Scientific Works for the English Restoration

BY **R. W. Home**

The period in English history known as the Restoration — that is, the period following the restoration of King Charles II to the throne in 1660 after the upheavals of the Civil War and Oliver Cromwell's dictatorship — saw a remarkable flowering in culture and intellectual life. Literature, art, music and scholarly pursuits all sprang vigorously to life as an unaccustomed peace and prosperity settled on the land. Most striking of all, however, was England's emergence in these years as a leading centre of scientific activity.

Modern science, it is generally agreed, had its beginnings in the "long" 17th century, in the period that historians of science usually refer to as "the scientific revolution". Between the publication in 1543 of Copernicus's *De Revolutionibus Orbium Coelestium* and Vesalius's *De Humani Corporis Fabrica,* and the death of Isaac Newton in 1727, the way in which people thought about the world in which they lived changed dramatically. So, too, did opinions about how to acquire knowledge about it. By the end of the period, it was widely accepted that such knowledge had to be empirically grounded, not based on revelation, intuition, or mystical insight. Moreover, the evidence had to be publicly accessible, at least in principle — that is, it had to be reproduceable. In Restoration England, the new approach found some of its most outstanding advocates and practitioners, including Robert Boyle, Robert Hooke and Isaac Newton, to mention only the most famous.

The period also saw the emergence of a new institutional form to support the practice of science, namely the scientific society, and a new form of publication, the scientific journal article. Indeed, these two developments were related. The existence of the scientific societies led to a growing tendency for people to report the results of their inquiries by means of papers presented at society meetings, rather than by the traditional means of publishing a book; and increasingly often, these papers were then published as articles in the society's proceedings, or in some other journal. However, the rise of the scientific journal by no means diminished the rate of publication of science-related books. On the contrary, the growth of the new science was accompanied by a rapid growth in scientific publication in all forms.

In these respects, too, Restoration England was at the forefront of development. The first recognised scientific society was the Accademia del Cimento, founded in Florence in 1657 under the patronage of the Grand Duke, but this survived for only a decade. The Royal Society of London, founded in 1660, the restoration year, and given its first royal charter two years later, proved much more enduring — indeed, it has existed continuously since then. It is the world's oldest scientific society and remains today Britain's premier scientific institution. The Society's journal, its famous *Philosophical Transactions,* commenced publication in 1665, and this, too, has continued to the present day, augmented in the 19th century by a second journal, the Society's *Proceedings.*

It is only natural, therefore, that Restoration England has long been, and remains today, a prime focus of attention for historians of science. Many of the field's most important historiographical debates have centred precisely on this period and so, too, have some of its greatest scholarly achievements. We are fortunate that the University of Melbourne Library includes, as part of its rich collection covering all aspects of the history of science, strong holdings relating to science in the Restoration period. These holdings have already underpinned internationally significant research. The Friends of the Baillieu Library some years ago made publications relating to the 17th century Royal Society one of its priority areas for purchasing for the Library as suitable items come on the market, and this has led to some notable additions to the collection. The present paper discusses just some of the highlights of this wonderful scholarly resource.

Boyle, Hooke, and the New Science

Robert Boyle was unquestionably England's leading exponent of the new science at the time of the Restoration. His experiments with the air pump built for him by Robert Hooke, that demonstrated (as Boyle put it) the "spring and weight of the air", became a *leitmotiv* for the Royal Society in its earliest years. In addition, Boyle was a ceaseless proselytizer for the new "mechanical" or "corpuscular" philosophy, one of the principal outcomes of the scientific revolution, that insisted that all natural change was to be understood in terms of the motions and interactions of the particles of which all matter was held to be composed. The University Library has very strong holdings of his publications, including a copy of the second (1662) edition of the work first published in 1660 in which Boyle announced his experiments with the air pump, his *New Experiments Physico-mechanical Touching the Spring of the Air.* When needed for comparative purposes, the text of the first edition is available on microfiche, along with many other works from the period, in the extensive "Landmarks of Science" collection that the Library also holds.

