice for a new National Railway Museum. A railway centre in its own right, with a long and distinguished history, it was also the home to Britain's first railway museum which had been opened in 1928 by the London & North Eastern Railway in small premises on Queen Street. With a decision to establish the National Railway Museum at York, under the direction of the Science Museum, the National Railway Collection had a new and permanent home. The Queen Street museum was closed and in September 1975, on the 150th anniversary of the opening of the Stockton & Darlington Railway, the National Railway Museum in York was opened by His Royal Highness the Duke of Edinburgh.

In 1983, under the terms of the National Heritage Act, the National Museum of Science & Industry was transferred from a Government department to a Board of Trustees appointed by the Prime Minister, thus bringing it into line with the other major national museums and ending a tradition going back 127 years. Today the Museum is funded by grant-in-aid from the Department for Culture, Media and Sport, restoring at least

symbolically the link between arts and manufactures envisaged by Prince Albert.

Further opportunities for development outside London arose during the 1980s. The British prototype of the Anglo-French supersonic airline *Concorde 002* had been taken into the Science Museum's National Aeronautical Collection and a home had to be found for it. In 1980 it was moved into a purpose-built museum building adjoining the Fleet Air Arm Museum at Yeovilton in Somerset.

On a much larger scale was the establishment of the National Museum of Photography, Film & Television in Bradford, the first part of which opened in 1983. This Museum now houses most of the Museum's photographic material including the outstanding collection of Talbot images, transferred from South Kensington in 1989. At the heart of this major component of the National Museum of Science & Industry is a large-screen IMAX cinema; a second screen and auditorium opened in 1992 and a complete rebuilding of the Museum, adding further galleries and a third cinema, opened in June 1999. The museum in Bradford, with 750,000 visitors a year is the most visited museum in England outside London. And the National Museum of Science & Industry as a whole serves an audience of some 3,000,000 people each year at its major locations in London and Yorkshire.

Today, the Science Museum is on the eve of another great period of expansion. With support from the Wellcome trust and the Heritage Lottery Fund, and major contributions from corporate sponsors, a new western extension to the Museum—the Wellcome Wing—is due to open in June 2000. This will increase the Museum's public area by some 30% and enable it to once again fulfil its original purpose, as set out in the 1850s. The Wellcome Wing will be devoted in its entirety to presenting contemporary science and technology and has been designed specifically for fast changing exhibitions and displays. Initially, the key themes of the Wellcome Wing will include the new biomedical sciences, with particular emphasis on genetics, and the digital revolution and all its implications. Other areas will be laid aside for short-term exhibits which will enable the Museum to present innovation in science and technology quite literally, as it takes place. A further feature of the Wellcome Wing will be a 450-seat IMAX theatre, a simulator, and a new restaurant and retail facilities.

