Lawrence M. Principe (ed.), *Chymists and Chymistry. Studies in the History of Alchemy and Early Modern Chemistry*, Sagamore Beach: Watson Publishing International Ltd., 2007, 274 pp. [ISBN 978-0-88135-396-9]

Why does the corpse of a murdered person start bleeding in the presence of its murderer? In the past this was a kind of trial (ordeal), a primitive approach toward determining the guilt or innocence of an accused person. Some trials of this kind were very cruel, such as burning the suspect with a glowing-hot iron: if no pain was apparent, then it was considered a sign of innocence. These approaches were gradually abolished, but the above-mentioned test by bleeding persisted for a long time. One might ask why a description of an old juridical practice occurs in a review of a book dealing with chymistry. Perhaps surprisingly, there is indeed a connection between them, as will be shown below.

First the book should be introduced. It is a collection of contributions presented at the "International Conference on the History of Alchemy and Chymistry" held in Philadelphia from 19 to 23 July 2006. The participants of this small "chamber meeting" have contributed the twenty-two chapters of this book. At first sight the list of contributors clearly reflects a recent development in the historiography of alchemy and chymistry: the increasing number of young scholars involved in this research. In this list one finds some expected names that are already "classic" in this field: W. R. Newman, B. Obrist, T. Nummedal, B. T. Moran, B. Joly, D. Kahn, and of course L. M. Principe, the editor of the reviewed book, just to mention a few. Along with these appear representatives of a new generation, a few examples of which include P. J. Forshaw (a postdoc at the University of London), G. Ferrario (who has recently obtained a Ph.D. in oriental languages from the University of Venice), and V. D. Boanza (a Ph.D. student in Toronto). The presence of these new contributors is worth mentioning because it reflects renewed interest in the history of alchemy and chymistry that one might call a new Renaissance dispersed around the globe.

It is not easy to review such a heterogeneous book dealing with widely dispersed topics. However, this broad variety encompasses major trends in the modern historiography of alchemy. Therefore, so as not to simply list each individual contribution, this review will be focused on identifying these trends, though their ordering here is in no relation to their importance. All of them contribute to the still incomplete mosaic of this field of history. There appear new objects of research, while we also observe further study applied to persons or books that seemed to have been sufficiently studied. In some cases, however, these "closed chapters" are revisited with surprising results. Research using various newly uncovered sources, not only books and manuscripts, but also letters, chronicles, or court records, sometimes throws new light on persons and events.

The examination of historical artifacts received new stimulus during the second half of the twentieth century, when very sensitive methods of chemical analysis and for examining the material of such artifacts were developed. Both approaches are found in the contributions by M. Martinón-Torres and R. W. Soukup. The former has studied alchemical crucibles, two kinds of which were very popular in Renaissance Central Europe. Chemical analysis of the remains allows one to ponder the processes performed with these utensils. Microscopic examination of the walls of these crucibles revealed their structure and explained why certain kinds were widely preferred. Here, a future direction of research could perhaps be aimed at the question of the discovery of European porcelain. Agricola men-

tioned "Waldenburgische Gefäse", vessels of glassy structure, and, as Prandtl had speculated, this information could have inspired von Tschirnhausen in his search for suitable material. "Crucibles, Cupels, Cucurbits" are the topic of Soukup's brief summary about his work in Oberstockstall, where the remains of an alchemical laboratory are being investigated, the results of which are discussed generally in relation to the influence of Paracelsus in Austria.

Interest in Paracelsus is a lasting topic, and this prominent figure of the European Renaissance is discussed within a broader framework concerning not only his work in medicine or alchemy, but his theological views as well (D. T. Daniel). Religious aspects are beginning to appear more frequently in discussions about alchemy, as shown by M. D. Garber in "Transitioning from Transubstantion to Transmutation: Catholic Anxieties over Chymical Matter Theory at the University of Prague". The protagonists of this article, R. Arriaga, the dean of the faculty of arts, and J. M. Marci, the dean of the faculty of medicine, were involved in a debate about transmutation (a process believed to occur among metals) and transubstantion (the mystical change occurring in the Eucharist). This contribution is one of numerous examples that demonstrate how such seemingly distant fields as chymistry and religion actually have diverse points of junction. (This paper might be of special interest to Czech readers, most of whom look upon Marci as a physicist; there is even a J. Marcus Marci medal of the Czech Spectroscopic Society).

The composition of matter and its changes are also perennial topics of scholarly studies on alchemy and chymistry, as there are still many questions to be solved. Sometimes new texts are analyzed, as in the article by W. Newman, "Newton's Theory of Metallic Generation in the Previously Neglected Text 'Humores minerales continuo decidunt'". Scholarly discussions of the past are also examined to throw new light on the questions of matter and its behavior, as in V. D. Boanza's "Reflection on Matter and Manner: Duclos Reads Boyle, 1668-69", and L. Peterschmitt's "The Cartesian and Chemistry: Cordemoy, Rohault, Régis".

