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**REPRESENTING NATURE:
AGOSTINO SCILLA AND THE PAINTING OF KNOWLEDGE IN
SEVENTEENTH-CENTURY ITALY**

(very rough draft: please don't circulate without permission from the author)

In 1670, a curious treatise appeared in the city of Naples entitled *Vain Speculation Undeceived by Sense*. Written as a letter dedicated to Don Carlo di Gregorio-Cattaneo, a prominent Sicilian nobleman and founder of Messina's leading literary and scientific academy, the Accademia della Fucina (1639-78), *Vain Speculation* refuted the theories of an unnamed naturalist.¹ It argued a fairly novel thesis: that fossils were not creations made of stone but creations made in stone. Using fossil specimens from Malta, Sicily and Calabria, many of which were strikingly illustrated in twenty-eight engravings accompanying the text, the author, Agostino Scilla (1629-1700), provided copious evidence that the visual similarities between fossils and the living creatures they resembled were not superficial similarities but indications of a causal relationship between living and historic nature. Scilla's treatise, along with the earlier work of the Neapolitan lawyer-naturalist Fabio Colonna, the contemporaneous investigations of the Danish anatomist Nicolaus Steno and the Royal Society's curator Robert Hooke, and subsequent research by Martin Lister, Edward Lhywd, John Ray, and John Woodward, became the cornerstone of a new understanding of fossils as an important record of the earth's history.²

There are many noteworthy aspects of Scilla's interesting account of the fossil record in southern Italy and Malta. *Vain Speculation* is a marvelous example of the

sophisticated understanding of empiricism by the mid-seventeenth century, as a scientific methodology capable of generating a new understanding of the natural world in post-Galilean Italy. It also testifies to the impact of antiquarian studies upon natural history, further reminding us how two centuries of excavating, collecting, and debating the origins and meaning of ancient artifacts provided scholars with the skills to approach nature as a similarly historical record.³ Furthermore, *Vain Speculation* is a fine instance of the development of vernacular prose as a legitimate medium in which to write science. Scilla indicated his consciousness of the Tuscan style of writing science, first developed by Galileo and perfected in the mid-1660s by the members of the Accademia del Cimento in Florence and by the Medici court physician Francesco Redi, when he indicated his desire “to have written in a very Florentine manner.”⁴ Finally, *Vain Speculation* must be compared to Robert Hooke’s *Micrographia* (1665), as an outstanding and early example of a text that made scientific illustrations an active part of the argument for interpreting nature.

Scilla’s importance lies not only in how he interpreted fossils but also in how he depicted them. To paraphrase Martin Rudwick, Scilla played a crucial role in creating a “visual language” for natural history. By illustrating his text with gorgeous copperplate engravings, richly detailed and at times offering multiple viewpoints of a single fossil, he sought to persuade readers to see the fossil record differently.⁵ [Fig. 1] While naturalists had exhibited a self-consciousness about their use of images since the emergence of the illustrated natural history in print in the 1530s, arguing for the importance of depicting nature “from life” (*ad vivum*) to achieve the kind of verisimilitude that made an image a truly meaningful record of their observations, the woodcuts adorning most Renaissance

natural histories did not achieve this effect without being hand colored. Even Fabio Colonna's self-conscious experiments with copperplate engraving in his descriptions of plants and fossils between the 1590s and 1610s still failed to produce images that fully translated his drawings into prints that would be more powerful than words.⁶ The failure of images, as David Freedberg has so eloquently written in his recent account of the natural historical projects of the Accademia dei Lincei (1603-30), was one of the great paradoxes of natural history at the height of the Scientific Revolution.⁷ Scilla's *Vain Speculations* demonstrated how an illustrated natural history could indeed be persuasive at an entirely new level. Building upon the work of Colonna, who had argued strongly for the cognitive function of images, Scilla experimented with new ways to unify words and images of fossils.

Scilla's approach to visualizing nature could not have been more different than the most important geological treatise of his generation: Nicolaus Steno's vastly ambitious anatomy of the earth entitled *On Solids within Solids* (1669). While both had been inspired to reconsider the earth's history because of the puzzling origins of Maltese tongue-stones (*glossopetrae*), Scilla kept his focus on the details of fossils themselves. Seeing specific manifestations of nature's operations was his goal. By contrast, Steno sought to explain the entire system of nature, *stratum super stratum*. Based on data he collected in Tuscany, he conjured up the earth's mechanical and physical transformations. Steno's highly geometric diagram [Fig. 2], possibly inspired by his reading of Descartes, presented his argument about the organization and movement of the earth's strata in the simplest possible terms.⁸ His image of the earth made no attempt to depict an actual instance of the earth's stratification. Instead, it sought to illustrate the

general principles of stratification and sedimentation that would help to explain the environment in which fossils formed.

Steno grappled with the laws of nature written into the horizontal layering of the earth. Scilla instead invited readers to look closely at nature's remnants. He asked readers to see nature as he did, repeatedly underscoring the uniqueness of his vantage point. As he reminded his patron Don Carlo di Gregorio in the preface to *Vain Speculation*: "remember that this is a composition not by a scholar but by a painter who nonetheless pretends to have an eye for judging things that we can manage with greater truth than those who are mere professors of blind speculations."⁹ Years later, Leibniz would fondly recall his encounter with Scilla in Rome in 1689-90 as an important touchstone for his own work on fossils: his *Protogaea*, composed in 1691-93 but unpublished until 1749. Discussing similarities between Maltese and Lüneburg tongue-stones, Leibniz invoked the authority of the naturalist who in his mind has most definitively established that tongue-stones were fossilized shark's teeth: *Scylla pictor*.¹⁰ "Scilla the painter" had given him the insight he needed.

"I AM A PAINTER"

Scilla indeed was an important painter in Messina during the mid-seventeenth century, the founder of a school of painting which included his brother Giacinto and his son Saverio. Celebrated in his own lifetime and prominently featured in histories of Sicilian painters in the eighteenth and early nineteenth centuries, he has only recently begun to receive the attention he deserves from art historians. Scilla, a notary's son, initially studied with the painter Antonino Barbalunga in Messina in the 1640s. Barbalunga,

himself a student of Domenichino, was so impressed with his work that he petitioned the Senate of Messina to provide his young pupil with a state stipend. In 1647, the teenage Scilla made the pilgrimage to Rome where he apprenticed for five years in the workshop of Andrea Sacchi (1599-1661), one of the most prominent classical painters in Baroque Rome, best known for his famous fresco of *Divine Wisdom* (1629-33) in Palazzo Barberini which has often been interpreted as a meditation on the relationship between the Barberini family and Galileo during the trial as well as an obvious homage to Raphael's vision of *Parnassus*.¹¹ There Scilla copied antiquities and the works of Renaissance artists such as Raphael and enjoyed contact with leading Roman virtuosi. We must also assume that he came into contact with the Roman scientific community which, as the case of Cassiano dal Pozzo (1588-1657) and his patron Cardinal Francesco Barberini (1597-1679) illustrates so well, was intimately intertwined with the city's thriving community of artists and their patrons.¹²

