Our Science *and* Art

Visualising the Human Body

Exhibition Guide

Thinking 3D

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ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF GLASGOW

1. X-ray tubes

c. 1890s

2018/11.1, 2018/11.2, 2018/11.6, 2018/11.8

These X-ray tubes were used in the Radiology Department of the Glasgow Royal Infirmary. Glasgow was the first city in the world to have an official radiology unit in a hospital, set up by physician and engineer, Dr John Macintyre (1857-1928) [2]. After the discovery of X-radiation by Wilhelm Röntgen (1845-1923) in 1895, Macintyre demonstrated the use of X-rays in medicine and went on to set up the radiology department of the Glasgow Royal Infirmary in 1896.[2]

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2. ‘Icones anatomicae...’ by Albrecht von Haller (1708-1777)

Gottingae :
Viduam B. Abrami Vandenhoeckii, 1756

Bookstore HAL [oversize] vol. 2

Albrecht von Haller was a multi-talented Swiss scientist, sometimes referred to as the father of modern physiology.[3] He moved from his native Bern to the University of Leiden in 1725 and began studying medicine, anatomy and botany under Herman Boerhaave. He continued his anatomical research after graduation and in 1736 was invited to the chair of medicine, anatomy, botany and surgery at the University of Göttingen.[4]

Haller worked with the artist C. J. Rollinus to produce his ‘Icones Anatomicae’. The book featured the most detailed depiction to date of the arterial network of the human body, and was praised by contemporaries for the fine detail of its illustrations.[5] The complete work was issued in eight separate parts between 1743 and 1756, but the College’s copy was later bound into two volumes: one contains the text and the other (on display here) contains the illustrations.

Rollinus’s images were reproduced for publication using copperplate engraving. This intaglio printing method involves using a wedge-shaped metal tool to gouge furrows in a metal plate. The plate is covered with ink, which is allowed to seep into these depressions. The ink remaining on the surface is then cleaned off with a cloth, and the image is transferred from plate to paper in a roller press. This process is more expensive and time-consuming than relief methods such as woodblock printing, but it also allows for a finer level of detail and a greater range of tone, which the artist has used well here to create a three-dimensional effect.[6-8]

3. ‘Surgical Anatomy’ by Joseph Maclise (1815-1880)

London : John Churchill, 1851

Bookstore MAC [oversize]

Joseph Maclise studied at University College, London under the tutelage of such famous surgeons as Samuel Cooper and Robert Liston (to whom this book is dedicated). He spent his career working primarily as a general practitioner in London’s Fitzroy Square, but also found time to produce a number of exceptionally detailed and beautiful works on anatomy.[9]

Joseph was the younger brother of the famous portrait artist, Daniel Maclise (1806-1870), and the style of his anatomical drawings is strongly reminiscent of his elder sibling’s work. The two brothers remained close throughout their lives, sharing homes and travelling together in Italy and France.[10]

The style of illustration is perhaps unusual for a treatise on anatomy for surgeons. Rather than being presented with cadavers in various stages of dissection we are instead shown a series of lifelike portraits, in which it is possible to “see into” a particular part of the subject’s body. The faces are rarely repeated throughout the book, and it has been suggested that they are actually individual portraits of visitors to the Great Exhibition of 1851.[11]

The illustrations in this book were reproduced for publication using the lithographic method, a printing process whereby an image is applied to a flat piece of stone using a greasy substance (such as crayon or a special type of ink), before printing ink is rolled on to the stone and then pressed on to paper. The ungreased parts of the stone retain the ink, while ink on the greased parts is transferred to the paper.8 above[8,12]

Lithography, invented in Germany in the late 18th century, allowed artists and printers to produce a wider range of detail and tone than had previously been possible with relief (e.g. woodcut) or intaglio (e.g. copper engraving) printing methods. It also made colour printing easier, as different colours of ink could be applied to different stones and then overprinted onto a single sheet. Despite this, the plates in Maclise’s work have in fact been coloured by hand.

4. Ernst Leitz microscope

c. 1890

2003/18/

Ernst Leitz was a firm in Weztlar, Germany, that produced high-quality microscopes and other optical instruments. [14] This monocular microscope uses a rack and pinion method to focus the lens.