Discussions concerning matter and its transformations were crucial to the development of chemistry. The quarrels between Etienne-François Geoffroy and Louis Lémery (B. Joly) show the former scholar in an unexpected light. Geoffroy, famous for his "tables of affinities", is commonly accepted almost as a modern chemist, as he certainly contributed variously to the emergence of this field. Yet, here he appears to vacillate on the verge of alchemy with his claim of having prepared a material resembling iron by heating balls of clay soaked in linseed oil. This process, which had previously been mentioned by J. J. Becher, led to confusing results that even deepened when Louis Lémery's father, Nicolas Lémery, found that "the charcoal of honey contains iron". Eventually, after further experiments, Louis Lémery solved the mystery of iron, allowing Bernard de Fontenelle, the secretary of the French Academy, to conclude that "It is not yet time to think about the pleasant hope of the artificial production of metals". Such valuable contributions clearly document that errors are the unavoidable attendants of progress in science.

The eighteenth century was a period of the gradual decline of ideas associated with alchemy as opposed to chemistry. This is no wonder, in view of the substantial accumulation of chemical knowledge during that time. Yet, alchemy retreated slowly from her positions and looked for back doors. One possibility for its survival was provided by the esotericism manifested by the formation of various secret societies. The appearance of the Gold- and Rose-Cross is not actually so surprising, given the appeal of its predecessor: the Rosicrucian movement of the seventeenth

century. But most previous studies of such groups are hindered by a lack of scholarly detail. Some prominent figures of esoteric alchemy in Germany are introduced in C. Priesner's "Alchemy and Enlightenment in Germany".

As mentioned in the introduction of this review, scholars sometimes return to previously studied texts. This is what G. Ferraria did in a contribution dealing with two manuscripts of the *Liber de aluminibus et salibus.* J. Ruska analyzed this treatise in detail during the 1930s. G. Ferraria has compared two manuscripts of this work, Arabic and Hebrew. This comparative analysis does not help solve the problem of authorship, as the original author remains unknown, but it has shown that the book apparently served as a laboratory manual. Furthermore, transliterated Italian words in the Hebrew version suggest that it was written by an Italian Jew. Ferraria finishes this contribution with an interesting and stimulating question: "… should we think about a medieval practical alchemical book of this kind as a fixed unit, or should we instead consider a single group of procedures or a single recipe as an oscillating unit liable of being improved, changed […] through experiences acquired in the laboratory?"

Whereas the *Liber de aluminibus et salibus* is well known, this is not the case of the manuscript *De Quercu Iulii pontificis sive De lapide philosophico* from the second half of the fifteenth century. The author of the latter tract, Giovanni da Corregio, had been considered a fictitious figure as recently as the first half of the twentieth century. W. I. Hanegraf adds biographical details to the knowledge of this alchemist – he was certainly a strange person who experienced apocalyptic visions earlier in his life. Later he devoted himself to alchemy and, according to the manuscript, he claimed to be a possessor of the highest alchemical knowledge of the philosophers' stone. He described its miraculous virtues in detail and did not conceal that he knew the secret of preparing it. The everyday prosaic life of alchemists comes to light later in the manuscript, dedicated to the Pope Julius II (Pope 1503-13), when the plea "protect me, protect me …" is addressed to this highest religious authority. The alleged owner of the stone fell into full poverty.

People of the sixteenth century seem to have looked upon alchemists with increasing suspicion, considering many of them to be frauds, or *Betrüger*, in the German speaking countries of the Holy Roman Empire where alchemy nonetheless flourished. It is interesting to follow the contemporary approach as expounded in the chapter "On the Utility of Alchemical Fraud" (T. Nummedal). The title itself is quite telling, with the word "utility". Yet, when leaving aside various tricks such as hollow bottoms of crucibles, many "fraudulent" alchemists made their experiments on a chemical and metallurgical basis and were skilled craftsmen who inadvertently contributed to chemical knowledge. This topic is dealt with at length in Nummedal's recent book *Alchemy and Authority in the Holy Roman Empire* (Univ. Chicago Press, 2007).

"Alchemical Exegesis: Fractious Distillation of the Essence of Hermes" (P. Forshaw) is another excursion in the European Renaissance, but with the Emerald Table of Hermes as a focus. We meet here the learned Jesuit Athanasius Kircher, whose explanation of this mysterious text is compared with that of Libavius. The latter is the protagonist in the contribution of B. T. Moran, "The Less Well-known Libavius", where the German educator and polyhistor is presented in quite a different light in the discussion of a thesis defended by his son Michael. As was common at that time, the true author was the teacher, Libavius the Elder. The thesis, entitled "Spirits, Humors, Innate Heat, and Human Faculties", deals with action at a distance. Libavius considered it possible that under corresponding

treatment by "spirituous fire", the qualities of gold could be transferred into another body. The plausibility of action at a distance was supported to some extent by the magnet and its influence on iron. As stated in the thesis, "we reject magic … [but] we accept the explanation which refers to the spirits or the breath of murderers, and we say that [the spirits in the breath] are the cause of the blood's movements". In other words, blood starts pouring from the wound. This statement brings us back to the introductory sentence of this review – there can be interesting and unexpected links between alchemical concepts and seemingly unrelated fields.

This last example shows how a broad spectrum of topics appear in the study of alchemy and early chemistry when these fields are examined in the wider context as an inseparable part of human knowledge. The reviewed book is an excellent picture of the current state of research, or, more correctly, of its parts, and simultaneously stimulates and suggests further study. In this review only a few examples have been given to illustrate what a reader can expect. We can congratulate Larry Principe on this book, small in its dimensions, but voluminous in content. It can be recommended as a wise adviser and companion for every historian of chemistry.

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