Robert Hooke

Introductory article

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(1635–1702/3) English instrument-maker, experimentalist and natural philosopher who made key contributions in a wide range of areas including physiology, geology and mechanics.

Born on the Isle of Wight, Hooke showed early aptitude with the design of mechanical toys. At Westminster School he learnt mathematics and geometry, and at Christ Church, Oxford, he joined a remarkable group of natural philosophers working before the Restoration on physiological and physical topics.

Much of Hooke's career was driven by financial uncertainty. As an employee, working firstly with Robert Boyle and then as curator of experiments at the new Royal Society from 1662 to 1677, Hooke's status as a professional in a society of gentlemen natural philosophers was problematic. He was continually concerned to establish his credibility, and his defences of ownership of his ideas were often vitriolic.

Hooke's disputes with Newton over light, mechanics, and the theory of planetary motion, in particular, have dominated assessments of his place in the history of science. Contrasts are often drawn between the single-minded genius and the dispersed interests of the technician: 'Hooke never achieved the highest status as a scientist, since he was not a theorist but a practitioner, who had not advanced far in mathematics, and tended to work by intuitive understanding rather than sustained thought' (Vickers 1987, *English Science: Bacon to Newton*, pp. 99–100). Other recent historians, suspicious of such neat dichotomies and the evaluations they support, have emphasized the intellectual coherence of Hooke's dauntingly diverse practical and theoretical projects.

Having published a pamphlet on capillary action in 1661, Hooke embarked on an ambitious series of experiments with the microscope on plants, on insect anatomy, and on combustion and respiration. He demonstrated that the function of respiration is simply to bring a constant supply of air to the lungs, not to cool or to pump. Key members of the Royal Society, including Christopher Wren (with whom Hooke would work closely as surveyor and architect in rebuilding London after the fire of 1666), were closely involved in the preparation of Hooke's *Micrographia*. With its magnificent plates of subjects like moss, mites and flies, and the blue mould, it showed critics of the new Society the relevance of the experimental method for the understanding of life. Hooke's discussion of the structure of cork included a use of the term 'cell' from which the modern biological usage descends. When Samuel Pepys bought his copy of this 'most ingenious book' on 20 January 1665, he 'sat up till 2-a-clock in [his] chamber, reading of Mr Hooke's Microscopicall Observations'.

The microscope supported the central claim of the mechanical philosophers that the subvisible world was composed of textured parts like those in the macroscopic realm. After the Fall, our cognitive limitations require us to supplement our senses with external aids to penetrate to the reality behind appearances. Apparently mysterious microphysical effects, which had traditionally been attributed to intrinsic, occult powers, might now, argued Hooke, be seen to be 'perform'd by the small *Machines* of Nature, which are not to be discern'd without these helps, seeming the meer products of *Motion*, *Figure*, and *Magnitude*'.

While officially Hooke upheld the mechanists' claim that all natural change is by contact action between material bodies in motion, he did in practice often allow matter to have intrinsically active powers such as gravity, congruity or incongruity, or sympathy. His studies of vibration and attraction owed much to music theory and to empirical traditions in natural magic. Hooke continued working on light, cosmology, earthquakes and fossils, cartography and meteorology. Often collaborating with a network of craftsmen and entrepreneurs, he designed and tested an array of instruments, including barometers and thermometers, clocks and marine chronometers, and telescopes.

Hooke always saw knowledge of nature as a sure way to uphold religious orthodoxy, and scriptural exegesis plays a significant part, for example, in his outstanding work in geology and Earth history. He consistently ridiculed reductionist approaches to life and mind. The theory of memory that he outlined in the *Lectures of Light* of 1682 (published in 1705), for example, was based on an executive soul which can radiate its attention out to the 'material and bulky' ideas splayed on the coils of memory in the brain.

Hooke's health, both physical and psychological, was fragile, and in the interests of self-observation he recorded all the physic he prescribed himself, as well as details of his every sexual experience. As his diary testifies, he carried an uneasy self-image through his stressful social and professional life. On attending a performance of Thomas Shadwell's farce *The Virtuoso*, which mocked the experimental life, Hooke growled: 'Dammd Doggs. *Vindica me Deus*, people almost pointed.'

Further Reading

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