

Richard K. Merritt*

Mathematics science and memory: Florentine painting and the origins of the experimental model during the Italian Renaissance

THE ORIGINS OF EARLY MODERN experimental science is oftentimes attributed to a constellation of scientific philosophies that emerge, coalesce and culminate during the sixteenth and seventeenth centuries.

This paper asserts that a new construct of the philosophical foundations of experimental science must be addressed. At the cornerstone of this approach is a re-examination of the role and development of the practice painting and its surrounding theories during the Fifteenth and Sixteenth centuries in Florence, Italy.

It is widely accepted that Filippo Brunelleschi (1377–1446), and Leon Battista Alberti (1404–1472) used the applied mathematics of masons and architects and the principles of optics to create the theoretical model for Linear Perspective, but it was the noted painter / mathematician Piero della Francesca (1412–1492) whose work *De Prospectiva Pingenti* would specifically apply these concepts to the practice of painting. With scientific theory in mind, the practice of painting begins a profound transformation.

Beginning with these developments we see two and a half centuries wherein painting parallels, mirrors and sometimes prefigures philosophical models of scientific practice. The work of painting during this period becomes an application of theory in the creation of an abstract construct (experiment) through a formal methodology (Linear Perspective and Projective Geometry). Central to the profession of painting during the Florentine Renaissance was the abstract construct / experiment that follows mathematical principles to replicate, in a controlled setting (the painting itself), the apparent qualities and attributes of nature.

The creation of an applicable theory effectively elevated painting from a manual to a liberal art. This evolution was linked to the artist's encounter with the sciences, engineering and mathematics in a fashion that directly concords with the practice of science during the Fifteenth and Sixteenth centuries merging; Memory and Classification, Calculation, Theory and Experiment, Philosophical Construct and Mechanical investigation.

This paper also covers the emergence of important treatises in Florence that contribute the development of "the science of painting" Ptolemy's *Geographica* (translated into Latin and published in 1406), the Aristotelian corpus, Augustinian traditions of Oxford and Paris, Renaissance Neo-Platonism of Marsilio Ficino, the memory practices of Giordano Bruno (*De umbris Idearum*) and the persistence of Medieval notions on the metaphysics of light. With particular attention to the availability of these works and ideas to artists, Mathematics Science and Memory: Florentine Painting and the origins of the experimental model during the Italian Renaissance argues that the humanistic intersection of scientific, mathematical literature and the theory and practice of painting propelled the development of the early modern experimental model and had profound influence on the subsequent thinkers such as Galileo Galilei (1564–1642).

The author seeks to broaden the philosophy of science as it pertains to Renaissance Italy, viewing the concurrence of painting, mathematics, science and engineering in the formation of the early modern scientific method.

Piero della Francesca's (1412–1492) *De Prosepectiva di Pingenti*, Leon Battista Alberti's *Della Pittura*, Pacioli's *De Divina Proportione*, as well as the paintings of Piero Della Francesca, Masaccio (1401–1428) and Leonardo Da Vinci (1452–1519) will be substantially addressed.

* Luther College, Decorah, Iowa, USA; email: merritri@luther.edu.