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# Boekbesprekingen / Comptes Rendus

H. Floris Cohen, *How Modern Science Came into the World. Four Civilizations, One 17th-Century Breakthrough* (Amsterdam: Amsterdam University Press 2010). 784 pp., ISBN 978- 90-8964-239-4. € 65,00.

This is a weighty book in many ways. Not just for its 800 pages of heavy paper, but for the importance of its themes, the range of coverage and the density of its argument. It has, moreover, a 'prequel' on prior historiography.[1] Together these books could be a game-changing contribution to history and philosophy of science: for the intellectual process and presentation as much as for the results.

A quote from Bacon epitomises Cohen's bold commitment to dialectic: 'Truth will emerge sooner from error than confusion. 'To historians more accustomed to reading 'cases' or 'illustrations' of particular approaches, Cohen's detailed dissections of historiographic positions and the careful testing of his own arguments may seem strange; but the subject surely deserves this care and confidence. For experts and students alike, this scholarly *tour de force* is a huge resource against which to judge later contributions. It is a model of how to interrogate the complex socio-cognitive patterns said to have given shape to an enterprise called modern 'science'. For Cohen, the birth of science was not inevitable, nor was its continuation; but to adopt the title of the Yves Tanguy picture on the book cover, its *motion has not yet ceased.*

Stressing the ways in which Renaissance Europe carried forward Greek traditions, Cohen looks at China and the Islamic world as comparators. Arguing that most philosophical traditions became less creative over time, he asks why, in Europe, the motion was not lost. He does not merely add to the usual foreshortened or euro-centric stories, he makes a cross cultural argument about conditions of novelty. Central to his answer is the cross fertilisation of two Greek traditions and the appearance of a relatively new one.

Here as elsewhere Cohen insists on comparative history, the importance of detail, the creative tension between local and universalizing components, and the articulation of cognitive and social (and material) histories. He rejects presentism, or any reification of 'science' across time, though his realism is clear. He avoids single-factor explanations, or any fragmentation of the subject into the separate histories of modern disciplines. He stresses contingency and uncertainty, intriguingly asking from time to time how a well informed observer would then have seen the future.

I am much in sympathy with Cohen's use of interacting traditions rather than styles which run in parallel through history. For Cohen, the traditions are Natural Philosophy, Alexandrian mathematics and Baconian 'experimental histories' – which is not far from the early modern genres with which I tried to sketch that period: natural philosophy, mixed mathematics and natural history.[2] The crucial initial interactions, for Cohen, lay in the work of Kepler and Galileo. The former tested a hermetic natural philosophy against a rigorous natural mathematics, fed by the detailed mathematical histories compiled by Brahe; the latter drew Aristotelian problems of local motion into the Archimedian mathematical tradition, and used the new natural history of the Earth's moon and Jupiter's moon s to build a stunning critique of Aristotle's organismic cosmology. The realist mathematics so created helped a second transformation: of revived ancient atomism into a kinetic-corpuscularian philosophy of nature (Beckman and Descartes).

The third early seventeenth century development was epitomised by Gilbert, Harvey and Van Helmont whose 'Baconian' projects of systematic experimentation were supposedly aimed at the discovery of new phenomena, though the facts so found were fertilised by their broad 'world views'. For Harvey alone, I can comment from my own rather distant reading of primary sources, and of secondary sources more recent than Cohen uses here. In Cohen's rendering of blood circulation, there lingers more than a trace of Harvey the modern experimentalist. But perhaps Cohen's general model of interacting traditions might be ser-

1 H.F. Cohen, *The Scientific Revolution. A Historiographical Inquiry* (Chicago etc.: University of Chicago Press 1994).

2 John V Pickstone, 'Working knowledges before and after c 1800: practices and disciplines in the history of science, technology and medicine', *Isis* 98 (1997) 489-516.

ved more plausibly by Andrew Cunningham's account of the several Greek traditions of anatomy revived in the sixteenth century, of Harvey's deep commitment to Aristotle's natural philosophy, and of the ways that comparative anatomy was used to explore the presumed centrality of the heart. The interplay between discoveries and natural philosophical agendas can then be further exemplified from Platonic readings of circulation, and especially by Cartesian readings which did more than make the heart a pump: they broke the Aristotelian link between embryonic primacy and the presumed importance of particular organs, and made circulating blood a medium of exchange. In mercantile Holland, discovering what materials went into blood and what came out became the central physiological problem. This at a time when anatomy was also natural historical: the body was directly compared with new lands, and illuminated through comparisons with the forms of plants.