At the height of his career in Sicily, from 1651 until 1678, Scilla was greatly in demand for his religious paintings, portraits, landscapes, and still lives. His commissions not only took him inside the churches and noble palaces of his native city but throughout Sicily (Palermo, Siracusa, Caltanissetta) and Calabria. He continued his work as a painter after his flight from Messina during the anti-Spanish revolts in March 1678. Several paintings survive from his brief residency in southern France and Turin.¹³ From 1679 until his death in 1700, Scilla lived out the remainder of his years in Rome, the city that had first inspired his youthful ambitions to be a painter and scholar on a large canvas. He became an important member of the Accademia di San Luca and a close associate of one of the leading lights of Roman painting, Sacchi's most famous disciple Carlo Maratta

(1625-1713). Scilla's association with the intellectual and artistic circle of Queen Christina of Sweden and his success in gaining the patronage of influential cardinals such as Giovanni Imperiali, Neri Corsini, Giorgio (?) Spinola, and Giovanni Francesco Albani (Clement XI, 1700-21) probably played a role in his admission to the Confraternity of the Virtuosi del Pantheon in 1680.¹⁴

Many examples of Scilla's work exist today, though there is still no major artistic study of him to consult since those written in the eighteenth and early nineteenth centuries.¹⁵ A number of others – quite appropriately given his fascination with the transformative power of nature – have been destroyed in the various earthquakes that have convulsed Sicily and Calabria over the centuries. Those that remain, such as his 1660s painting of *Saint Benedict Ordering the Destruction of the Idols* [Fig. 3], suggest that Scilla had absorbed well the lessons about classical style that he learned in Rome.¹⁶ The theme of this particular image, the destruction of pagan knowledge, undoubtedly appealed personally to Scilla. He was a passionate collector of antiquities, especially Roman coins, and wrote a treatise entitled *One Hundred Sicilian Cities Described with Medals* that he never published.¹⁷ Scilla alluded to this work in his *Vain Speculation*, writing: “my private intellect is devoted entirely to ancient medals.”¹⁸ Returning to Scilla's portrait of Saint Benedict, we can see the loving attention that he gave to fragments of broken antiquity in the foreground, remnants of a past that Scilla himself studied in Rome and collected in Sicily and Calabria.

Scilla's antiquarian interests played an important role in his decision to write a treatise on fossils which he described as being “an interlude in the pleasing exertion of medals.”¹⁹ Recent studies of other seventeenth-century naturalists have highlighted the

close connections between antiquarianism and natural history.²⁰ Antiquarianism was a discipline based strongly in physical evidence. Its practitioners developed finely honed skills that they used to discern authentic from forged antiquities, and to place objects in a precise moment in the past, in essence, writing ancient history from artifacts. In the midst of his discussion of the variations in fossil specimens, Scilla drew upon his numismatic skills to underscore the point that diversity was part of the historical record. “What’s more, anyone who has experience of ancient medals also knows how difficult it is to find even two medals, of the same emperor, on the same side and from the same time, that are cast from the same mint.”²¹ Human history, in other words, provided analogical confirmation of rule of natural history: no specimens were ever exact duplicates, making the differences between living animals and fossil remains far less puzzling than they might otherwise seem.

Despite the importance of his antiquarian’s eye to the study and understanding of fossils as historical artifacts deposited by nature in strata, Scilla did not foreground his skills as an antiquarian as the primary basis for his right to interpret fossils. After all, he presented antiquarianism as a product of personal interest – somewhat disingenuously given how well-respected and well-known Scilla’s activities as a student of Roman antiquities were. For example, Scilla possessed an important bronze tablet of a *Senatus Consultus* of Titus Livius that he donated to the great Roman antiquarian Raffaele Fabretti in 1699. The collection of papal coins developed and published by his son Saverio (1673-1748), which surely had its origins in his father’s collection, became part of the *Musaeum Christianum* founded by Benedict XIV and eventually the Vatican Museum.²²

While underscoring the importance of antiquarian skills for excavating nature's archeology, Scilla nonetheless placed great emphasis on his public persona as the basis for his authority to interpret nature.²³ Emphasizing his professional identity as a painter, he argued that the painter's eye gave him the kind of probing insight into nature – an ability to see things better – and the essential skills for transforming experience into science through his ability to both describe and represent nature accurately. This essay will address two principal questions: How did Scilla present his work as a painter as the basis for his scientific authority? What previous work by painters and natural philosophers in Renaissance Italy may have inspired him to see painting as the most scientific of all professions?

Both questions speak to a more fundamental issue underlying the significance of Scilla's work in illuminating our understanding of the ways in which the history of art and the history of science have intertwined in the past. In order to understand Scilla, we need to understand painting not simply as an artistic effect but as a deeply theorized kind of knowledge in late Renaissance and Baroque Italy. Scilla's comments allow us to see how painting was theorized as a science, not in the context of an instructional treatise addressed to painters and their patrons, but in a scientific treatise addressed to the community of scholars engaged in studying nature.

Since few of Scilla's paintings have been well reproduced (or reproduced at all), understanding the connection between his paintings and his natural history is still a work in progress. Numerous biographies tell us that Scilla was known for his "landscapes, animals, flowers, fruits, and similar things in which he was considered singular." Others praised his skill at depicting hunting scenes, on land and on sea.²⁴ Most recently,

Maurizio Marini has interpreted one of Scilla's still lives in a private collection in Pavia – a hunting scene of hares and avocets observed by a watchful owl – as an example of his natural philosophy. Arguing that the owl's nocturnal vision, like the eye of lynx made famous in the imagery of the Accademia dei Lincei, proclaims Scilla's insight into nature, he presents it as an interesting example of the sort of painting that gave Scilla the reputation as the “painter-philosopher.”²⁵

Scilla's strongest statement of his own understanding of the painter's knowledge comes from one of his self-portraits. In the painting at the Museum of Fine Arts in Boston – described by its cataloguers as a *Portrait of an Artist* and probably a painting of his master Sacchi but most certainly, as Sicilian art historians have written for some time, a *Self-Portrait* painted shortly after the publication of *Vain Speculation* – Scilla portrays himself as a man of authority, skill and learning. [Fig. 4] The book in Scilla's hand – quietly likely his fossil treatise – is as prominent as his paintbrush and palette. The papers and inkwell suggest a man of letters. It is his homage to Nicolas Poussin's first *Self-Portrait* (1649) in which he has one hand resting on a book that many considered to be his unpublished Leonardesque treatise on light and shadow, while the other hand holds a pen. Scilla's first residency in Rome coincided with the French painter's return to the Eternal City. Poussin's close association with Cassiano dal Pozzo and, to a lesser degree, Sacchi makes it easy to envision the multiple opportunities in which Scilla could have seen and absorbed Poussin's image of the painter as a philosopher.²⁶ In this painting of the 1670s Scilla presented himself as a learned artist, a scholarly participant in the republic of letters whose words and images were authoritative.

In his *Vain Speculations*, however, Scilla did not capitalize on the image of the learned artist explicitly. In a famous passage, he described himself as follows: “I am a man of this world, nude of learning.”²⁷ Scilla regaled readers with his travels in the hills near Messina and beyond Reggio, and with encounters with peasants who came bearing sackfuls of fossils to his doorstep. He laughed at the philosophers who knew less about the making of fossils than the fishermen in the port of Messina who took him to the caves nearby. Repeatedly, he reminded his audience that he was “ignorant and a painter.”²⁸ He begged them to excuse him for not even writing in good Tuscan, let alone Latin.

