

Transport and Technology Collections

Introduction

The Transport and Technology Collections reflect the leading role played by Glasgow and the West of Scotland in advances made in scientific enquiry and industrial production.

The technology collections were first developed for the opening of the City Industrial Museum in 1870. This was intended to highlight the output of Glasgow's industries and included samples and models from the important chemical, textile, locomotive and shipbuilding firms in the area. There were also examples of innovations in the making of optical and scientific instruments and communications technology. The museum displayed Glasgow's civic pride in its scientific and industrial achievements and provided a prestigious front window for its products. It also played an important didactic role in teaching Glasgow's young citizens about engineering and technology.

Many of the collections were loaned and often replaced by newer more impressive exhibits. Even items formally acquired into this collection were regarded with the same spirit of renewal and were often discarded in favour of more representative examples of modern industry. Although much has been lost there is still much of great interest that has survived from the early days of the museum. This is partly as a result of industrial failure when loaned material from failed companies was retained and eventually assimilated into the core collections. Such a direct relationship between the city's industries and the museum collections gives them an added degree of significance. This is particularly true of the outstanding ship and marine engineering models. The Clyde was at the forefront of revolutionary change in the shipbuilding industry so not only is the collection a truly representative sample of the Clyde's output, it also represents an important period of ship design and building that is unsurpassed anywhere in the world.

In 1962 Glasgow's trams were withdrawn from service. This gave great impetus to secure the preservation of a number of Glasgow Corporation tramcars. This led to the establishment of a new Museum of Transport, located in the old tram works on Albert Drive. Its collections were built up around this time with significant acquisitions culminating today in an unrivalled Scottish car collection, a comprehensive collection of Scottish built railway locomotives, a small group of buses noted for their innovative designs and a wide variety of horse-drawn vehicles from the West of Scotland. It also has the second largest fire-engine collection in the country, a Spitfire, caravans, subway vehicles and a station, some very rare commercial vehicles and a collection of cycles that includes almost certainly the oldest bicycle in the world. Unusually for Scottish museums, Glasgow Museums has acquired collections of prams and disability transport, both reflecting a growing focus on users and their needs. The most significant recent acquisition is a powerful steam locomotive from the 1940s, a prime example of Glasgow's locomotive builders export business.



Road Transport: Cars

During the early decades of the twentieth century Scotland produced 70 independent car manufacturers. Only one of these, Albion, survived into the 1940s. After this date mass produced cars from all over the world became the standard.

Collection Size

There are 86 cars in this collection: 19 veteran (cars built up to 31st Dec 1918); 22 vintage (cars built between Jan 1919 and Dec 1939); 28 classic (cars built between Jan 1940 and Dec 1975); 17 modern (cars built from Jan 1976 to the present); nine engines; approximately 1000 car parts; 2000 photographs, 1000 negatives and several thousand documents; costume (approx 30 items).

Collection Description

There is a superb range of hand-built veteran and vintage vehicles built by Scottish manufacturers: four Arrol-Johnston cars and one Galloway, of which Arrol-Johnston is the parent company, four Albion cars, a Beardmore taxi and an Anderson Special racing car.

The remainder of the collection is mixed and offers examples of the makes of cars that were commonly seen on the streets of Glasgow e.g., Austin 7, Morris Minor, Hillman Imp and Vauxhall Cavalier. Two of these cars are unregistered and consist of a 'cut and shut' and a crashed vehicle. The only steam powered vehicle is a Stanley Steam Car built in 1919. There are nine engines of which two are experimental: the Robertson of 1935 and the Anderson; the others are standard production engines. The associated collection of car parts, accessories and special collections is wide ranging, from petrol pumps to images to parking meters. A few items of motorists' clothing is rare.

Collection Significance

The Scottish car collection is unrivalled anywhere in the world; it is the only collection containing vehicles from six manufacturers producing cars in Scotland dating from 1900 to 1927. The most significant of these are seven Argylls, four Arrol-Johnstons and three Albions. When collecting began at the beginning of the twentieth century it was not the intention to build a specific car collection. Although the first car, an Albion chassis, was acquired in 1908 the Scottish car collection only took shape in the early 1960s when the decision was made to create a Museum of Transport. The active collecting that ensued included the acquisition of the first Hillman Imp to come off the Linwood production line.

The largest part of the collection is, with the exception of the American built Ford Model 'T', Stanley Steam Car, and the Japanese Mazda RX7, representative of British and European car manufacture from the late nineteenth to the end of the twentieth centuries. The earliest is a Benz Comfortable manufactured in 1897. The importance of this grouping is the resonance that people have with it rather than industrial production or technical performance. A good example of this is the Porsche gifted to the museum by Signeur Izzi who ran an ice-cream business in the local area. He gave the car as a way of saying thank you to Glasgow for being good to him and local people associate

the car with him. Importantly, almost all of the cars have sound provenance and a considerable amount of research has been undertaken to verify validity.

The engine collection is small but within it are experimental engines produced by Scottish manufacturers such as Robertson's two-stroke petrol engine, an early single sleeve-valve V4 built in the 1930s. One of the most important is an Anderson engine built by James Anderson, a garage proprietor and brilliant engineer, for his Special racing cars, one of which, the Bug, is in the collection. These cars were famed for their phenomenal acceleration and won numerous competitions.

The collection is also significant for the numerous car parts and accessories that relate to the vehicles. These include spare wheels, windscreen wiper blades, distributor caps, door handles, mirrors, windscreens, pressure gauges and assorted body panels. There are also sundry pieces of street and garage forecourt furniture such as parking meters and petrol pumps. In addition, there is a small but rare grouping of motorists' dust coats, caps, gauntlets, goggles and veils from between 1900 and 1920.

The support material is extensive. Of particular importance are the George Oliver Collection and part of the Royal Scottish Automobile Club Collection rescued by a member and donated in 2004. The George Oliver Collection consists of approximately 2000 photographs, 1000 negatives, a number of slides, professional correspondence, periodical articles and automotive press releases, brochures and research. Oliver was an eminent motoring journalist and photographer based in Glasgow during the twentieth century. The RSAC collection includes approximately 1000 photographs, 30 trophies and badges, a minute book, a selection of club year books, two framed testimonials, several framed large photographs and driving licences.



Bibliography

Macdonald A. Craig and Browning A. S. E. (1960-61) 'History of the Motor Industry in Scotland', in *Proceedings of the Automobile Division The Institute of Mechanical Engineers*, Number 9

(1968) *Scottish Cars*, Corporation of Glasgow

Smith, R. A. R. (1980) *A Guide to the Museum of Transport*, Glasgow Museums

Smith, R. A. R. (1988) *A Guide to the Museum of Transport*, Museums & Art Galleries

(2004) *A Guide to the Museum of Transport*, Glasgow City Council (Museums)

Dodds, Alastair (1996) *Making Cars (Scotland's Past in Action)*, NMS Enterprises

Webster, Jack (1996) *In the Driving Seat: A century of motoring in Scotland*, W. J. Williams & Son Books Ltd



Road Transport: Buses

Buses are an integral part of mass transportation. Motorbuses became prominent in Britain after World War I and quickly became a regular sight on the streets of every city and town. The growth of bus transport led to the decline of tram and urban railways and they continue to be a significant aspect of transport.

Collection Size

Internal combustion double-decker buses (2: Albion Venturer E.G.A. 79 and a Leyland Atlantean LA1); electric trolley bus TBS 13 (1); single-decker trolley bus TBS 13 (1); a small collection of engineering and motor related items; horse-drawn bus models (2); trolley-bus model (1).

Collection Description

The focus of the collection are three Glasgow Corporation Transport Department vehicles: two double-decker motor buses, an Albion Venturer E.G.A. 79, built in 1949, and a Leyland Atlantean, of the type introduced in 1958; and a single-decker trolley bus TBS 13, dated 1958. Associated with the vehicles are sections of bus engines: a gearbox and a torque converter.

There is also a collection of bus stop and fare stop signs relating to travel between the 1940s and the 1990s. Working life on the buses is represented by Glasgow Corporation uniforms and ticket machines. Documents include regulations, tickets, promotional material and photographs of Glasgow buses. There are also 18 albums of photographs showing buses from around the United Kingdom.

In addition there is a group of models consisting of two horse-drawn buses, one made in the 1860s and a wooden Glasgow Corporation Transport bus from 1947. There is also a trolley bus model representing the mid-twentieth century.

Collection Significance

Although there are only three buses in the collections, the vehicles are fine examples of innovative designs, reflecting important changes within public transport, and all are in good condition. The Albion Venturer E.G.A. 79 is the only CX37 type bus in preservation. It is of all-Scottish build and has a Croft 56-seat, highbridge body and India tyres. The vehicle was withdrawn from service in 1963 and transferred to the Glasgow Museums Transport Department on the advice of the Scottish Branch of the Omnibus Society.

The Leyland Atlantean LA1 was a revolutionary design which not only changed the appearance of the buses in Glasgow, but also in many other British towns and cities. The main innovations were the front access for passengers and its potential as a driver only vehicle. The LA1 was the first Atlantean in service anywhere and came to Glasgow directly from the 1958 Commercial Motor Show in London. It was the first Atlantean to be built by Walter Alexander's in Falkirk, where over 2,000 Atlantean bodies were subsequently built. Glasgow Corporation Transport purchased a further 1,448 Atlanteans between 1962 and 1981.

The first trolley buses ran in Glasgow in April 1949 and were in service until 1967. The TBS 13 is the only known example of this type of trolley bus in existence. Like the LA1,

the TBS 13 also came to Glasgow after the 1958 Commercial Motor Show. It is unusual in that it is 35 feet in length, which was longer than that permitted by law at the time it entered service. This extra length vehicle was promoted by Mr Fitzpayne, Manager of Glasgow Corporation Transport, based on Continental designs for single deck trolley buses. This innovative vehicle was seen as an influence on the introduction of longer single deck buses within Glasgow and Britain. Importantly, the route history of this vehicle is known.

There is a small grouping of related engineering and motor items including a gearbox and a torque converter. These show how the hidden parts of a bus work. The small street furniture grouping represents the organisation of passengers, route markings, and bus travel from the 1940s until 1990s. This is not a comprehensive grouping, but it provides an important insight into public bus travel in Glasgow.

The grouping of working life items includes Glasgow Corporation Transport uniforms, ticket machines, tickets and other promotional material that contribute to the knowledge and understanding of travel on the vehicles. The tickets and promotional material are important because they help to reconstruct the routes from different periods. The group of photo albums of buses adds a British and Northern Irish context to the bus collection.

An important part of the significance of the bus collection is that both the Albion Venturer and Leyland Atlantean are in good working order. A limited number of people are allowed to travel on these buses, which gives an experience of what public transport was like in the 1950s and 1960s.



Bibliography

(1969) *Glasgow Corporation Transport, Motor Buses*, Glasgow City Corporation

Smith R. A. R (1980) *A Guide to the Museum of Transport*, Glasgow Museums & Art Galleries

Smith R. A. R (1988) *A Guide to the Museum of Transport*, Glasgow Museums & Art Galleries

(2004) *A Guide to the Museum of Transport*, Glasgow City Council

Phillips, Ron (1998) *Leyland Atlantean: 1958-98 Forty Years of Service*, Gingerfold Publications

Booth, Gavin (1984) *Leyland Atlantean*, Ian Allan.



Road Transport: Cycles

The first popular craze for cycling occurred in the 1870s with the development of the Penny Farthing or Ordinary bicycle. Safety bicycles broadened the market to include women and the working classes. The introduction of new materials led to further developments in the late twentieth century.

Collection Size

There are 105 vehicles in the collection: hobby-horses (3); bicycles (88); tricycles (11); quadricycles (1); photos and documents (about 100).

Collection Description

The collection reflects the development of cycles from a wooden Draissene hobby-horse from the 1820s through to modern high performance bicycles. The largest part of the collection consists of pedal-driven bicycles, including what is probably the oldest surviving bicycle in the world, the MacMillan, made about 1845. Four are Ordinary bicycles, or Penny-Farthings, and the others are Safety Cycles, the earliest dating from the 1880s. Of the twentieth century bicycles, many are Scottish made, including those by the Glasgow firms of Rattrays and Robertson. Others are children's bikes such as the rare Jubilee Chopper from 1977, and mountain bikes. There are also three carbon-fibre bicycles: two made in 2004 by Scotsman Graeme Obree, a world champion cyclist, and the Lotus of 1994. There are also a number of tricycles, including one that was custom built for a child with mobility difficulties, and one Victorian quadricycle. There is also a small supporting collection of photographs and archival material.

Collection Significance

Overall the collection provides a spread of different types of bicycles and similar machines for a period of nearly 200 years. Importantly many of them are of Scottish manufacture, reflecting an aspect of the country's industrial past, with significant associations to Glasgow's engineering heritage. The quality of the collection is high with a particular strength in twentieth century Scottish bicycles. This collection was initiated through the development of strong links, from the 1930s, between Glasgow Museums and the Glasgow cycle industry when it was at its peak. New bicycles had by then come within the reach of ordinary working people who could escape from the city into the country. Also at the height of their popularity were cycling clubs which encouraged people to socialise.

Of particular interest is the Kirkpatrick MacMillan bicycle of 1845, claimed to be the oldest surviving pedal-driven vehicle in the world. However, it wasn't until later in the century that Scottish firms started producing cycles on a large scale. Two such firms were Howe and Singer of Glasgow. Both firms started by making sewing machines, but branched out into producing bicycles when the craze for penny-farthings was at its peak. Two of their machines are represented in the collection: the Howe Ordinary Cycle of 1885 and the Singer Xtraordinary of 1878. Made of tubular metal they were unlike the other Ordinary Bicycles in the collection which were partly made from cast iron. The Safety Cycles include two finely crafted examples, both Singers from the 1880s.

Rattrays, founded in 1901, was another Scottish firm which made well known brands such as the “Scot” and the later, post-war, “Flying Scot”. There are seven in the collection - the earliest is a 1937 “Scot” which is documented with photographs and a personal history from the donor’s family. Also included is a “Flying Scot”, the machine most associated with Rattrays and highly thought of by cyclists, and the ladies’ version “Queen of Scots”. Both machines were owned and donated in the 1960s by Rattray’s owners, Jack and Lottie Smith. Other types of Scottish bicycle is the Robertson Milano, a sports cycle influenced by European designs and two rare Baxters, manufactured in the 1930s and very good examples of early light-weight machines.

The development of bicycles made outside Scotland can be seen through a number of early twentieth century models. Two of the best, both in exceptionally good condition, are a 1920 lady’s Royal Enfield and a 1937 lady’s Hercules. One of the most important developments later in the century was the mountain bike which rejuvenated the industry. Amongst the first to be bought in Glasgow was a 1986 Ridgeback, which was modified for its lady rider. Amongst the most recent accessions are two bicycles from world record holder Graeme Obree made by him in 2004 for a film about his life called *The Flying Scotsman*.

Of the eleven tricycles in the collection, three are from the nineteenth century. They are significant because of their popularity amongst women and older men who couldn’t use Penny Farthings. Before the introduction of the safety cycle we have very few items of transport used by these groups of people. Tricycles were introduced in the mid-nineteenth century and the museum is fortunate to have a good example of an 1865 model as well a Rudge Rotary of 1885, used to provide companionable cycling for courting couples. It also possesses a *Dove* tricycle made in 1993 by Howie Therapy Cycles (Scotland) of Auchinleck, Ayrshire, for a boy of five with a form of autism. Unlike the standard arrangement of the wheels on a tricycle, the *Dove* has two wheels at the front and one at the rear.



Bibliography

Oddy, Nicholas (1990) ‘Kirkpatrick Macmillan, the Inventor of the Pedal Cycle or the Invention of Cycle History?’ in *The International Conference of Cycling History*, Van der Plas Publications

Woodforde, John (1970) *The Story of the Bicycle*, Routledge and Kegan Paul Ltd

Dodds, Alistair (1999) *Scottish Bicycles and Tricycles*, National Museums of Scotland

Wilson, Roderick and Gray, Martin (1978) *The Penguin Book of the Bicycle*, Penguin Books Ltd.

