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‘Ingenuity’ and Artists’ Ways of Knowing

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CONTRETEMPS

The editors of this volume called upon its contributors to write the history of the Renaissance differently by suspending the conventional operations of time and place, two of the most cherished and seemingly neutral epistemological categories in the humanities. Villaseñor Black and Álvarez invited discussion of the broader historical effects of our precisely honed investigations into primary sources in the following terms. First, they asked us to think intersectionally about the “rise [of] the scientific revolution” and “European imperialism.” No mean task, this first requirement involves breaching geographical and disciplinary boundaries designated by long-established specializations. “Art” and “science” were more fluid categories that overlapped in ways that our modern disciplinary formations do not recognize, while “imperialism” involves studying European behavior outside Europe in the same breath (and breadth) as within, not divvying up the world into “Latin American,” “Asian,” “European,” “Italian,” and other subdisciplinary fabrications of nineteenth-century origin. Second, the editors asked us to consider the “futurities” that emerge at the intersection of “interest in fame and posterity” frequently expressed in our sources and the “recent theorizing of temporality.” This second requirement asks us to breach conventional period boundaries by thinking critically—historically, strategically—about what “time” denotes. Since “time” is itself a culturally and historically specific construction, it too invites historical inquiry.

Our editors claim that writing history at these underexplored intersections with such heightened self-awareness of our own projections is desirable because “[i]nstead of blindly accepting fixed ideas about Renaissance futures, we try to rethink these developmental teleologies.” How might the “future” of the “Renais-

sance" be treated other than as part of a teleological trajectory, Hegelian or otherwise? In the overlapping worlds of science, technology, and art that served European imperialistic ambitions with great ingenuity, to summarize very briefly our editors' framing focus, the challenge of how to account for the event demands new tools, new subjects of investigation. I will leave aside (until the end) the question that arises of what justifies focusing solely on "European imperialism" if the goal is to revise, not re-instantiate, the Eurocentric approaches of our inherited histories.

As an Early Modern Europeanist art historian, my response to the invitation—what became the essay you are invited to read here—has been to offer reflections on the rich and complex history of the concept "ingenuity" itself. Although the present discussion is focused on painting and the artist's design process, a much broader study could inquire after the understanding of *ingegno* in other texts involving other techno-sciences that require theoretical knowledge combined with embodied practice.[1] The Italian word "*ingegno,*" often translated as "inborn talent," is a category historically associated with the individual. All the terms we use have histories and no matter how critical (and self-aware) we are of our inherited categories, we can never escape their effects any more than our subjects of study can, however "they" or "we" or "it" is construed. As far as the "futurities" of the Renaissance are concerned, ingenuity offers a significant opportunity to revisit well-known literature on the visual arts with different interpretive goals. Instead of looking for the origins of the modern concept of the artist as "genius" in the European literature from the fourteenth to the eighteenth centuries, when the modern notion of "genius" made its debut, we can ask how the artist's status and knowledge were understood in our primary sources, what activities were involved in the fabrication of works of human artifice, how the same criteria were applied to extra-European artisans and their products, how the manufacture of images and material things by Europeans were exported and actively received outside of Europe, and many other new questions that arise when the framework for discussion is transcultural and politically engaged in the ways that our editors ask. This essay takes what one might call a transverse path through the prehistory of "genius" since the first appearance of the term "*ingegno*" and its synonyms and alternatives in the literature on the visual and spatial arts around 1400. By the mid-seventeenth century the European empire was established across the globe through its various colonial outposts and trading networks. What does the visual artist's ingenuity have to do with it?

INGENIUM AND THE HUMANIST LEGACY OF ARTISTIC PRACTICE

> *Genius is a talent for producing something for which no determinate rule can be given, not a predisposition consisting of a skill for something that can be learned by following some rule or other.*
>
> —IMMANUEL KANT, *CRITIQUE OF JUDGMENT,* 1790, § 46[2]

There is no shortage of writings on the modern idea of "genius" that emerged in the late eighteenth century, most famously defined by Kant in his treatise on aesthetic judgment. According to the standard encyclopedia articles, "genius" designates "superior mental powers" closely linked with individualism and typically associated with some type of performance.[3] Cicero and Aristotle provide two anchor points for modern discussions. Cicero wrote about innate capacity as distinct from learned skill and, in doing so, brought skill (in Greek, *techne* [τέχνη]; in Latin, *arte*) and innate capacity (*ingenium*) into close alignment. With the pairing of *ingegno* and *mano* (hand), to use the Medieval/Early Modern terms often encountered in the vernacular literature, the ear and the eye become the final arbiters. According to Cicero, these are exceptionally skillful human organs of discrimination *(iudicium*) for judging differences of tone, pitch, and key in, for example, music and rhetoric.[4] Aristotle wrote about the faculty of "quick wittedness" (*Poetics* 1459a), that is, the "faculty of hitting upon the middle term instantaneously" (*Posterior Analytics* 89b34), a principle of inherited individual difference that achieves its highest form in the *phantasia* of the prophet. Aristotle's influential eleventh-century Arabic commentator Avicenna (who was translated into Latin and served as an important source of Aristotelian ideas for St. Thomas Aquinas and other Scholastic writers) considered *ingenium* to be the agent intellect associated with Aristotle's "faculty of discovering the middle term," perceiving what is right immediately by a kind of illumination.[5]

Ancient discussions of *ingenium* are concerned with sensate judgment, what we still call "discrimination" in the strictly quantifiable sense of the word. David Summers, who has studied the history of aesthetic judgment in Medieval and Early Modern European texts, and their ancient sources, argues that imagining *ingenium* or "quick wittedness" on a sliding scale running from mere cleverness to prophetic vision also explains why some writers thought that it could be taught.[6] If it is possible to teach quick-wittedness, Summers observes, then human nature can be corrected by art. It follows that, based on this philosophical heritage, the Christian justification for using images to acquire religious understanding—that is, its core defense against charges of idolatry since St. Augustine of Hippo (354–430 CE) and Pope Gregory the Great (ca. 540–604 CE)—has been expressed as the need to address human modes of cognition proceeding from sense experience.

