

Varieties of Things

*Objects of Knowledge and Baconian
in the Early Royal Society of London*

The founding of the Royal Society of London was a crucial step in the development of modern science. Following the restoration of Charles II to the throne of England, Robert Boyle, William Petty, John Wilkins, Robert Moray, and Christopher Wren met to discuss and promote a new approach to the study of nature. They established earlier, more informal meetings of natural philosophers to challenge the still-dominant scholastic philosophy and to seek the opportunity to gain Royal support. In 1660 they established a charter and an impressive program of empirical research to be carried out.¹

And yet historians have always shown a skepticism about the work of the early Royal Society. The scientific revolution of the sixteenth and seventeenth centuries is the transition to a Copernican worldview in astronomy and physics. According to this narrative, Newton added the final synthesis of previous work, demonstrating how Copernican astronomy could be derived from the mathematical physics of Galileo. While this view has been challenged, he did not employ hypotheses and his empirical approach has defied a Baconian reading of his accomplishments. Many have remained unconvinced. When comparing the Royal Society's emphasis on matters of fact and aversion to speculation, it is difficult to have advanced by rejecting their Baconian

¹Thomas Birch, *The History of the Royal Society: or, an Account of the Natural Knowledge, from its first rise*, 4 vols. (London: 1740).

The changing historiographical fortunes reflect the waxing and waning of the reputation of the philosopher of science. Where inductivism was seen as the success of science, historians could take comfort in arriving at true knowledge were applied. Bacon's significance for the history of science was the discovery of a method capable of application to the experiments and observations of the self-professed Baconian, the air-pump and the microscope, extending beyond the experience and subjected our view of nature to the authority of Aristotle.

With the development of varieties of neo-Kantian epistemologies in the twentieth century, the philosopher of science receded, and with it the Royal Society.² The process had its roots in the reaction against utilitarianism and professionalization. Additionally, professionalized research, with its coming individual and group differences, emphasized the communicability and the need for a logic of discovery.⁴ In the early twentieth century, David Brewster drove a wedge between the Baconian method canonically associated with the Royal Society and the context of discovery/context of justification. He preserved Newton's heroic status by rejecting the inductive process of discovery to be seen more as a prophet of science and a defender of inductivism.⁵

²David C. Lindberg, "Conceptions of the Scientific Revolution: A Preliminary Sketch" in idem and Robert S. Westman, *The Scientific Revolution* (Cambridge: Cambridge University Press, 1994), pp. 17.

³Otto Sonntag, "Liebig on Francis Bacon and the Scientific Revolution," *Journal of the History of Biology*, 19 (1986), pp. 373-86.

⁴Lorraine Daston, "Objectivity and the Escalator of Knowledge," *Isis*, 80 (1989), pp. 597-618, pp. 608-9.

⁵Richard Yeo, "An Idol of the Market-Place: Bacon's Ideas and the Scientific Revolution in Britain," *HS*, 23 (1985), 251-98, pp. 266-67, 271-2. For a discussion of Bacon's ideas, see Antonio Pérez-Ramos, *Francis Bacon: The Maker's Knowledge Tradition* (Oxford: Clarendon Press, 1995).

Contemporary historical research has found the success of Bacon's method even for the scientific revolution of the early Royal Society. Michael Hunter's *Science and Society in the Seventeenth Century* (Cambridge University Press, 1988) and Charles Webster's *The Scientific Revolution: A Study of Its Origins and Development* (Cambridge University Press, 1982) emphasize its methodological eclecticism. Webster argues that a set of general commitments rather than specific methods, so far as its self-professed goals of implementing a new system of natural knowledge, he deems it a relatively successful way to keep pace with its promise. Charles Webster's argument that Baconian commitments obscure significant differences between the Royal Society, serving more to legitimize its research, is a common research.⁶