Roberts, Derek (1991) *Cycling History, Myths and Queries*, John Pinkerton

McGurn, James (1987) *On Your Bicycle*, John Murray (Pub) Ltd.

(1970) *Cycles: A short history*, Glasgow Museum of Transport pamphlet.



Road Transport: Motorcycles

Motorcycles were the first main form of motorised transport available to a large market. They are used for business, leisure and sport. A small and short-lived Scottish motorcycle manufacturing industry existed in the early years of motorcycle development.

Collection Size

The collection consists of 85 motorcycles, scooters, mopeds, motorised trikes and bubble cars dating from 1899 to the present day: pre-1900 (1); 1900-1920 (8); 1920-1940 (20); 1941-1960 (32); 1961-present day (17); date to be confirmed (7).

Collection Description

This collection consists of 85 motorcycles, scooters, mopeds, motorised bicycles, motorised trikes and bubble cars dating from 1899 to the present day. It is particularly representative of the 1920s and 1960s. The oldest vehicle, and the only nineteenth century model, is the Beeston Motor tricycle. Contemporary technology and design is represented by a Ducati 916. Other well-known manufacturers' names include Douglas, Triumph, Honda, BSA, Ariel, Vincent, BMW, Humber, AJS, Harley Davidson, James and New Gerrard, the last made in Scotland.

The collection also holds five motor-bikes with sidecars, including a rare Beardmore Precision and a Brough Superior, two speedway bikes, two German bubble cars, a 1960 Vespa scooter, a BSA Bantam, originally used by the GPO, and a Wil-Mac motorised trike. Other notable inclusions are a Kingsbury scooter and a Ner-A-Car, both designed specifically for women in the early 1920s.

Collection Significance

The collection is one of the largest of its kind in Scotland and is particularly important for the range and variety of British machines dating from 1899 to the 1960s, prior to the decline of the UK motorcycle manufacturing industry. Besides powerful road bikes there are also machines used in sport (speedway) and ones that had almost cult status such as the Vespa. It is certain that motorcycle enthusiasts would have derided the mopeds and motorised bicycles, but they provided an important, cheap means of transport for thousands of people.

Amongst the rarest vehicles in the collection is the Beeston motor tricycle of 1899 which is one of the first examples of a motorised cycle. Designed by Thomas Humber in Nottingham, it is a three-wheeler, based on a French design which offered stability on the rough roads of the day and was one of the first truly successful motorcycle designs. The exclusive Brough Superior with sidecar, a star object in the collection, was manufactured during the 1930s to the highest specification. Such machines were regarded as the Rolls Royces of the motorcycle world. Designed by George Brough it has been called the first super-bike and is regarded by many as the fastest, best looking, most advanced and best finished motorcycle of its day.

Another highly regarded machine is the Ducati 916 which was purchased with help from the National Fund for Acquisitions after it was chosen by the noted Glasgow designer Janice Kirkpatrick as an ideally designed object for the Glasgow Design

Exhibition in 1996. The only sports motorbike designed in Scotland was the 1923 New Gerrard which was the work of Jock Porter of Edinburgh. Many of the other motorcycles are standard production models such as the Triumph Tiger T110, the Scott 'Flying Squirrel' and the quiet and boxy Velocette, the last a post-war vehicle popular amongst people unwilling to invest in a more conventional machine. They all, however, reflect a wide spread popularity and deep-seated affection. Such vehicles also found official uses such as the GPO BSA Bantam and a Triumph Tiger 90 police motorcycle and side-car. One machine, with tool-kit, was used by the AA.

Important to Glasgow is the rare 1922 Beardmore Precision with sidecar which was made by William Beardmore and Company. The firm existed from 1890 to 1930, but it was not until 1921 that Beardmore built this type of machine, following the take-over of the Precision range of motorcycles which had been developed by Frank Baker. Other significant vehicles from the 1920s are the Kingsbury Scooter, made in 1920, and a Ner-A-Car of 1921-1922, a vehicle which has a comfortable, laid back design, the work of Carl Neracher. These models are of interest because of the unusual markets targeted by these firms which were facing stern competition from car manufacturers. These machines were specifically designed to appeal to women and middle class buyers who could potentially aspire to car use.

Of the two speedway bikes one was raced by the Glasgow Tigers' star Steve Lawson who, in 1992, built his machine, the Jawa, from component parts. The other, a Douglas, was constructed in 1929, a year after speedway was first introduced into Britain from Australia. The machine was raced by George Pinkerton, later a Battle of Britain fighter pilot, who was amongst the first in the Glasgow area to become involved in the new sport. He enjoyed moderate success.





Road Transport: Caravans

Caravans are today commonly seen as recreational vehicles, but their use is much more diverse. Some groups use caravans as permanent mobile homes or for temporary residences.

Collection Size

Horse-drawn Reading caravan (1); motor-vehicle drawn caravans (3) and contents of two of these caravans (Carter family showman's and Faslane caravans).

Collection Description

Four caravans cover three subject themes: traditional Gypsy or Roma living, showman's/fairs in Scotland and the Faslane Peace Camp on Loch Long. The ornate, heavily carved and brightly painted gypsy caravan was built in 1918 by Dunton & Sons of Reading, but was rebuilt in the early 1980s. Unlike this caravan, the more spacious showman's living caravan, built in early twentieth century, is substantially original. A second showman's caravan was built to an American design around 1955 and owned by the Carter family.

The fourth caravan, from the Faslane Peace Camp, is equipped with a bed, bedding, clothes, cupboards, a wood-burning stove, a chair and table, pictures, posters and curtains. It was originally a mass produced, recreation caravan but has gone through extensive customisation by members of the Peace Camp group including the installation of the stove and external and decorative paintwork. There are associated documents, images, oral histories and newspaper clippings relating to this object and the Faslane Peace Camp protests.

Collection Significance

Caravans are found in museums throughout the United Kingdom, especially the Reading type used by travellers. There are a few large collections and those that are known tend to focus on specific types. Even though Glasgow Museum's collection is small, its range and variety is unusual.

The Reading style caravan represents the Roma or traveller lifestyle. It is a highly ornate and colourful vehicle with a strong appeal to the public. The importance of this vehicle is that it was an early mass produced type which can be studied by using comparative techniques with other caravans in museums throughout the United Kingdom.

The two showman's caravans represent the long tradition in Scotland, and Europe, of seasonal travelling fairs. The time of use of the two examples spans the whole of the twentieth century. The Carter family caravan came to the museum with an extensive history of the people who used and lived in it.

The Faslane caravan was used at the anti-nuclear weapon Peace Camp near the Faslane Naval Base. It was modified and customised for this purpose. It is a unique conversion and is not duplicated in any other museum. The entire contents were collected along with the caravan and there is detailed information on its use within the Peace Camp.

There is also an important diary and photograph album written in 1914 documenting a ten-day horse drawn caravan trip to the Trossachs. These documents show the history of the recreational use of caravans at this date. There are also a small number of caravan models.



Bibliography

(1969) *Horse-drawn Carriages: A descriptive guide*, Glasgow Museums and Art Galleries

(2004) *A Guide to the Museum of Transport*, Glasgow City Council

Dodd, J. (et al) (2002) *A Catalyst for Change: the social impact of the Open Museum*, University of Leicester (discusses Faslane peace caravan)



Road Transport: Commercial Vehicles

Since the beginning of the twentieth century commercial vehicles have provided a vital transport link between manufacturers, suppliers, business outlets and purchasers of goods. Scotland has contributed to this industry producing lorries and vans that have been used throughout the world.

Collection Size

Heavy goods vehicles (7); light goods vehicles (6); difficult terrain vehicles (2); mobile crane (1); Tricar (1); internal combustion engines (7).

Collection Description

Seven heavy goods vehicles form the largest group in this collection and consist of an Albion A10 lorry, converted to rail use, three Albion Flatbed lorries, a converted Austin Van, a Caledon Model 'E' lorry, and a Morris BMC open truck.

In addition there are six light goods vehicles. Four - an Austin, a Morris, an Albion and a Bedford - were used to sell and deliver goods. Another, an electrically powered, Smith's Elizabethan was used to deliver milk by Wiseman Dairies, while a Daihatsu van was acquired specifically for an Asian art project. Two difficult terrain vehicles, a Steyr-Puch Haflinger 4 x 4 703P, and a Stonefield 3000, were used by private and utility companies during the 1970s. In contrast, for interior use, there is an Empolini Tricar and a Ransomes & Rapier mobile crane.

There are five internal combustion engines which were produced by Rolls Royce, Caterpillar and Albion, for commercial use and another two Albion engines which were made for display purposes.

Collection Significance

This collection contains some very rare vehicles as well as some interesting curiosities. The Albion Company was an internationally renowned commercial vehicle producer. It started out as a car manufacturer, but the company's survival was due entirely to their transition to commercial vehicle production.

The Albion vehicles in the collection include three flatbed trucks. One was built in 1935 and donated by John Jolly, the local coal deliveryman from Orkney. The other two are from the Claymore series built in 1956 and 1965 respectively. The Albion A10 heavy lorry of 1916 was unusually converted from road to rail for use in local industries that had railway sidings. The smallest Albion, constructed in 1910, was used as a butcher's delivery van. These vehicles, along with the two Albion engines, give a good representation of the range of products produced by one of Scotland's major vehicle producers.

The fully restored Caledon Model 'E', another Scottish made lorry, is unique as no other similar vehicle exists anywhere else in the world. It was used to deliver petrol in cans and this one carries a full load of cans, all beautifully restored. The Morris BMC Open Truck No.1, built in Scotland, by a British firm, was the first of its kind off the Bathgate production line and symbolises the aspirations and failings of the political and socio-economic history of commercial vehicle manufacturing in this country. Although these trucks were successful the company withdrew operations from Scotland.

The larger of the two Austins was converted in a national scheme during World War II for use by the Ministry of Food as a mobile kitchen which travelled around Glasgow until 1958, teaching housewives how to get the best out of their rations. The small Austin van bears the Lipton livery and was used to deliver groceries. Lipton's was one of Glasgow's most famous companies with outlets throughout the UK. Another delivery vehicle is the ever familiar red Morris post van used by the Royal Mail. The milk float is the only electrically operated vehicle in the collection and celebrates a much valued method of delivery from the twentieth century. On the retail side is a Bedford ice cream van used by the Parker Family in Lanarkshire until very recently. Together with a horse-drawn vehicle, this vehicle gives an insight into the operation of a small local family business.

The Daihatsu was acquired for the Truck Art Project in 1997, a partnership involving one local and two Pakistani artists to paint this unique vehicle to look like the buses and trucks commonly used in Pakistan. The two difficult terrain vehicles are significant in that they were both typical examples of the types used by utility and other private companies in Scotland during the 1980s and 1990s. Both were used to convey personnel and their tools cross-country to sites difficult to access. By contrast the Empolini Tricar, now rarely found in the UK, was used for transporting parts around factories.



Bibliography

(1988) *A Guide to the Museum of Transport*, Glasgow Museums and Art Gallery

(2004) *A Guide to the Museum of Transport and Technology*, Glasgow City Council (Museums)



Road Transport: Emergency and Breakdown Vehicles

Since the Great Fire of Glasgow in 1652 there has been a fire-fighting force of some sort in the city. This has developed into the second largest fire-fighting service in the UK. Other emergency vehicles include those used by the ambulance service and police force.

Collection Size

Motorised fire engines and a trailer pump (3 + 1); horse-drawn fire engines (3); hand-pulled pumps (2); Bedford Ambulance with equipment (1); armoured Strathclyde police car (1); Renault prison van (1); police patrol car (1); police motorbike and side car (1); AA BSA M21 motorcycle and side-car (1); AA box (1); uniforms and associated objects (c150).

Collection Description

The largest part of the collection relates to fire fighting. The earliest fire fighting vehicles are a Merryweather (Newsham type) manual engine recorded as having been built in about 1880, but maybe older, and a Shand-Mason Manual of about 1880. The horse-drawn engines comprise a Herkless Manual of about 1860 which could also be pulled by hand, a Merryweather Greenwich Steam Pump of 1880, and a Shand-Mason Steam Pump of about 1880. The motorised fire appliances include a pump ladder Albion Merryweather of about 1928, a turntable ladder Dennis-Merryweather and a Coventry Climax trailer pump, for towing behind a vehicle, both from about 1940, and a pump escape Leyland Firemaster of about 1960. Each of the vehicles has a range of associated pieces of equipment such as ladders, hose reels, branches, couplings and adaptors.

Police vehicles include a Ford Granada traffic patrol car, a Rover armed response vehicle, a Renault prisoner transport van and a Triumph Tiger 90 motorcycle and side-car. The ambulance service is represented by a standard Bedford ambulance, while breakdown assistance is given recognition in an Automobile Association BSA M21 motorcycle and side-car, a roadside box and uniform. The rest of the collection is diverse and incorporates associated equipment, uniforms and images relating to the emergency services.

Collection Significance

The fire engine collection is the second largest in Scotland and includes good representative examples of different types of engines from the 1860s to the 1970s. It also has a good, local resonance: one engine, the Merryweather Greenwich Steam Pump of 1880, was used in John Brown's shipyard, and another, the Shand Mason Manual Pump of about 1880 was gifted by the Glasgow Fire Brigade. Another, the Herkless Manual of about 1860, was built in Glasgow, in the St Mungo's Works near to the Central Fire Station, Shuttle Street.

The Leyland Firemaster is unique in its design in that the styling of the crew cab is entirely different to any of the other twelve Firemasters ordered. This is the only vehicle from that order that is on public display in the UK. This and three other vehicles, the Dennis-Merryweather, Albion Merryweather and Shand-Mason were donated by Glasgow Fire Brigade/Service. The significance of these vehicles lies in the fact that

they are of a standard type commonly used by British and overseas fire services. Another standard vehicle was the Merryweather Greenwich Steam Pump that was used at John Brown's Shipyard and the surrounding communities before and during World War I. The Coventry Climax Trailer Pump, used during the Second World War, was powered by an engine designed and built by the company. It was later further developed for use by Rootes in the truly unique rear engined Hillman Imp.

The Rover 827Si, used from 1992 by Strathclyde Police Armed Response Unit, is unique in its design as it is heavily armour plated. It is an unmarked vehicle and looks like any other Rover of this type. In addition to being armour plated, it carried a gun safe and armed police officers. There is also a sectional chassis and engine, from a Zephyr of about 1955 with automatic transmission. It was used for police driver training purposes between 1955 and 1994, and a City of Glasgow Police 1968 Triumph 350cc motorcycle with sidecar. In addition there is a child's Hillman Imp pedal car of c1963, in the later livery of Strathclyde Police and used in road safety training.

The 1986 Bedford Ambulance is another standard vehicle. It was used by the Scottish Ambulance Service and came to the museum fully fitted with resuscitator, oxygen cylinders, stretcher and other equipment.

The remainder of the collection comprises items associated with the AA – a BSA M21 motorcycle and side-car and a roadside box from Inverary - uniforms, including firemen's, police and AA, helmets, fire plaques, tokens, medals, breathalysers, a radar speed detector, art works and fire-fighting equipment such as standpipes and hoses. Of particular significance are the objects relating to the Burghs of Glasgow such as fire drums and a helmet badge from Crosshill.



Bibliography

(1971) *Museum of Transport Booklet on Fire Engines*, Corporation of Glasgow

(1988) *A Guide to the Museum of Transport*, Glasgow Museums & Art Gallery

(2004) *A Guide to the Museum of Transport & Technology*, Glasgow City Council



Road Transport: Horse-Drawn Vehicles and Steam Carriages

Horses were the main means of providing power for wheeled vehicles until the early twentieth century. Attempts were made to supersede them by the use of steam engines, but ultimately it was the petrol and diesel engines that came to dominate the powering of road transport.