With this very brief introduction to the history of *ingenium* in mind, I would like to consider the new practical literature on art emerging at the end of the fourteenth century through one of the earliest and most famous vernacular texts on painting, Cennino Cennini's *Libro dell'arte* (ca. 1390–1410). Cennini's text cannot be considered a transparent record of late Quattrocento Florentine artisanal practices, however, as it is still often taken to be in the nonspecialist literature. Cennini was a painter at the court of Francesco Novello da Carrara, near Padua, in the 1390s when he most likely composed his manual, judging from the language and contents of the text.[7] After the Carrara library in Padua was largely destroyed by

invading Milanese forces in 1388, the ruler's son, Francesco Novello, rebuilt it with a new focus on practical wisdom, that is, on what were then known as the mechanical arts or productive sciences.[8] Painting technology was included in this library in the form of Cennini's compilation. Far from being a simple guide to current workshop practices, Cennini's text includes recipes and materials dating from late antiquity that were no longer in common use. Ancient pigment names and other peculiarities of his text indicate that he compiled an encyclopedic sourcebook on the productive science of painting, probably at the request of his patron.

Regardless of whether Cennini recorded theory that guided practices for his own profession or compiled his treatise for a humanistic patron with an interest in technology, his discussion of the formation of a personal artistic style is unprecedented. Cennini's remarkable text begins with *scientia* and *fantasia* as the two theoretical components of the artist's expertise.[9] The text assumes familiarity with classical theories of literary imitation defined as patterning one's work on the accomplishments of another. His account can best be understood within the context of court culture, particularly discussions of Petrarchan formulas for literary prose composition popular at the court of Carrara during the time he was there. Cennini adapted concepts and terminology for composing a literary text into the terms used to discuss the role of imitation in artistic apprenticeship, whereby the student learns by copying visual models of progressively increasing difficulty. At the same time, as Andrea Bolland has shown, Cennini's text remained notably similar to the advice given by the humanist educator at Carrara, Pier Paolo Vergerio (1370–1444), on the appropriate use of literary models.[10]

Since antiquity, the most significant correspondences between writers and painters in the Western tradition have revolved around their shared ability to fabricate an ideal kind of reality perfected by art. Cennini, writing in terms he could have derived from Vergerio, strongly advises following one master, "the best one with the greatest fame," to avoid becoming fickle. "*Fantastichetto*" is the vernacular term Cennini uses to mean becoming distracted by trying out each artist's manner in turn without perfecting one's skills or acquiring a manner proper to oneself.[11] Whether one combines many models into one style (as the bee gathers honey from many flowers) or follows a single master (these were the two choices in the literary tradition), the issue was how to develop "right judgment" to exercise hand and mind together. Cennini uses the word *fantasia,* a term so closely associated with *ingegno* that they are often considered synonyms, to describe an active mental power of discernment, which he insists must be internalized through imitating only one good model.[12] Through imitating good models, the artist exercises his *ingegno* until he develops good judgment.

Unfortunately, it remains unclear whether Cennini's remarkable theoretical advice was directly known to fifteenth-century painters. The earliest historical citation of his manuscript took place in another courtly context, when Vincenzo Borghini, who worked for Cosimo I de' Medici in Florence, acquired a copy from a

Sienese goldsmith in 1564, just one year after the founding of the Florentine *Accademia del Disegno,* where Borghini was appointed its first *luogotenante* in 1563.[13] Cennini's manuscript was first published only in the nineteenth century, although Vincenzo's fellow Florentine *letterato* Raffaello Borghini copied sections from it in *Il riposo* (Florence, 1584), an art treatise intended for an educated public.[14] And in the early 1460s, the Milanese architect Antonio Averlino, known as Filarete, apparently made extensive use of a manuscript of Cennini's compilation, and Filarete was also the likely source for Leonardo da Vinci's access to another key text in the early vernacular literature on art, Leon Battista Alberti's humanist treatise on painting (1435). From this evidence, and other documentation (such as Lorenzo Ghiberti's commentaries), it is known that theoretical texts were already circulating among artists in central and northern Italy by the mid-fifteenth century.[15]

There can be no doubt that workshop knowledge was not entirely tacit. In the Aristotelian sense in which Cennini, Leonardo, and their sixteenth-century successors understood *scienza,* it is the equivalent of *theoria* and means knowledge of the causes of effects observed in nature on the basis of two components: first principles, which Leonardo treated as knowledge of the geometrical principles of optics, and the experience of phenomena.[16] This is exactly how Leonardo defined painting as an investigative science requiring great *ingegno,* grounded in both theory and experience:

> Nature's aid, free of deception, is *chiaroscuro,* which painters call light and shadow. The painter generates it by himself with the greatest speculation, helping himself with the same quantities and qualities and proportions with which nature helps sculpture without the sculptor's *ingegno.* And the same nature helps such artificers with the proper diminutions which produce perspective naturally, by itself, without the discourse of the sculptor. The painter has to acquire this science by his *ingegno.*[17]

In numerous passages, Leonardo described the scientific knowledge the painter acquires by his *ingegno* (his mental, as opposed to physical, effort) in terms of the kind of judgments exercised in producing a work of art. His description of *ingegno* as a discursive process of reasoning ultimately derives from Aristotle's ten properties or "predicaments," expressions used to talk about any subject (*Categories* 4a10–30).[18] These are the "accidents" (from *accidere,* to happen) or properties that the physicist studies in natural bodies. In his polemical defense of painting, Leonardo argued that painted images are closer to the "truth" of nature than words because they reproduce the appearance of natural effects based on the artist's knowledge of their causes. Deriving his Aristotelian terms from optical theory, Leonardo also referred to these as the "functions (*ofiti*) of the eye," "visual discourses," and "the ornaments of nature" with which the painter embellishes his images.[19]

At the same time that Leonardo recorded his ideas on painting, *ingegno* also appears in contexts associated with engineering, a word that derives from the same

Latin root.[20] Instead of maintaining categorical differences between the fine and applied arts that emerged in eighteenth-century Europe, some Early Modern historians of art, science, and technology are taking a more holistic approach, pursuing connections in a wide range of sources among new forms of artisanal and industrial knowledge production requiring mechanical knowledge.[21] Ancient sources shared by Early Modern practitioners in these fields include Vitruvius and Lucretius, who assigned prominent roles to *ingenium* in the development of technology.[22] Vitruvius devoted extensive discussions to engineering practices based on knowledge of geometry and mechanics, reflected in Roberto Valturio's fifteenth-century treatise on the military arts that Leonardo and his associates studied extensively. Artists like Leonardo who practiced as engineers and technical consultants are evidence of the increasing stature awarded to the mechanical arts and emerging technology requiring theoretical knowledge in the fifteenth century.[23] In 1642, one of the earliest histories of Urbino, a duchy long renowned for its support of mathematics and its practical applications as studied recently by Alexander Marr, observed that this land "has in every age produced men of sublime *ingegno.*"[24] Globalization, industrialization, capitalism—the driving forces of modernity—encouraged innovation put to practical purposes. By the mid-eighteenth century, mechanical knowledge and Newtonian science ushered in what Margaret Jacob calls "the first knowledge economy" by supplying the theoretical underpinnings to technological innovation in mining, manufacturing, and the application of steam power more generally.[25] The role of ingenuity in technological fields is an important line of inquiry for future studies in a global framework that avoid developmental teleologies and inquire after the processes of European imperialism.

INGEGNO AND THE NEW PRACTICE OF COMPOSITIONAL SKETCHING

Focusing my analysis on the visual and spatial arts, I turn to Vasari, who first came to know Cennini's *Libro dell'arte* through Borghini at the time they were working together on the revised edition of the *Le vite de' più eccellenti pittori, scultori ed architettori.*[26] In his introduction to painting (chapter 16 of the Introduction to the *Lives*), Vasari described the process of developing the design of a painting from the initial compositional sketch to the transfer of the *disegno* to the surface to be painted. He might have derived his terms from any number of sources, including Scholastic theology. Vasari's formulation is also reminiscent of Cennini's account of the apprentice's program of study, where the student learns in a predetermined sequence of steps how to create a three-dimensional illusion through modeling in *chiaro* and *scuro*: first the student draws with silverpoint, then on paper using ink wash, leadpoint, and pen, until he is capable of rendering the "*disegno*: inside his head" (chapters 1–14).