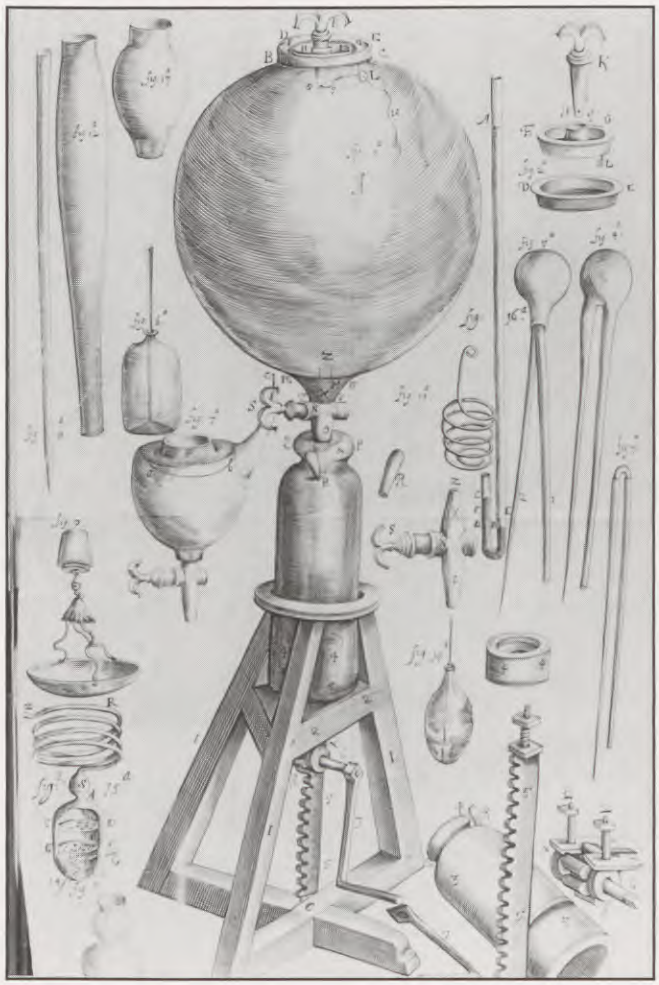

Illustration of the air pump, in Robert Boyle's *New Excerpts, at p. 1, New Experiments Physico-mechanical Touching the Spring of the Air, 1662.* (University of Melbourne Library Collection.)

Two of Boyle's earliest and most important statements concerning the principles of the corpuscular philosophy first appeared in 1661, namely his renowned attack on Aristotelian and Paracelsian theories of matter entitled *The Sceptical Chymist* and a more general work entitled *Certain Physiological Essays.* The Library has first edition copies of both, as well as several modern editions of the first of them. It also has original editions of his *Experiments and Considerations Touching Colours* (1664), his *Origine of Forms and Qualities* (1666), his *Some Considerations Touching the Usefulness of Experimental Natural Philosophy* (two volumes, 1664–1671, the first volume being the second edition of a work first published a year earlier, in 1663), his *Essay of the Great Effects of Even Languid and Unheeded Motion* (1690), and his *Medical Experiments* (1692). The Library has the catalogue of his works that was published in 1692, the year after he died (and also, of course, the comprehensive bibliography by J. F. Fulton, published in 1961); three volume sets of his *Theological Works* (1715) and *Philosophical Works* (1725); the five volume set of his *Works* published in 1744; the *Life of the Honourable Robert Boyle* by Thomas Birch published in the same year; and the six volume edition of the Works (including the *Life*) that was issued in 1772. A number of Boyle's other works are held in modern reprint editions, while all the major publications are held on microfiche in the Landmarks of Science collection. The Library has subscribed to the edition of Boyle's papers and correspondence currently being prepared under the supervision of Michael Hunter, and it has a comprehensive collection of 20th century publications on his work.