Collection Size

Four-wheeled horse-drawn vehicles: passenger (5); commercial (2); fire engines (3); caravan (1); tram (1); hearse (1). Two-wheeled horse-drawn vehicles: passenger (4); commercial (3); 18 wheels and wheel-parts misc. (3). Undercarriage and engine of a Gurney steam carriage.

Collection Description

There are thirteen four-wheel vehicles in the collection. Five were used to carry passengers including the Brougham, the 'Ardrishaig Belle' charabanc, the Lawsons omnibus, the mail coach and the waggonette. Commercial vehicles are represented by vehicles used by Muir the bakers and Buchanan the distillers, both Glasgow firms. There are also three fire engines, a gypsy caravan, a Glasgow Corporation tram and a hearse built in Greenock.

There are ten two-wheeled vehicles. The governess cart, the sporting gig, the cabriolet and the Irish outside cart were all used to carry passengers. The commercial vehicles were used to sell ice cream, to carry goods and deliver meat. In addition there is also a farm cart, a sour milk cart, and a horse-breaking cart, besides eighteen wheels and other wheel-parts.

Lastly, and by far the oldest item in the collection, is the undercarriage and engine of a Gurney steam carriage from 1831.

Collection Significance

The collection of horse-drawn vehicles provides a good overview of vehicles used from the mid-nineteenth century onwards. There is a wide variety of examples significant to the west of Scotland where most were either used or built. Typical is the latest acquisition – a horse-drawn ice cream cart - which was used by a local family business in New Mains near Glasgow until the 1950s. The collection is significant as it demonstrates how these types of vehicles were used locally and how they were utilised by a wide range of social groups.

A substantial part of the collection consists of passenger vehicles, ranging between the two-wheeled gig, a four-wheeled mail coach and a tram. They form an important element in being able to tell Glasgow's private and public transport history before and alongside the automobile. One of the most popular items in the collection is a charabanc called the 'Ardrishaig Belle', which was used on the west coast of Scotland from 1890 to the 1950s. Initially utilised by shooting parties, this horse-drawn bus, which carries over twenty people, latterly became a tourist vehicle when day trips on the west coast became a popular attraction during the twentieth century. A number of visitors to the museum remember travelling on the 'Ardrishaig Belle', and a collection of oral histories specifically related to the vehicle is being developed.

The horse-drawn tram no. 543 was owned and operated by the Glasgow Corporation from 1894. It was used until electricity was introduced to the transport system in 1902. The tram is important because it is a good example of early urban horse-drawn passenger transport, and provides a way of demonstrating how mobility for the working classes was improving from this time. In contrast, Lawson's omnibus is an example of a privately operated vehicle. It carried passengers between Glasgow and Kirkintilloch.

Some of the items in the collection are good examples of popular mid to late nineteenth century carriages. One of the oldest is the heavily restored stage coach from the 1840s, built by the London firm of Holland and Holland. The Brougham of the 1880s is a fine example of this type of design and was popular amongst the medical profession. Less sedate and providing a much more exciting drive is the gig, a cheap vehicle for those who couldn't afford a four-wheeled carriage. For more privileged families the governess cart was built with high sides to prevent children from falling out or from dangling their toys in the wheels.

Besides the social aspects of horse-drawn transport, there are good examples of vehicles that were built in the west of Scotland. The butcher's cart, for example, was constructed by Laurie of Paisley in about 1910 for William Storrie. Around the same time James Barrie of Rodney Street Glasgow built the bakers van for Muir who used it until the late 1930s. These vehicles, along with the whisky lorry and the ice cream cart, are also good examples of commercial vehicles used in and around Glasgow. Other vehicles built in the region consist of the hearse, believed to have been constructed in Greenock during the 1870s, and a Herkless Manual of about 1860, built in the St Mungo's Works near to the Central Fire Station in Shuttle Street, Glasgow.

The rarest item in the collection is the undercarriage and engine of a steam carriage built in London by the Cornish inventor Sir Goldsworthy Gurney and brought to Scotland in March 1831. It is the same model that operated between Cheltenham and Gloucester, the first commercial service of its kind in the world. The vehicle was driven by Gurney between Edinburgh and Glasgow prior to its being damaged by an explosion when in store. The undercarriage and engine were given to Glasgow Museums in 1889, but they were not recognised as being part of a Gurney vehicle until the 1950s. The machinery is a very unusual survivor of early steam carriage technology and is of UK national significance.



Bibliography

- (2004) *A Guide to the Museum of Transport*, Glasgow City Council (Museums)
Huggett, F.E. (1979) *Carriages at Eight*, Fakenham Press, Norfolk

Walrond, S. (1980) *Looking at Carriages*, Pelham Books, London

(1969) *Horse-drawn Carriages: A descriptive guide*, Glasgow Museums and Art Galleries



Road Transport: Disability Transport

Disability transport is the term used to describe the various means of conveyance used by people with disabilities to move around. Propulsion can be with the assistance of another person, by the user's manipulation of the controls of a conveyance or by electrical or petrol-driven engines.

Collection Size

Bathchairs (3); wheelchairs (3); electric powered vehicles (2); tricycle (1); Batricar (1); taxi cab (1); A.C. Model 70 invalid car (1); litter (1); walking sticks (not counted); walking brace (1); parapodium (1).

Collection Description

This collection includes items that assist the physically disabled with movement. Most are of British manufacture. A few items were made and used before 1900, but most date from the twentieth and twenty-first centuries.

The vehicles include a Metro Hackney Taxi Cab disabled access taxi and a three-wheeled A.C. Model 70 invalid car. Wheelchairs include an award winning 'Mekong' wheelchair designed by Motivation and one used at Glasgow Central Station to assist disabled passengers. There is a tricycle custom built for a child with mobility difficulties by Howie Therapy Cycles of Cumnock, Ayrshire. The walking aids consist of numerous walking sticks, several callipers and a Dynamic Parapodium exoskeleton.

Collection Significance

Glasgow Museums' collection of disability transport is unusual in Scotland and includes some objects of great significance in the development of mobility provision. Some are of general significance in the history of mobility transport whereas other items have strong local connections.

Amongst those items of high importance is the Litter of 1887, the first wheeled ambulance apparatus used in Scotland at Cowlairs by the North British Railway. The 1987 Metro Hackney Taxi Cab MCW Metrocab No. 1 (registration number ESS01 UGA) was specially adapted to meet the needs of wheelchair users. It was the first of its kind to be produced in Scotland, and the first to be used in Glasgow. This was the first UK taxi to meet the European Community standards for the needs of wheelchair users.

The 1993 'Mekong' Wheelchair, designated a Millennium Product in 2000, was gifted to Glasgow Museums by its designer, David Constantine, one of the founders of the Bristol-based international mobility charity, Motivation. This wheelchair was designed specifically to cope with the rough terrain of Cambodia for which standard wheelchairs are unsuitable. It was also designed so that it could be manufactured economically in Cambodia from locally available materials.

The Parapodium is innovative technology - an exoskeleton - which enables paraplegics to stand and walk in the vertical position. Developed by a Polish company it is made on licence in the USA. The technology has been acquired recently for use in British hospitals and the donation was sought at the same time as a Parapodium was first used in the local health service in the Glasgow area.

Other items in the collection are of significance in that they represent changes in the thinking underlying the provision for disabled people, particularly in the last decades of the twentieth century. The *Dove* Tricycle was made in 1993 by Howie Therapy Cycles (Scotland) of Auchinleck, Ayrshire, for a boy of five with a form of autism. The firm specialises in custom-made bicycles for children who, because of their disabilities, are unable to use a standard bicycle. As its literature states, the firm concentrates on 'special needs for special people'. Unlike the standard arrangement of the wheels on a tricycle, the *Dove* has two wheels at the front and one at the rear.

The other parts of this collection are of local significance but are also representative of the technology available to people with disabilities at various times. Some items have been gifted with the personal stories of their users. Typical is the Carters three-wheeled invalid carriage of about 1935 used by Miss Jessie Sommerville (Lady John Craig), a schoolteacher whose mobility was hampered by arthritis.





Road Transport: Prams

Prams are not normally seen as part of the broader transport network, yet they have provided an important method of conveyance for more than a century. Changes in social attitudes in the last few decades and, arguably, changes in design have made their use more acceptable to men.

Collection Size

Scottish and British-built prams and buggies (41); dolls prams (7); photographs (approx 50).

Collection Description

The collection dates from the late Victorian period to the present, with the earliest dating from 1900. It comprises seven dolls prams, one Victorian pram, seven Edwardian prams, five coach-built prams from between the wars, and ten elegant prams dating from the 1940s and 1950s including an Osnath bought in Glasgow.

A further twelve prams from the 1960s and 1970s include a Churchill Montana - a relatively small pram specifically made by the manufacturer for cars but not small enough to compete with the likes of the 1974 Silver Cross pushchair, also found in the collection. Contemporary design is represented by a further six prams and pushchairs from the 1980s to the present day, including a Dream Design 3-wheeled all-terrain buggy, regarded as masculine in appearance.

Accessories complimenting this collection include blankets, bags, mattresses, dolls, canopies, covers, clothes, pillows, netting, patterns, rain-coves, seat insets, and a parasol. Photographs featuring many of the individual prams also accompany the collection.

Collection Significance

The pram collection is the largest and most comprehensive of its kind in Scotland. There are few specialist pram collections elsewhere in the UK apart from the Jack Hampshire Pram Museum Trust in Kent. Glasgow Museums' collection is particularly important in representing technological and design changes throughout the twentieth century, some of which occurred in Glasgow.

Eight of the prams date from the Victorian and Edwardian period. These are the oldest objects in this collection. All are coach-built with the exception of a rare mail-cart type which was almost certainly made about 1900. There is a good wicker bassinet, built in North Wales, which was very popular amongst the middle classes.

There are five prams which date from between the wars. These are all coach-built, including a Glasgow made Churchill pram. Glasgow Museums is thought to have the largest collections of Churchill Prams in existence. The Churchill Company Ltd. was a Glasgow based firm, located in Commerce Street in Govan. It was the only firm in the city which specialised in making hand-built prams. Supporting the collection are personal testimonies from ex-Churchill employees who describe the processes of manufacturing.

Ten elegant prams date from the 1940s and 1950s. This group includes an exclusive Osnath pram bought in Glasgow in the 1950s as a luxury good. They were seen as the top end of the hand-built, luxury market and as such, were considered status symbols. They were also seen as a reaction to war-time austerity when materials had been in very short supply.

By the 1970s smaller prams were becoming more popular with the increasing number of car users and large hand made coach-built prams were falling out of favour. Of the twelve that cover 1960s and 70s, the Churchill "Montana" and the Silver Cross pushchair are the most significant as they demonstrate the influence of the car. Churchill, at its peak in the 1960s, attempted to keep up with this trend by producing the 'Montana' (1979), a smaller folding version of the earlier coach-built design. However it was not small enough and could not compete with the likes of the 1974 Silver Cross pushchair, a type also represented in the collection.

In recent years buggies have been collected which show the recent desire for all-terrain prams, a return to the post-war desire for status symbols. These form part of a group of six prams and pushchairs from the 1980s to the present day. One of the most recent to be collected is the 'Dream Design' three-wheeler, which was donated by a family from Glasgow. The family originally purchased the pram over the internet, specifically as it was of a type used by the actor Tom Cruise. This trend for all-terrain prams which have a more 'masculine' appearance is representative of wider changes in society, such as the increasing role that men play in child-raising.

The later twentieth century prams are supported with a number of good personal testimonies relating to their purchase and use.



Bibliography

(2004) *A Guide to the Museum of Transport and Technology*, Glasgow City Council



Rail Transport: Railways

Railways have played a significant role in the history of Scotland since the nation's first railway opened in 1820. Since then Glasgow has had an important impact on railway development as a centre for railway traffic, finance and construction.

Collection Size

Steam locomotives (8); track related items (approx 200); operational equipment (approx 200); railway furniture (25); paper based operational and promotional material (approx 500).

Collection Description

The collection contains eight locomotives with examples from the five large Scottish railway companies. Four of the locomotives were used on the main line for passenger and goods services, three in industrial yards for shunting, and one in South Africa. They represent locomotive production in Scotland from the 1880s until the 1940s.

A collection of track contains very early metal examples and more standard rails. The sleepers consist of very early stones, standard and modern wooden and concrete pieces, along with the metal chairs for affixing rails. Railway equipment includes signalling devices, a hand operated trolley, train staffs, railway station furniture, signal box repeaters, time switches and other items used by railway engineers. There are also a number of makers' plates and railway signs.

A large amount of paper material relates to Scottish and British railway companies, and Scottish locomotive builders. These include photographs, engineering drawings, station layout plans, operational and promotional documents, and original documents relating to companies.

Collection Significance

The museum holds the most comprehensive and extensive collection of Scottish built and operated steam locomotives in the world. It contains items used for industrial, commercial and passenger purposes as well as locomotives of innovative design such as the 4-2-2 Caledonian No. 123, built for high speed in challenging terrain. There are other Scottish locomotives and rolling stock in museums in the United Kingdom, but no other collection has the depth that is contained within Museum of Transport.

Glasgow was one the largest locomotive manufacturing centres in the world and the collection has items built by the main firms. The North British Locomotive Company (NBL) became the largest locomotive builder in Europe when it was founded in 1903. The Museum has three significant NBL locomotives. It also has the last surviving locomotive from the Glasgow and South Western Railway, the 0-6-0 Tank No. 9 designed for dockyard use. The 4-4-0 Gordon Highlander No. 49 was operated by the Great North of Scotland Railway and was used to haul royal, passenger and freight trains in the north east of the country. The 4-8-2 South African Railways 15F No. 3007 was built in Glasgow and exported to South African in 1945. It represents the extensive global trade of the NBL and is the only example of its type in the United Kingdom.

The museum also has two locomotives produced by companies that merged to form NBL in 1903. The 4-6-0 Highland 'Jones Goods' locomotive No. 103 was built in 1894 by Sharp, Stewart and Company and was the most powerful locomotive to be built in Britain at that time. The Caledonian 123 was manufactured in 1886 by Neilson and Company for the Edinburgh Exhibition of that year. It took part in the Great Race North in the 1890s from England to Scotland and it also served as a royal pilot locomotive for the Caledonian Railway.

The 4-4-0 Glen Douglas No. 256, built by the North British Railway, was designed for heavy traffic and used extensively on the West Highland Line. The fireless locomotive was built by Andrew Barclay Sons & Company of Kilmarnock around 1920 for use at the explosives works at Ardeer, where sparks from fires were deemed too dangerous. Another unusual engine is the 0-4-0TG shunter, built by Alexander Chaplin & Co., Cranstonhill Engine Works, Glasgow, in 1888 and used in the Northampton Gas Works.

The rail and sleeper collection contains early examples from the 1830s of permanent way used in Scotland as well as many types of fixings, sleepers and rails from the nineteenth and twentieth centuries. It offers an important comparative resource for track development in the United Kingdom.

The operational equipment includes signalling lamps, signals and semaphore devices, a hand operated trolley, train staffs, signal box repeaters, time switches and other items used by train engineers. This collection is Scottish in nature and covers a wide chronological context. There are few larger collections of such material in Scotland.

The railway furniture comprises benches from stations, lamp posts, a station clock and an England-Scotland border sign. It is a small, but informative collection and helps give context to the locomotives on display.

The paper-based collection contains significant amounts of promotional material as well as operation publications, engineering drawings and photographs. It offers an important information resource for Scottish railways in general and specifically for the objects within the collection.



Bibliography

(1967) *Scottish Railway Locomotives: A History of the Railways of Scotland and a Descriptive Guide to Scottish Locomotives in the Museum of Transport*, Glasgow.

Cornwell, H. J. C. (1974) *Forty Years of Caledonian Locomotives*, Newton Abbot.

Tatlow, Peter (1979) *A History of Highland Locomotives*, Oxford Publishing, Oxford.

Smith, David L. (1976) *Locomotives of the Glasgow & South Western Railway*, David & Charles, Newton Abbot.