Lest anyone take Scilla’s claims of humility too seriously, we should remind ourselves that *Vain Speculation* bristled with Latin quotations from ancient and modern authors which he did not bother to translate for an unlearned readership. Seneca, Strabo and Lucretius all provided the ingredients for his epistemology of the senses. Encountering a “mountain ... of snails and shells” above Reggio had sparked Scilla’s interest in the nature of fossils. But it was reading a passage from Strabo’s *Geography* on this same subject in his library in Messina that led him to a sustained investigation of the fossil question.²⁹ In practice, Scilla aligned himself with a new kind of humanist scholarship that did not reject ancient learning but bound it more closely to the idea of personal experience.

Scilla did not provide readers solely with the evidence of his senses in making an argument for the organic origins of fossils. He quoted liberally from earlier authors such as Girolamo Fracastero and Fabio Colonna, who had anticipated parts of his thesis in the proceeding century. He displayed his mastery of the fossil literature by citing, less approvingly, the works of Renaissance naturalists such as Ulisse Aldrovandi, Girolamo

Cardano, Michele Mercati, and Ferrante Imperato. He saved his greatest scorn for the more recent writings of contemporaries, most notably the Jesuit Athanasius Kircher's *Subterranean World* (1665), which argued that fossils were primarily a product of nature's "plastic virtue."³⁰ Scilla borrowed parts of his methodology from recent French authors – Gassendi, Descartes, and Mersenne – and from Galileans such as Giovanni Ciampoli.³¹ In other words, Scilla was as well informed as any naturalist of his time on the history of the fossil controversies and on questions of methodology.

Scilla's identity as a painter served several important functions in the development of his argument. First, it provided him with the rhetorical ingredients to contrast "vain speculations" with "sense," book learning with experience. As an artist, Scilla designed all of the images to accompany his text. We can see the frontispiece as a personal statement about how to conceptualize a painter's knowledge. [Fig. 5] In it, Vain Speculation appears as an ethereal and incomplete figure. Her incompleteness evokes Scilla's comments about fossils that, over time, also lost their limbs. Her hair, curling repeatedly backward into the shape of an elongated cumulus, brings to mind the remarks of the Turinese writer Emanuele Tesauro who, in his *Aristotelian Telescope* (1654), a text Scilla quite likely knew, described clouds as able to shape and reshape themselves to form "jokes of nature" – the very term Scilla's opponents used to describe fossils.³²

While Scilla's Vain Speculation is an unpredictable shape-shifter, his image of Sense is that of a young artist, quite likely the god of painting Mercury, who bears the eye of reason. He is a solid, earthly figure who lifts up a fossilized echnoid for inspection, while gesturing to numerous other specimens on the ground below. His completeness underscores Scilla's sense of the artist as someone who reasons through

experience, and who defines sight as the most important of the senses. The artist, in other words, is the very prototype of the model observer, capable of interpreting nature well.

“I KNOW MY EYES”

The words with which Scilla composed his treatise left no doubt as to the significance of experience. He consistently privileged sight over all the other senses, as when he wrote: “I would like the eye to have more force in deciding the things that it receives.” He strove to persuade readers that he wrote “only of the things I have seen and that we can see together.”³³ Although Scilla emphasized the importance of having a predominantly skeptical approach to knowledge, he reserved some measure of certainty for the evidence of sight. In the case of the organic origins of fossils, he proclaimed, “Experience makes me certain of it, having a continuous testimony of it in view.”³⁴ Lest readers wonder what experience defined, Scilla provided a definition that he borrowed from Galileo’s friend Ciampoli. “A simple demonstration of things.”³⁵

Scilla’s insistence on the simplicity of nature was both an artistic and scientific principle. His classical style of painting also provides evidence of an emphasis on a decidedly Galileian aesthetic. Galileo, as Eileen Reeves observes, had no great love of the Mannerist style of representation that reached its apogee in court art of painters such as Giuseppe Arcimboldo and in the decoration of early seventeenth-century palaces, churches and convents in many Italian cities.³⁶ Scilla shared this view. He associated this way of depicting nature with the kind of science practiced in the court of Rudolph II in Prague by figures such as the Hermeticist Oswald Croll. Citing Croll’s detailed

formulation of the Paracelsian doctrine of signatures, that made the principle of imitation a central feature of nature's operations, Scilla wrote:

Oh Lord, I knew that he sees in plants that design that other will never see if they have eyes. I am a painter. I swear, as a simple man, that a most horrible figure would be composed if its members were formed to correspond to this herb or that, as Croll describes them conforming to the parts of man.³⁷

This image of nature, he emphasized, epitomized the excesses of the imagination in art as well as science.

Scilla mentioned Croll but I am convinced that he had another, more recent author in mind: Athanasius Kircher. In 1670, all of learned Europe was still talking about the appearance of Kircher's vastly ambitious account of nature, the *Subterranean World*.³⁸ Kircher, as some of you may know, was a late and especially interesting exemplar of Renaissance polymathy. He believed firmly in every traditional theory of the world, while liberally updating ancient ideas with modern tools and techniques of scholarship. One of those theories concerned the origins of fossils, which he believed were "jokes of nature."³⁹ Kircher also did not make his argument with words alone. In his richly illustrated encyclopedia, he included a particularly interesting image which surely must have been on Scilla's mind. [Fig. 5] Entitled "The Works of Nature the Painter," it depicted the interconnections of the three kingdoms of nature and the world of man in the replication of imagery. Lamb-plants, mysterious earthen seals, fossils, an even a vast anthropomorphic landscape stolen from a sixteenth-century Flemish artist all made

Kircher's argument that nature was an artist who painted the world in mysterious and often surprising brushstrokes.

The misuse of painting as a metaphor for knowledge deeply troubled Scilla. He wrote, with great irony, that he understood well how blemishes might appear on stones but not how "a human face that resembled a tree" could lie hidden in rock.⁴⁰ Instead, he sought to demonstrate the importance of painting in training the eye to see nature with care. He, too, believed that nature was the product of artistry.

Whereas Arcimboldo, Croll, and Kircher emphasized the importance of resemblance, transforming nature's accidents into meaningful causal relations, Scilla argued that nature's artistry was orderly and historical. Attacking accounts of the island of Malta – not only Kircher's but his disciple Giovan Francesco Buonamico's *Trattato delle glossopetre di Malta e di Gozo* (1668) – as a volcanic island that had existed in the same condition since God made it, Scilla argued instead that Malta had emerged in a series of natural transformations over time. As the sea receded, layers of fossils appeared. To make his argument persuasive, he offered a visual analogy:

And if we observe well the progress of a painter and a sculptor, we realize that first they sketch and hew everything, and that the last strokes will be the most beautiful and most assured. And if this is true, consider the operations of the Great Artificial Creator who colored this world perfectly with a beautiful light, and who sculpted it marvelously with his omnipotent right hand. We must admire this island as one of the strokes reserved to the power of God, who intended to beautify the most noble part of the great body of the

earth with a lively and clarifying light.⁴¹

Rather than being the first creation of God, Malta was the last and most wondrous part of nature to appear and, as a result, the most historical. It provided proof that nature's artistry was a dynamic rather than static record of the world.

Addressing himself to the most skeptical reader, Scilla recommended that they peek inside the artist's sketchbook to see how dynamic nature could be. Critics of the organic theory of fossils had often noted the dissimilarities between fossils and living specimens. Scilla adroitly observed that living nature was not uniform. He offered the example of the human face:

Even though we are all of one species, we, in fact, vary in respect to our faces and limbs. Indeed, with age, we differ from our [earlier] selves. The same can be said of animals and fruits that are cultivated on the same tree. I pretend to be assured in one grasp of my experience of grapes, but if I need to paint them at times, I am forced to make a specific picture down to each seed.⁴²

Scilla constantly strove to persuade readers that painters had unique insight into the variety and complexity of nature because they sought to capture it on canvas. They possessed the secrets of nature through their attempts to observe and replicate them. In Scilla's understanding, nature and a painting were equivalent productions, giving the artist unique insight into the original act of Creation.

