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in the Humanities & Social Sciences

Karen Hunger Parshall, Michael T. Walton, Bruce T. Moran, eds.. *Bridging Traditions: Alchemy, Chemistry, and Paracelsian Practices in the Early Modern Era.* Early Modern Studies Series. Kirksville: Truman State University Press, 2015. xxii + 311 pp. $50.00, cloth, ISBN 978-1-61248-134-0.

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Published on H-Sci-Med-Tech (July, 2017)

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The essays in *Bridging Traditions: Alchemy, Chemistry, and Paracelsian Practices in the Early Modern Era* honor the historian of science and medicine and professor at the University of Chicago Allen G. Debus (1926-2009). Debus is portrayed as a researcher and mentor who spanned the divide between the history of science and the history of medicine, and who also established alchemy and magic as genuine topics of interest within the framework of the so-called Scientific Revolution. In eleven essays, Debus's colleagues and disciples show how he inspired and advanced their own work. As indicated by the subtitle, the book is of great value for historians of science and knowledge who are working on the history of early modern alchemy and chemistry, a field of research established and enlarged by Debus himself, subsequent to the work of the historian of medicine Walter Pagel (1898–1983). Scholars working in this currently expanding field will find some solidly constructed essays, though the book as a whole represents rather more a summary than an innovation.

In her introduction, Karen Hunger Parshall outlines the evolving career of the young Debus who, even if ultimately successful and providing so many connecting points, initially encountered fervent opposition. Ironically this opposition originated in particular from colleagues whose fields of study were relatively close to Debus's own areas of interest. Conrad "Kurt" Josten (1912–94), formerly the curator of the Museum of the History of Science at Oxford and a scholar of the early history of chemistry and astronomy, and the Oxford historian of medicine Charles Webster ardently criticized not only Debus's preference for rare books instead of manuscripts but also his selective approach. Nevertheless, in her brief account of Debus's biography, Parshall reveals just how systematically he persisted. In addition to mentioning his profound studies on English and French Paracelsianism and more generally on the "chemical philosophers" (Debus's own term for the early modern alchemists and chemists), Parshall draws attention to further achievements that substantiate Debus's innovative insistence—for example, his own 1968 edition of *World's Who's Who in Science*, which for the very first time placed the names of chemical philosophers among the other big names in the history of science.

Bridging Traditions is divided into three parts: "Curious Practices and Practices of Curiosity," "Regional Contexts and Communities of Texts," and "Evaluations and Perceptions." In the first and in my opinion the most interesting part,

the book reveals a new awareness of alchemy's academic status in the early modern period, which was initially focused in research by Bruce T. Moran. Both Moran (chapter 3) and Margaret D. Garber (chapter 4) in particular intensify our understanding of the concrete academic networks in which medical and transmutatory alchemy gained ground in the seventeenth century. Garber investigates the use of these alchemies in the early editions of the journal of the Leopoldina Academy of Curiosi, a society that was established in the Holy Roman Empire in 1652. Garber describes how the alchemical topics of new medicine and goldmaking gained full legitimacy through Leopoldina members' self-conception as ***curiosi***, i.e., as collectors of curious observations in the tradition of Francis Bacon. Garber also shows that the Leopoldina commonly distinguished between the terms ***alchymia*** and ***chymia***—the former to describe a wide range of artisanal crafts such as glassmaking and the latter for the more specific arts of making medicaments and gold. This is in contrast to the recent approach by William R. Newman and Lawrence M. Principe, who have emphasized the synonymity and equality of ***alchymia*** and ***chymia*** in the sixteenth and seventeenth centuries.[1] Garber argues that ***alchymia*** in the context of this journal was used—just as Andreas Libavius (1555–1616) did—as the broader term, while ***chymia*** represented only a subset. According to Garber, ***chymia*** seems to have been driven forward by new progressive and academic ambitions, in contrast to a rather statical use of ***alchymia***. Garber's investigation thus provides a new meaning to Libavius's use of the categories ***alchymia*** and ***chymia***, which was long considered as rather surprising and peculiar. In addition, her investigation shows that the Leopoldina's habit of publishing short observations led its members to adopt a more empirical approach to alchemy instead of relying on secret knowledge allegedly communicated by unknown adepts, as had been the prior tradition.

Moran and Garber both focus on concrete protagonists in medical alchemy as well: for example Wolfgang Wedel (1645–1721) who succeeded his teacher Werner Rolfinck (1599–1673) at the University of Jena, and who was the first to hold the chair for practical medicine and ***chymiatria*** (medical alchemy) there. He was convinced of the ontological feasibility of transmutation and interested in clarifying principles, language, and symbols of ***chymia***. Garber emphasizes this as yet another example—delimiting anew a thesis of Newman and Principe—that the impetus for simplifying language within ***chymia*** was an achievement not of the era of Enlightenment but rather of the transmutatory alchemy of the seventeenth century.