Court, John H. (c.1980) *North British Steam Locomotives built 1857-1956 for Railways Overseas*, Bradford Barton Ltd, Truro.

Thomas, John (1974) *The Springburn Story*, David & Charles, Newton Abbot.



Rail Transport: Trams

A tramway is a light rail network used for passenger transport in cities. Glasgow had one of the largest tram networks in the UK and played a leading role in the development of public transport.

Collection Size

Tram cars (7); street furniture (25 approx); bogies with electric motors (2); operational equipment (100 approx); destination signs (200 approx); promotional material (200 approx); engineering drawings (200 approx); photographs (500 approx).

Collection Description

The collection includes seven tramcars dating back to the beginning of the Glasgow Corporation Transportation Department. The horse-drawn car of 1898 is the earliest, while the latest, the 'Cunarder' of 1952, was the last double-decker tram built in the United Kingdom. The 1088 Standard Car is representative of the largest fleet of Glasgow trams while the 'Coronation' Car and the 'Baillie Burt' both represent technological advances.

A significant number of street furnishings that spans the life of Glasgow's tram system includes fare zone and tram stops. Operational equipment incorporates uniforms, ticket machines, badges and medals, drivers' log books, as well as destination screens dating from the 1950s and 1960s. The promotional material consists of tickets, maps, timetables, and advertising. There is a large collection of engineering drawings from Glasgow Corporation Transport Department, which detail the design and construction of the city's trams. Photographs include official images from the Bath Street Collection (publicity shots, records and tram safety) and historical images from the earliest days to closure.

Collection Significance

The collection represents the largest group of Glasgow trams anywhere in the world, is one of the largest groupings of a civic tram system in Europe, and tracks the development of tramcars from late nineteenth century horse-drawn cars to the then state of the art designs of the 1950s.

Glasgow was the last UK city to remove trams from its streets (1962). The collection includes seven tramcars dating back to the beginning of the Glasgow Corporation Transportation Department. The earliest tram is the horse-drawn car of about 1898, which was of standard design and built on the experience of the previous, privately owned companies. The latest, the 'Cunarder', dates from 1952 and was so nicknamed because it was said to resemble modern ocean liners. The 1088 Standard Car is representative of the largest fleet of Glasgow trams (in total almost 1,000 standard cars were built) while the 'Coronation' Car of 1937 and the 'Baillie Burt' represent new designs that made Glasgow trams some of the most modern and technological advanced in the whole of the United Kingdom. Glasgow Corporation built its own cars using parts built in the city or sourced from specialist manufacturers (electric engines from Metropolitan Vickers for example). All repairs or refits were also completed in Glasgow.

The Glasgow tram system was one of the biggest in the United Kingdom and the cars produced by Glasgow Corporation were not only robust (many were in service for 60 years), but also technologically advanced. The 'Room and Kitchen' tram, for instance, was the first electrified car in Glasgow and was one of the first to introduce American street car style centre entry. The 'Coronation' tram of 1937 was the first major design improvement on the earlier nineteenth century standard trams and featured a more stylish Art Deco design and greater capacity.

Such developments can be traced in the Glasgow Corporation Transport engineering drawings, which number in the hundreds and contain an immense amount of information about the design and construction of the city's trams and tram system. This is a significant and unique collection that represents the largest known grouping of drawings relating to Glasgow trams.

The paper and photographic collection gives significant insight into the operation, construction, maintenance and use of the Glasgow tram system. The Bath Street Collection of photographs, named for the headquarters of Glasgow Corporation Transport, is the largest known collection of its type and charts the growth of the system from the 1890s until closure in 1962.



Bibliography

(1969) *Glasgow's Trams*, Glasgow City Council

(2004) *A Guide to the Museum of Transport*, Glasgow City Council

Stewart, Ian (1983) *The Glasgow Tramcar*, Scottish Tramway Museum Publication

Stewart, Ian (1979) *Round Glasgow By Tram*, Scottish Tramway Museum Publication

Stewart, Ian (1986) *Glasgow Tramsapes*, Dianswell Publication

Brash, Ronald W. (1971) *Glasgow in the Tramway Age*, Then & There Series, Longman Group Ltd

Greenwood, Cedric (1986) *Glasgow Trammerung, the Twilight of the Glasgow Tram*, Heritage Press



Rail Transport: Subway

The Glasgow Subway was the third underground system in the world, after London (1863) and Budapest (1896). It was the only cable traction underground system in existence. The construction of the system began in 1891, opened in 1896 and underwent a massive modernisation in 1977-1980.

Collection Size

Subway cars (3); battery locomotive (1); tools truck (1); cable gripper (1). Merkland Street Station: platform, track and traction items, station fittings and fixings (approx. 350 items). Other equipment: maintenance equipment (2); passenger movement control (2); track, sleepers, and chairs (6); scientific instruments from Pinkston Power Station (23). Photographs (approx. 300); tickets (approx. 100); promotional material and manuals (approx. 100).

Collection Description

Two of the three subway carriages date from 1896 and were originally fitted for cable traction. The third, a trailer car with no cable traction ability, dates from 1898 and was introduced to increase passenger capacity. All have gone through considerable modifications including electrification. The battery locomotive and a repair wagon date from time of electrification in 1935. The collection of objects from the Merkland Street Station were acquired during the modernisation of the system. These items were in situ from 1935-1977.

The collection of equipment relates to engineering and repair operations, ticketing and passenger management, and includes scientific instruments used by the Glasgow Corporation chemist at Pinkston. The photographic collection documents the construction in 1896 to modernisation in 1977 as well as a detailed study of the Pinkston Power Station, the generating station for the Subway. There are also tickets from throughout the history of the Subway and maps, guides, and some related items concerning the working of the system.

Collection Significance

When the Glasgow Subway opened in 1896 it was only the third underground system in the world. It remains one of only three systems in Britain and the sole one in Scotland. Since opening it has been a vital transport link within Glasgow. Over nine million passengers were recorded in its first full year of operation and user numbers peaked during and after the Second World War at 37 million. Given its early date and its unique operating system the collection of Glasgow subway material is of national, or even international significance.

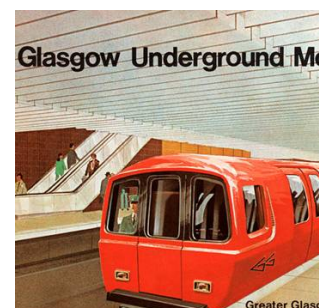
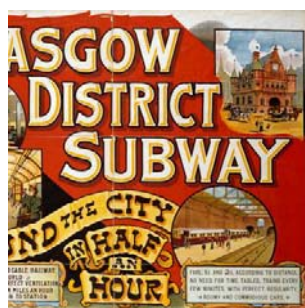
The quality of the collection is high because it relates to all aspects of the system from passenger use, to station architecture, maintenance and power supply. The passenger cars, which are in good condition, were in continual use from 1896-1977 and went through modifications during that time in to keep them in service. This part of the collection is the largest grouping of Glasgow Subway cars in existence and represents three of the five that are within the city, the others being a trailer car at Buchanan Street Station and a power car owned by Strathclyde Partnership for Transport. The system was electrified in 1935-1936 and the cars were altered to suit with no additional

rolling stock acquired. Although only one of three cars was built in the West of Scotland, all modifications and repairs were carried out in Glasgow at the Govan shed. As the cars had such a long working life, it is possible to trace the developments and changes to the system through each car. The battery locomotive, which was the only one to operate on the Subway, and a tools truck represent the overnight maintenance and repairs that allowed for the safe operation of the system. An original cable grip device dates from 1896 and was used until 1935.

The objects from Merkland Street subway station were obtained at the time of modernisation in 1977-1980. The majority of these items date from the 1930s with some dating from 1896. This is the most significant collection of station related material to be retained by any museum or organisation. Staff at the Museum of Transport completed a photographic and dimensional survey of the station before its closure in order to build a display that was as close as possible to the original station. The objects from the station were selected with the assistance of Subway staff.

The Merkland Street Station collection comprises three areas; the platform, track and traction, and station fittings. The platform items include flagstones and the structure and fittings of the stationmaster's office. The office was installed as part of the electrification of the system and contains electrical control equipment and communication devices. Every platform had such an office and they were integral centres for the overall and local operation of the system. The track and traction items include sleepers, track, signals and power supply rail equipment. The fittings relate to the public use of the station and includes a ticket window, lighting fixtures and a station clock. All were in use until 1977 and some would have been recognisable to people who used the system in 1896.

The photographic collection includes an extensive photo-documentation of the Pinkston Power Station, which was built in 1901 and used to power the Glasgow Corporation Transport services including the Subway after 1935. The building has been demolished and the photographs provide the most significant surviving documentation of transport power generation in Glasgow. The photographic survey of Merkland Street Station forms one of the best single collections of images of a station at the time of closure prior to modernisation.



Bibliography

- (2004) *A Guide to the Museum of Transport and Technology*, Glasgow City Council.
 Wright, John & Maclean, Ian (1997) *Circles Under the Clyde*, Harrow Weald.



Rail Transport: Railway Models

Railway models have been built for almost as long as railways have existed. Highly detailed scale models, used for promotion by companies or built by amateurs replicate the larger versions almost completely. Mass produced models have become well-loved toys to children around the world.

Collection Size

Mass produced railway models (approx 400); amateur models (approx 100); high detail scale or working models (30); highly detailed Glasgow St Enoch station model (1).

Collection Description

The majority of the railway models are mass produced toy scale models. These include locomotives, tenders, passenger carriages, wagons, scenery, buildings and track. There is also a small quantity of high quality, amateur models such as the two Caledonian Railway locomotives and fine manufacturer models, including British Rail steam, diesel and electric locomotives, and models of 1830s-1840s steam locomotives. There is a highly detailed scale model of the now demolished St. Enoch Station and Hotel in Glasgow. A more unusual item dealing with innovative designs for public transport in Britain is a demonstration model of George Bennie's railplane.

Light railways are represented by a small quantity of model trams. These range from highly detailed scale models to toy sets. Primarily they show Glasgow Corporation vehicles, but there are several from other West of Scotland services. There are two models of horse-drawn trams, fourteen electric trams and a small layout featuring Glasgow trams.

Collection Significance

Model locomotives allow us to represent the history of rail transport much more comprehensively than is possible with full-scale locomotives. This collection shows the development of motive power used or produced in Scotland, from one of the first passenger services to present-day Pendolino trains.

The two earliest models show early mainline locomotives from the 1830s. They were built by railway locomotive manufacturers, possibly as apprentice pieces. The Garnkirk and Kirkintilloch Railway locomotive and tender, a Stephenson *Planet* type of 1831, shows the kind of locomotive used on one of Scotland's first railways. The model of *Hibernia*, a locomotive built for Ireland by Sharpe, Roberts of Manchester in 1834, was acquired from the North British Locomotive Company of Glasgow after its bankruptcy in 1962. North British was a successor to Sharpe, Roberts and this model is thought to date from the mid-nineteenth century.

The models of two Caledonian Railway engines show classic late nineteenth century Scottish locomotive designs. The '769' was built some time after 1898 to the design of the actual Caledonian '769' locomotive and this model was displayed at the 1901 Glasgow International Exhibition (Catalogue number 363). The model of 'Cardean', made in about 1910, is a working steam locomotive and some features are out of scale to allow for operation. The model of a 1946 South African Railways 4-8-2 class 15f steam locomotive number 3057, built by the North British Locomotive Company, shows

a prime example of an export locomotive built in Glasgow. The significance of this model has increased as it represents the same class as the newly acquired full scale locomotive from South Africa. The model shows such locomotives as newly built, providing a contrast to the actual locomotive's "worked" condition.

Two models represent innovation in twentieth century railed transport with direct links to Glasgow. The first is a small demonstration model of the Railplane and track proposed by the inventor George Bennie in 1921. A short test track was built in Milngavie, and although his idea never took hold, Bennie's story continues to stir the imagination of both Glasgow residents and rail enthusiasts. Complementing this model are a number of original plans and publicity material for the railplane. The second is a model of the Glasgow 'Blue Train', the well loved and remembered electric trains that ran on the North Clyde line served the city from 1960 until 2002. The 'Blue Train' was of modern design and had passenger friendly features including forward and rear viewing windows.

The highly detailed model of St Enoch Station and Hotel is a physical reminder of one of the great railway stations in Scotland. The structure, built between 1875 and 1883, was demolished in 1977 after serving as a main terminus for railways to the south west of Scotland and to England.

The mass produced railway models vary in scale, time period and maker. Models made by companies such as Triang and Hornby represent the largest grouping within the collection. These include models of locomotives, rolling stock and model layout structures (buildings, other vehicles, etc). Included here are also many of the amateur models, many of which were built from mass produced kits. These range widely in style, time period and quality. The collection also has significant amount of model track and landscaping.

The tram models are mainly focused on original Glasgow Corporation Transport vehicles from 1894 until 1962. This is a small collection that includes both horse-drawn and motorised vehicles. The highly detailed models, like the railway examples, correspond with the actual trams in the collection and can be used for comparative displays on a small scale.



Bibliography

(2004) *A Guide to the Museum of Transport*, Glasgow City Council

W B Black (2004) *The Bennie Railplane*, East Dunbartonshire Council



Air Transport: Civil Aviation

The foundations of the civil aviation industry were established in the late 1920s. Scotland gained its first commercial airline in the 1930s. The demands of jet airliners saw the development of international airports at Abbotsinch and Prestwick.

Collection Size

Archival material and photographs (approx. 4000); costume (350); ephemera relating to passenger travel (650); aero engines (3); wooden propellers (2); various items relating to Lockerbie and airport security.

Collection Description

The Scottish Aviation Collection, about 1000 items, represents the operations, marketing and advertising of a variety of airlines between 1955 and 1985. About two-thirds of this material is non-paper and ranges from cutlery to glassware. In addition there are about 350 items of costume including airline employee uniforms. The large archive collection relating to Laura McDougall relates to all aspects of operations of the Scottish & Northern Airlines during the 1930s.

Two early experimental engines date from 1910 and 1913. Another is a 1970s Rolls Royce Olympus 593 engine used to test the effects of bird strikes in prototyping for Concorde. There are also two wooden propellers from pre-second world war aircraft.

The Lockerbie air disaster of 1988 is represented by a group of objects donated by Dr Jim Swire whose daughter, Flora, died in the tragedy. Other items like the x-ray machine and hand scanners relate to security in Britain's airports.

Collection Significance

Much of this collection relates to the development of civil aviation in Scotland and is therefore of national significance. Some elements are also of international importance.

The Laura McDougall Collection is of great importance to the history of commercial aviation in Scotland as it records the day to day happenings of Scottish & Northern Airlines over a period of three years. Laura McDougall was the Marketing Manager for Scotland's first commercial airline from its inception in 1938 until its closure in 1940. The collection reflects her work and was donated by her nephew in 2002. The company was founded by George Nicholson in 1937 as Scottish Airways and expanded to become Scottish & Northern Airlines in 1938. New routes were opened to include the Channel Islands. This company carried the Air Ambulance Service, the first of its kind in the world. This collection is one of the few surviving archives relating to Scottish aviation history.

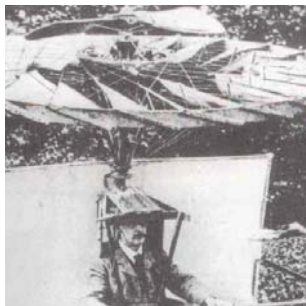
The Scottish Aviation Collection was developed by a number of enthusiasts and was formerly displayed at Prestwick Airport. It is significant for its representation of the post-war development of civil aviation. It includes 150 civil aviation aircraft models (see section on Aeroplane and Aerospace Models). In addition there are around 350 pieces of costume, mostly airline uniforms, but some marketing pieces such as scarves and ties with logos sold to passengers. The remaining non-paper items, important from the

point of view of corporate image making in the late twentieth century, range from cutlery, glassware, crockery, marketing pieces to freebies like sleep masks and irons.