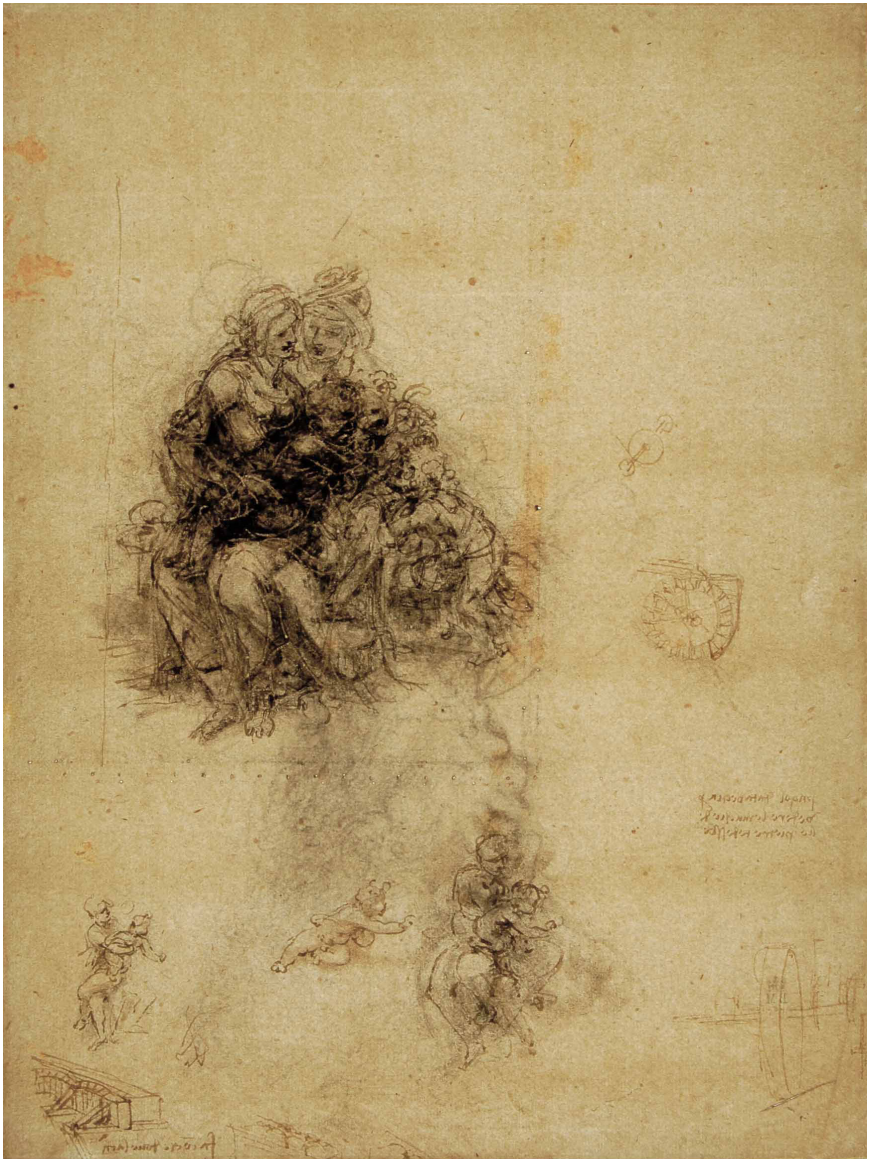

FIGURE 8.1. Leonardo da Vinci, Sketches for the Virgin and Child with Saint Anne; Wheels; a Weir, Dam, or Bridge, ca. 1500, pen and brown ink and wash over black chalk, 26.5 × 20 cm (10 7/16" × 7 7/8"). London, The British Museum 1875–6–12–17.

The many correspondences between Cennini's and Vasari's descriptions of the process of *disegno* from mental conception to physical drawing actually predate Vasari's knowledge of Cennini's text.[27] The description Vasari published in the 1550 and 1568 editions of the *Lives* is also essentially the same procedure that Leonardo described in his unpublished writings beginning with MS A (1490–92), which, as far as any surviving evidence is concerned, Vasari also did not know firsthand.[28] Yet Vasari's definition of a sketch as taking the form of a blot (*macchia*) is particularly reminiscent of Leonardo's advice on sketching a new composition. Leonardo's most mature surviving description is the paragraph famously discussed by E. H. Gombrich in his study of the artist's methods for working out compositions, in which Leonardo refers to the preliminary sketch as a *componimento inculto* (an unrefined or "wild" composition) (see figure 8.1 for a well-known example):

> Therefore, painter, compose roughly (*componi grossamente*) the limbs of your figures. For you will understand that if such an uncultivated composition (*componimento inculto*) is appropriate to its invention, so much the more will it satisfy when it is adorned with the perfection appropriate to its parts. I have seen in clouds and walls, splotches *(macchie*) that have roused me to fine inventions of various things, which, though they were wholly lacking in the perfection of any one member, did not lack perfection in their movements or other actions.[29]

Here is Vasari's very similar account of compositional sketching, combined with a description of the rest of the process of developing the design for a painting:

> On sketches, drawings, cartoons, and schemes of perspective: how they are made and how painters use them
>
> Sketches [s*chizzi,* literally splashes], mentioned above, are what we [artists] call the first sort of drawing [*disegno*] that is made to establish the poses [of the figures] and the initial composition of the work. They take the form of a blot [*macchia*] and establish only a rough draft of the whole [work]. Gripped by [divine] furor, the artificer makes them in a short time with pen or other drawing instrument or with charcoal, just to indicate his intentions using whatever occurs to him. And this is why we call them sketches. Afterwards, drawings executed in a more finished manner come from these, in which the artificer tries to copy from life, with all due diligence, whatever he does not understand completely in such a way that he could rely solely on himself. Later on, measuring with a compass or by eye, he enlarges [the drawing] by turning the little measurements into larger ones, according to the work in hand.[30]

It is worth noting that when his student Francesco Melzi compiled Leonardo's scattered notes on painting, he included the passages from MS A alongside others on the same topic of various dates, which he grouped together in a subsection of the *Libro di pittura*.[31] However, the passage cited by Gombrich was omitted when an unidentified editor, about 1570, combined what are passages 186 through 189

in the *Libro di pittura* to form what became chapter 98 of the printed edition, titled the *Trattato della pittura.*[32] The abridged version of Melzi's compilation is the only form in which the text circulated until the nineteenth century, when Melzi's original codex was discovered in the Vatican Library and published soon thereafter (ed. G. Manzi, Rome, 1817). Thus, Leonardo's crucial advice on compositional sketching would have been known only through the shorter version retained in the abridged *Libro.*

If Vasari did not know the Cennini passage at the time he wrote about the design process in similar terms and did not know the Leonardo passage about the *componimento inculto* preserved only in the *Libro di pittura,* then how are we to account for these intergenerational similarities? Cennini, Leonardo, and Vasari all drew on the living language and procedures of the workshop.[33] The literary authority of the language of artistic practice was largely established by Vasari, who could call on his own experience as an artist as well as other artists' largely unpublished writings.[34] While he was preparing the second edition of the *Lives,* Vasari was advised by his literary friends, including Borghini, who had a well-documented interest in enriching the written Tuscan language with vernacular terms derived from artisanal texts.[35] Cennini's text was specifically of interest to them because it provided a solid textual foundation for long-standing (and widespread) workshop procedures. Borghini described Cennini's *Libro dell'arte* to Vasari as containing "good old advice and such beautiful ancient things."[36] The portion of Cennini's text that might have impressed modern readers the most was its extensive discussion of *disegno,* which is the part that Vasari expanded in the 1568 edition.