At another point in *Vain Speculation*, Scilla described breaking open pieces of fossilized coral found in the hills to prove that the pale, stony exterior hid "a certain embodied tincture that assures us that it was colored red, like all of its species."⁴³ Color,

texture, and form were all the domain of the painter, as was its evolution from nature's rough sketch to the final product. Through brilliant use of the ordinary example, Scilla helped his readers to see that nature itself was not the alchemy of the canvas, as Kircher argued, but a painting with a history.⁴⁴ Restoring that history would restore the stages in nature's development.

“MEN OF STONE”

Understanding the internal workings of Scilla's argument about the authority of painters in scrutinizing nature begs the question: where did he get his ideas? In Messina, Scilla associated with an academy that included luminaries such as the mechanical philosopher Giovanni Alfonso Borelli (1608-79) who, after eleven years in exile for his anti-Spanish sympathies, returned to Messina with great fanfare in 1667 until the events of 1678 also forced a second departure. Borelli's account of the March 1669 eruption of Etna, published in the same year as Scilla's *Vain Speculations*, furthered the assault on Kircher's *Subterranean World* from this corner of Italy by negating the idea of eternal mountains and perpetual subterranean fires with ample evidence from Etna's lava flow and changing morphology.⁴⁵ It offered a far more radical specter of a dynamic nature in which the extinction of volcanoes might be but a prelude to the end of the earth. Such questions may have been on Scilla's mind but he prudently did not voice them in his text.

During the 1660s Scilla also became acquainted with one of the greatest anatomists of his century, the Bolognese physician Marcello Malpighi (1628-94) who was professor medicine at the University of Messina from 1661 until 1666 and the first Italian to be admitted to the Royal Society (1667). Malpighi's microscopic investigations

of humans, animals, and plants yielded numerous discoveries during this decade, beginning with his discovery of capillaries in a frog's lung in 1661.⁴⁶ His science was all about the details. Scilla's use of a microscope to examine fossils was probably inspired by contact with Malpighi who continued to be in contact with Scilla after returning to Bologna. Writing their mutual patron Don Antonio Ruffo in 1670, Malpighi noted with pleasure the arrival of "many curiosities" from his friend the painter and expressed the wish that others would follow. He also alluded to the imminent publication of *Vain Speculations*: "I am anxiously awaiting the things that he is publishing in order to enjoy his most honored efforts."⁴⁷ Unfortunately, we do not know (at least as my research has uncovered so far) what his opinion of the book was once it had appeared.

As this brief discussion of Scilla's life implies, he was no marginal figure in either the scientific or artistic world of this period. Messina was a thriving community for both endeavors in the 1660s with strong connections to multiple communities beyond Sicily: Rome, Florence, Bologna, Spain, and eventually France during the brief and unsuccessful efforts of Louis XIV to support the uprising against Spain. To this list we must also add Palermo, home of Scilla's closest associate and collaborator in his endeavors, Paolo Boccone (1633-1704), who had originally studied botany in Messina with Pietro Castelli, author of an unpublished *De insectis* that Scilla is said to have illustrated.⁴⁸ Boccone regularly traveled between Tuscany and Sicily as botanist to the Medici Grand Duke.⁴⁹ He was the crucial intermediary between the Maltese physician Giovan Francesco Buonamico, defender of Kircher's theories but admirer of Scilla's talent as a fossil-hunter, helping them to exchange letters as he traveled from island to island.⁵⁰ He may also have been the conduit for Scilla's knowledge of the work of the Tuscan naturalist

Redi. Boccone's work would ultimately play an important role in publicizing Scilla's ideas. Reviewing Scilla's associations in the 1660s, we must conclude that he not only belonged to a thriving community of observational naturalists, training by such luminaries as Castelli, but also enjoyed more immediate associations with a group of Galilean physicians and philosophers in Sicily whose work not only recalled the important research of the now defunct Accademia del Cimento (1657-1667), of which Borelli had been a member, but also, thanks to Malpighi's presence, demonstrated the fruitfulness of Galilean methodology in such realms as anatomy and physiology.⁵¹

How might a mid-seventeenth century understanding of Galileo have inspired Scilla's own natural history? As disciples of Galileo such as Viviani began to fashion a posthumous image of the famous scientist, an important part of his legacy regarded his reputation as a scientist in command of the arts of painting. Galileo had indeed been a member of Florence's Accademia del Disegno and was an accomplished enough draftsman to execute his own lunar sketches.⁵² He frequently analogized the relationship between the good painter and the good scientist, both of whom drew from nature. In June 1612, he offered a definition of painting to the painter Lodovico Cigoli, writing, "By painting, one intends that faculty that imitates nature with light and dark."⁵³ Galileo had no doubt of the superiority of painting to sculpture, which did not have to feign shadows.

In 1654, Vincenzo Viviani completed the first draft of his *Life of Galileo* for Leopoldo de' Medici. This important manuscript, surely known to Borelli, reinforced the image of Galileo the painter. Viviani praised Galileo's great artistic talent, letting readers know "that he himself often said to friends that if at that age it had been in his power to chose his profession, he would surely have chosen painting." Viviani further emphasized

Galileo's inclination towards painting by describing him as such a connoisseur that leading artists such as Cigoli and Bronzino preferred "his judgment of painting and drawing" to their own.⁵⁴

Did Scilla know this manuscript? This is a very hard to determine since he never mentioned Galileo or Viviani by name in *Vain Speculations*. Few Catholic writers cited Galileo directly in the decades immediately following the condemnation of 1633. Nonetheless, Scilla's references to Ciampoli, Redi, and the Cimento, and his associations with Tuscan scientists suggest that he would have been familiar with Galileo's views on painting and his reputation as an artist. He also invoked the power of that most Galilean instrument, the microscope, to demolish ancient theories of fossils. In an account of fossil echnoids, he brought forth the animal from the stone before the eyes of his readers with an excellent illustration. [Fig. 6] In the accompanying text, he wrote: "the observations of the tiniest little nipples that covered the entire body occurred with the help of a little eye-glass (*occhialetto*), that offers evidence that it was covered with the subtlest spines."⁵⁵ The eyes belonged to the painter, but the instrument was the work of a scientist. Scilla suggested that both perfected the study of nature.

Behind Galileo lay another important model for Scilla: the fifteenth-century painter, scientist and engineer Leonardo da Vinci. Readers of Leonardo's manuscripts will recall that Scilla was not the first artist to reconsider standard interpretations of the fossil record. He was preceded almost two centuries by Leonardo. Stephen Jay Gould made this subject the leading essay of his book, *Leonardo's Mountain of Clams and the Diet of Worms*.⁵⁶ We should revisit the essential details of Leonardo's own curiosity about fossils to consider the degree to which Scilla's own account of his discovery of the

true nature of fossils echoed this earlier instance of an Italian painter interpreting the natural world.