Robert Hooke began his career as Boyle's assistant in Oxford in the 1650s. Then, shortly after its foundation, the Royal Society engaged him as its "curator of experiments", charged with the responsibility of following up suggestions for experiments made at the Society's weekly meetings and of ensuring that at each meeting there were experiments to be performed and discussed. In 1665, the Royal Society's printer, John Martyn, published one of the most famous books in the whole history of science, Hooke's *Micrographia,* in which he delineated for the first time the astonishing new world, ordinarily invisible to us, revealed by the

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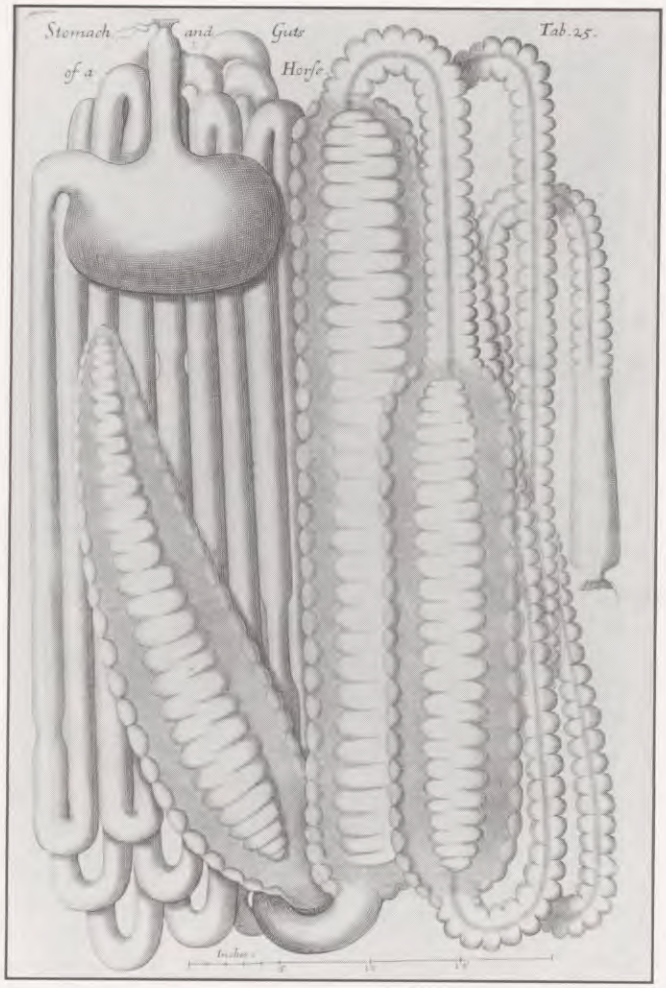

Illustration of the stomach and guts of a horse, in Nehemiah Grew's *Musaeum Regalis Societatis: or, a catalogue and description of the natural and artificial rarities belonging to the Royal Society*, 1681. (University of Melbourne Library Collection.)

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microscope. The Library has a splendid original copy of this work, as well as modern reprints. In addition, it has an excellent copy of Hooke's *Posthumous Works* (1705). More prosaically but no less usefully, it also has a modern facsimile reprint of his *Philosophical Experiments and Observations*, edited by William Derham (1726).

The Royal Society

One of the Royal Society's most cherished claims was that, as a body, it neither endorsed nor condemned work presented to it but merely promoted discussion and testing, leaving it to individuals to make up their minds as to whether the work was well-founded and what its implications were. In line with this policy, when the *Philosophical Transactions* was launched in 1665, it came out not as an official publication of the Society, but as a private (albeit approved) venture of the Society's secretary, Henry Oldenburg. This situation persisted for a long time: not until the middle of the following century did the Society take any official responsibility for the journal. Despite its ambiguous status, however, the *Philosophical Transactions* quickly became the major outlet for work presented to the Society, and so is a key source for modern day historians. The Library has a full run of the journal from its foundation to the present day, the section from 1665 to 1750 being a facsimile reprint edition produced in 1963 and the remainder being original. The Library also has several different sets of Abridgements of the early volumes that were produced during the first half of the 18th century. The Society kept detailed minutes of its proceedings from the outset in its so-called Journal Book. Extensive extracts from this, covering the period 1660–1687, were published by a later secretary of the Society, Thomas Birch, in his *History of the Royal Society*, published in 1757, of which the Library has a modern facsimile. In addition, it has an effectively complete set of later histories of the Society and, of enormous value to historical researchers, microfilm copies of both the Journal Book itself and the Society's Council Minutes for the whole period 1660–1800.

