of Libavius's influence and legacy in the chymical community would have been welcome. These quibbles aside, both Nummedal's and Moran's books are fair illustrations of the high calibre of work presently being done in the history of early modern chymistry.

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URSULA KLEIN and WOLFGANG LEFÈVRE, **Materials in Eighteenth-Century Science: A Historical Ontology**. Cambridge, MA and London: MIT Press, 2007. Pp. x + 345. ISBN 978-0-262-11306-6. £24.95 (hardback).
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Throughout the eighteenth century, substances were named and classified into affinity tables that were then used in experimental contexts. Perhaps the best known of these tables was published by Etienne-François Geoffroy in 1718, but there were a number of others, including an influential one proposed by the Swede Torbern Bergman in 1775. By exploring the reasoning behind affinity tables – why they grouped substances as they did – Ursula Klein and Wolfgang Lefèvre draw a clear connection between the tables and the *Tableau* included in the 1787 edition of *Méthode de nomenclature chimique* of Lavoisier (*et al.*) to represent the 'new' arrangement of proposed elements. In following such a path, Klein and Lefèvre cover hitherto untrodden ground. Their book makes a significant contribution not only to the history of chemistry narrowly construed, but also to the history of the material theories espoused by philosophers and the arrangement methods used by naturalists from the early modern period up to the early nineteenth century.

It is difficult to convey in a brief review the wealth of information in this book. One of the main claims of its first and second parts (out of three) is that the modern notion of a chemical compound was profoundly influenced by the experimental practices of early modern metallurgy and materia medica, especially the combination and separation of metals in alloys and saline mixtures. The authors suggest that between *c.*1600 and 1750 metallurgists and apothecaries slowly came to believe that heat and acids broke down metals into small invisible parts that were not themselves altered in any significant way. Although several historians have addressed the experimental inadequacies of atomism in recent years, *Materials in Eighteenth-Century Science* is unique in its attempt to grapple with the complex emergence of the affinity concept in a manner that takes seriously the classificatory logic of affinity tables and the practices that made that logic compelling.

Central to Klein and Lefèvre's story is a core of replacement reactions associated with a group of select salts and metals that were relevant to both academic and professional chemists. The growing interest in regularizing the material effects that such substances had on each other set the stage for Geoffroy's affinity table, which, crucially, listed only well-known substances believed to be irreducible (pure). Experimental evidence involving these substances could thus be used to establish a hierarchy of attractions between them. The tables that followed Geoffroy's pattern over the next century were similarly, and necessarily, selective in what they represented, classifying substances based on evidence gained from long-standing chemical operations but also from new ones as these became available. Furthermore, the names and classes on the tables allowed chemists to arrange substances in a manner that made sense to them and provided a common reference point – a common code, so to speak – for experiments. By approaching the history of chemistry from this perspective, the authors are able to show that the 1787 *Tableau* was, notwithstanding its new nomenclature, the continuation of a long tradition of affinity tables, as well as of naming practices which focused explicitly upon irreducible substances produced in experimental contexts and which determined chemical composition by breaking down (analysing) and then reconstituting (synthesizing) compounds.

As Klein has pointed out in several excellent articles that preceded the publication of *Materials*, the chemical revolution's fixation on the airs of pneumatic chemistry has unfairly overshadowed the simples and mixtures of plant chemistry. Her work, along with that of Larry Holmes, Bill Brock and others, has slowly undermined the old historiographic prejudice. Yet much more research still needs to be done on plant substances, especially on the question of how their properties were used to create periodic arrangements. It is for this reason that the book's third part, on plant chemistry, will be much appreciated by historians of chemistry and classification alike. Contrary to the 'eighteenth-century' designation contained in the title, these six chapters cover the period from the late seventeenth century to the 1840s. So impressive is the research presented here that in many ways this part could stand on its own as a separate monograph. Its detailed content, however, sits well with the two previous parts because it provides example after example of how chemists continued to use the old names of eighteenth-century chemistry well into the nineteenth century to explain the composition of organic compounds.

According to Klein and Lefèvre, this situation was brought about by the new nomenclature's inability to represent symbolically the exact composition of complex plant compounds, ultimately because of Lavoisier's belief that all vegetables could be reduced down to hydrogen, oxygen and charcoal. Even though a refined version of Lavoisier's prediction eventually became accepted, all sorts of problems arose when, for instance, chemists working with plant substances attempted to determine ratios of composition. Klein and Lefèvre contend that the problems stemmed from the fact that Lavoisier and his collaborators had not provided a general law of definite proportions. In the years after the publication of the new nomenclature there were several solutions proposed to fix this problem, including the general law of proportions offered by Joseph Louis Proust in 1797 and Berzelius's 1815 declaration that the composition of plant substances could be more adequately explained by his stoichiometric laws. But the bottom line was that it took several decades for chemists to work out, firstly, how these and other 'laws' fitted into the theoretical structure of the new nomenclature and, secondly, how they fitted into the practices of naming that were so crucial to arranging sensibly the substances under examination.

Klein and Lefèvre skilfully support this latter point by reproducing the tables of various systems used by chemists to classify plant substances before, during and after the publication of the *Tableau*. These tables show that many of the names used for plant substances up to the late 1820s were no different from those employed throughout early modernity, reinforcing the impression built up over the course of the book of continuity during the period once known as the 'chemical revolution'.

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Maurice Crosland, **The Language of Science: From the Vernacular to the Technical**. Cambridge: Lutterworth Press, 2006. Pp. 128. ISBN 978-0-7188-3060-1. £12.50, $27.50 (paperback).
Maurice Crosland, **Scientific Institutions and Practice in France and Britain, c. 1700–1870.** Aldershot: Ashgate, 2007. Pp. 228. ISBN 978-0-7546-5913-6. £60.00 (hardback).
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In both these slim and welcome volumes Maurice Crosland illuminates the practical and institutional aspects of science in the areas wherein he is past master – France and Britain from the 1750s or thereabouts through to the 1870s. In *The Language of Science* he develops case studies of nomenclature in botany, chemistry and metrology. The framework is broader than that, however. These sciences initiated the transition from expressing knowledge of nature in words taken from the vernacular, such as bramble, salt and foot, into the technical denominations of *Rubus fructicosa*, sodium chloride and metre, with some denotative, as in chemistry, and others assigned, as in botany and metrology.