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COMPS Proposal
Advisor: Prof. Morse
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COMPS Proposal

Today, our world is saturated with images. This is especially true in modern science textbooks. A biology textbook is littered with microscopic photographs of cells, while a question in a physics textbook may contain an accompanying picture that illustrates the forces of gravity on a ball rolling down a ramp. But in order to understand the last example, you would need to know how to read the scientific illustration: what is the angle and height of the ramp, or the perspective taken in the picture? The different parts of the illustration may be labeled with a or b or c in order for the question to make sense. Thus, the accompanying text and a number of cultural assumptions allow you to comprehend the image and the information it contains.

For my integrative exercise, I will explore the ways in which the Early Modern Early Modern book integrated illustrations by focusing on a selection of architectural and engineering texts from roughly 1450 to 1600. The book as a whole, and the illustrations in particular will be the focus of my inquiry. Why were illustrations included in these “technical” texts, and what was the importance of visual information for the Early Modern engineer or architect? In order to answer this larger historical question, I will investigate the anxieties expressed about using images, the relationship between prose and image, what audience was the illustration intended for, and if there were any differences between illustrations that were drawn and printed. This project will be predominately a work of intellectual history that examines how information was documented and communicated,

but also delve into the cultural history of how books — and the images inside them — were created by authors and consumed by the readership.

The illustrated book was by no means an invention of the 15th and 16th century, but it did become increasingly widespread during this period.¹ The creation and dissemination of the printing press played a large role in this development. Instead of having to copy books by hand, the printing press made it much more affordable — both in time and financial resources— to reproduce books. This is especially true for images. Instead of drawing each illustration by hand on each page, a wood or copper plate could be carved and then used to create theoretically an infinite number of prints. Furthermore, before the printing press, authors could be reasonably certain that their words would be copied faithfully, but illustrations could often be misinterpreted or badly drawn by an untrained hand. This is especially important for technical drawings, which relied on a visual understanding in order to comprehend the mechanical invention or design.

The primary sources for this project will draw specifically from architectural and engineering texts. I selected these texts because of their unique reliance on image — each contains a wealth of illustrations (often a hundred or more). Additionally, all these sources were widely printed and read in the 15th and 16th century. I already have familiarity with some of the texts from my previous research. For example, last winter, I worked with Victoria Morse and wrote a paper that explored how Agostino Ramelli's *Various and*

¹ Luisa M. Dolza comments that “illustrations became increasingly popular, and publishers began discovering new and improved methods for the reproducing illustrations alongside texts. The illustrated book, which was ever more attractive and affordable had become...a cornerstone of religious and cultural life of the period, in Luisa M. Dolza, “Reframing the Language of Inventions: The First Theatre of Machines,” in *The Power of Images in Early Modern Science*, ed. Wolfgang Lefèvre, Jürgèn Renn, and Urs Schoepflin (Basel: Birkhauser Verlag, 2003), 89.

Ingenious Machines (1588) was produced for both a technical, practicing audience, as well as the curious courtier or nobleman who was interested in learning more about technology. In a similar thread, my 395 paper looked at how machines — ranging from the water mills to the fountain to the astronomical clock — were described in a variety of Early Modern travel literature. I concluded that the fascination with machines originated from the ways in which the technology blurred the ontological lines of nature and the artificial. These projects reflect my interest in the history of science in the context of Early Modern Europe. I envision my comps project as continuing this previous work, but expanding to new primary sources and different research questions. While the other projects were only tangentially concerned with the illustrations, this project will focus on how the machine (or building) is described through visual means.

More specifically, I have narrowed my inquiry to six primary texts that rely heavily on illustrations. Of the six sources, three are architectural texts, while the other three are engineering. I am looking at both bodies of literature because they incorporate a large number of images and, I will also suggest, that they use illustrations in similar ways. Furthermore, while these two fields are separated today, the *ingegnere* figure of the Renaissance would have claimed expertise in both engineering and architecture.² The professional and epistemological categories that we use today are not always applicable to

² Samuel Edgerton comments that “both Filippo Brunelleschi, the architect, and Leonardo da Vinci, the painter, considered themselves *ingeneri* first and “artists” in our more familiar self-expressive sense only secondarily. The profession of *ingegnere* was much honored in the Renaissance because it descended from Archimedes, Philon, and Hero of Alexandria; in Samuel Edgerton, “The Renaissance Development of the Scientific Illustration,” in *Science and the Arts in the Renaissance*, ed. John Shirley and David Hoeniger (Washington: Folger Shakespeare Library, 1985), 172.

Early Modern Europe. Nonetheless, I will be attuned to differences that may arise between the architectural and engineering texts.

Crucially, all the primary sources are translated into English from Latin, Italian, or French. I have some reading ability in Italian and French. Time permitting, I will attempt to read important excerpts in their native language, but will always have an English translation to consult and compare with my own translation. Additionally, the translations will not always be faithful to the placement of the illustrations in the book; therefore, I will supplement the printed translations with digitized originals to discern any significant differences in organizational structure.

