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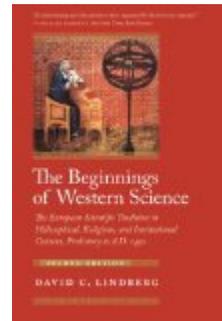
in the Humanities & Social Sciences

David C. Lindberg. *The Beginnings of Western Science: The European Scientific Tradition in Philosophical, Religious, and Institutional Context, Prehistory to A.D. 1450*. Second edition. Chicago: University of Chicago Press, 2007. xvi + 488 pp. \$25.00 (paper), ISBN 978-0-226-48205-7.

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An Origin Story

History can teach us something about change over time, even progressive change, without discounting the complexities of causation and contingency, and without denigrating ideas that on their literal face have been rejected in the past. This is the challenge faced by many historians of science, especially those who want to tell a diachronic story, and most especially those who wish to tell such a story in a grand sweep, as does David C. Lindberg in *The Beginnings of Western Science*. In a chronicle covering more than two thousand years of history it is impossible to include everything—some compass must be used with which to steer and some meter defined with which to measure. Lindberg uses, in part, some of the ideas, values, and methods recognizable in modern science to help direct his course and gauge his subject, and for this he certainly need not apologize. As his study reveals, some of those ideas, methods, and values were present in the investigation of the natural world throughout the period he addresses and contributed to shaping the course of natural knowledge then as they still do today. While Lindberg makes every effort to weigh the ideas of the past in relation to their own context and that of their predecessors rather than simply assaying them for evidence of future goals and achievements, his choices frequently do reflect future outcomes. What distinguishes Lindberg's calculated use of a modern meter from those of some other historians is that he applies his measure inclusively rather than exclusively, in order to encompass as much about the philosophy of nature as he can justifiably con-

nect to what we today call science. Lindberg wants to guide his readers through an origin story, but he is ever watchful of the dangers of perpetuating a creation myth.

Lindberg manages his task with pedagogical skill honed by over forty years immersed in the ideas of pre-modern science and engaged in teaching those ideas to modern students. Not only is he able to distill the essential elements from the abundant quantity of complicated material that comprises premodern natural philosophy, he translates and imparts those essentials to readers using a delicate balance between introducing new concepts and reiterating them to help secure them in his readers' minds. The text's focus is on theoretical rather than practical knowledge and the story follows largely chronological lines from prehistory to about the year 1450. Lindberg displays particular strength in his special attention to developments in optical theory, a very balanced approach to the relationship between religion and science, and due concern for the institutional frameworks that helped and hindered scientific achievements. Lindberg regularly leads his readers to a more comprehensive understanding by drawing out broader themes precisely, such as the linguistic and epistemological difficulties of defining science, the philosophical implications following from different concepts of change, and the roles of experiment and mathematics in understanding and explaining the natural world. Consideration of these and other broader themes helps Lindberg showcase continu-

ities within the scientific enterprise throughout the western tradition.

The value of Lindberg's book as an introductory text for students is clear, but it will also serve as an excellent resource for non-specialists, particularly those teaching comprehensive survey courses. The history of science is too often neglected in general courses, probably due more to professors' lack of familiarity with the subject than to the relative importance of its impact on historical themes. *The Beginnings of Western Science* offers a concise, highly accessible introduction to the essential elements of western knowledge about the natural world that will help guide instructors in developing curricula that give adequate attention to this very important area. One could easily use this text as a sole resource to develop a thematic unit covering premodern natural philosophy. Alternatively, Lindberg's diligence about contextualizing his subject within the philosophical, religious, and institutional milieu offers instructors a template for how to integrate scientific ideas seamlessly into more general curricula. Just a few potential points of departure include incorporating the *Timaeus* into discussions of Greek philosophy, addressing Augustine of Hippo's discussions about the proper relationship between natural and theological knowledge (a thorny issue even in the fourth and fifth centuries, the specifics of which would later play an important role in the Galileo affair), and the interpenetration and exchange of Greek, Islamic, and medieval Latin ideas about the natural world. The possibilities presented to enrich and enliven a general history course abound.

The body of Lindberg's text offers students and non-specialists a taste of the rich depth of natural knowledge in the premodern world, but the author also directs readers who would like to pursue an issue further with specific notes referencing an extensive bibliography. Lindberg's forty-nine pages of sources are composed of mostly English works ranging from the technically explicit to the philosophically sublime. Along with a compilation of some of the most important scholarship produced throughout the past century, Lindberg catalogues many of the finest translated and edited editions of accessible primary sources that collectively reveal much of the character of natural knowledge before the advent of modern science. Lindberg's expertise in the literature of his subject is fully apparent in this updated bibliography.

While the first edition of *The Beginnings of Western*

Science remains a valuable resource, this second edition surpasses it significantly in content. In particular, the enhanced section on Islamic science embraces recent scholarship and ameliorates the severe deficiency in general histories of science regarding the contributions made by Islamic culture during the Middle Ages. Lindberg expands the contextual account from his first edition by specifying the elements in the centralized Islamic state that promoted the translation movement, briefly exploring the intellectual and political background to help explain why Baghdad became the center of Greek assimilation, and delineating the specific practical, political, and religious utility that motivated Abbasid culture to welcome such foreign influences. Lindberg's richest amendment to this section, however, is his detailed account of the original work produced by Islamic scholars concerning mathematics, astronomy, optics, and medicine. He credits outstanding individual scholars with the innovations they achieved and attributes the invention of observatories for astronomical research and the further development of hospitals (originally founded in Byzantium) into institutions for medical research to Islamic culture. Lindberg takes a much stronger stand on the issue of the Islamic appropriation of Greek learning than he did previously, making it clear that Islamic science was not just a surrogate for Greek ideas, but a genuine forebear of western science.

Lindberg justifies his project in the context of recent scholarly debates by making his ideas about the methods he tries to employ explicit. In so doing, he calls attention not only to some of the traps into which historians can fall all too easily, but also to the very legitimate reasons historians of science so often find themselves in such territory. To trace the development of ideas over time one must inevitably take a future state as a starting point, but one need not and should not take that point as being inevitable. For those who can see the value of genealogical reconstructions, Lindberg does nothing so well as exemplify a golden mean for how to chart a course through such a historical minefield. He neither suppresses nor belittles natural knowledge that has been replaced or superseded by modern conceptions, but he does draw lines of connection to the future where they are relevant. It takes a daring scholar to undertake such a campaign and an accomplished one to achieve the goal with a minimal loss of depth. While Lindberg does not execute his mission flawlessly, his success is substantial, and this second edition of *The Beginnings of Western Science* will remain a fundamental and reliable resource for many years to come.

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