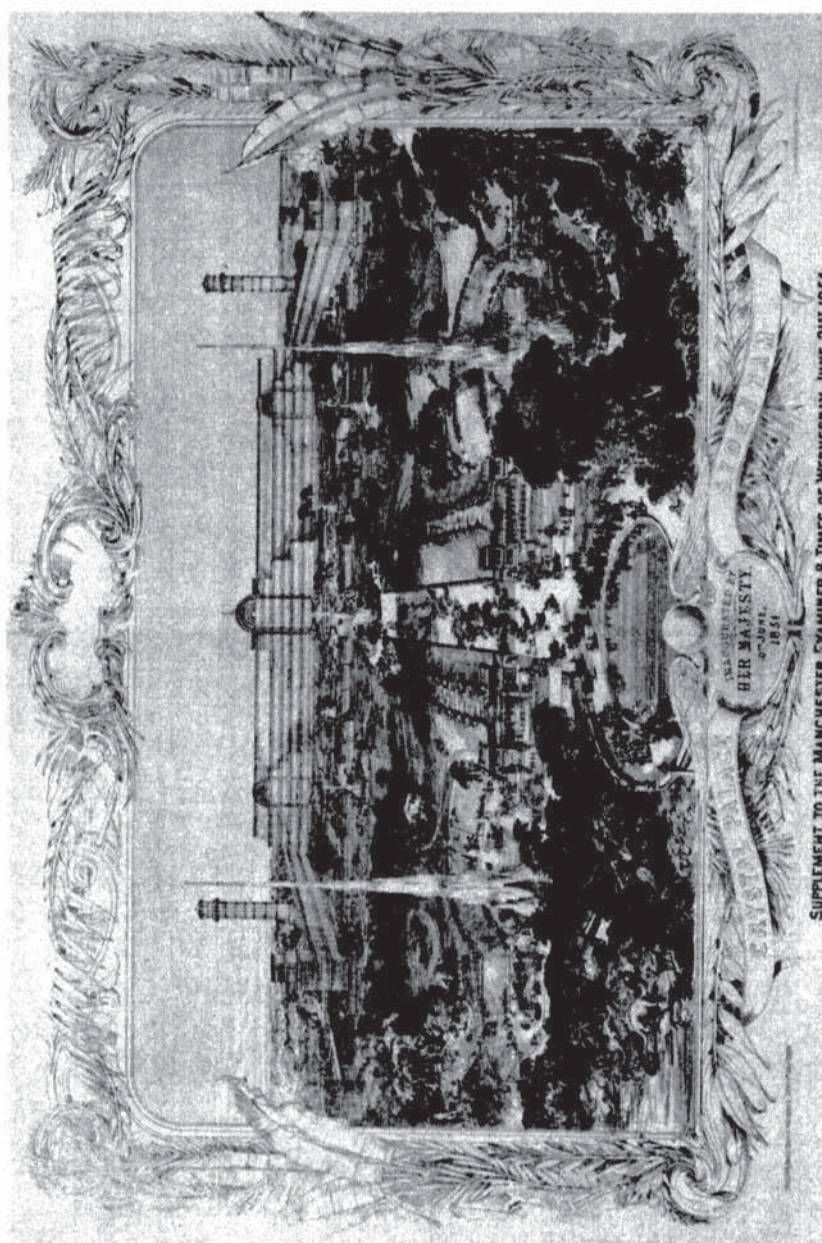
The opening of the Wellcome Wing will complete the main structure of the Science Museum, as defined in the Bell Report of 1911, but, unlike the original recommendations, the new western extension does not fully occupy the site available. To its west will be an elegant landscaped garden and on the street frontage of Queen's Gate, at the extreme western

end of the Museum's estate, construction will start shortly on a further building designed to be a «Centre for Science and the Public». Here will be based the Museum's public understanding of science staff, together with the relocated headquarters of the British Association for the Advancement of Science. Extensive conference facilities will be provided in lecture theatres and there will be a large circular forum designed for debate and fully equipped for radio and television broadcasting.

