Book Review

John G. McEvoy: *The Historiography of the Chemical Revolution: Patterns of Interpretation in the History of Science*, London: Pickering and Chatto, 2010, xiii + pp. 328 [ISBN: 978184893030]

by Seymour Mauskopf

This is an ambitious book. From its title, I had inferred that it would be primarily a descriptive work, an account of the changing interpretations of what, up to recently at least, has been a staple – indeed, the paradigm – of scientific revolutions (p. 18). It is that, to a degree. But the historiographical narrative is couched in very detailed philosophical contexts. Moreover, the work is also prescriptive, advocating a particular approach that McEvoy styles 'robust contextualism'.

However, it should also be pointed out that McEvoy narrows his Chemical Revolution focus to scientific activities of Priestley and Lavoisier. And I should indicate at the start that I found much of McEvoy's writing difficult to fathom.

The historiography constitutes the first six chapters; the seventh is devoted to an exposition of McEvoy's own 'robust contextualism'. I shall first delineate the historiography. McEvoy sees three principal stages of interpretations, which appear to follow more or less chronologically one upon the other. The first stage is termed 'positivist-Whig', the second, 'postpositivist', and the third, 'sociology of scientific knowledge'. Each is associated by McEvoy with a discipline domain: positivist-Whig with science, postpositivist with philosophy, and sociology of scientific knowledge with sociology.

The first stage held sway from the nineteenth century down to the 1960s. According to McEvoy, this had a number of characteristics. Perhaps the most important is a 'Manichean duality' between the obscurantist world of pre-Lavoisian chemistry (especially the phlogiston theory and including Priestley) and the enlightened chemistry associated with Lavoisier. Other features include a 'founder myth' crediting Lavoisier, a construction in which Robert Boyle's positive moves towards modern chemistry had been stymied in the eighteenth century, particularly by the phlogiston theory, and the es-

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sential change of the Chemical Revolution as a move from a qualitative to a quantitative chemistry.

McEvoy deploys a variety of historical works as illustrations by such authors as Douglas McKie, J.R. Partington and C.C. Gillispie (*The Edge of Objectivity*). There seems to be little systematic survey of works; on the one hand, a work by George F. Rodwell dating from 1868 figures rather prominently while, on the other hand, the writings of Hélène Metzger, Henry M. Leicester, and Aaron Ihde are conspicuous by their absence.[1] Had McEvoy looked at Leicester's *The Historical Background of Chemistry* (1956), he would have found a very positive evaluation of the phlogiston theory: "It was thus the first great unifying principle in chemistry. Its success accounted for the importance it assumed for eighteenth century chemists."[2]

In chapters two and three, McEvoy turns to his second historiographical stage, the 'postpositivist', which emerges in the 1960s and 1970s. Although valuing science and maintaining something of a progressivist historical perspective (although not without ambiguity and even dissent), the postpositivist approach largely ran counter to the precepts of its predecessor. McEvoy attempts to cover a lot of philosophical territory in a few pages in this chapter and his prose is dense, full of technical terms and very difficult to fathom.[3] He sees postpositivism as developing from general philosophical considerations associated with such philosophers of science as Quine, Popper, Hanson, Feyerabend, Kuhn, Lakatos, Laudan, and Toulmin. Some of these philosophers had strong historical associations (Kuhn is the most notable) whereas others did not (*e.g.* Quine). McEvoy also treats the French philosophers Foucault and Althusser in this chapter.

In addition to its challenges to the relatively philosophically untutored historian of chemistry, I find chapter two to be much too long for a book focusing on the historiography of the Chemical Revolution. For instance, I cannot understand why Popper, who, as far as I know, never wrote on the Chemical Revolution, receives two and a half pages of detailed exposition whereas Metzger gets just intermittent sentences.

Chapter three does indeed return to the primary focus of the Chemical Revolution and has much of interest to the historian of chemistry. It addresses a number of issues that have engaged scholars working in the history of eighteenth-century chemistry and the Chemical Revolution, such as continuity-discontinuity regarding the Chemical Revolution and earlier eighteenth-century chemistry, disciplinary identity and the new chemistry, the revolution in methodology, the relationship to eighteenth-century matter theory, the development of the idea of chemical simple substance or element, *etc.* But there is the same kind of scatter-shot citation of historians as in the first chapter. And, once again, there are some scholars working in these years who get little or no mention; in particular, William Smeaton (work on Four-

croy, Guyton de Morveau) receives no mention. And, although Henry *Guerlac's Lavoisier – the Crucial Year: The Background and Origin of His First Experiments on Combustion in 1772*[4] figures prominently in these chapters, one gets little sense of the Lavoisian and more general eighteenth-century graduate research group that Guerlac developed at Cornell, or of other such historical research traditions (*e.g.* at the University of Wisconsin).