The Society's royal charter gave it the right to appoint a printer and engraver, and during the first decades of its existence, while carefully not endorsing material submitted to it, it took advantage of this privilege to publish a number of separate works on scientific subjects. It also gave its imprimatur to allow the printing of others without incurring the expense of publishing them itself, and it is often difficult to determine into which of the two categories a work belongs. Hooke's *Micrographia* was one of the first works to carry the Society's imprimatur, the only earlier one being the magnificent folio printing of John Evelyn's *Sylva, or a discourse of forest trees*. The Library does not have a copy of the first (1664) edition of the latter work, but it does have copies, likewise in folio, of the second (1670) and third (1679) editions.

From its early years, the Royal Society began accumulating a museum of natural rarities that quickly became the most important in the kingdom. Eventually, in 1781, the entire collection was transferred to the British Museum, but until then, an inspection of the Society's holdings was a "must" for visitors to London. Only 20 years after the founding of the Society, the collection had become so extensive that one of the Fellows, Nehemiah Grew, was commissioned to prepare a catalogue, published as a folio of nearly 500 pages by the Society in 1681 under the title *Musaeum Regalis Societatis: or, a catalogue and*

description of the natural and artificial rarities belonging to the Royal Society. The work was printed together with Grew's lectures, read to the Royal Society in 1676, on the comparative anatomy of stomachs and guts. The Library has a very fine copy of the whole.

Grew was one of the leading naturalists of the age, and the Society authorised the printing of other works of his, two of which are also represented in the Library's collection, namely *The Anatomy of Vegetables Begun* (1672) and *The Anatomy of Plants* (1682). In addition, it has Grew's *An Idea of a Phytological History Propounded* (1673), which was published independently of the Society. Another famous work sponsored by the Society and held by the Library is John Wilkins' *An Essay Towards a Real Character and a Philosophical Language* (1668). The Society's own publishing activities (as distinct from giving an imprimatur) came to an end with the publication of Francis Willoughby's magnificent *Historia Piscium* (1686), which cost so much to produce that it exhausted the Society's coffers. The Library has a copy of this, too.

Illustration in Francis Willoughby, *Historia Piscium*, 1686. (University of Melbourne Library Collection.)

Newton

Undoubtedly the most famous work to carry the Royal Society's imprimatur was Isaac Newton's *Principia Mathematica Philosophiae Naturalis,* issued in 1687 under the authorisation of the Society's President at the time, Samuel Pepys. The Library has a 1954 facsimile of this, and original copies of the third (1726) edition, published with Newton's final amendments in the year before he died, and the so-called "Jesuits' edition", with annotations by the Jesuits Thomas Le Seur and François Jacquier, published in Geneva in three volumes, 1739–1742. Of Newton's second great work, his *Opticks,* the Library has a facsimile of the first edition (1704) — there is an original in the Newman College library — and an original of the third edition (1721), plus numerous subsequent printings in various languages. The text of the other early editions is available on microfiche, in the Landmarks of Science collection. The Library also has both the 1672 and 1681 editions of Newton's first book, the edition he prepared of Bernard Varenius' *Geographia Generalis;* the work in which Newton set out the principles of the calculus he had invented, his *Analysis Per Quantitatum Series, Fluxiones, ac Differentias* (1711), and also the English translation of this by John Colson that was published in 1736; his *Optical Lectures,* read at Cambridge in 1669 but not published until 1728, and also the Latin edition of this, *Lectiones Opticae* (1729); and two other posthumously published works, his *Chronology of Ancient Kingdoms Amended* (1728) and his *Observations Upon the Prophecies of Daniel* (1733). There are also very strong holdings of 18th century scientific works that take Newton's ideas as their starting point, and a comprehensive collection of 19th century and 20th century historical analyses of the work of Newton and his successors.