Moran's and Garber's prosopographic research on the academic establishment of medical alchemy gives us a better understanding of the activities of the followers of Johannes Hartmann (1568–1631), for instance, who held the first chair in alchemy at the beginning of the seventeenth century at the University of Marburg and who was for a long time incorrectly viewed as a solitary figure in the history of alchemy. And according to Moran, it was Libavius who intended to establish ***chymia*** as a part of natural philosophy and as a didactically attractive discipline at universities. Zacharias Brendel the Younger (1592–1638) and Rolfinck apparently worked on a realization of Libavius's ideas and thus contributed to the combination of ***chymia*** and medicine at German universities.

Ku-ming Chang's chapter (chapter 5) outlines the history of Georg Ernst Stahl's (1659–1734) phlogiston theory. Going against the traditional stigmatization of phlogiston as a futile narrative in the history of science, Chang investigates Stahl's concrete terminological and empirical work. He demonstrates that Stahl's phlogiston theory was both descended and a sharp break from the two Arabic and three Paracelsian principles—often sulphur (combustion), mercury (volatility),

and salt (solidity). The different concepts of principle were used by alchemists for theoretical as well as experimental work. Chang argues that, while chymists like J. B. van Helmont (1580–1644) and Robert Boyle (1627–1691) were skeptical that any substance could be reduced to its principles by combustion, they also developed new requirements as to what a principle should in fact do. Therefore, Chang argues, Helmont and Boyle, made the concept of "principle" more material than the relatively abstract Paracelsian principles had been: by seeking and failing to find non-composite substances, the chymists concluded that principles must be considered compounds, rather than rejecting the principles entirely. Stahl noticed that not all sulphurous substances were inflammable, and thus he defined the principle of inflammability with the neologism phlogiston. We typically understand the collapse of the theory of three principles as a consequence of Stahl's work on phlogiston. Yet, as Chang continues to follow the history of the concept of sulphur, he shows how its transformation from an alchemical principle to a Lavoisieran element in turn improved the image of (Paracelsian) alchemy during the Enlightenment.

Jole Shackelford (chapter 2) discusses Debus's term "Elizabethan compromise," which Debus used to describe how Paracelsian medicaments and practices were applied to Galenic concepts, especially in England. Shackelford develops Debus's approach by asking whether there were also Paracelsians who started to create their own systems by combining new practices and new medicaments with older and already well-accepted theories. As an exemplary source, Shackelford cites a book written by the German physician Johann Hayne (fl. 1620), whose relevance is underpinned by the fact that his book was consulted in the United States until the eighteenth century. Hayne corresponded with Leonhard Thurneysser (1531–1596) who devoted a book on urine to him in turn, and referred to Hieronymus Reusner (b. 1558) who worked on the same topic. According to Shackelford, Hayne combined astrology, the analysis of tartar, and chemical uroscopy as an integral approach of etiology, semiotic diagnostics, and therapeutic guidance. Shackelford assumes that the analysis of urine at the end of the sixteenth century, inspired by Paracelsus's lectures at the University of Basel, became the preferred form of Paracelsian diagnosis while Galenists distanced themselves increasingly from the same. To conclude, Shackelford portrays the Paracelsian approach as amateurish and eclectic, which somewhat contradicts his initial intention of describing the innovative interplay of Paracelsian systems in theory and practice.

In the following, I will discuss some aspects contained in the second and third parts of the book that appear controversial and thus act to stimulate further research. Mar Rey Bueno (chapter 6) investigates how alchemy was applied in Spain in the sixteenth and seventeenth centuries. Contrary to the old narrative (one that was adopted by Debus and most other scholars) that Philip II hindered scientific progress in Spain by prohibiting students to leave the country, Rey Bueno points out that Philip himself was interested in distillation processes. Rey Bueno asserts that the situation in Spain was in some ways similar to the situation in other European countries: Galenists and Paracelsians coexisted and began to adapt to each other. There was a new Paracelsian chair for secret medicaments in Valencia and an active transfer of knowledge and goods with the Netherlands and Italy. Rey Bueno points out that women played an active role in recording recipes: "In style and content, food recipes and health remedies reflect the knowledge traditions and scientific developments of the early modern period, standing as unacknowledged companions of the experimental texts of the 'new science'" (pp. 150-151). Rey Bueno thus represents a field of research that has been productive for more than a decade now and will hopefully continue to be developed. Her central claim itself seems to argue against a systematic neglect of Iberia's role in the

Scientific Revolution, a neglect rooted in the infamous "Black Legend" of Spanish historiography, dating to the Elizabethan era. This interesting critical consideration, found at the beginning and the end of Rey Buenos's essay, is unfortunately too briefly mentioned for it to be fully comprehensible. The critical reader will moreover fail to find an exact description of the relevance of such authors as Ramon Llull (ca. 1232–ca. 1315) and Arnaldus of Villanova (ca. 1240–1311), as well as their pseudonymous followers in the history of alchemy. It is to be hoped that Rey Bueno develops her critique further and in more detail in future work. The relations of Spanish alchemy to the alchemy of other European countries, to Arabic alchemy, and to alchemy in the "new world" are very significant and demanding subjects, and can be considered as desiderata of research.

