

Collection Significance Report: Science, Engineering & Technology: Scientific Instruments

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About this Document

This document is extracted from a report by Glasgow Museums submitted to the Scottish Executive's Recognition Committee as part of its recognition scheme for non-national collections.

Overview

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).

The Collection

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)

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