

Hiro Hirai. *Le concept de semence dans les théories de la matière à la Renaissance: De Marsile Ficin à Pierre Gassendi.*

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In antiquity, seeds, whether conceived of metaphysically, metaphorically, or materially, played a role in explanations of the physical world. For example, seeds as metaphors were featured in Presocratic accounts of the cosmos; discussions of the actual seeds of plants and animals were included in ancient medical writings as well as in Aristotle's biological works; Lucretius's *semina rerum* referred to particles that governed the regularity of atomic formations; and Augustine's seminal reasons explained creation. Even though Augustine's influence in the Middle Ages is well known, until now the role of the notion of seed in its various guises for the development of Renaissance science has been studied only slightly. Hiro Hirai has written a nearly exhaustive history of the various ways in which this concept affected matter theory from the middle of the fifteenth century until the middle of the seventeenth. Hirai is less concerned with theories about how actual seeds worked — such as the problem of germination or the issue of whether females contributed seed to their offspring — than with how various thinkers used notions of seeds to explain material change and to give an account of the forms and qualities of metals and minerals.

This book traces the influence of these theories from Marsilio Ficino through Aristotelian mineralogical writers and Paracelsian alchemists until arriving at Pierre Gassendi. It succeeds in showing the concept of seed was widely used. For example, Ficino contended that all sublunar bodies are formed by *spiritus* and seminal reasons that come from the world soul; for Georg Agricola, the efficient cause of minerals was linked to a seminal power; Paracelsus connected seeds not only to natural bodies and the elements, but also to the word of God; according to Jean-Baptiste Van Helmont, seeds are the containers of the final causes of natural bodies. Moreover, Hirai convincingly argues for the existence of chains of influence that go from fifteenth-century Neoplatonists to the seventeenth-century revival of Epicureanism. The more exciting claims of this book include that early sixteenth century medical authors such as Girolamo Fracastoro and Jean Fernel were influenced by Ficino's theory of seeds — which ultimately derived from Plotinus — and that Gassendi's usage of the concept of seed derived as much from seventeenth-century alchemical writers as it did from the ancient atomists. Despite showing that a wide variety of authors used the concept of seed in their matter theories, the overall thesis of this work is modest. While maintaining that the concept of seed was central to Renaissance matter theory and that it played a role in the formation of modern Western science, it is unclear to what extent Hirai wants to link the centrality of this concept to the development of modern atomism or other aspects of seventeenth-century science such as the "mechanical philosophy." While Hirai connects the concept of seeds to Gassendi, he is silent on

whether the concept had any place in the thought of Francis Bacon, René Descartes, Robert Boyle, and many others who are typically considered key to the development of modern science.

This work is at its best when it traces sources and influence while explaining the nuances of the various conceptualizations of seeds. The emphasis on the influence and authority of earlier authors, while extremely helpful in understanding the transmission of ideas, leaves one wishing for a deeper understanding of why various authors chose to follow certain predecessors. Indeed, the theories of seeds are explained in detail, but analyses of the epistemological (or cultural) motivations for adopting a given theory are limited. Moreover, while it is clear that this study is the result of large amounts of research, an editor more generous to the book's potential readers, might have limited (or relegated to footnotes) the block quotations that grace nearly every page of this work. Even though these quotations demonstrate the author's erudition and are evidence of his accurate readings of the primary sources, they often repeat the author's earlier paraphrase of the text at hand, thereby rendering the book needlessly clunky. Nonetheless, this work admirably explores a large number of infrequently studied texts as well as classics, and connects these writings in a meaningful way. Because of its clear explanations, this book should remain useful for a long time to those interested in Renaissance matter theory.

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