A new generation of scholars has taken issue with the claim that no abstract methodological doctrine can be applied to general philosophical practice, which has its own logic. For them, methodological doctrines are best seen as heuristic, good for justifying new approaches in a particular area, as actual guides for research.⁷ This skepticism has led to more contextually sensitive varieties of scientific method. It has been the same: scientific method emerges from a particular practice from method.⁸ The overall thrust

⁶Michael Hunter, *Science and Society in the Seventeenth Century* (Cambridge University Press, 1988), pp. 11–21; Michael Hunter, *Science and Society in the Seventeenth Century* (Cambridge University Press, 1989), pp. 6, 11–12; C. Webster, "The Origins of the Scientific Revolution," *BJHS*, 13 (1980): 106–28; P. B. Wood, "Methodology and Apologetics of the Royal Society," *BJHS*, 13 (1980): 1–26.

⁷Steven Shapin and Simon Schaffer, *Leviathan and the Experimental Life* (Princeton, N.J.: Princeton University Press, 1985); Peter Dear, "Totius in Verba: Rhetoric and Authority in the Seventeenth Century," *BJHS*, 76 (1985): 145–61; John A. Schuster, "Methodology and the Future Historiography of Method," *Methodology and the Future of History*, ed. John A. Schuster and Richard Yeo, (Princeton, N.J.: Princeton University Press, 1986), ix–xxxii; Schuster, "Cartesian Method and the Future of Structural Analysis" in Schuster and Yeo, *Methodology and the Future of History*.

⁸N. Jardine, *The Birth of History and Philosophy: Tycho against Ursus* with *Essays on Its Prolegomena* (Cambridge University Press, 1984); Richard Yeo, *Methodology and the Future of History: Confirmation and Reality in the Natural Sciences* (Cambridge University Press, 1987).

scholastic learning, artisanal practice, or science are the new arenas of dispute.⁹

Lost in the shuffle has been the significance of the reform of knowledge itself. While this was situated with respect to social class, religion, or identified with any single group or dogma, the critique of scholastic learning came to be associated with Francis Bacon. To understand the significance of science held for the generation before and after, we need to pay attention to the heterogeneous agency coalescing around his name and the ways in which they recognize each other as part of a common enterprise.

The Historiography of Baconianism

Commitment to Bacon's program for the reform of knowledge was evident in the interests and writings of naturalists and artisans. Bacon's writings on the trades and natural history an epistemic significance, previously possess, enabling scholars, virtuosos, to identify themselves as part of a common project. Anglican, and distinctly class-conscious gentlemen, engaging "mechanical, capricious persons" like former Samuel Hartlib's interest in a Baconian program, came the interest in questions of trade and industry. Fellows like William Petty and Robert Hooke

⁹Mario Biagioli, *Galileo, Courtier: The Practice of Art and Politics in the Early Modern Age* (Chicago: University of Chicago Press, 1993); Roy Porter and Roy Porter, "Social Bricolage, and Etiquette" in Roy Porter and Roy Porter, *Revolution in National Context* (Cambridge: Cambridge University Press, 1994); Steven Shapin, *A Social History of Truth: Civility and Science in England* (Chicago: University of Chicago Press, 1994); *Science and the Scientific Revolution: The Mathematical Way in the Scientific Revolution* (Chicago: University of Chicago Press, 1995); Pamela H. Smith, *The Business of Science: The Holy Roman Empire* (Princeton: Princeton University Press, 1997); *Science and the Secrets of Nature: Books of Secrets and the Making of the Scientific Book* (Princeton: Princeton University Press, 1997); *Book: Print and Knowledge in the Making* (Chicago: University of Chicago Press, 1997).