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5. Histology slides

20th century

2005/2.1–4

These slides belonged to Dr Alice Margaret Insh, who worked at Shieldhall Fever Hospital and was a Senior Medical Officer in Lanarkshire in the mid-20th century. They were probably used for teaching, and contain a variety of samples, including cancer, bacteria, and general histology, taken from both animals and humans.

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6. Culpeper-type microscope

Early 19th century

2003/14

Edmund Culpeper was an English instrument maker in the late 17th century. Although having made simple microscopes before, his personal design included a compound microscope with a tripod stand. The tool was so popular that it continued to be manufactured for the next century.[15]

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7. Pritchard-type microscope

c. 1830

2003/26

This achromatic microscope was manufactured by Andrew Pritchard, an optician and instrument maker of the mid-19th century.[26] Achromatic lenses focus light of different wavelengths in the same plane, hence producing a sharper microscopic image. They were developed by the physicist Joseph Jackson Lister, father of the famous surgeon, Joseph Lister.[17]

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8. Various books on microscopy

19th century[18-30]

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9. Procto-sigmoidoscope

1926

2003/3.1

Part of a “5 in 1 Electro-diagnostoset” set manufactured by Cameron’s Surgical Specialty Co. (Chicago, USA).

The rigid sigmoidoscope – essentially a tube with a small light – allows the physician to examine a patient’s colon and large intestine. It can be used to find the causes of abdominal pain, intestinal bleeding, inflammation and ulcers. A slightly different version of this instrument, called a flexible sigmoidoscope, is commonly used today in screening programmes for colorectal cancer.[32]

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10. Cameron’s oralite

1926

2003/3.4

This illuminated, collapsible tongue depressor is also part of the “5 in 1 Electro-diagnostoset” set manufactured by Cameron’s Surgical Specialty Co. (Chicago, USA).

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11. Surgilite

1926

2003/3.6

The “5 in 1 Electro-diagnostoset” includes a number of lamps designed to fit the various instruments. These lamps can be connected to a power supply and screwed into the handle of an instrument, providing illumination for examination, diagnosis and surgery.[33]

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12. Brunton’s Auroscope

c. 1880–1920

2006/7.6

This device is used to visualise the ear canal and tympanic membrane. Light is funnelled into the instrument and the image of the ear is reflected from an internal mirror towards the eye piece.

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13. Gastroscope

c. 1960s

2000/10.2

Rudolf Schindler was the brains behind the first ever semi-flexible gastroscope, created in 1931. He constructed the gastroscope in such a manner that the distal end could be rotated, while the proximal end remained stationary. This allowed easier access to all areas of the stomach.[34]

Gastroscopy today involves examining components of the gastrointestinal system by inserting a thin, flexible tube down the patient’s throat. This endoscope contains a camera and light, and is controlled by the physician performing the examination. The images from the camera are then fed to a monitor screen for visualisation.[35]

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14. 'De Humani Corporis Fabrica' by Andreas Vesalius

Basileae : Ex officina Joannis Oporini, 1543

Bookstore VES [folio]

Andreas Vesalius was a 16th century Flemish anatomist and physician. He attained his MD at the age of 23 and almost immediately was appointed Professor of Anatomy and Surgery at the University of Padua. It was while working in this post that he produced his most important and influential book, 'De Humani Corporis Fabrica.' In this landmark study of human anatomy, Vesalius presented a firm challenge to Galenic teaching by pointing out the anatomical errors present in Galen's work, and instead adopting an empirical, evidence-based approach. Crucially, Vesalius based his descriptions and depictions of the human body on his own observations from cadaveric dissection (a taboo practice in a time when most dissection for anatomical instruction was still carried out on animals, including dogs and monkeys). The publication of this book, and the condensed 'Epitome' of 1555, led to significant and permanent changes in the study of anatomy and medicine. Vesalius's approach to empirical observation placed his work at the forefront of a significant shift away from the received orthodoxy of Galen and towards the practice of anatomy as a modern science. It is for this reason that he is known today as the "father of modern anatomy."[36,37]

Vesalius spent at least three years preparing the text for his great work, eventually writing seven distinct books, to be published together in a single volume:

1. The Bones and Cartilages
2. The Ligaments and Muscles
3. The Veins and Arteries

4. The Nerves
5. The Organs of Nutrition and Generation
6. The Heart and Associated Organs
7. The Brain

He took sabbatical leave from the University of Padua in 1543 to travel to Basel in Switzerland, where he enlisted the services of the printer, Johannes Oporinus. The end result, a large folio volume with exquisite typography and over 250 highly detailed illustrations, is a testament to the skills of the printer and the artistic craft of the illustrator and engraver. The artist behind the original drawings is unknown, but is generally believed to have been a student of the Venetian painter, Titian.[38,39] The illustrations were then reproduced using woodcuts. In this process the image is carved in relief into a block of wood (pear wood in this case). The block is then locked in a forme alongside pieces of metal type, inked, and pressed on to paper in the printing press. The press used by Oporinus would probably have been a large, wooden screw press, which had to be turned by hand for each impression.[40]

The College acquired its copy of the first edition of the 'Fabrica' in 1894, but it was originally owned by Paul Eber (1511-1569), a Lutheran theologian who also taught anatomy at the University of Wittenberg. Eber probably used this copy as source material for his lectures, and his annotations can be found throughout the book, demonstrating the sudden and dramatic impact that the publication of Vesalius's work had on anatomical teaching across Europe.[41,42]

15. Early ultrasound scan

1968

RCPSG/65/3/1

One of the earliest scans taken in 1968 by Dr Patricia Morley, a radiologist specialising in ultrasound at the Western Infirmary, Glasgow. Working with Professor Ian Donald, Dr Morley used an early Diasonograph 'B' scanner sited in the Radiology Department. The two scans show a simple renal cyst at the upper pole of the left kidney.[43]

Upper: Longitudinal scan in prone position showing renal cortex, collecting system and 'echo free' cyst at upper pole.

Lower: Axial scans showing 'echo free' area more clearly with 'acoustic enhancement' confirming that the space is fluid filled and therefore a cyst.

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16. Ultrasonic Echo-sounding

c. 1960

RCPSG/1/20/14/46

Professor Ian Donald is shown here in a still from a short, instructional film featuring some of the earliest clinical applications of ultrasound. You can see clips from the film on the screen in Crush Hall.

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17. Liebreich ophthalmoscope

1855

1997/2

The ophthalmoscope, an instrument for looking inside a patient's eye, was first invented in 1847 by Charles Babbage.[44] In 1851, unaware of Babbage's creation, the German physicist and physiologist Hermann von Helmholtz devised and created his own ophthalmoscope, with a much more efficient design than its English predecessor.[45] The ophthalmoscope combines reflecting glass and a concave lens to allow the physician to simultaneously illuminate and observe the retina, making it easier to diagnose complaints such as glaucoma, tumours, and detached retinas.[46]

The ophthalmoscope shown here was designed by another German physiologist. Richard Liebreich, author of the highly acclaimed 'Atlas des Ophthalmoscopie,' which was the earliest atlas dedicated to the subject of ophthalmoscopy.[47]

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18. Beale self-illuminating ophthalmoscope

c 1860s–1880s

2003/77.1

This self-illuminating ophthalmoscope was designed by the British physician Lionel Beale and manufactured by the London-based firm, Hawksley and Sons. The ophthalmoscope was illuminated by a flame, kept alight by a spirit burner contained within the stand of the instrument.

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19. X-Ray department at the GRI

c. 1914

RCPSG/1/12/10/13/1-12

Photographs showing John Macintyre's X-ray department at the Glasgow Royal Infirmary, the first hospital radiology unit in the world.

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20. Mass X-Ray Campaign in Glasgow

1957

RCPSG/52/8/9/1

Invitation to Dr Alexander Dale, Superintendent of Mearnskirk Hospital, to a reception at the City Chambers to mark the X-ray campaign in Glasgow, 1957. The campaign was organised by Glasgow Corporation and the Western Regional Hospital Board in co-operation with the Department of Health for Scotland and the Scottish Information Office. During a five week period between March and April 1957, 714,915 people were X-rayed in Glasgow at 37 mobile units. This was the first such campaign in the UK.

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