The greatest historical significance of Vasari's introductions to the three arts of *disegno,* which he called "*Theoriche,*" is their rich lexicon of artistic terminology—a glossary of terms and recurring problems in the *Lives* themselves that were mined by the Florentine academician Filippo Baldinucci for his famous dictionary of artistic terminology published by the Accademia della Crusca in 1681.[37] In seeking continuities between verbal and visual accounts of the creative process, such correlations between literary audiences and artistic ones are significant because they show in concrete terms how a shared language for discussing the creative process and aesthetic response developed out of humanist interest in the techno-science of painting and workshop knowledge. This contributed to the artist's rising intellectual status as new demands were placed on him, such as knowledge of perspective theory, anatomy, proportion theory, and the close observation of natural phenomena.

A different account of *ingegno* derives from the classical idea of divine inspiration originating in the philosophy of Plato. It was a commonplace of the Platonic tradition that *furor poeticus* refers to the inspiration of the poet as it took form in the language of poetry.[38] Applied to the visual register, *furia* refers to the spontaneous quality of works of art resulting from the excited state of the artist. Sixteenth-century writers such as Vasari, Gianpaolo Lomazzo, Federico Zuccaro,

Vincenzo Danti, and others close to Michelangelo understood *furore* as a hallmark of divine inspiration linked closely to both the artist's initial idea or *concetto,* and his inspired execution. One of the major ancient statements of this ideal known to Early Modern writers was the *De Demosthene* of the Greek historian and teacher of rhetoric, Dionysius of Halicarnassus (ca. 60 BCE–7 BCE), who described the highest form of furor in the following terms:

> I am swept this way and that, one emotion follows another . . . a succession of all the passions that can sway the human heart. I think that at such times I am in exactly the same state as the initiates at the mystery of the Mother of Corybantes, or the like (whether it be smell, or sound or the actual breath of the divinity that arouses in these persons such a galaxy of varied visions).[39]

The arousal of *furore* by sensation that Dionysius describes (as the equivalent of an initiation rite) is closely aligned with Vasari's description of the artist as "gripped by furor" and also calls to mind Leonardo's discussion of the excited *ingegno* working with the *imaginativa* as the motivating force for the rapid-fire first sketch of the composition. Like Dionysius, Leonardo associated the onset of the artist's heightened state with certain sense impressions: "I have seen in clouds and walls, splotches that have roused me to fine inventions." Vasari and Leonardo need not have known *De Demosthene* directly, because the Platonic idea of *furore* was widely disseminated in Christian and secular sources, and must have been familiar in the oral culture of the workshop. To cite a significant example dating from the mid-sixteenth century, the Portuguese writer and artist Francisco de Hollanda (1517–1587), who lived in Rome from 1538 to 1547 and published a dialogue in which Michelangelo was one of his interlocutors, describes how the artist has first "in his imagination an idea and immediately he will conceive in the mind [*entendimento*] the invention that the work will have"; then, having fixed the invention in his *fantasia* with "great care and forethought," when his hand is placed to paper, "the idea or concept must be placed most quickly in execution" so that the artist does not lose "that divine furor and image that it bears in the *fantasia.*"[40]

In De Hollanda's description of the creative process, the passage excerpted above continues by discussing different media used in the successive stages of developing the composition: the initial use of red and black chalk, followed by pen to make the outlines and contours, and wash to make a "sweet tint" (*tinta dolce*) that veils and shades it; then using "a fine brush tipped in white heightening with gum for the highlights of the drawing" to establish the *rilievo,* all of which he calls "the order of coloring." Using only pen, De Hollanda specifies, is difficult but more masterful than other media—surely because it allows for fluid execution unparalleled in other media and cannot be erased.

At the end of the century, Lomazzo and Zuccaro both published treatises on painting titled *Idea* (in 1590 and 1607, respectively), in which they described the artist's mental process of invention in similar terms.[41] Lomazzo was directly famil-

iar with Leonardo's writings, and Zuccaro, who probably owned a manuscript copy of Leonardo's abridged *Libro di pittura,* was informed by Florentine ideas of *disegno.* Yet the presence of so many similar accounts of the creative process in so many sources is difficult to explain as the transmission of texts alone. Rather, it indicates the existence of a shared oral tradition of workshop practice with a theoretical component—artisanal knowledge orally transmitted through the workshop found its way into the new sub-philosophical literature on art, some of which was also circulating in workshops.[42]

The relationship between Leonardo's text in the unpublished MS A and Vasari's famous chapter in the introduction to his *Lives* has been treated as an important point of confluence by modern scholars. Carmen Bambach considers these two famous texts along with Leonardo's procedures to "represent essentially the legacy of High Renaissance practice."[43] Bambach develops an account of Leonardo's design process, building on Gombrich's classic study of Leonardo's method for working out compositions, in which the rapid sketching of figures and Leonardo's extensive use of small notebooks to sketch figures from life and write about the physical expression of *moti mentali* play an important role.[44]

