

In *Reproduction by Design*, McLaren has produced a highly readable account of the complex relationship between technology, ecology and sexuality, and the reproductive dilemmas that accompanied modernity. Those interested in the modern history of science, reproductive technology and sexuality should find it a rewarding read.

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Lawrence M. Principe, *The Secrets of Alchemy* (Chicago, IL: University of Chicago Press, 2013) pp. v + 281, £ 17.50, hardback, ISBN: 978-0-226-68295-2.

The historiography of alchemy has undergone a sea change in the past few decades. As the pejorative label of 'pseudo-science' was abandoned, the alchemical tradition became an area of serious historical study. Scholars discovered new texts and archives, (re)edited and translated important documents, and unearthed hitherto unrecognised lines of development. This welcome historiographical turn, however, brought about one (and only one) drawback: except for the specialists, nobody else could have a clear glimpse of the current state of research. This is why scholars from various quarters began calling for a new synthetic survey of the history of alchemy. The book under review has now fulfilled this expectation. The author, Lawrence Principe, is one of the most distinguished scholars in the field. Combining his own research with a wide-ranging reading of old and new studies, he produces a reliable, up-to-date, and stimulating historical narrative. His prose is clear, jargon-free, and full of humour. Many references to German, French, and Italian scholarship indicate the book's freedom from any anglocentric bias.

Principe begins his story in Graeco-Roman Egypt, a region that gave birth to the so-called Leiden and Stockholm papyri, as well as the *Corpus alchemicum graecum*. In contrast to the practical nature of these writings, a form of art appeared around the beginning of the fourth century that consisted of transforming base metals into gold with substantial theoretical backups. This is what was to be called 'alchemy'. Chapter 2 of Principe's book gives an overview of the alchemical tradition in the Arabic world from about 750 to 1400. The art was first transmitted into that linguistic sphere around the beginning of the eighth century, again in Egypt. The early alchemical corpuses include the *Emerald Table* attributed to Hermes, the legendary founder of the art. Also worthy of note are a vast array of writings produced under the name of Jābir. The Jābirian authors set forth the Mercury-Sulphur theory, and the quantitative method of producing gold with the use of an elixir.

Chapter 3 outlines the development of alchemy in the Latin Middle Ages. The west began producing its own alchemical writings from the the mid-thirteenth century. One of the most salient is the *Summa perfectionis* written under the name of Geber (Jābir). The work, probably composed by the thirteenth-century Franciscan Paul of Taranto, explains the process of transmutation on the basis of quasi-particulate matter theory. Around the same time, some philosophers started to doubt alchemists' ability to produce gold. It is in reaction to this increased suspicion that alchemy began securing its legitimacy by forging a strong tie with Christian dogmas. The Christianisation was fostered by authors such as pseudo-Arnald of Villanova and John of Repescissa. John also expanded the goal of alchemy to the preparation of medicines. By the start of the sixteenth century,

alchemy's two principle aims were thus firmly established: the transmutation of metals and the production of medicines.

Principe here interrupts his chronological narrative. He skips the early modern era and devotes Chapter 4 to the eighteenth century and onward, in order to explore how modern perceptions of alchemy emerged during and after the Enlightenment. At the beginning of the eighteenth century, transmutational alchemy was severed from chemistry, as the latter was then becoming a professionalised discipline and therefore needed to free itself from any activity liable to suspicion. This separation, however, did not bring about the demise of alchemy. From the mid-nineteenth century, the psychological interpretation of alchemy gained popularity. Consolidated by Jung's psychoanalytic reading of alchemical texts, this interpretation continues to condition the current perception of the art. As Principe cautions, anyone who wishes to obtain an accurate understanding of early modern alchemy should avoid projecting these biased images into the past.

The author then sets out to address the 'Golden Age' of alchemy: the sixteenth and seventeenth centuries. Chapter 5 explains the principles and goals of the alchemical activities of the time: how did early modern alchemists gain information about the method of producing the Philosopher's Stone? What were its starting materials? What operational procedures did alchemists follow? The salient feature of early modern alchemy is its strengthened connection with medicine. This orientation came mainly from Paracelsus. He not only perceived alchemy as the main model for his explanation of nature, but also advocated the preparation of medicine by separating toxic materials from poisonous substances. Chapter 6 is the most stimulating part of the book. Principe decodes the symbolic description of alchemical texts and replicates, with his own hands, the experiments dictated therein. By doing so, he finds that the apparently nonsensical alchemical texts record what really happened in the past laboratory (albeit often with false theorising).

Chapter 7 examines the place of alchemy in the early modern cultural context. From the Middle Ages onward, alchemy had often been regarded as a fraudulent activity. To counter this negative assessment, some humanist scholars, for instance, began interpreting Greek and Roman myths as conveying encoded alchemical messages, with the intention of giving the art a classical pedigree. Such a bifurcated reputation of alchemy permeated the minds of poets and painters, whereas playwrights often cast alchemists as comical characters. Lastly, alchemy maintained a strong tie with religion; chemical books were full of theological discussions and images, while alchemical metaphors appeared frequently in sermons and writings by churchmen. This reflected the general world-view of the time: God arranged everything to bring about a unified and harmonious cosmos.

Throughout his narrative, Principe demonstrates that alchemy always intersected various intellectual, social, and religious situations of the past. Despite its many vicissitudes over time, however, it retained one fundamental feature: it never ceased to be an enterprise in which both mind and hands participated. The history of alchemy thus provides a good avenue of research in which scholars can bring the histories of ideas, scientific practices, and past cultures into conversation with one another. For those wishing to embark on this challenge, *The Secrets of Alchemy* will be a definitive starting point for generations to come.

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