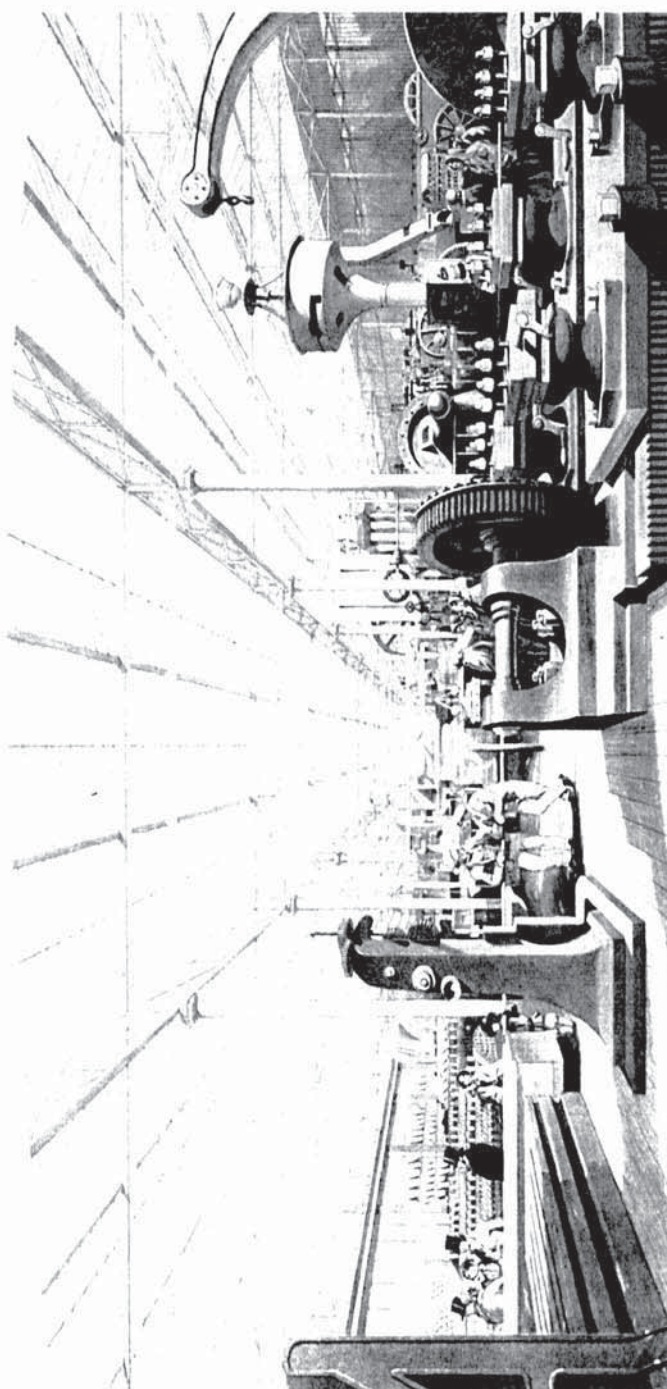
As the Museum enters the new millennium it sees its original functions, of exposition and preservation, as pertinent today as they were 150 years ago. What has changed however is the public's view of science and technology. No longer can those who promote change through scientific and technological innovation assume widespread and unquestioned public support. Indeed, it is one of the paradoxes of modern developed societies that the greater the benefits that accrue from science the greater the questions asked of scientists. So, the Museum will increasingly become a forum for debate, a place where the scientific and technological community and the wider public can meet together to explore and discuss and, we hope, generate a mutual respect and understanding.