One day during the 1490s, peasants brought “a large sackful” of “shells and corals full of holes, still sticking to the rocks” from the mountains of Parma and Piacenza to Leonardo’s workshop in Milan.⁵⁷ Fossils became an important subset of Leonardo’s investigations of water. In the *Codex Leicester*, Leonardo devoted an entire section to refuting both neoPlatonic and Noachian accounts of the fossil record. His observations of living bivalves led him to conclude that they moved too slowly to arrive on mountain tops on their own, and that they arrived in too varied a fashion to attribute the result to one cause. He noted the layering of fossils in “stratified rock” and concluded that neither nature’s plastic virtue nor violent upheavals would have produced such a result.⁵⁸ [Figs. 7-8] In brief, there are many similarities between Leonardo’s and Scilla’s explanations of the fossil record.

Scilla’s understanding of the authority of the painter closely echoed Leonardo’s own statements on this subject. Organizing Leonardo’s writings on painting in the late sixteenth century, the Milanese painter Francesco Melzi created the following heading for one section: “The Painter is Lord of All Types of People and Things.”⁵⁹ Leonardo had many things to say about the primacy of the eye among the senses and was adamant about the superiority of painting over any other kind of art or science. In his *Treatise on Painting*, he wrote: “Painting presents the works of nature to our understanding with more truth and accuracy than do words or letters.”⁶⁰ He repeatedly indicated his distaste for what he called “speculative sciences,” priding himself on his reputation as a man of

the world, *omo senza lettere*.⁶¹ All of these statements correspond closely to Scilla's argument about "the ample privilege I enjoy as a painter."⁶²

How might Scilla have gained access to Leonardo's notebooks? Most, after all, were in Milan where he does not seem to have had any direct contacts. During the 1630s and 40s, however, Rome became an important center for the revival of Leonardo studies, principally in the figure of the virtuoso Cassiano dal Pozzo. Manuscript copies of fragments of Leonardo's *Treatise* already were in circulation in Italy by the 1580s and 90s. It is quite likely, for instance, that Galileo had access to copies in Florence and Padua.⁶³ In 1640, a complete version of the *Treatise* was found among the books in the library of the deceased duke of Urbino, Francesco Maria della Rovere, that were now in the possession of the Barberini family. While the manuscript, known today as the Codex Barberinus Latinus 4304, did not find its way to the Vatican Library until 1657, it became the basis for the published edition of the *Treatise* which appeared in print in 1651. [Fig. 9] Scilla was in Rome during these crucial years, as a young pupil of Sacchi and in the orbit of such key figures in the Leonardo project as Dal Pozzo and the illustrator of the manuscript upon which the printed *Treatise* was based: no other than Poussin.⁶⁴ It is impossible to imagine that he did not know of this great editorial project and did not have access to either a manuscript or printed copy.

It takes no leap of faith to image Scilla as a reader of Leonardo's *Treatise*. Leonardo's statements on the painter's insight into nature must certainly have been a stimulus to his own visual epistemology. **[Will add more specific passages later to make this tighter]** But nowhere in this work did Leonardo discuss fossils. Certainly Scilla's interest in fossils was deeply indebted to the scientific climate of the 1660s, when

a number of influential naturalists reopened the debates about fossils. Yet I also am inclined to speculate that Scilla's insistence of the authority of a painter in interpreting the fossil record came from some knowledge of Leonardo's interest in this subject. Let us see how we might make this connection more specific. During the 1630s and 40s, copies of many Leonardo manuscripts made their way from Milan to Rome. In October 1634, Cassiano dal Pozzo reported his pleasure in these developments, saying, "only ample time is needed to extract all that we can from the labors of Leonardo's mind."⁶⁵ Among these manuscripts was Leonardo's *On the Motion and Measure of Water*, which today is known as Codex Barberinus Latinus 4332, only a few hundred acquisition numbers away from the Urbino manuscript of the *Treatise on Painting*.

Yet the key to all this lies in the history of the *Codex Leicester*, which is the treatise actually containing Leonardo's own observations of fossil shells on mountains. Where was it during the middle decades of the seventeenth century? Quite likely, in Rome, for that is where the painter Giuseppe Ghezzi (who attended Scilla's funeral) found it in 1690, when he acquired a chest that had belonged to the late sixteenth-century sculptor Guglielmo della Porta.⁶⁶ Perhaps it enjoyed a quiet existence in della Porta's possessions, unread by anyone after his death in 1577. Perhaps it circulated among the inner circle of Leonardo scholars in Rome, which does not necessarily mean that Scilla laid eyes on it. Yet Scilla was certainly back in Rome for its reappearance in 1690. He had been living there for over a decade and I would certainly like to think that he at least had the opportunity to leaf through the pages of this fabulous manuscript and recall his own efforts to reinterpret the fossil record.

Further research may yield a definitive answer to the mystery of Scilla's relationship to the Leonardo manuscripts. Indirectly or directly, he was certainly an heir to Leonardo. Scilla's self-description in *Vain Speculations* as a man without letters (*nudo di buone lettere*) leaves us with little doubt that he had read and understood the implications of Leonardo's presentation of the painter as *omo senza lettere*. Yet at the same time he could not escape, nor did he wish to evade the fact that he was far more learned than this great Florentine artist, a "painter-philosopher" in the manner of Raphael, Rubens, and most recently Poussin, who prided himself on his portraits of ancient philosophers, his learned biblical allegories, and his mythological paintings.⁶⁷

Scilla belonged to a moment in which a painter was not only able to observe nature but capable of producing books about it. To categorize such literature as "art" or "science," is to render it meaningless in the terms in which it was produced. He reflects the Baroque understanding of nature in all its complexities, and of painting not as a simple allegiance to a single school but as a perfectly rationalized response to all that came before him.⁶⁸ Scilla's fossils, in other words, were part of a series of experiments in visualizing the natural world that found their counterpart in his paintings of crustaceans and other marine life that are largely vanished today. To critique the aesthetic of Arcimboldo, for example, was also to unravel the philosophy of nature his paintings allegorized.⁶⁹ Making a new style of nature painting and creating a new interpretation of nature were different parts of the same project, even if the unique combination of events in the 1660s provided Scilla with some very specific reasons for demolishing the traditional account of fossils. As his most authoritative biographers

suggest, the publication of *Vain Speculations* did increase his authority as a painter and an antiquarian.⁷⁰

“ONLY THE OBSERVATION OF THINGS”

Scilla was one of the last scholars to believe that his work as a painter gave him special insight into nature. Within his own lifetime, the status of the artist as a purveyor of scientific truths underwent important changes. Having chosen to write *Vain Speculations* in Italian, he initially had a limited audience; in 1724, a Latin edition of his work translated by the great Corsini librarian G. G. Bottari appeared under the more sober title, *On Petrified Marine Bodies*, published together with Colonna’s earlier treatise on tongue-stones. Subsequent editions of Scilla’s work in 1747, 1752, 1754, and 1759 gave his ideas even wider currency.⁷¹ Those who bothered to read Scilla’s treatise in the 1680s and 90s found much to commend. Leibniz praised Scilla’s work as supporting his own theory of fossils, citing “the testimony of a learned painter” in his *Protogaea*. Boccone traveled to Paris and London, giving lectures which brought Scilla’s work to the attention of a broader audience. In 1696, William Wotton presented Scilla’s work before the members of the Royal Society.⁷² He did so with the malicious purpose of discrediting John Woodward, author of the influential *Essay towards a Natural History of the Earth* (1695), whom Wotton believed to be a plagiarist of Scilla.