Despite their detail, unlike Leonardo's notes, neither De Hollanda's nor Vasari's text was meant to serve as technical information for professional artists; rather, De Hollanda's account was a fictional dialogue, a popular humanist genre, whereas Vasari's essay on artistic techniques was meant as an introduction to his biographies for the educated reader interested in practical knowledge.[45] Bringing these intertextual relationships involving *ingegno* to light helps explain how workshop knowledge was transmitted and shared with a humanist audience. The sources point to a complex interplay between written and oral transmission of artisanal knowledge. Verbal descriptions apparently changed little between Cennini and Vasari, even though the appearance of works of art did. The considerable gap between the written legacy and actual artmaking practices must relate in part to the fact that the transmission of sensitive practical knowledge was not normally entrusted to written texts. The crucial details of fabrication were privileged information. Very little technical information exists in the *Libro di pittura* that Melzi compiled from Leonardo's autograph notes, and even less resides in the abridged version that circulated, perhaps partly to safeguard workshop secrets and partly because the skills and procedures involved were passed down orally and through demonstrations.

THE PURPOSE OF ILLUSION IN SACRED PAINTING

Leonardo's legacy comprised writings and visual material that enable us to trace connections between his ideas and his artistic production unmatched by any other artist. But why did he and his contemporaries put so much time and effort into acquiring the knowledge and producing spectacular effects of illusionism and movement in the first place? Beyond the scientific and practical information needed

to produce these effects is the still more fundamental question of what purpose they were meant to serve in the *Virgin of the Rocks,* the *Salvator Mundi,* the *Last Supper,* the *Madonna of the Yarnwinder,* the *Virgin and Child with St. Anne and the Lamb,* and other sacred images that constitute most of Leonardo's paintings.

The question of "why" the artist puts his intellectual effort and manual skills to certain uses and not others is actually broad enough to encompass a wide range of artistic practices. Herbert Kessler, Cynthia Hahn, Caroline Walker Bynum, and many other Medievalists now emphasize that Medieval sacred images manifest, evoke, and conjure up the sacred—that is, they *show* significance without recourse to representation.[46] Certain precious materials, such as rubies, rock crystal, mother of pearl, gold, and ivory, and imitations of them ranging from expensive enamels to cheap paste jewels have become the subject of study by Medievalists interested in understanding what properties ranked these above others as suitable containers for relics.[47] This is the "materiality" of materials—the significance attached to certain kinds of matter, especially when transformed by inspired artists who translate their mental images using their skilled human hands into works of art praising God, the Divine Artificer.[48] Instead of the mimetic, illusionistic modes that try to trick the senses, as in Pliny's stories, Kessler writes, Medieval artisans call attention to the stuff their reliquaries and other sacred objects are made of. They call attention to the signifying properties of the fashioned materials themselves.[49]

In the case of reliquaries, how artisans understood their process of conception and fabrication must be recovered from the material object, technical manuals, and theological writings. The issue I want to pursue now concerns the transition from a "Medieval" sense of the materiality of art to the "Modern" sense of an illusionistic visual image. What are we to make of the changed mode of presentation signaled by Medievalists such as Hans Belting, Kessler, Bynum, and others? We are accustomed to thinking about "virtual images" as a modern if not exclusively contemporary phenomenon, yet the optical naturalism we still associate with the label of Renaissance art is also a regime of virtual images. In fact, the standard definition of a virtual image derives from Medieval optical theory.[50]

How are the Medieval sense of materiality and the virtual reality of illusionistic art mutually related; how are they entangled with each another? The presence of the eternal and immutable in the transient and corruptible is a paradox central to all Christianity—and is not limited to the "Medieval" period. Discussions pertaining to the productive arts that were first formulated by theologians in the eleventh and twelfth centuries were widely diffused in courtly poetry, vernacular literature, scientific writings on mechanics, optics, and anatomy, and other sources that artists and humanists who wrote about the arts read in the "Early Modern" period as well. Does the era of illusionism we associate with "Renaissance" art divest sacred images of their time-honored power to manifest the significance of that which is understood to be immaterial? Put another way, were the virtual images that Leonardo and his contemporaries so skillfully fashioned related in any way to long-standing preferences for using certain precious materials, such as gold, crystal, and

gems, to convey Christian themes and theological ideas? Will the answer help us more fully understand *ingegno* in historical terms?

One set of clues resides in certain passages from MS A and elsewhere that Melzi included in the first, theoretical section of the *Libro di pittura* that were eliminated from the 1651 *Trattato,* where Leonardo describes the painter's *ingegno* as an active power for gathering and exercising knowledge. Deriving his terms from Dante (who in turn derived his language from St. Thomas Aquinas, who was dependent upon Aristotle via Arabic sources available in Latin since the early thirteenth century), Leonardo conceives of painters as being able to "transmute" themselves into the mind of nature.[51] By making their *ingegni* like the surface of a mirror, which contains the similitude of whatever object is placed before it, Leonardo writes, painters "discourse" about the properties of observed nature. He quotes lines from Dante's *Convivio* that the painter could not paint a thing if first his *fantasia* did not have the capacity to conceive the incorruptible form of it.[52] Such statements demonstrate that Leonardo subscribed to the widespread Augustinian view that God is perceptible everywhere in creation, as the following well-known excerpt describing the ornaments of nature from the *Parte prima* of the *Libro di pittura* attests:

> Painting considers all the qualities of forms with philosophy and subtle speculation—seas, sites, plants, animals, grasses, and flowers, which are enveloped in shadow and light. Truly this is science and the legitimate child of nature because painting is born of nature; but to be more correct, we should say it is the grandchild of nature because all perceptible things are born from nature, and painting is born from the nature of those things. So, strictly, we shall speak of it as the grandchild of nature and kin to God.[53]

"Nature" in this sense is eternal, the source rather than the sum of perceptible things and created by God *ex nihilo.* We must look further into the premodern history of accounting for the artist's creative process that is preserved in theological texts. Thomas Aquinas, like St. Bonaventure, Hugh of St. Victor, and other Medieval theologians, distinguished between the craftsman's initial free act of contemplation, in which his active intellectual powers *united with God* so that the "exemplary form" was made "alive" in him, and the subsequent menial operation of fabrication that produced a useful or delightful object. In the Scholastic theological formulation, the more closely an entity was *in contact with* God (the "first intelligible object"), the more *divine and noble* it was. Leonardo is claiming nobility for the artist by his proximity to the intelligible acts of God in nature. Commenting on Aristotle, Thomas Aquinas defined something perfectible as "*receptive of a perfection*"; material substances received likenesses ("similitudes" of the intelligible) by way of human sensory powers.

In Aristotle's account, the foundation of this epistemology, sense impressions are received by the imagination as if they were a stamp or a signet ring impressed on a wax tablet, and these mechanistic analogies are tremendously important for

the Medieval idea of the artist. Thomas Aquinas also compared "intelligible forms" to the mental images (*fantastic forms*) used by the artist in making things. Similitudes conceived from intellective things are similar to manifestations generated by art (*Comm Metaphysics,* VII.L6: C1381–1416). Aquinas characterized the artist's "quasi-idea" as analogous to the working of the divine mind, but it was important to distinguish between the divine source of the artist's idea and the human source of his manual labor of fabricating objects from materials created *ex nihilo* by God. This distinction was meant to guarantee the "truth" of the artistic representation, made by human hands, within a Christian ontology of images. The most truthful "image" was one made without human artistic intervention at all—like a contact relic or a divine apparition—because the image was made in direct contact with the divine without human intervention.

The question, again, is whether the Medieval sense of materiality was lost in the era of illusionistically rendered sacred images, in the modern secular sense that Kessler and others posit.[54] Leonardo went a step beyond Aquinas in claiming that painting "truthfully" imitates the appearances of nature because the artist has knowledge of nature's causes. Leonardo identified this knowledge with the first principles of the science of optics, concerned with explaining the action of light by combining the first principles of mathematics with direct observation of nature's appearances. The *dangerous* innovation in Leonardo's argument—from a Christian ontological standpoint—lay in granting the artist too active a role, perhaps an independent one. The artist was then no longer simply a passive recipient, the "offspring" of a Christian God who communicates His likeness in "multiplication of itself," to cite the language of optics in the neoplatonic Christian tradition of Roger Bacon that Leonardo himself used to argue for the nobility of painting.[55]

In its Christian formulation, the "truth" of the artistic representation was crucial, for it justified the use of images in religious worship. Given this theological context for the artist's production of images intended for contemplation and prayer, Leonardo's virtual treatment of charged materials arguably attests to the continued presence of signifying materialities in sacred images and objects in the era of optical naturalism as carrying significance to an informed audience through their direct presentation: Their visuality goes far beyond their visualness *per se.*[56] The newly identified painting of *Christ as Salvator Mundi* (figure 8.2), attributed to Leonardo by some leading scholars—even if it is compromised by its condition, only a beautifully restored wreck or perhaps a variant produced by a student or a follower[57]—gives us something new with which to think about the materiality of Leonardo's virtual sacred images. The exquisitely rendered rock crystal globe, the precious silk and embroidered tunic with its intricate folds, the lustrous and transparent jewels, the otherworldly face of Christ as Savior recalling miraculous Santo Volto images (figure 8.3), the complete effacement of all brushstrokes, that is, all signs that the image was made by human hands, attest to the many creative ways in which Leonardo put scientific study in service to religious ends.