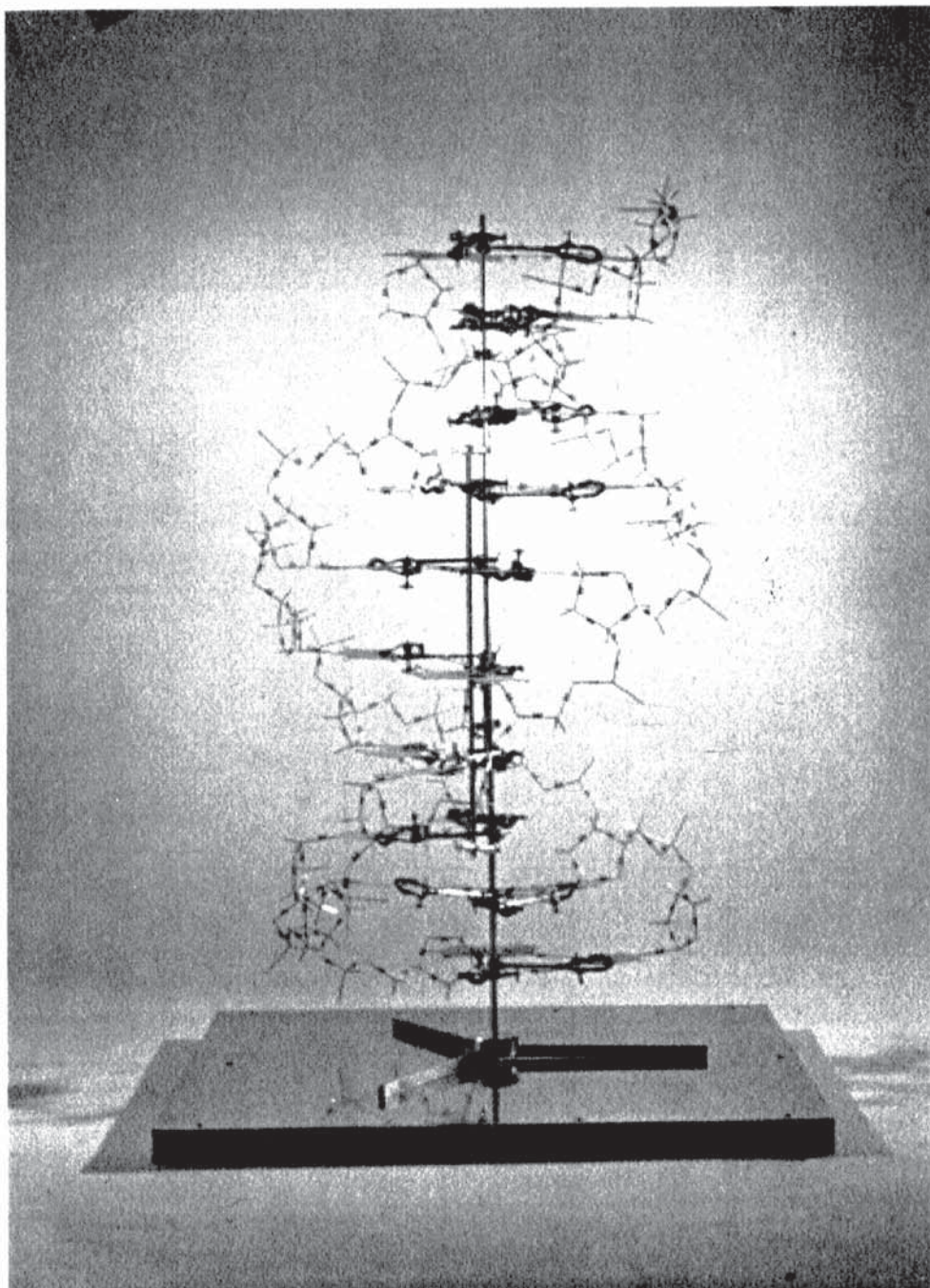
Coalbrookdale by Night, 1801. This remarkable oil painting by Philippe-Jacques de Loutherbourg (1740-1812) shows one of the Coalbrookdale Ironworks at night silhouetted against the fiery glow of a furnace being tapped of its ore.



Crystal Palace, Sydenham, South London, 21 June 1854. Lithograph by Maclure, McDonald and Macgregor, published in a supplement to the Manchester Examiner. Crystal Palace was built to house the -Great Exhibition of the Works of the Industry of all Nations-, conceived by Prince Albert (1819-1861). The exhibition was held at Hyde Park before the structure was moved to Sydenham. It was the first large-scale prefabricated ferrous (iron and glass) structure, and was designed by the Joseph Paxton (1801-1865).