Defending the New Science

Not all of King Charles II's subjects saw the new science in a favourable light — indeed, even the King himself is said to have made jokes about his philosophers who spent their time weighing air, as did Thomas Shadwell in his satirical play, *The Virtuoso,* while more serious critics saw the claims of those philosophers as a threat to religious belief. In 1664, the council of the Royal Society was sufficiently concerned that it commissioned

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Thomas Sprat, later Bishop of Rochester, to prepare, in its defence, an account of the Society and its work that was published by the Society in 1667 as *The History of the Royal Society of London, For the Improving of Natural Knowledge.* The University Library has a copy of this, presented by the Friends of the Baillieu Library, and also a copy of the later, 1734 edition, as well as a modern reprint. The controversialist Joseph Glanvill, who became a Fellow in 1664, also leapt to the Society's defence; the Library has a copy of his *Philosophia Pia, or, a discourse of the religious temper, and the tendencies of the experimental philosophy* (1670), presented by the Friends of the Baillieu. It also has a very fine copy of one of the most important published attacks on the Society, Henry Stubbe's *A Censure Upon Certain Passages Contained in the History of the Royal Society, as Being Destructive to the Established Religion and Church of England* (1670).

The Royal Society weathered such storms, as we know, as well as others later on. The works described in this brief and by no means comprehensive account are one of the splendours of the Baillieu Library's collection, and deserve to be better known. ▮

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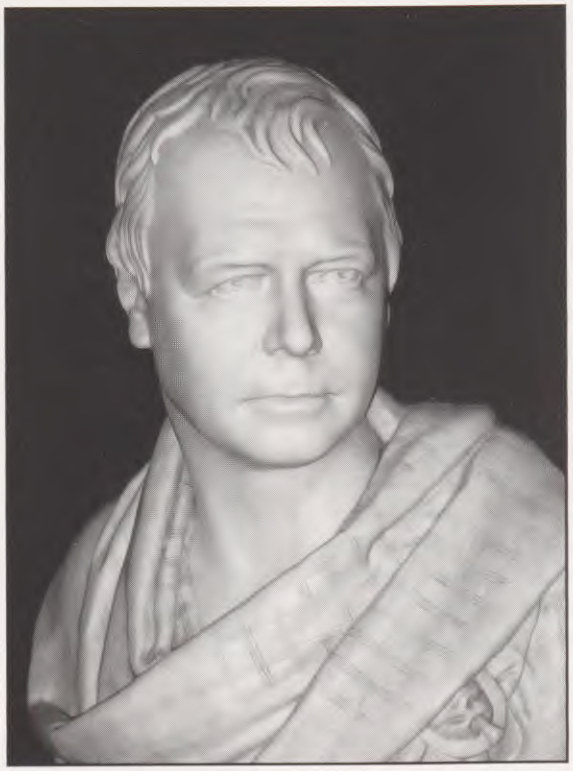
Sir Walter Scott at Melbourne University

BY **B. J. McMullin**



Walter Scott, portrait bust (after the marble bust by Sir Francis Chantrey, 1820. University of Melbourne Library Collection).

AMONG STUDENTS OF THE WORKS of Sir Walter Scott there may be an awareness that the University of Melbourne Library is the repository of one of the best collections in the world devoted to the author. But that awareness is limited, since the Library's Scott collection is not catalogued, and to that extent it may fairly be said that the Baillieu Library has within its walls a research resource of considerable potential which has been little exploited.

The Scott collection is said to comprise approximately 2,500 volumes, made up of works by *and about* the author; it forms (with some additions) part of the Poynton collection of close to 15,000 volumes which Dr Orde Poynton has presented to the University of Melbourne at various stages since 1959. The Poynton collection itself comprises a number of groupings, among them several thousand volumes devoted to major British authors of the 18th and 19th centuries: Boswell, Browning, Burns, Byron… and Sir Walter Scott.

If the Scott collection is at present insufficiently known, that situation may soon be changed. The impetus for change is the recent publication of *Sir Walter Scott: a bibliographical history,*