The early experimental aero-engines are important because they reflect Scottish developments in aeronautical engineering at an early stage in the evolution of powered flight. They were built in Scotland by A.B. Baird and Robert Black in 1910 and 1913. The Baird 4-cylinder aluminium and cast iron engine was made in Edinburgh for a 'flying machine' and is no more than 30 inches in length, while Black's small rotary engine – with propeller - was probably designed for vertical lift.

The Olympus 593 engine is almost certainly the only one of its kind to survive. It was used to test the effects of bird strikes as part of the Concorde development programme. Its significance has been recognised by Rolls Royce who are working in partnership with Glasgow Museums to further our understanding of this object.

The Lockerbie material is hugely important given the international consequences of the bombing of Pan Am 103 in 1988. The material has been acquired in collaboration with survivors of the disaster. Dr Jim Swire has donated some objects, such as a dummy bomb he used to demonstrate poor airport security. He has also contributed many hours of oral history which gives the collection added resonance. Glasgow Museums is also pursuing the acquisition of a piece of the aeroplane that was recovered and used as evidence in the trial. Keith McIntyre's oil painting *Psalm of the Shadows Opus 2* (1991) and a series of pastels, including *Broken Angel on the Roof Beam 2*, are commemorative pieces.



Bibliography

Webster, Jack (1994) *The Flying Scots: A Century of Aviation in Scotland*, Glasgow.



Military Aviation

Aeroplanes used for military purposes have played a significant part in the development of aviation. Glasgow role in military aviation is best exemplified in the formation of 602 (City of Glasgow) Auxiliary Squadron which flew Spitfires during the Battle of Britain.

Collection Size

Approximately 530 objects: Supermarine Spitfire LA198 (1); oral histories and ephemera from WW11 pilots (approximately 500); Beardmore propeller (1); Gnome Rhone engine (1); Messerschmitt propeller hub with spinner (1); Mercedes Benz carburettors (4); compasses from WW11 aircraft (2); Bentley and Beardmore engine part approval pieces (6); bomb release lever (1).

Collection Description

This collection boasts the exceptional Supermarine Spitfire LA198 - a late Mark 21 Spitfire dating from 1947 and the last surviving Spitfire flown by the 602 (City of Glasgow) Squadron. Although this aircraft was active it was not used in combat. Supporting material includes a collection of oral history taken from the pilots who served with this squadron.

Several aircraft parts form the remainder of the collection. The most significant is the propeller from a Beardmore World War I fighter aircraft. Other items, donated by the Ministry of Defence, are from World War II German aircraft, specifically a propeller hub and spinner possibly from a Messerschmitt, two compasses and four Mercedes Benz carburettors. Additional items consist of a bomb release lever, a Beardmore mechanical lubricator and five similar pieces from Bentley.

Collection Significance

The Supermarine Spitfire LA198 is of major importance to Glasgow because of its historic association with the city. It is the last surviving Spitfire flown by the 602 (City of Glasgow) Squadron. Supporting the aircraft is a collection of oral histories taken from the pilots who served with this squadron and flew Spitfires during the Battle of Britain. They also had experience in many other types of aircraft. This material is rare and of national significance. There is also a collection of roughly 500 commemorative pieces, photographs, signatures and other ephemera donated by World War II pilots, which is also of national significance.

Several aircraft parts form the rest of the collection. The most significant is the propeller from a Beardmore World War I fighter aircraft. Beardmore was a major steel and arms manufacturer in Glasgow. The company developed a series of successful aero engines and aeroplanes during World War I. A French Gnome Rhone rotary engine also dates from this war. Both of these objects are rare.

Bibliography

(2003) *Glasgow's Spitfire*, Glasgow City Council (Museums)



Aeroplane and Aerospace Models

One of the principal purposes for aircraft models has been marketing. Airlines commissioned them and displayed them in their booking halls and in travel agencies. Other models have been used as prototypes to give shape and form to actual aircraft of the future.

Collection Size

Civil airline models mostly dating from between 1955 and 1985 (approx. 150); books (300); model of Glasgow Airport (1); and Wave Rider models (6).

Short Description

The bulk of this collection formed part of the Scottish Aviation Collection. It consists of models of civil airliners, including Tridents, Boeing 737s, 747s and Concorde. Some are finely constructed cut-away models showing internal structures and fittings that can be lit from the inside, others are low grade models used as marketing pieces. The collection encompasses models commissioned by airline companies for display in their front of house operations such as booking offices and travel agencies. A model of Glasgow Airport showing the original Basil Spence designed terminal of 1966 was renovated in 2000, a project funded and supported by Glasgow Airport. The collection of aerospace models is small, consisting of two Space Shuttles and six Wave Riders. The latter were part of the experimental work into hypersonic flight by Terence Nonweiler, professor of aeronautics at Glasgow University.

Collection Significance

The collection of aircraft models is probably the biggest of its kind in Scotland and many of the items are of high quality. It was created by Reg Goddard and other enthusiasts who gathered objects from airlines throughout the UK to create the Scottish Aviation Collection. This was donated to Glasgow Museums in 1995.

The collection gives an insight into civil aviation in the period 1955-1985 during which British deregulation led to the creation of a variety of competing airlines. It reflects the change from British to overseas holidays and the fact that flying changed from being an upper class hobby or business to means of mass transportation allowing working people to travel the world. The collection also charts changes in aircraft design and technology and improvements in safety. The model collection is supported by a collection of approximately 300 books.

The models acquired before 1995 are, largely, of the great pioneering aeroplanes such as the Bleriot and the Wright Brothers aircrafts. These are duplicated in other collections. More important is the architectural model of Glasgow Airport that was gifted in 1966, around the time that the new, Basil Spence building was opened. It has since been renovated by BAA under whose auspices the Terminal building has been extended and changed beyond recognition.

The aerospace models are represented by two Space Shuttles and, more significantly, six Wave Riders. The latter came from Glasgow University which was heavily involved in aerospace theory development. The Wave Rider principle, concerned with hypersonic flight at more than five times the speed of sound on the outer edge of the

Earth's atmosphere, was developed in the 1950s by Terence Nonweiler, Professor of Aeronautics. The models were made as part of his department's experimental work. As such, they are prototypes and represent Glasgow's standing in this international field of study. It may be that these models attain greater importance as the history of this field of endeavour unfolds.





Maritime Transport: Shipbuilding

Some of the most famous ships in the world were built on the Clyde such as the *Lusitania*, the *Queen Mary* and HMS *Hood*. These magnificent ships were sisters to many thousands of vessels which gave the phrase 'Clyde-built' the status of a by-word for quality, innovation and durability.

Collection Size

Shipyard related items: specifications, letters and contracts (c25); plans (c100); tools (c100); launch related items (43); union related items (15); training and apprenticeship items (11); company histories (13). There are also: items from Clyde built ships (16); other items of rigging/portholes etc (c20); art works (c40 - including 6 portraits of shipbuilders); photographs (c400).

Short Description

The collection contains a very wide range of material and represents most of the important shipbuilding firms, including J. & G. Thomson, Robert Napier, Denny Brothers, John Brown's, Fairfield's, Stephens', Yarrow's, Lithgow's, Scott's and Tod & MacGregor. Material from these firms covers all the main aspects of the shipbuilding process from planning (specifications and contracts), designing (ships plans), building (tools and vessel parts), launching (photographs and ephemera) and fitting out (photographs). There is also material related to the training and management of the workforce such as apprenticeship papers, work rate cards, union documents. There are a number of items which relate to very early ship building, relics from famous Clyde steamers, and a group of works from artists such as Muirhead Bone, Norman Wilkinson and John Lavery, and a large number of professional and amateur photographs.

Collection Significance

This collection has been built up through direct contact with shipbuilding firms and people who worked in them. This has resulted in a collection with a very wide range of material which focuses on one of the greatest shipbuilding centres in the world.

This collection includes some highly significant material such as three fragments from the hull of *Charlotte Dundas* (1803), the first effective steamboat in Britain, the builder's model and a number of fittings from the *Comet* (1812), the success of which heralded the development of the shipbuilding industry on the Clyde. The builder's plan of the *Vulcan* (1819) shows the early introduction of iron shipbuilding on the Clyde.

Also of great importance is the company archive material relating to shipyards of the Napier family. Robert Napier was known as the 'father of Clyde shipbuilding' and this archive is an important resource for the study of the early development of shipbuilding on the Clyde. It includes ship plans, contracts, notebooks and letters. Other important archival material includes an original general arrangement drawing of the clipper *Cutty Sark* of 1869 and a plan by John Elder for a 'Cyclad' circular gunboat from 1867.

There are also some important relics from Clyde-built vessels. These include a figurehead from the sailing ship *Helen Denny* built by Robert Duncan & Co. in 1866 and the figurehead and decorative name boards from J. & G. Thomson's 1885

passenger steamer *Grenadier*. There are ship's bells from some significant Clyde passenger vessels including *Lucy Ashton* (1888) and *Talisman* (1935). Of particular interest is the builder's plate from the *Queen Elizabeth* which was rescued from the vessel after it was destroyed by fire in Hong Kong harbour in 1972.

A large number of items relating to ship launches give a fascinating insight into the most public, and ephemeral, aspect of shipbuilding. These include photographs, tickets and passes, programmes and commemorative items such as sponsor's caskets and gavels; a section of drag chain and a number of 'launch' flags. One item of particular significance is the pair of silver scissors used in the launch ceremonies of the *Queen Mary*, *Queen Elizabeth* and *QE2*. Launch tickets date from Napier's *Simoom* of 1849 to the *QE2* in 1969 and there are also many items such as tickets, programmes, commemorative medals and bars of soap relating to the launch of the *Queen Mary* in 1934. The disastrous launch and capsizing of the *Daphne* in 1883 is commemorated in a small collection of photographs, two of them unique to this collection, and a commemorative clock presented to a member of the Linthouse Ambulance Brigade who took part in the rescue of survivors.

There are around 100 tools representing the personal working equipment of shipwrights, draughtsmen, cabinetmakers, plumbers, carpenters and boilermakers working on the Clyde. Supporting these are a small number of items of personal protective equipment and items relating to training and apprenticeship, personal contracts and references. A project in 1991 generated some valuable oral history recordings from a range of shipyard workers. There is also some trades union material including banners and ephemera relating to the UCS work-in.

A wide range of photographs and artworks show every part of the shipbuilding process from the laying of the keel, through construction and launch to fitting out. Many, such as bound volumes of photographs from Wm Simons & Co, were designed for use as promotional material while others record the personal working environment of friends and colleagues. Significant artworks include Robert Salmon's *The Launch of the Christian* (1818), Norman Wilkinson's *The Queen Mary fitting out at Clydebank, 1936* and a study by John Lavery for a mural in Glasgow City Chambers entitled *The Art of Shipbuilding* (1888). Of particular interest are the prints by Muirhead Bone which are among the most famous images of the shipbuilding industry.



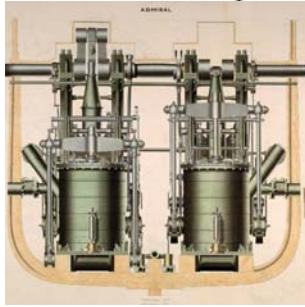
Bibliography

(2004) *Guide to the Museum of Transport and Technology*, Glasgow City Council (Museums), Glasgow.

Walker F. M. (1984) *Song of the Clyde: A history of Clyde shipbuilding*,

Bellamy, M. (2006) 'Shipbuilding and Cultural Identity on Clydeside', *Journal for Maritime Research*.

Bellamy, M. (2001) *The Shipbuilders: An anthology of Scottish shipyard life*, Birlinn Ltd, Edinburgh.



Maritime Transport: Marine Engineering

Marine engineering is the use of power aboard ships. Some of the key developments in this technology were made on the Clyde, which became the principal centre of marine engineering in the world in the nineteenth century.

Collection Size

Complete engines (9); auxiliary equipment (approx 30); models (approx 50); archives (approx 250).

Collection Description

This collection includes a number of complete ship engines, engine parts and associated equipment, engine and boiler models and archival material. The most important part of the collection relates to early steam shipping. The oldest item is the original cylinder of the *Comet* of 1812. There are also complete side-lever engines from PS *Comet II* (1821) and PS *Industry* (1828). Another pioneering era of steamship technology is represented by the steam turbine engines for *King Edward* (1901), the first commercial turbine steamer in the world. Diesel engines are not well represented although there are a couple of small examples. The most significant marine engine model is a ¼ scale model of a steeple engine for SS *Simla*, made by David Napier, exhibited in the Paris International Exhibition in 1855. The archive collection includes David Kirkaldy's remarkable drawings of Napier engines. There are also various photographs, engine manuals and other ephemera.

Collection Significance

The quality of the collection is generally very high. It includes some extremely important firsts such as the *Comet* cylinder and the *King Edward* turbines. The *Comet* was the first commercially successful steamboat in Europe and heralded the Clyde as a major shipbuilding and engineering centre. The engines of *Comet II* and *Industry* come from significant vessels. The *Comet II* was built in 1821 and was involved in a collision with great loss of life in 1825. The *Industry* was built in 1814 and became the first vessel of the Clyde Shipping Company. It was re-engined in 1828 and was famed for its longevity, operating until 1862.

Complete examples of early marine engines (pre 1830) are extremely rare. The only other survivals are the engines of PS *Comet* (1812) and William Symington's experimental Dalswinton steamboat (1788) at the Science Museum and Robert Napier's side-lever engine from the *Leven* (1827) at the Scottish Maritime Museum. The *Comet II* and *Industry* engines are therefore of great importance to the early history of marine engineering.

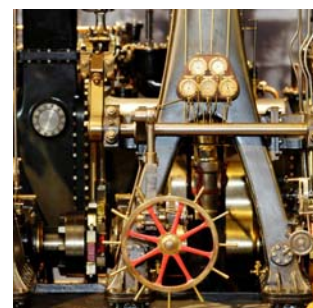
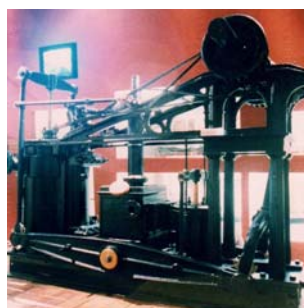
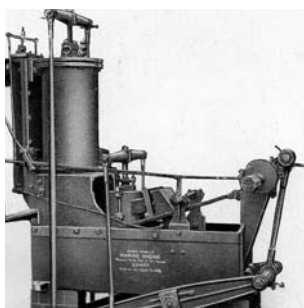
The *Simla* model engine is another highly significant piece of marine engineering history. It was made by David Napier, one of the pioneers of early steamship technology. He developed the steeple marine engine in 1830. This is the only example of a model marine engine of this scale and age in the world, and is probably the only surviving example of a David Napier marine engine.

The development of steam turbine machinery was a major advance for high performance vessels such as passenger liners and warships. The first commercial vessel to use these engines was the TSS *King Edward*, built in Dumbarton in 1901. Its success paved the way for the use of turbines on transatlantic liners. The engines were built by Parsons Marine Steam Turbine Company of Newcastle and rescued when the vessel was scrapped in 1952. The reduction gearing from S.S. *Hantonia*, built in 1912 by Fairfield's of Govan, represent another technological advance. This was the first merchant turbine steamer fitted with reduction gearing (to reduce the speed and increase the efficiency of the propellers). This significantly improved performance and was used as a model for all subsequent turbine steamers. Other early turbine engines are rare. The first marine turbine from *Turbinia* (1894) is at the Science Museum. The vessel *Turbinia*, with turbines from 1897, is held by Tyne and Wear Museums Service, and HMS *Caroline* in Belfast has turbines dating from 1914. The *King Edward* and *Hantonia* machinery is therefore of great significance to the history of marine engineering.

The other part of this collection of international significance is the archive of drawings of Robert Napier engines drawn by David Kirkaldy. Robert Napier was one of the most important marine engineers of the nineteenth century and is known as the father of Clyde shipbuilding. David Kirkaldy was one of the foremost draughtsmen of his day and his engineering drawings were exhibited at the Royal Academy. The only other examples of Kirkaldy drawings are at the National Maritime Museum.

