
In 1565, two spirited young Danes set out on a grand tour of Europe in order to expose themselves to the most advanced medical knowledge of their day. One of them, Johannes Pratensis, would subsequently become a renowned if short-lived medical professor at the University of Copenhagen. The dramatic and tragic death of Pratensis from a pulmonary hemorrhage during his delivery of a university lecture cut short his promising career. But the other young aspirant, Petrus Severinus, would go on to become the most influential popularizer of Paracelsus and his ideas that the sixteenth century produced. His *Idea medicinae* of 1571, read by Francis Bacon, Joan Baptista Van Helmont, and a host of other early modern reformers of science, was the classic presentation of Paracelsianism to the learned world. Indeed, it is probably fair to say that among non-German readers, more were exposed to Paracelsus through the elegant Latin of Severinus than through the tortured language of the Swiss scientific reformer himself. And yet up until the appearance of the present study, no detailed monograph book on Severinus had been published. Happily, Jole Shackelford has changed all that with this magisterial study of the life, thought, and influence of Severinus, a work that represents the culmination of well more than a decade of scholarship and research.

Shackelford's study not only illuminates Severinus and his influence, but also serves as a who's who of Scandinavian science and court culture in the second half of the sixteenth century. For example, the physician Pratensis was a close friend of Tycho Brahe's, and the astronomer was himself quite interested in the strange cosmological notions of Paracelsus. Shackelford goes into Tycho's alchemical interests in some detail, and in the process is able to throw new light on the possible falling out that he and Severinus may have experienced towards the end of Tycho's Danish career.

But the most valuable aspect of this important book may well lie in Shackelford's study of Severinus's ideas and their influence on subsequent scientific figures. Two interrelated themes in particular stand out, one in the history of medicine and the other in the realm of matter theory. Severinus was not merely a popularizer of Paracelsus, but also a theorist and systematizer in his own right. From the chaotic expressions of his Swiss master, Severinus was able to develop a well-articulated ontological theory of disease that went against the dominant humoral pathology of early modern scholastic medicine. A key element in the Danish physician's theory was that illnesses are borne by seeds (semina) that can be "transplanted" from one location to another, and that once they take root, the principles of disease can manifest themselves in diverse ways. Shackelford gives a clear exposition of this medical theory in *A Philosophical Path* and provides compelling evidence for its influence on figures as diverse as the German expatriate Ambrosius Rhodius (who happened to marry Severinus's grand-daughter) and the Scottish physician William Davidson, who became an important figure in the Parisian *Jardin des Plantes* during the second half of the seventeenth century.

As it happens, however, the *semina morborum* that led to disease were but a specific case in a much more general theory deriving ultimately from the ancient philosophical
concern with *rationes seminales* as causes for the specificity in nature at large. Just as he opposed the excessive reliance on the theory of four humors as a medical factotum, so Severinus found himself at odds with the common university appeal to the four Aristotelian qualities hot, cold, wet, and dry as agents for explaining material change in general. Again developing a concept that he had found in the Paracelsian corpus, Severinus argued that the division of the world into varying species of animals, vegetables, and minerals was due to the unfolding of dimensionless *semina* in matter. Like Paracelsus, Severinus did not deny the reality of the four peripatetic elements, but argued that they were matrices in which the *semina* developed their own potential. This idea rather fully undercut the common scholastic theories of generation, corruption, and mixture, which had given considerable importance to the elements and their qualities as agents of change and growth in the material world. As Shackelford points out, Severinus himself wrote at least part of a book on mixture, which has unfortunately not survived.

In the hands of the Wittenberg medical professor Daniel Sennert, who also figures prominently in Shackelford's account, the *semina* came to be associated with the substantial forms of the scholastics. Indeed, there is a direct genealogy between Severinus's *semina* and the *atom* for which Sennert is justly famous. Just as Severinus buried his *semina* within the four traditional elements as guiding principles of change, so Sennert locked substantial forms within elementary capsules to account for the permanence behind the apparent mutability of the universe. Both Severinus and Sennert were seeking a way to avoid the jejune explanatory tools provided by the four elementary qualities while also trying to explain why chemical change displays a principle of regularity. Hence, rather than arguing in traditional wise that generation and mixture were due to the adventitious rays of celestial bodies, Severinus and his followers argued that the species of things arose during God's creation of the world and were continually renewing themselves through the ongoing action of the *semina*. Hence the *semina* acted as robust agents of physical continuity over time, while also accounting for change as they developed and underwent transplantation. The quest for specific agencies partaking of an underlying permanence was one of the leitmotives of early modern science and medicine, and the role of Severinus in giving voice to this theme in the generation before atomism burst upon the European scene is worthy of further study.

Shackelford's account of Severinus and his legacy, while giving a full account of the Danish iatrochemist and his influence, also raises further questions in the mind of the reader. The influence of Severinus and of chymical thought more generally on Francis Bacon remains a difficult area, for example, and one that would reward further study. To what degree was Bacon's strange theory of pneumatic substances really "semi-Paracelsian," to use Graham Rees's terminology, and how was it related to his reading of Severinus? Shackelford makes a first stab at answering these questions, but a full resolution will require deeper study. Another question concerns Severinus's relationship to other writers on *semina* such as Girolamo Fracastoro. In laying out the map of contemporary thoughts about *semina*-theory, the reader is advised to supplement Shackelford's account with the newly published book of Hiroshi Hirai, *Le concept de semence dans les théories de la matière à la Renaissance de Marsile Ficin à Pierre Gassendi* (Turnhout: Brepols, 2005).