Cohen then has three further transformations: the geometrization of corpuscular motion (Descartes, Huygens and Newton); the mutual reinforcement, especially in London, of Baconian experimentalism and corpuscular accounts of motion; and lastly, as culmination, the Newtonian synthesis. That the study of such traditions and their interactions is our best prospect for the improvement of big picture histories, I am entirely convinced; and as Cohen shows, it is equally powerful for the smaller histories which comprise the big. While there is lots of room for differing accounts, that common basic model may help structure debate.

That the interactions of the seventeenth century were crucial to later patterns seems indisputable, as was the role of bodies such as the Royal Society in bringing together adepts from all three enterprises. For Cohen, this first scientific revolution was indeed the birth of modern science, but note that his revolution has six stages, and he leaves room for other framings. Indeed, he agrees that notwithstanding the seventeenth century interactions, philosophical, mathematical and historical studies of nature remained substantially separate through the eighteenth century. Mathematics and natural history were proving their utility to states and commerce, and natural history was embedded in polite society, but Cohen could doubtless have written plausible counterfactuals in which these traditions preserved their early eighteenth century relationships for much longer than proved the case.

Cohen thus happily accepts the second scientific revolution, where, for many of us, the emergence 'science' as a supposedly unified activity is best situated. Here again old traditions interacted, producing relatively new ones, e.g. substantive analytical sciences, and externalising others, e.g. natural philosophy. But now there were also much stronger relations with commercial, professional and academic work – and thus new reproductive mechanisms. As a mechanism of cultural reproduction, the German Research University was perhaps outdone only by the industrial capitalism which has now taken over some if its roles.

To my mind, the core agenda of the historical study of knowledge and related practices is the exploration, explication and explanation of *many* such reconfigurations – large, small and connected. We may disagree as to whether the subject of this present work was *the scientific revolution* or six early transformations of an ever changing organism sometimes called science; and we may also dispute some of Cohen's particular claims. But as a model of how such transformations can be studied, and as a basis for future work, this brave and searching work is surely a tremendous gift.

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Djoeke van Netten, *Nicolaus Mulerius (1564-1630). Een geleerde uit Groningen in de discussies van zijn tijd* (Groningen: Barkhuis 2010). 96 pp., ISBN 978-90-77922-72-9. €17,50

Nicolaus Mulerius (1564-1630) was na Ubbo Emmius de tweede hoogleraar die in 1614 werd aangesteld aan de net opgerichte universiteit in Groningen. Mulerius, afkomstig uit Brugge, opgeleid aan de Leidse academie, bracht vrijwel zijn gehele werkzame leven door in Friesland en Groningen, waar hij werkzaam was als arts en docent. Daarnaast publiceerde hij over astronomisch-wiskundige onderwerpen en redigeerde hij in 1617 de nieuwe druk van Copernicus' *De revolutionibus*. Naar hem is de stichting Nicolaas Muleriusfonds genoemd, en deze stichting is de drijvende kracht achter de reeks Biografieën van Groningse hoogleraren. In deze reeks is nu een compacte studie verschenen over de naamgever van het fonds.

De studie is opgebouwd uit vier thematische hoofdstukken, die voorafgegaan worden door een inleiding en worden afgesloten met een epiloog. Bovendien is het werk rijk geïllustreerd. De keuze voor de thematische opbouw, in tegenstelling tot de in biografieën vaak gebruikte chronologische struc-