¹⁰Evelyn to Boyle. Aug. 9. 1659 in Robert Hooke

Unfortunately, the heterogeneous nature of English Baconianism has routinely been used to move it into separate camps of serious amateurs, dilettantes, or proto-professional researchers. Within the Royal Society, significant differences in the position and method of the society have traditionally relied upon a tacit model of professionalization in the period.¹¹

Opinions are divided on whether the Royal Society was against Bacon. In some cases, biographers have been sufficiently broad-minded so as to avoid the issue, or have strictly interpreted. Thus, 'Espinasse distinguishes a realistic approach, which allowed an in-depth study, from Boyle's neglect of the subject, true empiricism and experiment.¹² On this view, strict Baconians were distrusting their confidence about method as a result of the biographer Barbara Shapiro similarly notes the contrast to "the sensationalist Baconians, the empiricists and who refused to recognize the in-depth study as other forms of abstract reasoning."¹³

While some historians are concerned with the exclusion of select Royal Society fellows from the category of empiricism, others are concerned to distinguish between empiricists. Thus, M. M. Slaughter borrows a

Robert Boyle, Thomas Birch, ed., 6 vols. (Hildesheim, 1965-1966), VI, 287-88, p. 288.

¹¹Michael Hunter and Paul B. Wood, "Toward a History of Reforming the Early Royal Society," *HS*, 24 (1995), 245-246. Hunter and Wood see the debates over method as expressing legitimate disagreements over the Baconian methodological program, rather than in terms of professionalization. Within the historiography of the Royal Society, the distinction between professionalized scientists and dabbling amateurs has been made in spite of the widespread rejection of the simplistic model of Baconianism. See, for example, *Scientists and Amateurs: A History of the Royal Society* (Berkeley, CA: University of California Press, 1948).

¹²Margaret 'Espinasse, *Robert Hooke* (Berkeley, CA: University of California Press, 1956).

¹³Barbara Shapiro, *John Wilkins: An Intellectual Biography* (Berkeley, CA: University of California Press, 1969), pp. 56-57.

pure Baconians from Plugh Trevor-Roper's role in the changing form of Baconianism at the Royal Society.¹⁴ In this interpretation and the vulgar Baconian reformers' polemic, Webster inverts this picture, attributing the creation period to its socially active Baconian

Further vexing our understanding of the place of the virtuosi, those gentlemen-amateurs and wonders. The presence of virtuosi and philosophers is held to explain the hodge-podge of serious science recorded in the Society's proceedings. Houghton considers the virtuosi "antipathetic to the new science" and notes an "unconstructive mentality" emblematic of the "illustrated by many of John Evelyn's comments on the proceedings at the Royal Society: he often noted things as 'rare' and 'wonderful', and tended to ignore the Society's business."¹⁶ Houghton remarks that Evelyn "think, does [Evelyn] show the slightest concern with the main *raison d'être* of the study of nature, the discovery of law; which is hardly surprising in an age no longer a rarity."¹⁷

¹⁴ M. M. Slaughter, *Universal Languages and the Seventeenth Century* (Cambridge: Cambridge University Press, 1972); Trevor-Roper, *Religion, Reformation and Social Change* (London: Macmillan, 1972), pp. 258, 289. Walter E. Houghton, "The Relation to Seventeenth-Century Thought as Seen in the *JHI*", 2 (1941): 33–60, p. 39, similarly distinguishes between the virtuosi with Baconian natural history and the manual arts and sciences who were less experimental and "were primarily concerned in a strict sense."

¹⁵ Charles Webster, *The Great Instauration: Bacon, the Royal Society and the Scientific Revolution, 1660* (London: Duckworth, 1975).

¹⁶ Hunter, *Science and Society*, p. 67.

¹⁷ Walter E. Houghton, "The English Virtuosi and the Scientific Revolution" (1942): 51–73, p. 193. A similar theme is developed in Houghton's *Enchantment* (Chicago: University of Chicago Press, 1972). For discussion of the significance of the virtuosi for the new philosophy, see Houghton. For discussion of the coexistence of Baconian and Aristotelian ambivalence about the early Royal Society, see Houghton, *Enchantment: Selected Studies in Scientific Tradition and*