Despite the international significance of much of the collection it is relatively patchy in charting the whole history of marine engineering. For example, it does not contain examples of later nineteenth and early twentieth century reciprocating steam machinery, and diesel engines are very poorly represented. This is largely because of the prohibitive size of machinery of this date. There are few example of this type of machinery in museum collections although some do survive in preserved vessels. The model collection largely represents this period of marine engineering and although smaller in quantity to that of the Science Museum is of a comparable quality.

The collection mainly comprises 'prime movers' and there is very little in the way of auxiliary machinery other than three engines from the *Newshot* floating crane (1946) and at windlass from the steam yacht *Morven* (1886). This is typical of other museum collections which tend to have little of this type of machinery.



Bibliography

Martin Bellamy, 'The Engine of P.S. *Industry*', *Industrial Heritage*, 10/2 (1992), 29-30.

Peter McOwat, 'The *King Edward* and the Development of the Mercantile Marine Steam Turbine', *Mariner's Mirror*, 88 (2002), 301-306.

Peter McOwat, 'The Design and Performance of the *King Edward* Turbines', *Transactions of the Newcomen Society*, 76 (2004).



Maritime Transport: Ship Models

Ship models represent full size vessels. In modern times their main use has been in the shipbuilding industry to test and refine designs, set out complex framing and plating plans in three dimensions and display and promote the finished vessels.

Collection Size

788 models: full-hull (327); half-hull (280); amateur and miniature models (181).

Collection Description

This collection covers a wide variety of ship model types, from intricate seventeenth and eighteenth century Admiralty models, through early nineteenth century prisoner-of-war models, early shipbuilding half-hull models and gloriously detailed twentieth century exhibition models to lovingly crafted amateur and working models. There is one example of a Dutch votive model and several marked up half-hull model used to aid the difficult process of plating a ship.

Over half of the models are directly related to Clyde based shipyards, forming an unparalleled three-dimensional record of shipbuilding in the West of Scotland from pioneering vessels, ships of innovative design and some of the most famous vessels ever built such as RMS *Queen Mary*, RMS *Lusitania* and HMS *Hood*.

Collection Significance

This is an internationally important collection that represents the range and depth of shipbuilding on the Clyde. The products of most of the major Clyde yards from every period are represented, including John Browns, Fairfield's, Yarrow's, Barclay Curle and Stephen's, together with many models of vessels from smaller or more transient yards such as Aitken & Mansell and T. B. Seath. The overall quality of the collection is excellent and many of the individual models are extremely significant. It was begun in 1870 when Glasgow's City Industrial Museum opened and has been developed consistently ever since through purchase of individual models and collections and important donations direct from Clyde shipbuilders and shipping companies.

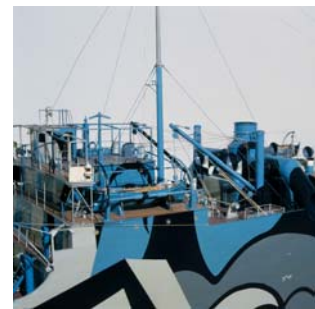
The oldest item in the collection is a model of the English fourth-rate frigate HMS *Oxford*. The model is contemporary with the building of the vessel in 1674 and is one of the earliest models officially produced for the Admiralty Board. The *Oxford* has a wealth of detail from the trim lines of her hull to a finely carved lion figurehead. The model was one of the first to enter the collection and has an added significance in that it was owned by the famous Clyde shipbuilder and engineer Robert Napier and was gifted by his family after his death in 1876.

Full hull models represent a huge range of vessel types from harbour dredgers to the most prestigious transatlantic liners. The significance of the collection lies in two main areas. Firstly, there are models of internationally important vessels, such as *Comet* of 1812 (builder's model), *Queen Mary* of 1936 (test model) and *HMS Hood* of 1918 (builder's model). Secondly, there are models where the manufacture is extremely skilled and the level of detail very impressive. These obviously include some models of significant vessels, but also covers minor craft from yards which took pride in creating

or commissioning first class models. A collection of fifteen very fine dredging and harbour vessel models from Wm Simons & Co. falls into this category. One of the undoubted star items in the collection is the full-hull model of the yacht *Livadia*, built for Czar Alexander II of Russia by Elder & Co. in 1881. Designed with an almost fully circular 'cyclad' hull this luxury vessel was intended to provide relief for the Empress Maria Alexandrovna's seasickness, and a luxurious floating palace to entertain guests.

The half-hull models in the collection fall into three main categories: half-blocks which show the hull form, but have little other detail; board mounted half-blocks with details such as coloured paint, deck fittings and masts added; and mirror-backed models where the impression of a painted and detailed full-hull model is given by backing the model with a mirror. Half-hulls were the most common form of working model used in shipbuilding. This direct relationship to the vessels they represent is very much strengthened by the fact that in most cases the models came directly from the builders or owners. Their significance is further strengthened in the many cases where no physical or pictorial evidence remains of the ships. The collection holds models of important early Clyde-built vessels such as the clipper *Taeping* of 1863, the steamer *Mary Jane* of 1846 and Napier's groundbreaking ironclad HMS *Black Prince* of 1861.

There are twenty prisoner-of-war type models made by mainly French prisoners captured by the British in the Revolutionary and Napoleonic Wars. These models show the heights the modeller's craft can reach with the most basic materials such as bone, wood, straw and hair. This is one of the major collections of this type of model in the UK. It has four particularly fine bone models, one beautifully detailed wooden model complete with copper cladding below the waterline and three 'bijoux' models, the finest of which is mounted on a delicate hexagonal wooden stand with straw 'marquetry' and tiny sails made from wood shavings.



Bibliography

(1957) *A Descriptive Catalogue of Ship Models in the Glasgow Art Gallery & Museum*, Glasgow

(1965) *Ship Models Part II*, Glasgow

(1971) *Descriptive Catalogue of Ship Models Part 1, Ocean Going Steamers; Part 2, Sailing Ships; Part 3, Clyde and Other Steamers; Part 4, Warships and Other Craft* Glasgow

Boyd, Norman Napier (2000) *The Model Ship, Her Role in History*, Woodbridge

(2004) *A Guide to the Museum of Transport and Technology*, Glasgow



Maritime Transport: Shipping

Shipping relates to transport by sea. The Clyde was a major international port and was home to a number of important shipping companies serving local and international trade. The Clyde has also played an important role in leisure boating and as a naval base.

Collection Size

Merchant Navy (c.50); Royal Navy (c.50); paintings & drawings (14); posters (76); house flags (20); bells (13); items of tableware (15); guidebooks (c.50); ephemera and ship fittings (c.50); photographs (c.3000); boat (1).

Collection Description

This collection draws together items relating to the way ships and boats have been used. The finest material relates to Glasgow based shipping companies and consists of posters and other advertising material, flags, ships' bells and items of uniform. There is a significant range of material relating to very early steam shipping on the Clyde such as an account book from PS *Comet* from 1819-20 and a poster for PS *Leven* from 1827.

Other material ranges from a full size boat to photographs, to ship portraits and tableware. Many items relate strongly to the ship model collection. For instance, the builder's model of the pioneering turbine steamer *King Edward* of 1901 is complemented by the vessel's bell, a poster advertising her first season and timetables detailing her sailings over subsequent years. A fine model of the battle-cruiser HMS *Hood* is complemented by personal effects such as photographs, a crossing the line certificate and a cap tally.

Collection Significance

Glasgow was the home of a multitude of local, national and international shipping companies in the nineteenth and twentieth centuries, which played a significant role in the history of shipping. Most of the well-known firms are represented by objects in the collection.

The collection holds a number of significant items relating to the early history of steam shipping services on the Clyde. The *Comet* (1812) was the first commercially successful steamboat in Europe. In the collection are its original compass, bell and a table from its internal fittings. There is also an account book for the vessel from 1819 to 1821 when it was pioneering West Highland services. There is a range of early steamer advertising material including a poster for the *Leven* in 1827 and a range of timetables and guide books including Lumsden's *Steamboat Companion and Stranger's Guide* (1823). There is also some important archival material relating to Robert Napier's involvement in establishing the Cunard Line in the 1830s.

Material relating to later shipping companies includes a collection of house flags which represent companies from small puffer owners Ross and Marshall through coastal traders like the Clyde Shipping Company and David MacBrayne to large international businesses like the Anchor, Baron (Hogarth), Denholm and Blue Funnel Lines. The vessels themselves are represented by a number of brass bells, including the

Buchanan steamer *Elaine* (1867) and the Anchor line's *Circassia* (1937). The collection also includes the small rowing tender from the McCallum, Orme & Co. steamer *Dunara Castle*. This was used to ferry the last residents of St. Kilda to the *Dunara Castle* for evacuation to the mainland. There is also a small collection of items of uniform, ranging from captain to 4th engineer, company and vessel branded tableware, tickets, luggage labels and ephemera. The working lives of seamen and vessel crews is represented by a small collection of photographs and service records and papers.

There is a very fine collection of 64 posters advertising the transatlantic and far eastern services of the Anchor Line. The collection came directly from the company and represents the range of posters produced from 1920 to 1939 when they were not only advertising cheap passages for emigrants to Canada, but promoting the nascent holiday cruise trade. The evocative images, by artists such as Kenneth Shoesmith, show the range of their services from exotic Indian scenes to ploughmen on the grain fields of Canada. This collection is complemented by a number of other posters, notably those advertising an 1839 sailing of the *Bengal Merchant* to New Zealand and sailings of the *Rose*, *Thistle*, *Shamrock* and *Londonderry* to Ireland in 1854.

There are a number of fascinating vessel portraits and photographs showing working vessels. These range from a fine Charles Keith Miller portrait of the steamer *Braemar Castle* in a storm to an unsigned oil painting of the Clyde built sailing ship *William Davie* and a Norman Wilkinson painting of the *Empress of Scotland* at sea. Dan MacDonald's wonderful photographic collection shows the Clyde fleets and visiting vessels going about their business in the river unloading grain, shipping locomotives, waiting for pilots and being towed into dock.

The Clyde has substantial naval connections. Many warships have been built on the river, local people have served in the navy and it was used as a naval port during two world wars. The Faslane submarine base has also become one of the Royal Navy's major naval dockyards. The collection contains a number of items relating to HMS *Glasgow* (1909, 1937 and 1979), ranging from a signal book detailing encounters with the German fleet in 1914-15, honours boards and the bell from the last vessel to hold the name. There are also a small number of items of uniform, including a cap ribbon from HMS *Hood*, four naval flags, including a 'God Save the Queen' courtesy flag flown at naval launches, two decorative brass gun muzzle tampions, and a small quantity of official and personal photographs and ephemera.



Bibliography

(2004) *Guide to the Museum of Transport and Technology*, Glasgow City Council (Museums), Glasgow.

Paterson L. (1998) *One Man's River; The Clyde in Pictures 1920-1980*, House of Lochar, Colonsay, and Glasgow Museums, Glasgow.

Fox, Stephen (2003) *The Ocean Railway: Isambard Kingdom Brunel, Samuel Cunard and the Revolutionary World of the Great Atlantic Steamships*, HarperCollins Publishers Ltd.



Maritime Transport: River Clyde

The River Clyde is Scotland's third longest river, but is undoubtedly the most important in terms of industrial and technological significance. The popular axiom 'The Clyde made Glasgow and Glasgow made the Clyde' encompasses two hundred years of development where the river was transformed into one of the great industrial waterways of the world.

Collection Size

Ship models (52); paintings and drawings (54); prints (35); photographs (c.4000); maps and plans (c.20); posters (c.150); rowing skiff (1); tickets, guidebooks and postcards (not counted).

Collection Description

This collection draws together material specifically related to the river Clyde. It reflects the great interest generated by the river, its scenery and setting, the industry along its banks and the multitudes of vessels which have sailed and steamed on its waters. The collection includes ship models which represent vessels with a direct and continuing link with the river Clyde as their permanent home or their main port of call, ranging from tiny river steamers to transatlantic liners. The Clyde is represented in many paintings and drawings and this collection has a number of works by John Knox (1778-1845), Horatio McCulloch (1805-83), William Leighton Leitch (1804-83), William Simpson (1823-99) and one by L. S. Lowry (1887-1976). These works use the river as a subject for landscape painting, or to document the vessels and industries along its banks. Other material relates to the Clyde Navigation Trust, maps and plans of the river and a large collection of photographs and ephemera.

Collection Significance

The significance of this collection is that it illustrates the development and use of one of the greatest industrial waterways in the world. The collection ranges across aesthetic, technical, historical and social fields to provide a full and rich understanding of the river. The river and its banks have changed beyond all recognition in recent decades. This collection helps to preserve an industrial heritage that is fast disappearing.

The Clyde Navigation Trust (now Clydeport plc) was responsible for the commercial use and improvement of the river from the late eighteenth century to the present day. The majority of the Trust's archive is held at the Mitchell Library, but Glasgow Museums has a small collection of objects relating to their work – photographs and models of dock construction, vessel photographs, three ship models and ephemera. These items support the magnificent gold, platinum and diamond studded Chain of Office once worn by the Trust's chairmen and now entrusted into the care of Glasgow Museums.

Today it is difficult to imagine the great variety of shipping that once used the Clyde. One way is through the 52 ship models of vessels built for use on the river. The high quality builder's models of river steamers, ferries, tugs and dredging craft show the full detail of their shape and also their operating livery, from the practical brown of the *Vehicular Ferry No.4* (1934) to the magnificent salmon pink and silver grey of the luxurious river steamer *Glen Sannox* (1892). There are also good amateur models of the Clyde 'Cluthas' (ferries) and the *Waverley* of the present day.

Paintings and prints offer a valuable documentary record of the early history of the Clyde as well as providing a more artistic representation of the river. The collection includes views of the river from the Falls of Clyde to the Firth. They vary in quality from amateur watercolours to works by famous Scottish artists and have traditionally been categorised as marine art. Fine examples include Robert Salmon's *A Snow off Greenock* (1818) and William Clark's portrait of *HMS Hogue at the Tail of the Bank* (1862); ship portraits such as Salmon's *The Launch of the Christian* (1818); and landscapes such as John Knox's *The First Steamboat on the Clyde* and Thomas Fairbairn's *The Clyde at Govan Ferry* (1845). These images, along with the fine collection of topographical representations of Glasgow, make a significant contribution to our understanding of the city and its relationship with the Clyde.

The substantial collection of around 4000 photographs of the Clyde include official images of launch days from the 1880s to the present day; formal and informal images of shipbuilding and bound volumes of shipbuilding and engineering company photographs. The collection also contains 28 notebooks holding 3000 photographs taken by Clyde shipping enthusiast Dan MacDonald between the 1920s and the 1970s. They form an evocative and very useful record of shipping on the river from the last days of sail, to majestic liners to photographs taken on board Clyde 'puffers'.

The remainder of this collection is disparate in nature, but the following items are particularly significant: the rare 'Bute Sharp' rowing skiff, owned and raced on the Clyde by the Glasgow Printer's Rowing Club c1910-1930; some early plans of the Clyde including one showing overcrowding on the upper river on the 10th May 1875; and a second edition of Lumsden's pioneering travel guidebook *The Steamboat Companion and Stranger's Guide to the Western Islands and Highlands of Scotland* (1825).



Bibliography

Davidson, A. S. (2001) *Marine Art and the Clyde*, Jones-Sands Publishing, Upton.

Paterson, L. (1998) *One Man's River; The Clyde in Pictures 1920-1980*, House of Lochar, Colonsay, and Glasgow Museums, Glasgow.

(2004) *Guide to the Museum of Transport and Technology*, Glasgow City Council (Museums), Glasgow.

Riddell, J. F. (1979) *Clyde Navigation: A history of the development and deepening of the river Clyde*, John Donald, Edinburgh.

