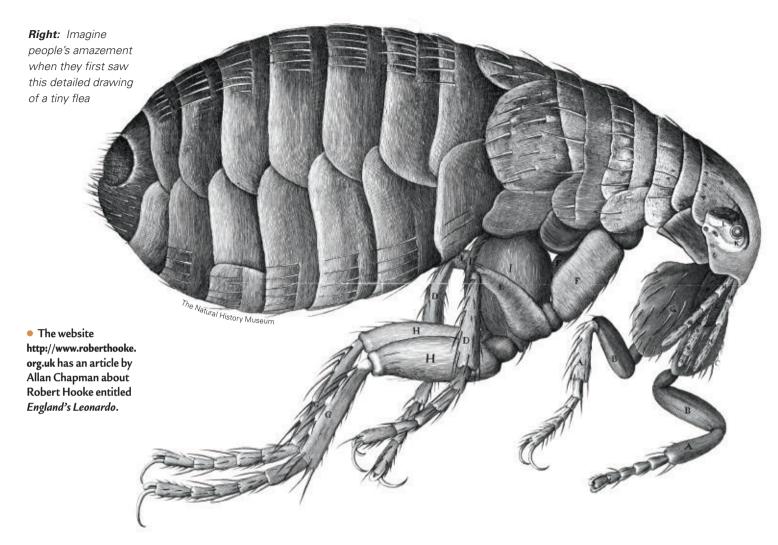
A life in science

Robert Hooke



Right: A portrait, believed to be of Robert Hooke, in the Natural History Museum

- Borrow The Curious Life of Robert Hooke: The Man who Measured London by Lisa Jardine (2003) or The Man who knew too Much by Stephen Inwood (2002) from your public library.
- Find out more about the other scientists who appear in Hooke's story.



You may have heard of Hooke's Law, relating to springs and elastic materials and what happens when they are stretched. But who was Hooke?

obert Hooke, who lived from 1635 to 1703, was a man of many interests. He invented the universal joint used in all cars and many other mechanical devices, designed a balance wheel for a watch and, as part of his wide-ranging observations using a microscope, first coined the term 'cell'. Hooke was involved with The Royal Society from its formation — he was employed by the society as an experimenter and demonstrator. His work in astronomy led him into conflict with Newton, who became much more famous. Although Hooke took an important part in the rebuilding of London after the Great Fire, you are more likely to have heard of Christopher Wren in this context.

Box 1 Micrographia

Hooke's Micrographia contains the results of a series of observations and experiments conducted between 1661 and 1664. When copies first appeared in January 1665 at a lavish 30 shillings each, the book had a tremendous impact. Samuel Pepys was captivated and sat reading until 2 in the morning, saying it was 'the most ingenious booke that ever I read in my life'.

Hooke could write vivid and powerful prose in an accessible style. It was, moreover, the first proper picture-book of science. Its 60 'observations' were accompanied by 58 beautiful engravings of objects seen beneath the microscope or with a telescope. Among these were regular empty spaces in sections of cork. Hooke described these as 'cells', bounded by 'walls' because they reminded him of the cells in which monks live in a monastery. The word cell is still used today.

Although Micrographia sounds as though it is mainly about small things it also contains:

- a description of the earliest investigation of the colours of thin plates of mica with an explanation based on interference of light rays
- observations on soap bubbles
- a theory of light as a transverse vibrational
- a definition of heat as a property of a body arising from the vibration of its parts
- a discussion on the true nature of combustion
- observation of a group of lunar craters made with a 30 foot telescope

Curator of experiments

Hooke was employed by The Royal Society to conduct experiments supporting other people's work and to carry out demonstrations. He became actively involved in research himself and wrote and talked extensively about his findings. Topics he investigated included:

- the nature of the air and its relationship to respiration and combustion
- the laws of falling bodies
- improvements to diving-bells
- methods of telegraphy
- the relationship of barometric readings to the weather
- transfusion of blood

It seems clear from comments at the time that it was exciting to be present when Robert Hooke was demonstrating - he was something of a showman with a dramatic sense. Today he might have been a Royal Institution Christmas Lecturer. He invented instruments throughout his career, from his first devising of an airpump for Robert Boyle in 1659 to his last recorded scientific utterance in December 1702, when he was trying to devise an improved instrument to measure the Sun's diameter.

Box 2 Timeline

- 1635 Born in Freshwater, Isle of Wight, on 18 July, son of Rev John Hooke. Robert was a fast learner and was good at making things, including mechanical toys. A visiting artist, struck by Robert's draughtsmanship, advised Rev Hooke to settle upon an artistic career for his son.
- 1648 After the death of his father Hooke went to London and, dropping art, soon joined Westminster School.
- 1653 Attended Christ Church, Oxford. Became a close friend of Christopher Wren, another pupil from Westminster.
- **1655** Assistant to Robert Boyle, helping in construction of an air pump.
- **1662** Appointed Curator of Experiments at The Royal Society, the first salaried research scientist in Britain.
- **1663** Elected to be a Fellow of The Royal Society.
- **1664** First to infer that the planet Jupiter rotated.
- 1665 Hooke's post of Curator at The Royal Society was made permanent.

Micrographia was published.

Plague hit London and Hooke moved to Epsom.

- 1666 Made drawings of Mars which allowed others to work out its period of rotation more than 200 years later. As the plague abated, meetings of The Royal Society resumed in London. Hooke suggested measuring the force of gravity using a pendulum. He showed that the centre of gravity of the Earth and the Moon describes an ellipse around the Sun.
- **1667** After the Great Fire Hooke put forward proposals for rebuilding the City of London. His plan was not adopted, but he was appointed as one of six city surveyors, along with Christopher Wren. Hooke and Wren designed the Monument to the Great Fire.
- **1672** Hooke published a paper on diffraction of light, in which he included objections to Newton's paper published the month before. Hooke continued to make telescopes and conduct astronomical
- 1675 Isaac Newton published Discourse on Colour. Hooke objected that much of the material was already contained in Micrographia. Newton acknowledged that Hooke's work had helped him.
- **1676** Hooke published *A Description of Helioscopes*, describing the principles of spiral springs.
- **1677** Hooke became secretary to The Royal Society.
- 1678 Hooke published papers on comets, including a statement of the inverse square law of gravity (though he had no proof of it). In another paper he gave an account of elasticity and the kinetic theory of gases that matches current ideas.
- 1679 Hooke wrote to Newton, which induced Newton to 'resume his former thoughts concerning the Moon'.
- **1684 onwards** Robert Hooke continued to invent, including a practical system of telegraphy and the universal joint. He observed and tried to explain the motion of the Sun among the stars, the nature of fossils and the succession of living things on Earth.
- 1700 Edmond Halley described Hooke's last invention, a marine telescope, to The Royal Society.
- **1703** Hooke became blind and his legs swelled possibly a consequence of diabetes.
- 1704 Hooke died at Gresham College, 3 March, and was buried at St Helen's Bishopsgate. His remains were exhumed and reburied in 'north London' sometime in the nineteenth century. The location of his grave is unknown.

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