What Woodward did not possess by theft, he acquired by more legitimate means. In 1717, he purchased Scilla’s specimens and his drawings in preparation for the thirty illustrations of *Vain Speculations*. Today they reside in the Sedgwick Museum in Cambridge, England, where they have been beautifully photographed by Rosamund

Purcell.⁷³ [Figs. 10-11] In compiling notes on Scilla's illustrations, Woodward had the following to say about Scilla's drawing of Table 19, Figure 2, which depicted a mass of shells encased in rock. "He took a little too much liberty in his Icon, there being several things in the Figure which are not in the Body," observed Woodward. "But indeed their Ill Usage and Exasperations of him, and his Zeal for maintaining his Argument, disposed him to take that Liberty in several other Particulars."⁷⁴

It is ironic to think of Scilla the painter being critiqued by Woodward the scientist for his enthusiasm in making the argument through images. In part, we must take Woodward's criticisms as a response to earlier accusations of plagiarism; critiquing Scilla was a means of distinguished his own work from that of his Sicilian predecessor. In part, we should understand this as the prerogative of a professional naturalist to claim greater expertise than a painter. Yet Woodward also had a point. As the recent collaboration of Rosamund Purcell and Stephen Jay Gould has shown, Scilla's images, indeed, often completed what the eye could not entirely see. [Figs. 12-13]

Should we take this as a failure of Scilla's emphasis on the senses? Not necessarily. Another important English naturalist, John Ray, had an entirely different reaction. Writing to Edward Lhwyd in March 1692, Ray offered the following review of *Vain Speculations*:

Agostino Scilla hath long dissertations on his draughts, but his pencil is much finer than his pen. He borrows most from Columna & Steno but his figures are originals very larger, many & excellent.⁷⁵

For Ray, the occasional exaggeration of Scilla's image served an important purpose: they indeed made the argument. Ray was also correct regarding Scilla's liberal borrowing of

words from recent authors. Yet the words Scilla reserved for his illustrations were entirely his own. Describing Table 12, Figure 1 in *Vain Speculations*, an image of a white Maltese rock encasing a shark's jaw so perfectly that one could still discern the roots of the teeth, Scilla described his effort to replicate it as "a most precise drawing."⁷⁶ Looking at his efforts today, we can see how his illustrations simplified what was, in reality, a difficult observation. [Figs. 13-14]

Describing his own discovery of the value of images in the decade after the appearance of Scilla's *Vain Speculations*, the English naturalist Martin Lister informed the secretary of the Royal Society, Henry Oldenburg, that he had come to a new understanding of the visual dimensions of his discipline: "Words are but ye arbitrary symboles of things," he wrote, "& perhaps I have not use ym to ye best advantage. Good Design ..., or ye things ymselves, wch I have all by me, would make these particulars much more intelligible and plain to you."⁷⁷ By the end of the decade Lister would outline his principles of illustration in the preface to the reader of his *Historiae animalium Angliae tres tractatus* (1678), strongly emphasizing the importance of close collaboration between scientists and artists so that the artist absorbed the rules and precepts of seeing scientifically. Praising his own illustrator Francis Place in 1682, he criticized those who did not understand the value of the artist's contribution to natural history: "Natural History is much injured, through the little encouragement, which is given to the Artist, whose Noble performances can never be enough rewarded; being not only necessary, but the very beauty, and life of this kind of learning."⁷⁸ It was Lister, after all, who would offer some of the most spectacular engravings of fossils for readers in the generation after Scilla. Further research might reveal that Lister and his colleague

Ray, who encouraged him to pay greater attention to images around 1670, had access to Scilla's treatise. They may have been inspired by its images, if not always in agreement with its content. Certainly the English community of naturalists was much better apprised of Scilla's work after a lengthy review of *Vain Speculation* appeared in the *Philosophical Transactions* in 1695, including the re-publication of several of his images, and a partial translation by William Wotton was published as an appendix to John Arbuthnot's further refutation of Woodward's account of the deluge.⁷⁹

We need to know a great deal more about how news of Scilla's publication traveled and to what degree subsequent depictions of fossils responded to it. Much like Galileo's moon maps, Scilla's fossil images helped to persuade readers of his argument.⁸⁰ After describing to his satisfaction how his specimens of a petrified animal vertebrae in Table 18 could easily be reconstructed to correspond to its living counterpart, Scilla directed his reader's attention to the accompanying engraving which depicts the vertebrae in a manner that brings to mind Leonardo's famous anatomical and machine drawings that also offered a visual anatomy of things by articulating each segment. Scilla's satisfaction with the effect as well as the explanation is unmistakable. "What more should we go looking for?"⁸¹ [Fig. 15] Like Leonardo, Scilla harbored the aspiration to create an image that would provide complete knowledge of an object to the point where words might become unnecessary. He sought to fully realize the visual program of post-Galilean science, and the scientific program of Baroque art, never doubting that he could replicate nature with a painter's eye.

¹The naturalist in question was the physician Giovan Francesco Buonamico, who had provided Scilla's with fossil specimens, especially tongue-stones, from Malta in the late 1660s. With the specimens, Buonamico had included a letter, dated 28 August 1668, stating his views on fossils, to which Scilla responded. A copy of the letter can be found in the Biblioteca Comunale, Palermo; see Corrado Dollo, *Filosofia e scienze in Sicilia* (Padua: CEDAM, 1979), p. 178n2. It was also later published as "Lettera missiva del Signor Gio. Francesco Buonamico Maltese Dottore di Medicina, Filosofo, e Poeta diretta ad Agostino Scilla messinese Pittore, ed Academico della Fucina detto lo Sclorito," in *Opuscoli di autori siciliani* (Palermo, 1758-71), vol. 11, pp. 105-200. For more on Buonamico, see Giovanni Manglon, "Giovan Francesco Buonamico scienziato e letterato maltese del Seicento," *Studi secenteschi* 12 (1971): 285-321; and Nicoletta Morello, "Giovanni Francesco Buonamico and the Fossils: A Flood of Problems," in *Italian Scientists in the Low Countries in the XVIIth and XVIIIth Centuries*, ed. C. S. Maffioli and L. C. Palm (Amsterdam: Rodopi, 1989), pp. 131-145.

²The following books make brief mention of Scilla's importance for the history of paleontology: Martin Rudwick, *The Meaning of Fossils: Episodes in the History of Paleontology* (Chicago: University of Chicago Press, 1976), 2nd ed.; Paolo Rossi, *The Dark Abyss of Time: The History of the Earth and the History of the Nations from Hooke to Vico*, trans. Lydia G. Cochrane (Chicago: University of Chicago Press, 1984); and Rhoda Rappaport, *When Geologists Were Historians* (Ithaca, NY: Cornell University Press, 1997). The only work to offer a more sustained reflection on Scilla, in the context of doing a critical edition of his treatise is Nicoletta Morello, *La nascita della*

paleontologia. Colonna, Stenone e Scilla (Milan: Franco Angeli, 1979). See also the introduction by Paolo Rossi to Agostino Scilla, *La vana speculazione disingannata dal senso*, ed. Marco Segala (Florence: Giunti, 1996); and Morello, “The Question on the Nature of Fossils in the 16th and 17th Centuries,” in *Four Centuries of the Word Geology: Ulisse Aldrovandi 1603 in Bologna*, ed. Gian Battista Vai and William Cavazza (Bologna: Minerva, 2003), pp. 127-151.