Walker F. M. (1984) *Song of the Clyde: A history of Clyde shipbuilding*,



Science, Engineering & Technology: Optical Technology

Optical technology enables and enhances the way in which we see, observe and record the world about us. Intrinsic to optical instruments are lenses that enable us to view things which the human eye cannot see.

Collection Size

Surveyor's drainage level (1); theodolite (10); microscope (20); spectacles and spectacle cases (c.127); optician's lenses (2 sets); magnifying glasses (7); stereoscopes (2); rangefinders (6); binoculars and accessories (7); sextants (3); octants (5); telescopes (12); cameras (approx. 210), accessories and publications (approx. 217); photographic enlarger (16); enlarger lens (1); television camera (1); cine camera (11); cine projectors (74), parts and accessories (20); slide projectors (4); overhead projector (1); epidiascope (1); magic lanterns (8), magic lantern parts (2); lighthouse lantern and lens (1); cinema projectors (9), cinema projector part (1), associated equipment (8).

Collection Description

This collection includes superbly made technical instruments used in navigation, microscopy and surveying; instruments used to create and project still and moving images; spectacles designed to enhance sight; and opticians' lenses to test eyes.

Technical instruments include theodolites, range finders, binoculars, microscopes, telescopes and a surveyor's drainage level made by John Gardner who worked in Glasgow under James Watt. There is navigational equipment such as octants, sextants and lenses from the Toward Lighthouse on the river Clyde. Photographic equipment includes box, folding, plate, pocket, quarter plate and SLR cameras. These range in date from the late nineteenth century to the present day. There are also home movie cameras and television cameras. Projection equipment includes magic lanterns, cinema, cine, slide and overhead projectors, epidiascopes and enlargers. There are associated collections of lenses, lens covers, bulbs, films, photographic chemicals, camera plates, information booklets, camera club syllabi, visitor books, prize shields and trophies, and camera cases.

Collection Significance

The optical technology collection is of particular interest because of its local resonance, but there are also some items of greater importance.

Amongst the navigational objects is a small group of sextants and octants from the eighteenth and nineteenth centuries. All the octants are highly regarded, being the work of skilled London and Newcastle specialist instrument makers such as Spencer, Browning and Rust (fl. 1784-1819) and Richard Lekeux (fl. 1777-1838). One of the most important microscopes is a solar type instrument made of turned wood, with a set of lenses dated 1790, sold by T. Pether of Edinburgh. An unusual instrument is a 'Waterhouse' museum microscope, incorporating a revolving drum capable of taking twelve slides, made by W. Watson and Sons (fl. 1837-1899). Other pieces of significant optical equipment include a surveyor's drainage level, produced by John Gardner who worked in Glasgow under James Watt, and a theodolite used in surveying the River

Clyde in the 1830s. Two other theodolites were made by the opticians and instrument makers Kelvin & James White Ltd of Glasgow (1900-1913). There is also a Gregorian reflecting telescope, signed by James Short of Edinburgh and dated 1737, and an early 19th century refracting telescope by Blunt & Son of London. There are two telescopes with interesting local connections: a 1935 astronomical 'Royal Century' telescope by W. Watson & Sons Ltd presented to Prof. Peter Paterson on his retirement from Glasgow Royal Infirmary, and a collapsible telescope by Wm Scott & Co Ltd, Glasgow, used by the West of Scotland Ladies' Rifle Club.

The most notable Scottish manufacturer of optical equipment was the Glasgow firm Barr & Stroud, most famous for their military range finders and binoculars. The collection of Barr & Stroud material includes a trainer's telescope, a 1906 range finder for use by infantry and a 1970s range finder for tanks. There is also a high-speed camera with synchronising unit by Barr and Stroud.

By far the largest piece of optical equipment is a section of the Stevenson holoplate lens (with lens cover and clockwork mechanism) used in the Toward lighthouse between 1877 and 1933.

The camera collection has a number of noteworthy examples, mostly because of their local and Scottish connections. Several cameras were, for instance, made by Lizars of Glasgow, such as the folding type model C 'Challenge' of about 1905. From later in the decade is a quarter plate 'Yachtsman' camera by John Trotter, also of Glasgow, with the lens by Taylor, Taylor & Hobson. A sliding box style wet plate camera by R. H. McBean of Edinburgh is rare. Amongst the small number of cine cameras is a Glasgow-made 8mm Argus.

One cinema projector of particular note is a hand-cranked projector which could also be utilised as a magic lantern. This was used from about 1909 onwards in Scott's Electric Theatre in Gallowgate, Glasgow. This was one of the first cinemas in the city which was later to gain the title 'cinema city'.

The grouping of over 100 pairs of spectacles includes several made in the eighteenth and nineteenth centuries, pince-nez and bifocals. Of particular interest is a set of optician's lenses used by the Glasgow artist-optician John Quinton Pringle, an amazing amateur painter with a distinctive and unforgettable painting style.



Bibliography

Moss, Michael & Russell, Iain (1998) *Range and Vision: The First Hundred Years of Barr & Stroud*, Edinburgh: Mainstream.

**Science, Engineering & Technology: Scientific instruments**

Scientific instruments are used in scientific experiments or as precision tools for a diverse range of activities, from the navigation of ships, to surveying, to the study of natural history. They were the products of highly skilled craftspeople whose work was precise and often pleasing to the eye.

Collection Size

Astronomy, navigation and telescopes (28 + about 100 documents); electrical instruments (60); gas instruments (5); microscopy (19); magnetism (c. 12); temperature and air pressure (42); liquids (25); measuring, weighing and calculating (8); surveying (8); miscellaneous scientific apparatus (19).

Collection Description

This collection ranges between superbly made technical instruments utilised in astronomy, navigation, microscopy and surveying, to instruments used to generate, measure and store electricity and to measure gas. Others relate to aspects of air and temperature, to magnetism, to measuring specific gravity in liquids and to weighing and calculating.

Amongst the finest items are an early nineteenth century orrery made by John Fulton, a Raingo astronomical clock and a telescope made by James Short of Edinburgh in 1737. A surveyor's drainage level was produced by John Gardner, while navigational instruments span octants, sextants, a backstaff and compasses. Amongst the microscopes is one made by Andrew Ross of London in the early nineteenth century.

Electrical instruments include a Wimshurst electrostatic machine, a globe electrical machine and instruments developed by Lord Kelvin encompassing ampere gauges, electric balances, voltmeters and galvanometers. Other instruments, such as barometers, anemometers and thermometers, measure air and temperature, while a Sikes hydrometers relates to specific gravity.

Collection Significance

Glasgow is renowned for being home to men of great scientific genius, including some of the major figures in the history of science such as Joseph Black and Lord Kelvin. It was also a centre for the manufacture of scientific instruments. The collection includes some rare and extremely interesting items that represent scientific pursuits within the city and the manufacture and use of precision instruments. It is significant because of the importance of some of the early instruments and because of the range of items that were Scottish made, including those produced in Glasgow, particularly at the end of the nineteenth and beginning of the twentieth centuries.

One of the most outstanding pieces is John Fulton's orrery, made between 1823 and 1834. Constructed after a period of complex calculations, it required more than 200 moving parts which provided an accuracy said to approximate closely to astronomical tables, a remarkable achievement for an Ayrshire shoemaker. The orrery is supported by other material – wooden patterns and approximately 100 family letters, as well as a pre-1869 visitors' book. Another astronomical instrument, an early nineteenth century

clock, was made by Raingo of Paris and collected by the explorer Dr David Livingstone.

Important navigational instruments include an eighteenth century English brass equinoctial ring (sun) dial and five eighteenth and nineteenth century octants. One is the work of Spencer, Browning and Rust of London (fl. 1784-1819) who also produced, as part of a set, two parallel rules, a protractor and compass, and a backstaff. An important compass comes from the PS *Comet* of 1812 which has a rose made by David Heron & Co, Broomielaw, Glasgow.

Equipment used by land surveyors includes a waywiser perambulator measuring wheel, the work of the English instrument makers J. & J. Watkins (fl.1784-1798), a miner's compass, the product of James White of Glasgow (est. 1850), and a drainage level made by John Gardner, also of Glasgow, who was James Watt's senior journeyman before trading independently between 1773 and 1792.

Amongst other significant optical equipment are a Gregorian reflecting telescope signed James Short of Edinburgh and dated 1737, an early nineteenth century refracting telescope by Blunt & Son of London, and a solar microscope from the 1790s by T. Pether of Rose Street, Edinburgh. For measuring the density of liquids there are two important hydrometers made by Ludwig Oertling (est. London 1847) and another by Bate of Cheapside, London, and specific gravity beads, the work of Anthoni Marnoni of Glasgow (fl. 1844-49). A rare eighteenth century globe electrical machine was produced by George Adams, an outstanding London-based instrument maker. One particularly unusual instrument is a goniometer, made by Troughton and Sims of London, which measures the angles of crystals.

The work of the important Glasgow instrument maker James White, is further represented by seven voltmeters, including two for used in ship's engine rooms, an electrical resistance meter, an eideograph and two ampere gauges. White went into partnership with Lord Kelvin in 1900. Four objects in the collection, two theodolites, an electric balance and a rolling parallel drawing instrument were produced by them. From 1914, the firm's business continued under the name Kelvin, Bottomley and Baird which developed Kelvin's inventions such as the electrostatic voltmeter in the collection. An interesting group of Glasgow made objects for generating, measuring and storing electricity were produced by Baird & Tatlock. Their work is represented by Bunsen, Smee and Grove cells, a d'Arsonval galvanometer, a dial resistance box, an electrophorous, a resistance coil and a Smee's condenser. An electroscope, used to detect static electricity, was made in about 1915 by the Glasgow Scientific Instrument Company.



Bibliography

Holbrook, M. (1992) *Science Preserved: a Directory of Instruments in Collections in the United Kingdom and Eire* (HMSO, London)



Science, Engineering & Technology: Stationary Engines and Electrical Power

Power is essential for industry and domestic use. Many sources of power have been used over the past two centuries, from simple steam engines pumping out mines to electric dynamos powering arc lighting. The supply of power to factories and homes has changed the way society lives and works.

Collection Size

Steam engines (3); hot air engines (10); gas engines (1 + 1 part oil); hydraulic motors (2); electric motors & dynamos (20); experimental engines (c.5); models (c20).

Collection Description

Glasgow Museums has collected engineering related items since its foundation as the City Industrial Museum in 1870, often to display what was then the best in current technology. The collection of stationary engines and electrical power generators all have the same purpose – to provide motive power from everything from a colliery to a sewing machine - but they used diverse sources of power to do so. They comprise large and small steam engines, hot air engines, oil and gas engines and electric and hydraulic motors. Across this range the collection contains a number of very important items such as a Newcomen steam engine, a Parsons turbo-generator and a Gramme Dynamo of very early date. There is a good range of machines built by Glasgow manufacturers such as Barr & Stroud, Mirrlees Watson and Mavor & Coulson and several were also used in the city, from the Queen Street Station Gramme dynamo to the Glenfield & Kennedy hydraulic motor.

Collection Significance

Steam was the driving force of nineteenth century British industry, but engines needed large, expensive boilers, which were often dangerous if not well maintained. As the century progressed, inventors tried to tackle the problem of making power sources that were economical and easy to run, resulting in a very wide range of hot air, oil and gas engines, dynamos, motors, and turbines. This collection provides a very good representative collection of these types of engine, many of which were used or manufactured locally. With Glasgow's leading role in the development of industrial manufacture this collection is of national significance.

The earliest engine in the collection is a Newcomen steam engine installed at Farme Colliery in Rutherglen in 1810 and operated until 1915. Another Newcomen engine can be seen in an 1830s watercolour of a Glasgow distillery by the French artist Depressoir. There are five other full size steam engines in the collection – the oldest is a swing bridge engine from Kingston Dock c1867. A second dock bridge engine dates from c1883 and there is also a single expansion crane slewing engine of 1946. One of the more unusual steam engines is a Gardner Serpollet c1907 which shows the influence of the petrol engine on steam engine design. Finally, there is a small two-cylinder steam winch engine c1886. In addition to the full size engines there is a representative grouping of steam engine models and boilers from early beam engines and steam blowing engines to a Robey 'Uniflow' model of c1890.

The development of hot air engines as a cheap power source began in 1816 with the engines of Rev. Robert Stirling of Kilmarnock. The collection includes two of these

engines, an Ericsson and a Henrici, which date from the early 1880s. There is also a Robinson hot air engine from c1886. This last type was produced until the 1920s, but by then had been almost completely superseded by electric motors.

Gas engines were the first internal combustion engines to be used extensively in industry. Otto and Langen are credited with developing the first practical gas engine and the collection holds one of their early models, built by Crossley c1872-8. Oil was also used to power internal combustion engines and these are the forerunners of the petrol and diesel engines of today. They are represented in the collection by two items – an Allan Hot Bulb engine c1905 and the cylinder head from a Mirrlees Watson diesel engine used at Oban power station.

The generation of electric power for application in industry and the home was one of the most significant technological developments of the late nineteenth century and Glasgow Museums collection has a range of important small scale generators and motors. Of particular significance is an experimental turbo-generator set by Charles Parsons, dating from 1889. This is one of Parsons' own machines, developed to further his experiments in turbine technology which culminated in the revolutionary vessel *Turbinia* of 1897. Also of great interest is an example of the first practical dynamo by Gramme dating from 1876. It was one of the first to be used in Scotland when it powered the electric lighting in Queen Street railway station in 1878.

In addition the collection has a Holmes Magneto-electric lighthouse generator from 1872 and an early domestic water powered turbo-generator by Mavour & Coulson, dated 1886, which was used in a hunting lodge at Ellary in Argyll.

All the items described above were successfully used in industrial, public and domestic settings. There is also a group of experimental machines which never became commercially viable, but which show the extent to which experiments were made in creating a compact, efficient power sources. Included in this grouping are a model of an opposed piston steam engine, a rotating steam engine and an Inshaw rotating petrol engine.





Science, Engineering & Technology: Tools

A tool is a piece of equipment which provides a mechanical advantage in doing a physical task. They are used in the process of manufacture and in repair. Glasgow was a major centre of the production and use of tools on an industrial scale.

Collection Size

Saddler's tools (about 200); car tools (approx. 150); Mathieson (160); shipbuilding related tools (c.100); plumbers' tools (36); others not counted.

Collection Description

This collection comprises a wide range of hand tools, from those used by shipwrights to plumbers. Notable among these is a collection of over 100 tools from the Glasgow toolmakers Alexander Mathieson & Son. The collection contains toolboxes owned by shipwrights, engineers, a railway coach builder and a plumber. Smaller groups of tools and individual items represents other trades including those of the cooper, cabinetmaker, joiner, saddle-maker, draughtsman, sail-maker, hatter, engraver, wheelwright, shoemaker, cobbler, tinsmith, brass finisher and carriage-maker. There are also six exhibition pieces finished in ebony, ivory and silver. Tools associated with cars include valve extraction tools, car jacks, spanners and specialist tools for Rootes vehicles.

Collection Significance

Tools are important across the Transport and Technology collections, as they were used in the construction and repair of many of the items we hold. The collection as a whole can be divided in two – the first and most significant part represents tool manufacture in Glasgow through a collection from the internationally renowned firm Alexander Mathieson & Sons and the second represents the use of tools in some of Glasgow's crafts and industries. The quality of the collection ranges from superb, mint condition, well documented manufacturers' tools through to workmen's toolboxes consisting of commercial and homemade tools.

The finest examples in the collection is the group of over 100 tools representing the products of Alexander Mathieson & Sons which illustrate the items displayed in their 1902 catalogue. None of the tools have been used and range from ordinary hammers and planes to six extraordinary exhibition pieces - two planes, a hammer, a saw and two spirit levels - superbly crafted in silver, ebony, ivory and polished steel.