Chapters four through six deal with McEvoy's third stage, the sociology of scientific knowledge (SSK). The beginning of chapter four provides an excellent general overview of SSK but then, as with earlier parts of the book, McEvoy does not seem to be able to resist giving a much more global account of postmodernism. In order to do this, he also discusses 'modernism' – also an excellent account but one that would have been much better placed in chapter two (where it would have provided a clearer introduction to postpositivism than what McEvoy gives there). The rest of the chapter, while containing much interesting material on postmodernism, could have been vastly abbreviated. Indeed, it should have been combined with chapter five, 'The Sociology of Scientific Knowledge and the History of Science'.

The last of this trio of chapters devoted to the sociology of scientific knowledge finally comes to the Chemical Revolution. Here, the principal theme is 'specificity'. By this, McEvoy's emphasizes the break that his third stage makes with the first two, particularly, the second (postpositivism) with its efforts to ensconce the Chemical Revolution in yet broader, 'global' processes and movements. 'Specificity' is employed to suggest geographical 'decentering' for the Chemical Revolution: that it was not simply about a word gone out from Paris to the rest of Europe but about a congeries of *local* events, developments, practices and reactions. It also suggests conceptual decentering, as, for example, Holmes' demonstration that there was no single 'tradition' of phlogiston but rather it meant different things at different times and places during the eighteenth century.

Another theme cluster in this chapter, related to the epistemic agnosticism of much of the sociology of science literature and also to the focus in this same literature on science as the exercise of power and control, is the characterization of the activities and associated tools of scientists (texts and instruments), particularly of Lavoisier, as rhetorical (in the negative sense). That is, they were not designed simply to advance natural knowledge and enlightenment but also to secure power and control over a scientific community. Even the 'founder myth' focusing on Lavoisier was unmasked as a nineteenth-century ploy to establish the scientific status of chemistry.

This is, for me, the most valuable of the chapters. It provides a synopsis of much of the recent literature (*i.e.* over the past twenty five years) on the Chemical Revolution. I found the discussions of the work of Simon Shaffer, Jan Golinski, Bernadette Bensaude-Vincent, Mi Gyung Kim, and others very

enlightening and useful.[5] But there is one egregious omission in it: the discussion of Frederic L. Holmes' *Eighteenth-Century Chemistry as Investigative Enterprise*.[6] The work is in McEvoy's bibliography and he does have a brief section on Holmes and 'investigative enterprise' (pp. 215-6) but he utterly neglects the principal imports of this book, namely, (1) that the early eighteenth-century French chemists at the *Académie des Sciences* defined a series of research programs that really dominated chemical activity, particularly that devoted to salts and (2) that these programs indeed 'decentered' the chemical enterprise away from its traditional formulations as backgrounds to the Lavoisier-Priestley Chemical Revolution. I think that Holmes' book marked a watershed in the historiography of the Chemical Revolution and, therefore, that it merited major consideration in McEvoy's book.

Curiously, although Holmes' thesis about the importance of the early eighteenth-century Parisian *Académie* chemists is absent, the associated works by Ursula Klein and Mi Gyung Kim do receive detailed exposition. Moreover, in reference to Klein's, Kim's and Jonathan Simon's works, McEvoy brings out an important historiographical development of the 1980s and 1990s: the recognition of the importance of chemical crafts such as metallurgy and, above all, pharmacy, throughout the eighteenth century.

In the seventh and final chapter, McEvoy turns prescriptive by unveiling his own approach to comprehending *historically* the Chemical Revolution: robust contextualism. McEvoy clearly believes that this is the instrument for realizing the destiny of all the previous historiographical endeavors: to give a truly historical account of the Chemical Revolution:

> Robust contextualism highlights conceptions of the specificity and autonomy of history and the methods used to understand it. Adopting Althusser's Marxist notion of the 'relative autonomy' of the different levels or domains of a 'decentred totality', this model elucidates the way in which the socioeconomic transition from feudalism to capitalism generated, through a long drawn out process of simultaneous dissolution and autonomization, 'the Enlightenment' as a dominant ideological apparatus which stabilized and reproduced the emerging conditions of production of eighteenth-century capitalism. The enlightenment thus articulated a 'hierarchy of effectivity', which included the Chemical Revolution as a dynamic pattern of 'multiple existence', or distinct disciplinary interests and practices, with a determinate shape and duration. [p. 258][7]