³This context is discussed briefly by Rossi, *Dark Abyss*, pp. 19-24, 35-36. **Cite Levine, etc?** I would also like to thank Richard Lombardo for providing me with his unpublished paper, “‘To Satisfy the Eyes of All’: Agostino Scilla, ‘Virtuosi,’ the Epistemology of Sense Experience, and ‘la Veridica Storia.’”

⁴Agostino Scilla, *La vana speculazione disingannata dal senso* (Naples, 1670), n.p. All subsequent citations of Scilla are from Morello’s edition in *La nascita* (until I have time to refer further to the original!). This aspect of Scilla’s work is discussed in passing in Giacomo Nigido-Dionisi, *L’Accademia della Fucina di Messina (16399-1678) ne’ suoi rapporti con la storia della cultura in Sicilia* (Catania: Niccolò Giannotta, 1903), p. 160. For further discussion of the Tuscan style of science, see **[articles by Jay Tribby; Findlen, “Controlling the Experiment,” new study of Cimento by L. Boschiero, etc]**

⁵ Martin Rudwick, “The Emergence of a Visual Language for Geological Science 1760-1840,” *History of Science* 14 (1976): 149-195.

⁶See especially Claudia Swan, “*Ad vivum, near het leven*, From the Life: Considerations on a Mode of Representation,” *Word and Image* 11 (1995): 353-372; Sachiko Kusukawa, “Leonhart Fuchs on the Importance of Pictures,” *Journal of the*

History of Ideas 58 (1997): 403-427; and Federico Tognoni, “Nature Described: Fabio Colonna and Natural History Illustration,” *Nuncius* 20 (2005): 347-370.

⁷David Freedberg, *The Eye of the Lynx: Galileo, His Friends, and the Beginnings of Modern Natural History* (Chicago: University of Chicago Press, 2002). **Cite my review in Metascience?**

⁸Nicolaus Steno, XXX, p. ? For an enjoyable synthesis of recent scholarship on Steno, see Alan Cutler, *The Seashell on the Mountaintop: A Story of Science, Sainthood, and the Humble Genius Who Discovered a New History of the Earth* (New York: Dutton, 2003).

⁹Scilla, *Vana speculazione*, p. 156.

¹⁰Gottfried Wilhelm Leibniz, *Protogaea sive de prima facie telluris et antiquissimae historiae vestigiis in ipsis naturae monumentis dissertation ex schedis manuscriptis viri illustris in lucem edita a Christiano Ludovico Scheidio* (Göttingen, 1749), p. 48. **Cite André Robinet on Leibniz in Rome; forthcoming trans of Protogaea?**

¹¹The details of Scilla’s artistic itinerary are outlined in *Memoria de’ pittori messinesi* (Messina: Giuseppe Pappalardo, 1821), pp. 139-147. On the atmosphere in which Scilla studied in Rome, see Ann Sutherland Harris, *Andrea Sacchi* (Princeton: Princeton University Press, 1977). **Article on Divine Wisdom in *The Church and Galileo?*** Eileen Reeves?

¹²Francis Haskell, *Patrons and Painters ...*; **cite Freedberg and some of the Dal Pozzo literature.**

¹³**French lit on Scilla’s paintings**

¹⁴Some of the most important art historical work on Scilla includes Valentino Martinelli, “Agostino Scilla, pittore e scrittore messinese, esule a Roma,” in *Scritti in onore di Salvatore Pugliatti* (Milan: Giuffrè, 1978), vol. 5, pp. 595-605; Elvira Natoli, “Per Agostino Scilla,” *Quaderni dell’Istituto e Storia dell’Arte Medievale e Moderna, Facoltà di Lettere e Filosofia Università di Messina* 3 (1979): 17-22; Luigi Hyerace, “Aggiunte ad Agostino Scilla,” *Prospettiva* 93-94 (1999): 200-207; and **articles in *Wunderkammer siciliano*.**

¹⁵**Cite eighteenth century histories ...**

¹⁶Four of the most accessible of Scilla’s paintings are in the Museo Regionale in Messina. In addition to the image mentioned above, they are: *Saint Hilarion in the Arms of Death*, *Saint Gaetano Before the Virgin*, and *Saint John the Baptist*; see *Museo Nazionale di Messina*, pp. 52, 54; and *Museo Regionale di Messina*, pp. ???. The Galleria Regionale della Sicilia in Palermo owns Scilla’s *Epicarmus crowned by Thalia*. Scilla’s *Self-Portrait* and *St Jerome* can be found in the Accademia di San Luca, Rome. The Museum of Fine Arts, Boston possesses a painting by Scilla that they have called a *Portrait of an Artist* an identified as a probable portrait of Sacchi, which I will discuss later. **Luigi Hyerace has done a catalogue of Scilla’s works that is not readily available so I am still constructing a more complete list – difficult since many are owned privately. Also drawings in the Uffizi and Frick, London, Paris?**

¹⁷*Memorie*, p. 143. Hyerace and his colleagues have rediscovered this manuscript in a private collection and are preparing a critical edition. **Cite other title?**

¹⁸Scilla, *Vana speculazione*, p. 162.

¹⁹Idem, p. ?

²⁰Rudwick, *The Meaning of Fossils*; Rossi, *Dark Abyss*; and William Ashworth, “Natural History and the Emblematic World View,” in *Reappraisals of the Scientific Revolution*, ed. David Lindberg and Robert Westman (Cambridge, U. K.: Cambridge University Press, 1990), pp. 303-332.

²¹Scilla, *Vana speculazione*, p. 182. On the development of antiquarianism and its relationship to history, see Arnaldo Momigliano, “Ancient History and the Antiquarian,” *Journal of the Warburg and Courtauld Institutes* 13 (1950): 285-315; and Alain Schnapp, *The Discovery of the Past*, trans. Ian Kinnes and Gillian Varndell (New York: Abrams, 1997).

²²Sebastiano Di Bella, “Le collezioni romane di Saverio Scilla,” *Archivio storico messinese* 76 (1998): 21-57, esp. 37, 39. **Cite 1715 publication by Saverio. Bronze table is now in the Kunsthistorische Museum, Vienna.**

²³As the exact title of his recently rediscovered treatise on medals reveals, even as antiquarian Scilla advertised his professional identity: *De' Discorsi sopra alcune medaglie delle siciliane Città di Agostino Scilla Pittore*. See Hyerace article in *Wunderkammer siciliano*, pp.??.

²⁴*Memorie*, p. 142. **See also Susinno, etc.**

²⁵Maurizio Marini, “Due nature morete di Agostino Scilla,” *Quaderni dell'Istituto e Storia dell'Arte Medievale e Moderna, Facoltà di Lettere e Filosofia Università di Messina* 14 (1990): 49.

²⁶Elizabeth Cropper and Charles Dempsey, *Nicolas Poussin: Friendship and the Love of Painting* (Princeton, 1996), esp. pp. 145-149.

²⁷Scilla, *Vana speculazione*, p. 158.