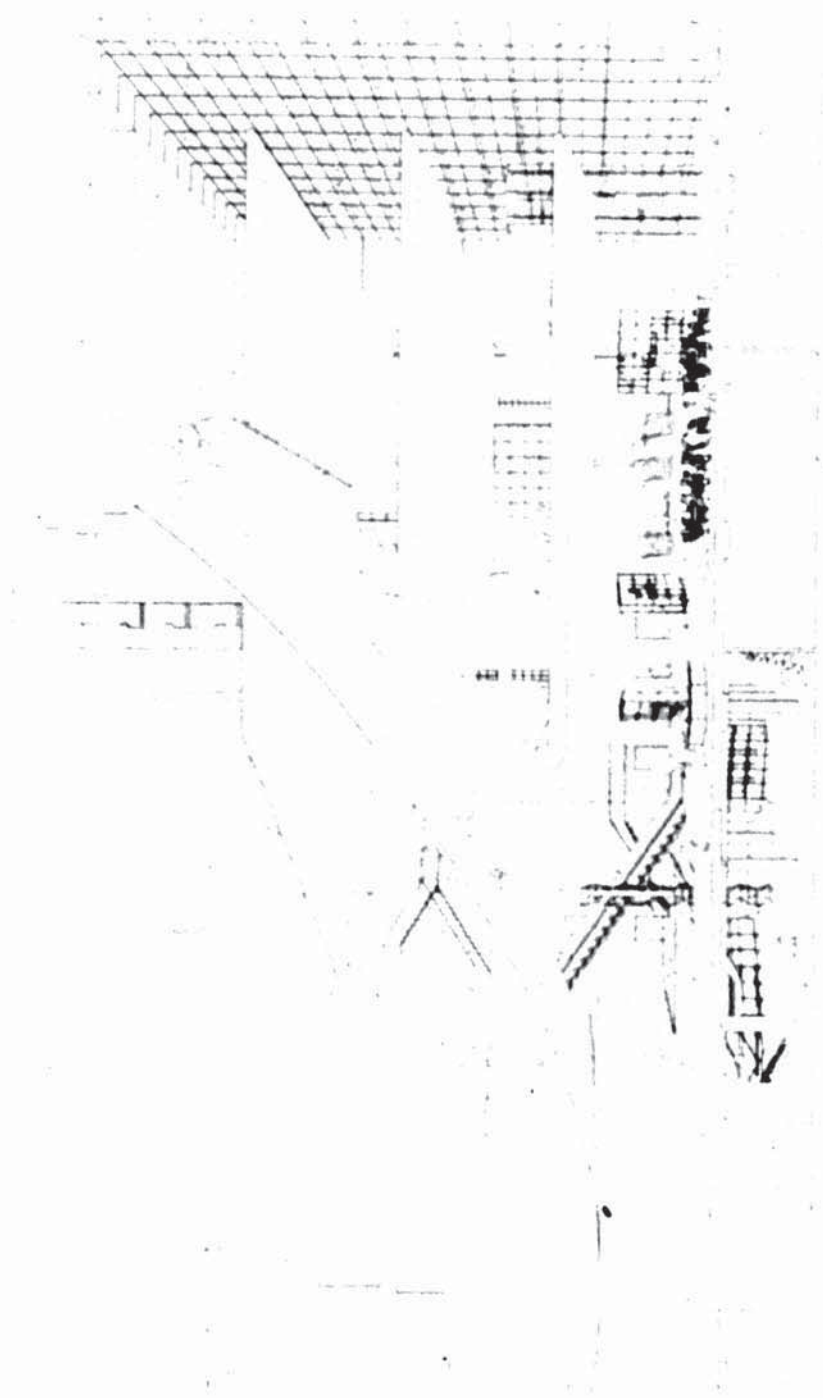
Whitworth's stand of machine tools, for planing, slotting, drilling, boring, etc. at the Great Exhibition, 1851.



