

attention—even if it meant zooming out from the school more frequently—to why these decisions were made, to more fully understand *why* as well as how the school changed as it did.

Grundy identifies as a desegregation advocate. She came to the story of West Charlotte seeking to capture the school's special magic in the 1970s and 80s. She offers many compelling points of evidence for how students learned from desegregated educational spaces—as well as of the work involved in building and sustaining these spaces. The segregation inside the school along academic tracks, or the persistent worry that, as one black parent put it, via desegregation “our people” would “be consumed by the white people” (55), reflect harder realities of the process of desegregation and perhaps could offer sources of insight for why the period of desegregated success proved short-lived. Grundy clearly acknowledges these difficulties and inequalities in the process of desegregation, but could plumb their origins and consequences to a greater extent. New approaches to desegregation today—those imagining explicitly anti-racist desegregation—have to face this complex history. One West Charlotte alumnus's view of desegregation in the 1970s has lessons for the present: “Our society is very witty.” He continued, “and as new demands come upon us for changing we find new ways to entrench ourselves in the old” (114).

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Rivka Feldhay and F. Jamil Ragep, eds.

*Before Copernicus: The Cultures and Contexts of Scientific Learning in the Fifteenth Century*

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Montreal & Kingston: McGill-Queen's University Press, 2016. 344 pp.

Much ink has been spilled on the question of why Nicolaus Copernicus made the radical decision to propose a heliocentric cosmology. Recently, scholarly discussion and debate has centred on potential paths of transmission of Islamic astronomical models that appear in Copernicus's 1543 masterwork *De revolutionibus orbium coelestium* and his earlier *Commentariolus*. *Beyond Copernicus* aims to make this discussion available to a broader historical audience, but also to definitively expose the absurdity of holding the position for the independent European development of these astronomical models in the face of overwhelming evidence—contextual, textual, visual, etc.—of Islamic influence. This evidence illustrates “transformations in the background to the Copernican system” (8) that deal with the body of astronomical and cosmological knowledge, the status of astronomy as a discipline, and the transmission of knowledge. The outcome of these transformations shows that Copernicus's proposal of a sun-centred cosmos was the culmination of a centuries-long Islamic astronomical tradition (*hay'a*) that sought to provide physically viable configurations of the cosmos that accounted for celestial motion.

One of the most powerful features of the volume is its coherence. In their Introduction, Rivka Feldhay and F. Jamil Ragep masterfully craft the historiographical stage, laying out decades of scholarship on Copernicus in a few pages by focusing on the question of the physicality of celestial orbs in the set of texts, which were crucial forerunners to Copernicus's *De revolutionibus*. The editors insist that approaching the astronomical developments in the fifteenth century and Copernicus's radical decision require a multidisciplinary, multicultural explanatory framework.

Christopher Celenza's first chapter provides the intellectual and cultural backdrop of the "long fifteenth century" (17) in which contemporary citation practices, communal authorship, and exchange explain why Copernicus was reticent about his use of certain Islamic sources. Nancy Bisaha illustrates in her chapter that despite the increasing political and military tensions between European powers and the Ottoman Empire, the boundaries between them were porous enough to allow ample opportunities for scholarly exchange. Her study proves that "the ideas that travelled westward... were changed or cloaked, consciously or unconsciously, perhaps to fit with the growing belief among Europeans that their current scholarship had surpassed that of the East" (40-1). These two chapters provide the multidisciplinary and multicultural backdrop for the European intellectual and scientific contexts of the fifteenth century treated by the other authors.

Edith Sylla traces the influence of a core *hay'a* text, Ibn al-Haytham's *On the Configuration of the World*, to George Peuerbach's *Theorica novae planetarum*, through an extensive analysis of Aristotelian commentaries which discuss the status of astronomy in terms of the relationship between mathematics and natural philosophy. She argues that Brudzewo's commentary on Peuerbach's *Theorica* "repeatedly makes clear the distinction in scientific status between physical orbs and mathematical or imaginary circles" (75) and that this approach illustrates an attitude of acceptance towards the fallibility of science, a crucial element of the Copernican context. Michael Shank's contribution provides a stimulating account of Regiomontanus's role in this physico-astronomical tradition, and especially his consideration of homocentric astronomy. While Shank makes frequent mention of Regiomontanus's astrological texts, tables, and associations, he falls short of directly addressing the astrological reasoning behind Regiomontanus's concern with celestial configuration. Raz Chen-Morris and Feldhay examine the status of mathematics vis-à-vis the axis of the visible and invisible in the works of Nicolas of Cusa. As the volume deals with the influence of Islamic sources, there was a missed opportunity to consider Nicolas of Cusa's polemical *Cribratio Alkorani (The Sifting of the Qur'an)*, written at the behest of Pope Paul II, who features prominently in Bisaha's chapter.

Moving to the Islamic world, Sally Ragep provides an insightful overview of the *hay'a* tradition and the teaching and practice of astronomy more broadly. She argues that Ottoman institutions, crucial crossroads for scholarly exchange, have been overlooked in understanding the tradition of *hay'a* and its influence in the West. F. Jamil Ragep devotes his chapter to the transmission of the Tusi couple and its many versions, which appear in several different texts in Islamic and Latin manuscripts. After providing an overview of the extensive evidence in favour of Islamic influence, he

considers the issue of what counts as evidence for transmission. Given that scholars so frequently cite argumentative similarities and visual diagrams for the transmission of ideas within a single culture, he questions why it is so difficult to accept this same sort of evidence in cross-cultural contexts. This meta-level analysis of the “debate” about Islamic influence is a breath of fresh air in what has become a somewhat stale scholarly conversation. Robert Morrison’s final chapter provides an additional dimension of analysis by looking at critiques of Ptolemy within the tradition of homocentric astronomy among Jewish scholars, which links to Sylla’s project of identifying aspects of the *hay’a* tradition in European texts. He also identifies an additional path of transmission of the Islamic models via Jewish intermediaries.

All told, for an edited volume the authors have done a brilliant job condensing a multidimensional, multidisciplinary, and multicultural argument into a coherent account of the Islamic influences on Copernicus. I must note, however, the lack of attention in the volume to astrology, which was certainly more central to the Copernican context than the mathematical musings of Nicolas of Cusa. All authors in this volume mention the practice of astrology, but always in relation to predictive accuracy and the construction of tables rather than for the importance of explaining the physical configuration of the universe. As Shank notes, “the clue to Copernicus’s mathematical transformation” (106) appears in Copernicus’s handwritten notes in a copy of Regiomontanus’s *Tabulae directionum et profectioinum* and the *Alfonsine Tables*. Regiomontanus’s important astrological work was the first book of tables which provided values for two astrological points (*directio* and *profectio*), used for calculating the length of life, among other things. Lastly, given the focus on *scientific learning* in the title of the book, I expected to see more on teaching and universities. Sylla and Sally Ragep were the only contributors who treated science pedagogy in depth.

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Rosa Bruno-Jofré and Jon Igelmo Zaldívar, eds.

*Catholic Education in the Wake of Vatican II*

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The Catholic Church has a lengthy history of councils, starting with the Council of Jerusalem mentioned in Acts 15. Over that history there is a consensus that the Second Vatican Council (1962–5) represents something different. Normally convoked to settle doctrinal questions or other problems (my favourite is the Council of Vienne, 1311–12, which addressed the problematic Knights Templar), “Good Pope John” XXIII called for a council on the Church itself, with the goal of *aggiornamento*, or bringing it up to date with the modern world. Exploring new vistas for religious freedom, relations with other Christians and people of other faiths and—of importance to this collection, Catholic education—“Vatican II” addressed the theme of