A good example of an individual's tools is a collection used for railway coach building contains more than 100 individual objects. The owner, Mr. Bramley, was originally from Glasgow and worked at several firms in the area including the LMS Railway and R.Y. Pickering of Wishaw. This box of tools is representative of a craftsman working in the large railway coach building industry that at one time thrived in Glasgow. This includes such companies as North British Railway, Caledonian Railway and Glasgow Corporation. There is also a very interesting collection of plumbers tools which includes many handmade items which are housed in a re-used wooden toilet cistern. There are

also collections of shipwrights, draughtsmen's and other trades which are of interest from a social historical perspective such as cabinet-making and shoe-making.

The car tool collection is diverse and provides support material for the car collections as a whole. Items include jacks, tyre pumps, valve extraction tools, specialist tools for engine rebuilds and Rootes vehicles (of which there are several in the car collection), tyre repair tools, spanners vulcanisers and a Sun engine analyser unit from the 1960s.

Of the saddler's tools, there is one particularly noteworthy collection of 122 objects which dates from 1917. This is a representative collection from Dumbarton and includes tools commonly used in the trade as a whole.





Science, Engineering & Technology: Engineering Models

Engineering models were made to illustrate ideas, test designs, support patent applications and promote products. They were also built by those who took delight in the craft of the engineer. Often this resulted in beautiful working models which elegantly represented the full size machine or structure.

Collection Size

Boilers (28); brake (1); civil engineering (11); Ancient Greek steam engine (1); single cylinder engines (37); two cylinder engines (8); three cylinder engines (3); 4 cylinder engine (1); turbine engines (2); rotary engine (1); diesel engines (4); oil engines (2); petrol engines (1); engine components (6); generator (1); traction (4); industrial machines (5); ancillary shipbuilding models (43); cranes and lifting machinery (9).

Collection Description

This collection of models illustrates developments in engines, boilers and components in the nineteenth and early twentieth centuries. Engineering in a wider sense is represented by fine mechanical and civil engineering models.

Heat engines form the largest part of this collection and can be divided into four sections: steam, gas, petrol and diesel engines. The majority are steam engines and the wide range of types include single-, two- and three-cylinder engines arranged as beam, horizontal, vertical, steeple and oscillating types. Later engine models represent diesel, oil and petrol engines.

Mechanical engineering models include fine examples of industrial machinery such as retort loaders, a steam hammer and a hydraulic press. There are also models which relate to shipbuilding such as a model of a lifeboat davit winch, model propellers and anchors. Civil engineering models include models of cranes and dock structures.

Collection Significance

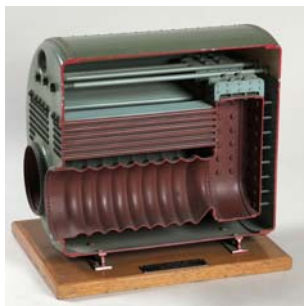
Glasgow was internationally renowned as a centre of engineering innovation and excellence. This is reflected in the origins of the collection in 1870 when the City Industrial Museum was opened. Many of the exhibits were donated by engineering firms in the West of Scotland to demonstrate their skill. The collection contains professionally made display models, some of which have direct links to the companies which built the actual machines, and a fine group of amateur models, which required equally fine engineering skills and knowledge. This collection therefore represents a key aspect of Scotland's industrial history and is of national significance.

There are models of exceptional quality, particularly within the heat engine group. Two of the most outstanding professionally made engine models are Robert Napier's large quarter size model of the steeple engine for SS *Simla*, exhibited in Paris 1859, and a model of Walter Brock's quadruple expansion engine built for QSS *Buenos Aires* and exhibited at Glasgow's International Exhibition of 1888. There are also a number of very fine amateur models – Thomas Glen's 1866 working model of a vertical single-cylinder engine is an exquisite, finely detailed demonstration model, as is a prize winning model of a horizontal factory steam engine made by William Riddell. This model also has supplementary information in the form of a catalogue from the

exhibition held at the People's Palace in 1903, where Riddell's entry is detailed under the pseudonym of "The Gael". There are also a number of high quality boiler models ranging from the ubiquitous Scotch boiler to a fully detailed Babcock and Wilcox water-tube boiler. Overall, the group of models representing heat engines forms an invaluable series of types illustrating the main developments in steam technology and the dominant types of diesel, oil and petrol engines in the nineteenth and early twentieth centuries.

Models representing aspects of civil engineering fall into two small groups – cranes and lifting equipment and dock related objects. The former includes two models from the Glasgow based firm William Arroll & Co. and a small model of a hammerhead crane from the Fairfield shipyard. The latter consists of models relating the construction of Queen's Dock in the 1880s. These belonged to the main contractor Thomas S. Hunter and show his patent excavator, and the unique structure of the quay walls. The models are supported by a number of photographs which show the dock structure and the excavator in use. This is a unique assemblage as far as dock construction on the Clyde is concerned.

Mechanical engineering is represented by a disparate group of models of industrial machinery from a steam hammer and hydraulic press to a hydraulic riveter and a patent slaughterhouse stall. Most of these were made in Glasgow and many represent items, such as two Foulis gas retort loaders, which no longer exist. This part of the collection is largely made up of professionally made demonstration or sales models. The slaughterhouse equipment, for example, was made by the North British Lifting and Moving Appliance Co Ltd of Glasgow and the models are complete with leather travelling cases and sales literature.



Bibliography

Kaplan, Wendy (1990) *Glasgow Creates: 5000 years of art and design*, Glasgow Museums in association with Weidenfeld & Nicholson.



Science, Engineering & Technology: Agricultural Technology

The improvement and mechanization of farming has demanded considerable technological innovation and ingenuity, particularly after the application of steam power to agricultural machinery.

Collection Size

Two-wheeled, horse-drawn vehicles (4); threshing machine (1); traction engine (1); some wheels and wheel parts may also be linked to this collection (18).

Collection Description

This collection of agricultural machinery is small in scope, but includes the magnificent steam traction engine 'Pride of Endrick', No. 113812, built by Ruston and Hornsby of Lincoln, England, in 1920. This was used as a show engine, travelling to agricultural and other shows around Scotland. It was accompanied by a threshing machine built in Sandbach, Cheshire, by E. Foden Sons and Co. Ltd (No. 454).

Other items in the collection are two-wheeled horse-drawn vehicles. There are two farm carts from Fullwood Mains Farm in Linwood: a "Jenny Linn" type, made about 1930, and a 1930s box cart type. There is also a sour milk cart, used at Cranslagroority Farm, Bute, and a two wheeled farm cart of unknown origin.

Collection Significance

The main items of significance in this collection are the steam traction engine and threshing machine. The traction engine was built in 1920 by Ruston and Hornsby of Lincoln for Strathendrick Farmers. It is fitted with a 6 NHP compound engine and has a weight of 12 tons. This vehicle provided the motive power for an agricultural road train which would travel from farm to farm to assist with the harvest in the days before the advent of the combine harvester. It is a typical example of an agricultural engine used in conjunction with a thresher and a baler.

The threshing machine was donated to the museum with the traction engine in September 1974. It was made by E. Foden Sons & Co. Ltd., based in Sandbach. The firm had stopped producing such equipment by the late 1940s and it is thought this machine is a rare surviving example. The threshing machine and the steam traction engine have been used for agricultural purposes and later at show grounds throughout Scotland.





Science, Engineering & Technology: Communications Technology

Communications technology describes the mechanical and electronic means of transmitting information, sound and images.

Collection Size

Telegraphy: submarine cable sections (approx. 68); other cable sections (approx. 28); office-based telegraphic equipment (55). Telephony: telephones and equipment (58); telephone systems and exchanges (3); cellular phone (1); AA 'Callsafe' (1); documents (10). Sound and recording: phonographs, recordings, accessories and publications (99); gramophones and assoc. items, recordings and publications (38+); record players, assoc. equipment and publications (37); records (approx 100); radios and assoc. items (71). Dictaphones, discs and microphones (c.66); microphones (8); amplifiers (10). Televisual broadcasting: television (c.30); videos (1); equipment (3). Printing: printing press (4); assoc. items (c.80). Computing: computers (5).

Collection Description

This collection includes items relating to telegraphy and telephony; sound recording; broadcasting and amplification; televisual broadcasting and recording; printing, typing and computing. The material dates from the nineteenth century through to the present

Amongst the telegraphy equipment, manufactured between the 1850s and the early 1900s, are submarine cable sections, transmitters and receivers as well as wireless equipment which are representative of the revolution in rapid communications, enabling messages to be sent world-wide in minutes. Landline telephony equipment ranges between the 'butterstamp' telephones of the 1870s and early 1880s to the candlestick-style instruments and dial phones of the twentieth century, including design classics such as one of the first type 706 telephones introduced in 1957 and a 'Trimphone' from the mid 1960s.

Equipment for sound recording and reproduction includes phonographs, gramophones, record players, records, radiograms, radios and amplifiers, dating from the 1880s until the later half of twentieth century. By far the most important item in the televisual collection is the Baird Televisor receiving set of 1930-2. Printing equipment includes a Columbia Eagle printing press of 1853 used by the Glasgow Co-operative Wholesale Society, nineteenth and twentieth century typewriters and twentieth century computers.

Collection Significance

As a key centre of business and export, Glasgow was one of the leading British cities in the development of mass communications, especially in relation to telegraphy and early telephony. The significance of the collections lies in their local provenance of both manufacture and use which reflect this development and helps to place Glasgow in its technological and engineering heritage. Within this Glasgow context, the collections hold items of national and international significance. Other museum collections hold many individual items relating to mass communications associated with their locality and the National collections hold a comprehensive overview of the subject. These

collections represent one of the most significant in terms of provenance of manufacture and use within the context of one city's communications evolution.

The telegraphy collection includes an early and fine example of a double needle telegraph instrument of 1857, made by William Reid of London who had worked with William Fothergill Cooke and Charles Wheatstone in the development of telegraphy in the 1840s. Another set of machines of particular importance is the Creed receiving perforator, transmitter and receiver from around 1921. They were invented by Frederick George Creed whilst living in Glasgow in the early 1900s, and were designed for use with a Wheatstone automatic telegraph to facilitate re-transmission and became one of the standard pieces of equipment used by the Post Office for later telegraphy and a forerunner of the Telex communication system. The collection also represents the work of Glasgow inventor James Anderson's own experimental work on wireless telegraphy from the 1920s. It also provides a good overview of items commonly used throughout the UK, such as the equipment gifted in 1911 by the General Post Office, Glasgow. The collection of submarine cables, dating from 1858 to 1909, is typical of other museum collections. However, there are individual items of more national importance such as the section of 1858 transatlantic cable in souvenir packaging by Tiffany of New York accompanied by its original letter of authentication, written by Cyrus W. Field (the leading promoter of the transatlantic cable).

Glasgow's electrical engineers were amongst the first to establish telephone networks and exchanges. The telephony collection illustrates its local usage and manufacture. There are some instruments of great importance, including several 'butterstamp' telephones of the late 1870s and early 1880s, a very early pair of which possibly date from 1877, soon after Bell's telephone was first demonstrated by William Thomson in Glasgow in 1877 and made commercially available in the UK by Alexander Graham Bell's company in the latter part of that year. The collection includes an unusual Glasgow made mechanical telephone from the 1880s, illustrating continued experimentation with non electrical communication. There are also several switchboards, amongst which is a mid twentieth century telephone exchange from a Maryhill school and a switchboard used by Glasgow Museums. Of considerable interest and of national significance is the 1910 Antarctic Expedition's telephone system supplied by the National Telephone Co Ltd of Glasgow (established in 1881).

The collection of objects for sound recording and reproduction illustrate most of the twentieth century developments, with a few notable items such as a phonograph made by S. Bergman and Co., the first type of commercially successful machine. The Apollo hot air gramophone of 1908 is an outstanding and rare example of an unexpected application of a Stirling engine (a Scottish invention of 1816) to an instrument then commonly powered by a clockwork motor. Not many were made and very few survive, the only other UK example being in the National Museum of Science and Industry. The most important object in the televisual collection is the Baird Televisor of 1930-2 which was the first commercially available television.



Bibliography

(2004) *A Guide to the Museum of Transport*, Glasgow City Council (Museums)



Science, Engineering & Technology: Industrial Machinery

Industrial machines produce or process large quantities of material. Since the late nineteenth century they have made most of the items we use in everyday life, from clothing and carpets to cars, books and a lot of the food we eat.

Collection Size

Textile machines (7) and related items (14); rope-making machines (4) and related items (+ c15); metal working machines (15) & related models; wood working machines (7); construction related items (4); machines and other items relating to printing (4); pumping machine (1); testing and maintenance machines (5); machines for making consumer goods (2); collections of machine product samples (4); sketches and paintings (13).

Collection Description

This collection of industrial machinery encompasses textile, metal, woodworking and rope-making machines and a limited range of items relating to construction and printing. Some objects, such as the carpet manufacturing machines from James Templeton & Co., and the mid-nineteenth century rope-making machinery from the Gourock Rope Works Co. Ltd, were collected as companies modernised their factories.

Other items, such as the cigarette-making machine from Stephen Mitchell & Son and the Glasgow Corporation tinsmith's workshop machines were rescued as premises closed or businesses were wound up. Noteworthy items include: a Columbia 'Eagle' press from around 1853; a number of very fine models include a 'Rigby' patent steam hammer and a 6,000 ton hydraulic forging press.

The machinery collection is complemented by photographs, documentary material and a number of sketches and paintings depicting industrial production.

Collection Significance

This collection contains items from some of Glasgow and the West Coast of Scotland's most important industries. In the late nineteenth century the City Industrial Museum built up a large collection of samples and products from Glasgow's textile, metal and chemical industries, which at the time ranged from the manufacture of felt hats to gunpowder. Unfortunately, a lot of this collection was subsequently disposed of or destroyed, but what has survived provides an insight into the many industries operating in Glasgow.

The textile industry is represented by two handlooms, shuttles from hand and power looms and two carpet making machines from Templeton's, used for setting and cutting Chenille carpeting. These are supported by a large number of carpet samples showing the products of the firm, including a sample of the carpeting made for the *Queen Mary* c. 1935. Glasgow Museums is also currently in the process of acquiring a nationally significant collection of carpets from the liquidated firm of Stoddard's, which incorporated Templeton's.

An early set of belt driven rope-making machines from the Gourock Ropework Co. of Port Glasgow represents the rope-working trade. Dating from the 1840s they were

used until the end of the nineteenth century and brought out of retirement during the Second World War when the company needed extra machines to keep up with demand.

Machinery used in the metal-working industries include drilling, screwing and bending machines and a group of seven machine tools used for working with tin. There are also fine models of a Rigby patent steam hammer, a 6000 ton hydraulic forging press c1918 used by William Beardmore & Co. of Glasgow and a machine used to cut ovals in sheet metal. Beardmore's is further represented by a fine set of six etchings by Frank H Mason, made for the 1924 British Empire Exhibition in Glasgow. There is also a group of watercolour sketches prepared for the company's display at the 1938 Empire Exhibition, Glasgow, by Cavendish and Morton, who also produced paintings of the Parkhead Forge in about 1950. The work of G. & J. Weir of Glasgow during the Second World War is shown in two recently acquired paintings by Tom Purvis. One shows the turbine shop, the other the finishing of a 25-pounder field gun by a group of women. A model of a pump reflects peacetime production.

There are three items relating to construction industries – a model of the Hunter patent excavator used during the building of Queen's Dock, Glasgow in the 1880s and a model riveting machine and full size riveting samples from the firm William Arrol & Co. of Glasgow. Other items relating to this firm include apprenticeship books from the 1890s and bridge plans from the 1970s and 1980s.

The printing industry is represented by one fine printing press, a Columbia Eagle dating from 1853 and used by the Scottish Co-operative Wholesale Society in Glasgow for over 100 years. There is also a machine for printing card tickets a punching machine and a model printing press.



Bibliography

Kaplan, Wendy (1990) *Glasgow Creates: 5000 years of art and design*, Glasgow Museums in association with Weidenfeld & Nicholson.

Blake, George, (1963) *The Gourock*, Port Glasgow, The Gourock Ropework Co Ltd.