Dane T. Daniel (chapter 9) outlines the dispute between the historians Walter Pagel (1898–1983) and Kurt Goldammer (1916–97) concerning research on Paracelsus. Pagel worked with seemingly authentic Paracelsian as well as known pseudo-Paracelsian texts, applying the rather mystical tradition of Neoplatonism to explain Paracelsian philosophical works on nature. Goldammer, however, himself an expert on Paracelsus's unpublished theological works, repudiated any such connection between Paracelsus and Neoplatonic ideas. Only toward the end of his life, Goldammer started to analyze Paracelsus's magic in relation to Neoplatonism as well as to other more conventional sources, such as Augustinus. Daniel's analysis of Pagel and Goldammer's dispute is grounded on his own experience of reading and writing on the Paracelsian book *Astronomia Magna* (1537/38 and published in 1571, though this dating is among the authentication problems), and he rightly remarks on how difficult it is to distinguish between authentic and pseudo-Paracelsian texts. Daniel nevertheless notes that individual traits document the authenticity of *Astronomia Magna*, especially the Christian belief in *Creatio ex nihilo* and a disinterest in mathematics (pp. 213, 220). This is something I cannot agree with. In my opinion, the paradoxical use of "creatio" in this and other Paracelsian texts, whereby judging single passages authentic or non-authentic seems to be impossible, contradict the first assertion. Contradicting Daniel's second assertion: the *Astronomia Magna* contains diverse categories and interesting descriptions of magical and mathematical instruments (of course "mathematics" here is used differently from our modern use of the term). I would even contend that some of the pseudo-Paracelsian texts and passages of texts are more relevant and intellectually demanding for current research than their apparently authentic precursors. Furthermore, only in parentheses does Daniel mention that it was Pagel's deliberate, international approach that detached historians' views of Paracelsus from the nationalistic German approach of the 1930s and 1940s. At this point we ought to add that the pseudo-Paracelsian texts Pagel worked on were written in the sixteenth century, just as were the authentic texts of the author Paracelsus himself. This international network of Paracelsus and his followers then underwent concrete analysis by Debus. Ultimately, the authors of pseudo-Paracelsian texts were none other than those Paracelsians who constitute the center of current research.

Interestingly, Nicholas H. Clulee (chapter 10) discusses ongoing research on John Dee (1527–1608/9) from the 1950s until the present. In his opinion, a coherent approach to Dee and his work has yet to materialize. In both early modern and modern times, Dee was viewed as a magician and political theocrat, images that damaged his historical reputation. In particular, Clulee distances himself from the research of Frances A. Yates (1899–1981), who emphasized this image of Dee as magician—but, at the same time, Clulee himself states that Dee cannot be understood unless sufficient investigation of his quest for an Adamitic language is undertaken. Thus the task remains to integrate Dee's occult philosophy and magical practices into our understanding of him as a polit-

ically influential person in the early seventeenth century.

The final essay is a contribution by Heinz Schott (chapter 11) concerning the gynephilic versus the misogynic traditions in conceptions of nature. In his opinion, the misogynistic tradition is well known and has long been investigated by historians of gender and sexuality (though he fails to provide any names); in fact, he himself claims to have pioneered research of the gynephilic tradition of nature depicted as feminine. Schott understands the positively connoted female allegories of Nature, Science, Theory, Ethics, and so forth in text and image as gynephilic, without taking into consideration that the use of female representations was only possible because these figures could not be identified as real persons. He asserts: "From the fifteenth to the eighteenth century—over a period of some four hundred years—there were more writings on the superiority of women than there were explicitly misogynic ones" (p. 289). Although it is certainly likeable when an author likes gynephilic texts and images, it is necessary to discuss just what a gynephilic representation actually looks like. Schott's text would have profited from taking the long, diverse, and productive tradition of gender research here more seriously and putting more effort into positioning himself with respect to it.

The book ends with a useful index. The editors noticeably abstain from naming current desiderata in the history of alchemy and chemistry as fields for further research. As a reviewer, I would like to take this opportunity to note some desiderata of my own. Current research on early modern alchemy and chemistry could and perhaps should progress more systematically by clarifying the reasons and motives behind the selection of materials. Which sources in this immense production of books and images merit analysis and why? While some academic forms of early modern alchemy and their international expansion are shown by this book to be important subjects for further research, a future history of the state of alchemy at early modern universities would also certainly benefit from relating it more closely to the histories of such fields as astronomy/astrology and theology/theosophy with their academic destinies.

Note

[1]. William R. Newman and Lawrence M. Principe, "Alchemy vs. Chemistry: The Etymological Origins of a Historiographic Mistake," ***Early Science and Medicine*** 3 (1998): 32-65; and Lawrence M. Principe and William R. Newman, "Some Problems with the Historiography of Alchemy," in ***Secrets of Nature: Astrology and Alchemy in Early Modern Europe***, ed. William R. Newman and Anthony Grafton (Cambridge, MA: MIT Press, 2001), 385-431.

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Citation: Ute Frietsch. Review of Parshall, Karen Hunger; Walton, Michael T.; Moran, Bruce T., eds. *Bridging Traditions: Alchemy, Chemistry, and Paracelsian Practices in the Early Modern Era.* H-Sci-Med-Tech, H-Net Reviews. July, 2017.

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