His actual model is simpler and more coherent than this description sounds. The transition from feudalism to capitalism generated, by the eighteenth century, the Enlightenment 'self-defining subject' or 'epistemic self'. In contrast to the medieval concept of 'self' defined in relationship to a cosmic order, the epistemic self was sundered from the world, which it now investigated ana-

lytically and empirically. Moreover, the changes in the theories of eighteenth-century chemistry mirrored the relational changes of self to cosmos:

> The unfolding logic of the self-defining subject and the Enlightenment ideology of 'analysis' underpinned a century-long process of ontological dissolution and autonomization, which robbed the medieval and Renaissance cosmos of the unity and coherence afforded by the four contraries, Earth, Air, Water and Fire. By the end of the eighteenth century, chemists had replaced three of these generative elements with, respectively, the class of specific earthy substances, a multiplicity of gases, and ordinary water; while Fire lingered on in the attenuated form of the caloric theory of heat. [p. 252]

Mine is an oversimplification of McEvoy's model – for instance, real differences between Enlightenment investigators like Priestley and Lavoisier are noted and related to national social and cultural differences. But, in the end, McEvoy's model strikes me as unhelpfully abstract and reductionist. Does McEvoy's notion of the destruction of the medieval cosmos really afford a satisfactory historical explanation of eighteenth-century changes in theories of chemical substances?

More generally, I think that McEvoy's decision to concentrate his delineation of the Chemical Revolution around Priestley and Lavoisier is unhelpfully restrictive. A good deal of the 'decentering' of eighteenth-century chemistry – much of it before McEvoy's third (SSK) stage – involved the recognition of the 'autonomy' of Lavoisier's own French disciples, contemporaries and predecessors, *e.g.* Guyton de Morveau, Berthollet, Fourcroy, Macquer, Baumé, Rouelle, Venel, going all the way back to the early eighteenth-century academicians such as Homberg and Geoffroy. It has also included the historiographical sea-change that has marked the study of pre-eighteenth-century chemistry and the resultant challenge of how to relate new perspectives on sixteenth- and seventeenth-century chemistry to that of the eighteenth century. It has, finally, begun to embrace the role (and autonomy) of chemical communities beyond France: in Britain, Sweden, and Germany in particular. At best, only some of this comes through McEvoy's account and then only intermittently.

This is certainly an ambitious book, one that demands intense focus to master. I do think that McEvoy's ambition leads to philosophical over-complexity and historiographical over-capaciousness in 'robust contextualism'. But I may be wrong about this latter; it will depend on how McEvoy and others flesh it out. And I do find much that is valuable and thought-provoking in this book.

Notes

[1] Although Metzger receives occasional mention and is even deemed "arguably the finest historian of chemistry in the twentieth century (p. 85), she receives very little systematic treatment in her own right. Similarly, Maurice Daumas' important book, *Lavoisier, Théorecien et Expérimentateur* (1955) gets, at most, a brief phrase, if it is that book to which McEvoy is referring on p. 116.

[2] New York: John Wiley & Sons, 1956 [First science edition printing, 1965], p. 123.

[3] *E.g.*, "Althusser used the hybrid philosophy of Structural Marxism to combat the historicist interpretation of history associated with the Marxist tradition. He linked the 'humanist' interpretation of history developed by phenomenological and existential Marxists like Maurice Merleau-Ponty and Jean-Paul Sartre to the historicist notion of a teleologically structured subject of history and the essentialist idea of an underlying cognitive complicity or identity, between the objects of history and the subjects who produce and interpret them." (p. 81)

[4] Ithaca, NY: Cornell University Press, 1961.

[5] Albeit with a tendency to laps into obscurity: "Roberts [Lissa] incorporated Shapin's agency-based notion of literary technology, understood as an author's expository means of mobilizing assent for matters of fact *into an antihumanist, Heideggerian framework, which treated human actions as enmeshed in, and structure by networks of anonymous practice*." (p. 216, my italics)

[6] Berkeley, CA: Office for History of Science and Technology, University of California, 1989.

[7] McEvoy frequently uses the words 'complexity' and 'autonomy' in relation to his historical approach.

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