was impossible for Ireland to maintain a strong chemical community. LUIGI CERRUTI and EUGENIO TORRACCA's study of Italian chemistry is particularly useful. There is not a large literature on nineteenth century Italian science as such, yet it is clear that there was a lot going on there (one only has to think of Avogadro and Cannizzaro for instance) and this essay should, I hope, encourage further study. Of the 'smaller' countries KRAGH's on Denmark/Norway is excellent.

As I have indicated, and despite the excellence and usefulness of some of the papers, the volume does not quite come off as a book. But this does not mean that the attempt should not have been made. With the growth of the European Union, there is certainly a need for a strong European perspective to replace the various national histories of science. While it is important to emphasize the commonalties of Europe, this should not be done at the expense of unduly playing down past divisions and nor should we project back current boundaries and political arrangements to a time when they did not exist.

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KANT'S RECEPTION OF LAVOISIER'S 'NEW CHEMISTRY'

PAOLA VASCONI, *Sistema delle scienze naturali e unità della conoscenza nell'ultimo Kant*, Firenze, Olschki, 1999 (Biblioteca di Storia della Scienza, vol. 42), xix + 146 pp., (ISBN 88-222-4729-9).

That there exists a relationship between scientific knowledge and philosophical thought is well known. Unfortunately, however, this relationship is often characterized by contrasting interpretations. Scientific knowledge is interpreted in the context of philosophical thought and *vice versa*.

We must therefore be grateful to Paola Vasconi for offering us a book that concerns both the history of science and the history of philosophy. It is impossible, in a brief review such as this, to do justice to all the suggestions Vasconi puts forward in this work. I will, therefore, confine myself to one point that particularly captured my attention.

Paola Vasconi is very successful not only in demonstrating the close relationship between chemistry and the philosophy of Immanuel Kant, but also in analyzing Kant's conversion to Lavoisier's '*nouvelle chimie*'.

Vasconi criticizes the interpretation of von Engelhardt, according to which the role of science in Kant's philosophy only represented a passage to *Naturphilosophie* (p. 8). It is widely known that Kant developed an interest in chemistry following his activity as *Privatdozent* (p. 24). For many years Kant thought that physics, or, more accurately, mechanics, represented a comprehensive explanatory model for all sciences. He maintained that the Newtonian law of gravity was the expression of the only force existing in nature, a force that controlled not only the movements of the planets, but also the process of chemical reactions. In the *Metaphysische Anfangsgründe der Naturwissenschaft* (*Metaphysical Foundations of Natural Science*), Kant did not yet regard chemistry, and particularly the chemistry

of Stahl, as a science, because it represented an empirical rather than a mathematical kind of knowledge: "Chemistry can never become anything more than a systematic art or experimental doctrine, but can never be called a science proper, because these grounds or principles are ultimately merely empirical and do not allow any a priori representation through intuition; and consequently do not make in any way intelligible the foundations of chemical phenomena, because it is impossible to apply them to mathematics" (translation by Paola Vasconi from, 'Kant and Lavoisier's Chemistry', in *Philosophers in the Laboratory*, edited by Valeria Mosini, Proceedings of the meeting: *Riflessioni Epistemologiche e Metodologiche sulla Chimica*, Rome, 1-2 Dec. 1994, Modena-Rome, 1996, pp. 155-162).

In her first chapter, Vasconi makes an accurate analysis of the role of chemistry in Kant's philosophy; indeed, this part of Vasconi's book is extremely useful because it provides the chemical sources of Kant's works. Fundamental is the third section (pp. 30-35), in which the problem of Kant's acceptance of the new chemistry is solved. In short, while Erich Adickes (*Kant als Naturforscher*, 1924-1925) maintained that Kant only came to support Lavoisier's theory in August 1795, Vasconi argues that, in fact, this development took place as early as 1793.

Thanks to Lavoisier's revolution, Kant was able to conceive of a new theory of natural science. For Lavoisier, chemical research was meant to be limited to determining simple substances through a process of an analytical nature, and to determining the way in which these substances were combined. While revolutionizing chemistry with physical methods and instruments, Lavoisier also understood that it was essential for the models that characterized this discipline to sever all ties with physics and to remain firmly anchored to specific principles obtained through analysis. Chemical phenomena were too specific to undergo mathematization by means of the same criteria that were applied to mechanics.

His acceptance of Lavoisier's chemistry obliged Kant to revise his transcendental philosophy. In fact, Kant was convinced that the language of chemistry could modify the language of his philosophy. As Vasconi rightly points out, the first indication of the influence of the new chemistry upon theory formulated by Kant in the *Opus postumum* (or rather, *Übergang von den metaphysischen Anfangsgründen der Naturwissenschaft zur Physik – Transition from the Metaphysical Foundations of Natural Science to Physics*) concerned the use of the term '*Stoffe*' (elements), and the concept of '*ether*'. In the *Opus postumum*, Kant was able to introduce a new theory of matter that made possible the transcendental foundation of the system of natural sciences (p. 35).

Lavoisier, according to Kant, did not cast doubt on the Newtonian dream of being able to mathematize all experimental sciences. On the contrary, his new definition of an element represented the physical base ('*Basis*') for reconciling the theory of the science with reality. This solution will be well understood by Mendeleev in his 1889 Faraday lecture.

One of the results of the widening of horizons in the study of the eighteenth century has been an increasing disciplinary and sub-disciplinary fragmentation. Now, both historians of science and historians of philosophy will profit from reading Vasconi's excellent work.

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