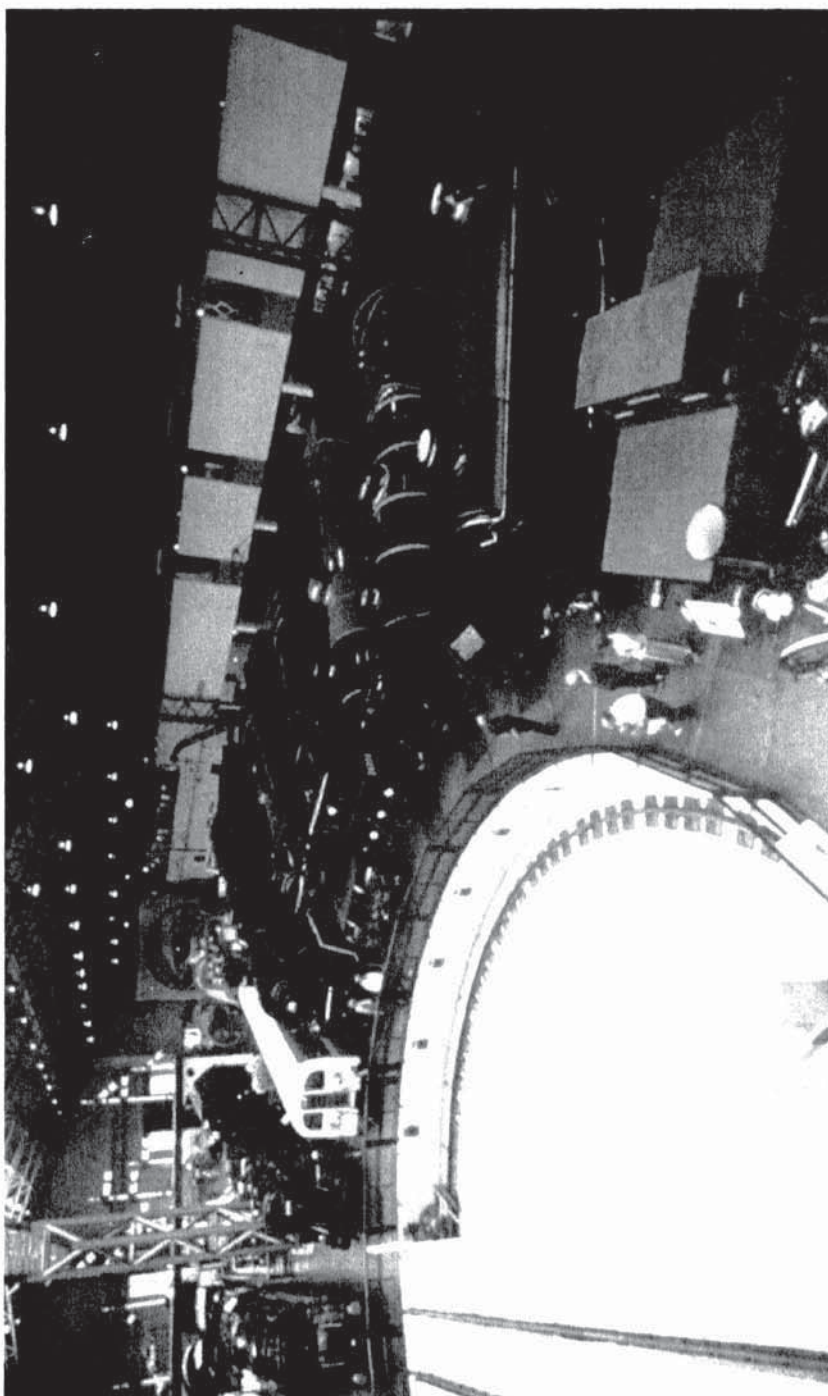
DNA molecular model. 1997. Replica. Francis Crick (1916-) and James Watson (1928-) made the original DNA model in 1953 working at the Medical Research Council Unit at the Cavendish Laboratory in Cambridge, England.