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- ²⁸Ibid., p. 174.
- ²⁹Ibid., p. 162.
- ³⁰Morello and Gould articles on Kircher
- ³¹Ibid., pp.?? **[complete citation]**
- ³²Emanuele Tesauro, *Il canocchiale aristotelico* (? , 1654), p.? **[complete citation].**
- ³³Ibid., p. 177.
- ³⁴Ibid., p. 163.
- ³⁵Giovanni Ciampoli, *Frammenti* (Venice, 1655), in Scilla, *Vana speculazione*, p. 203.
- ³⁶Eileen Reeves, *Painting the Heavens: Art and Science in the Age of Galileo* (Princeton: Princeton University Press, 1997), pp. 7, 18.
- ³⁷Scilla, *Vana speculazione*, p. 172.
- ³⁸Paula Findlen, *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy* (Berkeley: University of California Press, 1994), *passim*. **Cite more recent work.**
- ³⁹Findlen, “Jokes of Nature and Jokes of Knowledge: The Playfulness of Scientific Discourse in Early Modern Europe,” *Renaissance Quarterly* 43 (1990): 292-331; and Horst Bredekamp, *The Lure of Antiquity and the Cult of the Machine*, trans. Allison Brown (Princeton: Markus Weiner, 1995), pp. 63-80.
- ⁴⁰Scilla, *Vana speculazione*, p. 178.
- ⁴¹Ibid., p. 76.

⁴²Ibid., p. 181. This wonderful passage reinvents a famous episode in the history of ancient painting, recounted by Pliny in his *Natural History*. In a public contest to determine the best painter, Zeuxis, whose painting of grapes appeared so life-like that birds tried to eat them, was outdone by Parrhasius, whose painting of the curtain was so realistic that it deceived even Zeuxis.

⁴³Ibid., p. 219.

⁴⁴On the alchemy of painting, see Pamela Smith, *The Body of the Artisan ...*; and James Elkins, *What Painting Is: How to Think about Oil Painting Using the Language of Alchemy* (New York: Routledge, 1998).

⁴⁵Nigido-Dionisi, *Accademia della Fucina*, pp. 200-201. See Giovanni Alfonso Borelli, *Storia e meteorologia dell'eruzione dell'Etna del 1669*, ed. Nicoletta Morello (Florence: Giunti, 2001). Nico Bertoloni Meli's article on Borelli?

⁴⁶Bertoloni Meli, ed., *Marcello Malpighi*. Adelman ..

⁴⁷Malpighi to Ruffo, 1670, as quoted in *La natura morta in Italia* (Milan: Electa, 1989), vol. 2, p. 1002. **Find original in Adelman.**

⁴⁸**Ref to Castelli, Scilla and De insectis?**

⁴⁹Dollo, *Filosofia*, p. 140; idem, *Modelli scientifici e filosofici nella Sicilia spagnola* (Naples: Guida, 1984), p. 205; and Manuela Trinci, "L'occhio, l'occhialino e la vista di Agostino Scilla," *Il piccolo Hans* 57 (1988): 130. **Accordi article on Boccone?**

⁵⁰Morello on Buonamico ...

⁵¹Torrini, *Dopo Galileo*. Nico's recent article on Malpighi as a Galilean.

⁵²Mary Winkler and Albert Van Helden, "Representing the Heavens: Galileo and Visual Astronomy," *Isis* 83 (1992): 195-217; and Reeves, *Painting the Heavens*, pp. 6-

11. This section of the paper is especially indebted to Reeves' excellent study of the artists around Galileo.

⁵³Galileo Galilei, *Opere*, (Florence: Giunti Barbèra, 1934 ed.), vol. 11, p. 340.

⁵⁴Vincenzo Viviani, *Vita di Galileo*, ed. Luciana Borsetto (Bergamo: Moretti & Vitali, 1992), p. 82. This passage is also highlighted in Reeves, *Painting the Heavens*, p. 117.

⁵⁵Scilla, *Vana speculazione*, p. 210; see Trinci, "Occhio," pp. 132-133.

⁵⁶Stephen Jay Gould, "The Upwardly Mobile Fossils of Leonardo's Living Earth," in his *Leonardo's Mountain of Clams and the Diet of Worms* (New York: Harmony Books, 1998), pp. 17-44.

⁵⁷*The Notebooks of Leonardo da Vinci* [find citation], in A. Richard Turner, *Inventing Leonardo* (Berkeley: University of California Press, 1992), p. 183.

⁵⁸Leonardo, *Notebooks*, p.?. [check citation]; Gouldi, *Leonardo's Clams*, pp. 27-28.

⁵⁹Turner, *Inventing Leonardo*, p. 158.

⁶⁰Martin Kemp, *Leonardo on Painting* (New Haven: Yale University Press, 1989), p. ?.

⁶¹Leonardo, *Notebooks*, pp. 5-6 (short version).

⁶²Scilla, *Vana speculazione*, p. 226.

⁶³I have reconstructed the history from: Turner, *Inventing Leonardo*, pp. 68-74; Kate Trauman Steinitz, *Leonardo da Vinci's Trattato della Pittura: A Bibliography of the Printed Editions 1651-1956* (Copenhagen: Munksgaard, 1958); and Carlo Pedretti, *Leonardo da Vinci on Painting: A Lost Book (Libro A)* (Berkeley: University of

California Press, 1964). On Galileo's access to the Leonardo manuscripts, see Reeves, *Painting the Heavens*, pp. 29-31, 114-116.

⁶⁴Cropper and Dempsey; Janis Bell, etc.

⁶⁵Steinitz, *Leonardo da Vinci's Trattato*, p. 96.

⁶⁶Trevor Fairbrother and Chiyo Ishikawa, *Leonardo Lives: The Codex Leicester and Leonardo da Vinci's Legacy of Art and Science* (Seattle: Seattle Art Museum and the University of Washington Press, 1997), p. 18.

⁶⁷More on this subject, e.g. Rubens-Lipsius?

⁶⁸Comment on Harbison's interpretation of Baroque nature?

⁶⁹Arcimboldo literature

⁷⁰Susinno?

⁷¹Agostino Scilla, *De corporibus marinis lapidescentibus* (Rome, 1747). Fill out publication history.

⁷²Rossi, *Dark Abyss*, pp. 23-24; Rhappaport, *When Geologists Were Historians*, p. 127. For Wotton's review, see *Philosophical Transactions* 19 (1695/96): 181-201.

⁷³Rosamund Wolff Purcell and Stephen Jay Gould, "Relics of the Flood," in their *Finders Keepers: Eight Collectors* (New York: W. W. Norton, 1992), pp. 81-94.

⁷⁴David Price, "John Woodward and a Surviving British Geological Collection from the Early Eighteenth Century," *Journal of the History of Collections* 1 (1989): 92. This passage is also highlighted in Purcell and Gould, *Finders Keepers*, pp. 92-93.

⁷⁵Robert W. T. Gunther, ed., *Further Correspondence of John Ray* (London: Dulau, 1928), p. 235. I thank Richard Lombardo for bringing this passage to my attention.

⁷⁶Scilla, *Vana speculazione*, p. 211.

⁷⁷Oldenberg Correspondence (4 November 1673), as quoted in Robert W. Unwin, “A Provincial Man of Science at Work: Martin Lister, F.R.S., and His Illustrators 1670-1683,” *Notes and Records of the Royal Society of London* 49 (1995): 209-230.

⁷⁸Lister, *Johannes Godartius of Insects* (York, 1682), as quoted in Unwin, “A Provincial Man of Science,” p. 224.

⁷⁹“*La vana speculazione* With short Notes, by a Fellow of the Royal Society,” *Philosophical Transactions* 19 (1695-97): 181-201. **Wotton extract.**

⁸⁰Winkler and Van Helden, “Representing Nature.”

⁸¹*Ibid.*, p. 217.