Klaas van Berkel, **Isaac Beeckman on Matter and Motion: Mechanical Philosophy in the Making.** Baltimore: Johns Hopkins University Press, 2013. Pp. ix + 265. ISBN 978-142140936-8. £21.00 (paperback).
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A prominent Dutch natural philosopher, Isaac Beeckman (1588–1637) published virtually nothing during his lifetime (only his medical dissertation saw the light in 1618). Yet he played a significant part in seventeenth-century science through his correspondence and his contacts with scientific practitioners and natural philosophers, including Mersenne, Descartes and Gassendi. Beeckman was born in Middelburg to a strict Calvinist family, studied theology and mathematics in Leiden, then took his degree in medicine at Caen. He became a teacher in the grammar school in Utrecht and then in Rotterdam; finally, he moved to Dordrecht, where he was rector of the Latin school. A skilled craftsman and a scholar, he carried out experimental investigations on a wide range of topics, such as mechanics, acoustics, optics, magnetism and hydrostatics, and developed a strict mechanical theory of matter.

Very little was known of his life and work before Cornelis de Waard discovered Beeckman's diary in 1905. De Waard published it in four volumes as *Journal tenu par Isaac Beeckman de 1604 à 1634* (1939–53), adding biographical material and extensive annotations. For a long time, historians concentrated on Beeckman's relation to Descartes, and on his work on mechanics and matter theory, while paying little attention to his social and intellectual milieu. Van Berkel's is the first book-length study of Beeckman in English. It contains a detailed biographical account of Beeckman, insightful investigation of his views of matter and motion, and a fresh look at his commitment to technological innovation. Van Berkel places Beeckman's scientific work in the intellectual and social context of the Dutch Republic. One reads that Beeckman 'underwent theological training and served as an active elder in the Reformed Church; and that a quarter of the books listed in his library catalogue are on theological subjects' (p. 140). Therefore the author's noncommittal statement – 'Perhaps Beeckman's Calvinist convictions influenced the development of his natural philosophy' (p. 140) – leaves readers interested in exploring the role of religion in Beeckman's science rather disappointed.

Van Berkel convincingly relates Beeckman's natural philosophy to his work on practical matters, notably hydraulics and applied mechanics. He also investigates Stevin's influence on Beeckman, showing that the latter made use of illustrations borrowed from Stevin's works. In 1626 Beeckman was responsible for the creation of an informal scientific organization in Rotterdam, the Collegium Mechanicum, including craftsmen and mathematical practitioners, such as Jan Jansz. Stampioen Sr, who was a skilled surveyor and cartographer. The members of the college investigated natural philosophy and were involved in socially relevant projects, notably water regulation, drainage and surveying, as well as designing and building machines for practical uses. The college closed in 1627 when Beeckman moved to Dordrecht. The impact of the college is difficult to assess, given the paucity of existing documentary evidence – the only available source being Beeckman's notebook.

The second part of the book deals with Beeckman's mechanical philosophy, i.e. a view of the world as consisting of particles of matter in motion in empty spaces and having different forms, sizes and states of motion. As Van Berkel points out, Beeckman first articulated his matter theory in a letter of 1613, where he also maintained the existence of empty spaces within bodies – as attested by rarefaction and condensation of air. He rejected action at a distance, as well as occult qualities. Bodies, he argued, interacted solely by collisions. He put forward an articulate theory of matter, maintaining that atoms form complex corpuscles of different stages of aggregation. Beeckman called the primary clusters of atoms *homogenea*, arguing that they differ according to their textures. As a student in Leiden, Beeckman became familiar with atomism via Lucretius, Hero and the references to ancient corpuscular theories to be found in the works of Galen. Like Gassendi, who visited and admired him, Beeckman 'Christianized' atomism, maintaining that God created the world and its constituent atoms. Van Berkel investigates Beeckman's mechanical explanations of a variety of natural phenomena, including acoustics, optics, pneumatics and magnetism. He argues that according to Beeckman 'only those explanations that allowed the human mind to form a mental picture of the mechanism that was behind the phenomena – literally to "imagine" what was going on – were acceptable' (p. 81). For Van Berkel, Ramism provided an inspiration to Beeckman's stress on the visual element in mechanical explanations. The book includes a very useful bibliographical essay on Beeckman and the mechanical philosophy. It is a thoroughly researched, if sometimes a little dry, study of Beeckman's life and scientific achievements.

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Richard Yeo, **Notebooks, English Virtuosi, and Early Modern Science**. Chicago and London: The University of Chicago Press, 2014. Pp. xvii + 398. ISBN 978-0-226-10656-4. $45.00/£31.50 (hardback).
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When we think of notebooks and science, the modern hardbound and gridded laboratory journal comes to mind. With its entries written in pen, its pages numbered sequentially, these little volumes are designed so that all data and experimental results are recorded faithfully and accurately. That is the lofty intent, at any rate. When I was a scientist, my own notebook featured columns of data, smudges of crystal violet or safranin dye, and photographs of ghostly electrophoresis bands to determine the components of a macromolecule at a glance. The humanist commonplace notebook of the sixteenth century, on the other hand, had an equally lofty intent: to stockpile memorable phrases from the Classics to adorn one's own writing – Ciceronian tropes rather than microscopes.

When assessing the rise of experimental science in the seventeenth century, it has often been assumed that the humanist note-taking mentality became extinct. After all, reading was out, and direct observation was in. Not so. As Yeo's recent book shows us, early modern virtuosi employed notebooks just as much as their humanist predecessors, if not more so. It was not for nothing that the Royal Society's flagship journal, the *Philosophical Transactions*, was, in the words of its secretary Henry Oldenburg, a series of 'philosophical commonplace books' (see, for this description, his letter to René Sluse of 2 April 1669). The virtuosi still had the humanist impulse to relieve and prompt memory, but they experimented not only with elements of the natural world, but with new ways of organizing and recalling information.

There was, after all, so much more information to sort and remember. Flora and fauna from the New World created vast reservoirs of empirical data to organize, and the botanist John Ray knew 'that lost notes meant lost information' (p. 231). To cope with the onslaught, John Locke created a 'hybrid form of notebook in which entries made in chronological order were given marginal Heads that served as keywords for an index to each journal' (p. 197). Robert Hooke kept a detailed weather diary, and, not entirely surprisingly, by the 1680s, his colleague Martin Lister invented the histogram as a new way of visualizing barometric pressure.

And the early modern English natural philosophers also had to consider their notes not just as personal carriers of information or memory prompts, but as serving collaborative purposes, as 'detailed records that could be understood by others' (p. 171). As Yeo has shown, this was a particular challenge for the nascent Royal Society. What was one to do with such a paper archive, and what was to be the location, arrangement and administration of the papers containing, in Thomas Sprat's words, 'a mixt Mass of *Experiments*' (p. 236)?

In a fascinating analysis, Yeo elucidates how Robert Hooke as Royal Society secretary addressed these two challenges. He first investigated the capacity of human memory, positing that any instruments that enhanced the senses, such as the microscope, must also be supplemented by intellectual