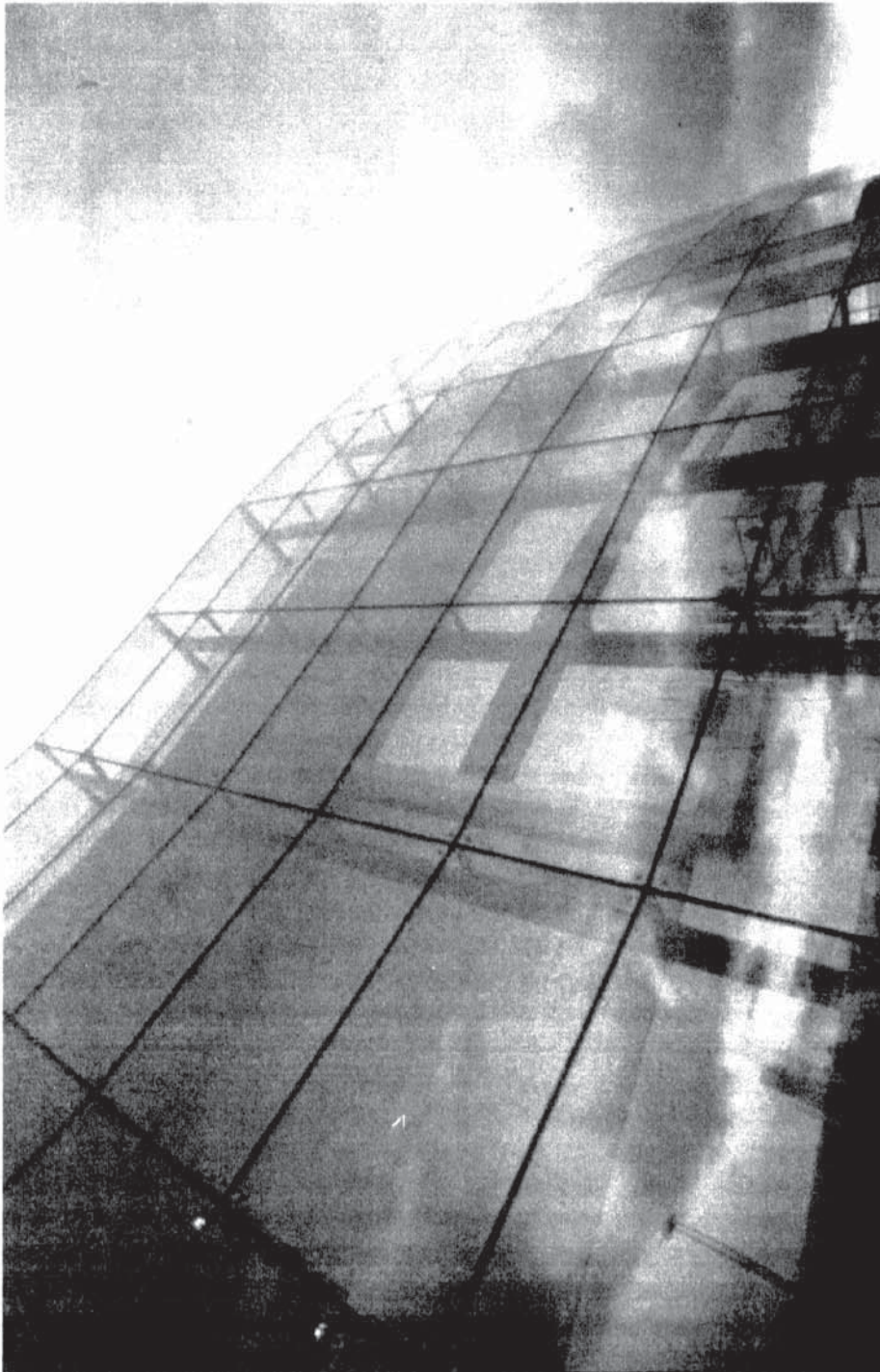
The Information Desk in the East Hall of the Science Museum, London 1990s.



Computer generated artist's impression of the new Wellcome Wing, built at the Science Museum, London, 1995-1998.



National Railway Museum. Great Hall. The turntable in the Great Hall. National Railway Museum (RNM), York, 1999. The National Railway Museum documents the origin and expansion of the railways to the present day. It houses the largest railway poster collection in the world and an extensive photographic collection, including 10,000 photographs taken by the British Transport Films Unit (BTF).



Glass frontage of the National Museum of Photography, Film and Television (NMPFT), Bradford, May 1999. The NMPFT is part of the National Museum of Science and Industry (NMSI).



Night view of the National Museum of Photography, Film and Television (NMPFT), Bradford, May 1999.