To supplement this project, there is a substantial body of scholarly literature that pertains to my research questions. In his article *The Role of Visual Representation in the Scientific Revolution: A Historiographic Inquiry*, Renzo Baldasso outlined the historiography from the 1940s until now.³ Baldasso traced how historians throughout the 20th century have sometimes privileged, and at other times dismissed, visual information when studying the 16th century and then the “Scientific Revolution” that followed thereafter. As early as 1955, George Sarton asserted that “the main evil of Renaissance science was its love of words; that evil was finally compensated and redeemed by the love of clear and good images.”⁴ Sarton is one of the earliest historians to draw an explicit connection between the developments in art and science during the Renaissance. In 1978, Samuel Edgerton continues with this theme in an article titled *The Renaissance Development of the Scientific Illustration*. Edgerton boldly claimed that “at its best, the Renaissance scientific picture

³ Renzo Baldasso, “The Role of Visual Representation in the Scientific Revolution: A Historiographic Inquiry,” *Centaurus* 48: 69-88.

⁴ George Sarton, *Appreciation of Ancient and Medieval Science during the Renaissance, 1450-1600* (Philadelphia: University of Pennsylvania Press, 1955), 95.

gave precise information about the physical world not only without the need of explanatory texts but without the need of the viewer to refer to the actual objects depicted.”⁵ Edgerton examined a number of European scientific texts to decipher the “grammar and syntax” of the illustrations, and concludes that they were important conveyors of technical information.

More recent scholarship complicates earlier historiography that concluded the illustrations were the triumph of science and rationality. For example, Bert Hall criticizes Edgerton for erasing the boundaries between technology (machine design and architecture, for example) and scientific disciplines like physics, biology, or astronomy.⁶ Furthermore, Hall titles his article *The Didactic and Elegant*. As suggested by this title, he concludes that illustrations in scientific books not only communicated information, but also were meant to be aesthetically pleasant. At times, these motivations could compliment one another and, in other moments, could be contradictory. This, he argues, was certainly the case for Agostino Ramelli’s book of machines.⁷ In an even more recent survey (2003), Wolfgang Lefèvre sought to explain what “cognitive functions” illustrations had for their designers and the audience of the text.⁸ Lefèvre distinguished between illustrations that were “pictures,” which showed a view of an object from a certain perspective, and “plans,”

⁵ Edgerton, 169. I believe Edgerton oversteps his evidence in making this claim. Most technical illustrations from this period relied heavily on either textual information or prior expert knowledge.

⁶ Bert Hall, “The Didactic and the Elegant,” in *Picturing Knowledge: Historical and Philosophical Problems Concerning the Use of Art in Science* (Toronto: University of Toronto Press, 1996), 27.

⁷ Hall wrote that Ramelli “wishes to display a catalogue of whole machines and to show how each works, but this is blended with the goal of showing these contrivances in a manner that pleases and delights while instructing,” 34.

⁸ Wolfgang Lefèvre, “The Limits of Pictures: Cognitive Functions of Images in Practical Mechanics - 1400 to 1600,” in *The Power of Images in Early Modern Science*, ed. Wolfgang Lefèvre, Jürgen Renn, and Urs Schöpflin (Basel: Birkhäuser Verlag, 2003), 69.

which attempted to provide a fuller view of the object and “avoid distortions whilst representing the spatial elements of the project.”⁹ Lefèvre concluded that most of the illustrations in the books were pictures, not plans.

But there still exists some holes in the existing scholarship. For example, Wolfgang Lefèvre notes that “little attention has focused on the significance that these drawing had, not for present historians, psychologists, and philosophers, but for the historical actors themselves, that is for the mechanics, engineers, and architects of that age.”¹⁰ This is the central question of this project: why did engineers include illustrations in their works, and how was this realized in the text.

A large part of this project will involve analyzing and using illustrations as evidence in the argument of my paper. Therefore, how I will “read” the illustrations is an important methods question that needs to be addressed. When looking at an image, I will ask what kind of information is the illustration communicating: do we see the inside of the building, is linear or orthographic perspective employed, and — just as important — what is not being shown in the depiction. These questions will be considered in order to answer my larger question of the function and significance of image in the book. I will be particularly attentive to moments when the prose alludes to the picture in any manner in order to understand the way that the illustration and text conveys information. Thus, this project is grounded in history, but also requires art history or at least a background in visual analysis. Last year, I took Art History II and then applied the classroom experience to the interpretation of art and architecture on the Carleton Rome program. This summer, I

⁹ Lefèvre, 70

¹⁰ Wolfgang Lefèvre, “Introduction,” in *Picturing Machines 1400-1700*, ed. Wolfgang Lefèvre (Cambridge, Massachusetts: MIT Press, 2004), 1.

researched and wrote labels for the exhibit *Mediterranean Rivers: Chained and Unchained*, which required critical and sustained analysis of book illustrations. The experience has inspired me to focus on the image as an important locus of historical study.

The project proposed will delve into a variety of fields. I will draw from the existing scholarship in art history, history of science, and cultural history to make a larger claim about the role of the illustration and book in Early Modern Europe. As every architect or engineer knows today, images are a crucial medium of communicating their ideas, but this was not necessarily the case in the 15th and 16th century.¹¹ By understanding why authors used illustrations during this period, we can begin to sense the ways in which images became powerful conveyors of information. It is my contention that by carefully examining illustrations we can understand the function of technical illustrations and how they were communicated to a curious, expanding readership.

Next Term's Classes:

- 1) *Bringing the English Past to (Virtual) Life* (HIST 235) - 2a
- 2) *Auditing Idoltary* (ARTH 323) - 5a

¹¹ In the conclusion of *The Didactic and the Elegant*, Bert Hall asks “what happened in the cultural shift from medieval to Renaissance modes of communication to enable pictures to be vested with intellectual authority,” 36.

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