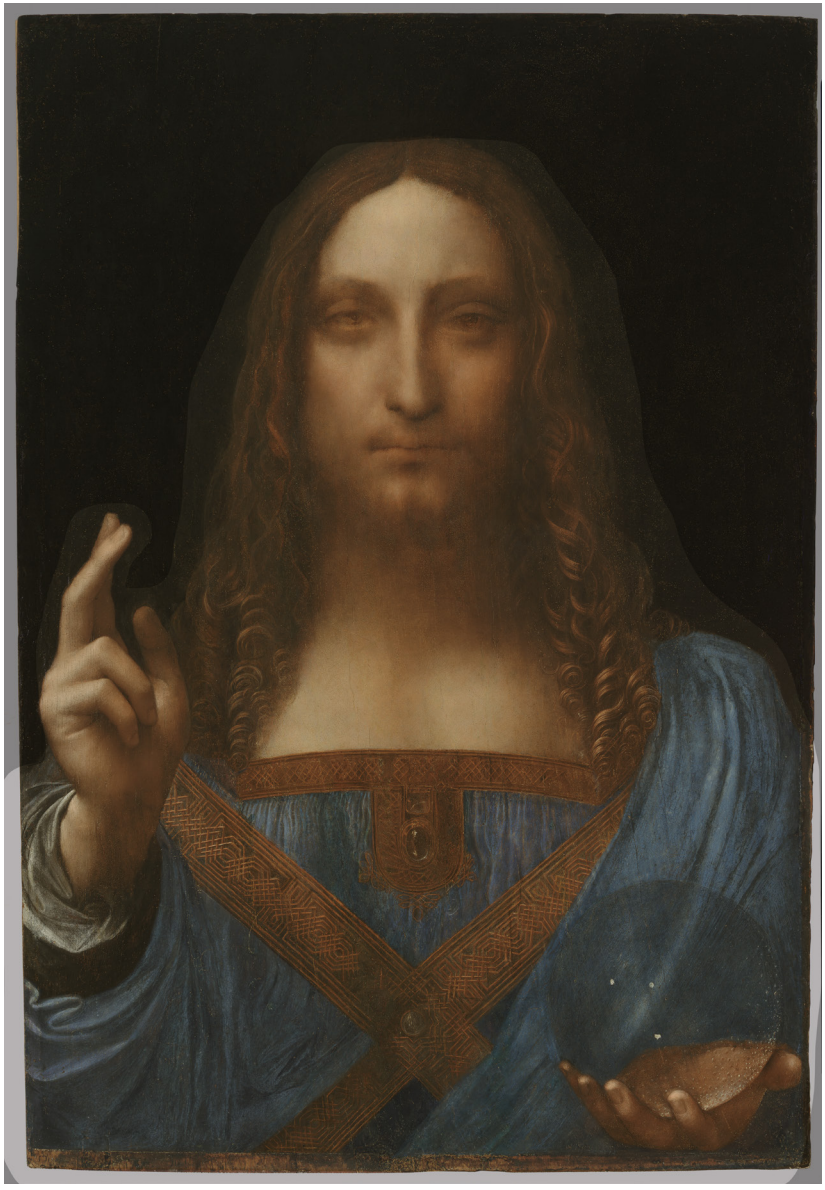

FIGURE 8.2. Leonardo da Vinci [?], *Christ as Salvator Mundi,* oil on panel, 45.4 × 65.6 cm (17 ⅞" × 25 ⅞"). Collection Prince Mohammed bin Salman. Photo by Tim Nighswander/ Imaging4Art, courtesy of Robert Simon for Salvator Mundi LLC.

FIGURE 8.3. Santo Volto of Genoa. Church of San Bartolomeo degli Armeni, Genoa. Photo in the public domain, Creative Commons licensing.

Art historian Michael Baxandall called attention to a distinction made by Alberti in his 1435 treatise on painting, which Baxandall confirmed by studying fifteenth-century commission documents, that patrons should value the artist's scientific knowledge over the use of expensive materials. A scene illusionistically rendered with knowledge of the action of light, color, and shadow in nature, Alberti argued, is more praiseworthy than the inclusion of precious materials such as gold.[58] The combined visual and literary legacy of Leonardo and his contemporaries and successors provides extensive evidence that artists understood investigations of such optical phenomena to be operations of the *ingegno.*[59]

To recover the historical understanding of *ingegno,* however, it is necessary to refer beyond the science of artistic practice to the broader context in which artists made sacred images, virtual in their presentation of charged materials but palpable nonetheless—thanks in part to the unprecedented efforts by artists to understand the play of actual light, shadow, and color as a resource for making charged material images that seem to resonate with life. What is so significant about these connections on a broad historical scale is the manner in which theoretically grounded and technologically experimental painting practice imitates and exaggerates natural appearances with great rhetorical force, conforming to the long-standing ontological requirement that sacred Christian images be reliable and true, as artless or "perfect" as possible, to recall Savonarola's understanding of poetry's moral efficacy.[60]

Leonardo saw compositional sketching as the supreme act of the artist who makes "true" artistic images by "transmuting" himself into the mind of nature. Does it follow that he thought about artistic practice in the same terms, as dependent upon the shared understanding of the principles of light and shadow to render a "true" image? Every indication is that he—not unlike the fourteenth-century Sienese artist Lando di Pietro (died ca. 1340), who inserted strips of paper containing humble prayers offered to God inside his carved crucifix—conformed to the long-standing understanding of sacred images as infused with the embodied agency of *both* their immediate and ultimate makers, that is, the humble human artist who works through his materials and his divine artificer counterpart, who generates matter itself and is the source of the artist's *idea, concetto,* or *exemplum.*[61]

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The brief, nontechnical discussion by Vasari about how the artist composes an image out of his imagination was known widely, but many of the other texts by artists writing at that time or earlier remained unpublished until the nineteenth or twentieth centuries. The outstanding exceptions are the many Catholic Reformation writers who redirected the discussion of ingenuity to emphasize the role of God and the acquisition of adequate representational skills for making sacred images that conform to scripture. In the institutional context of the teaching academies maintained to produce artists in service to church and state, as the structure of artistic instruction developed in the later sixteenth, seventeenth, and eighteenth centuries, artistic invention was taught as something transmissible and attainable through the acquisition of a specific skill set. That, in fact, is how Leonardo's treatise had been organized by his student Melzi: as a recursive set of exercises of increasing complexity to build a skill set. The orderly, progressive acquisition of skills and knowledge drew on long-standing workshop practices as well as a written tradition infused with humanist ideas and values already in place in the 1390s, when Cennini composed his *Libro dell'arte* probably for the library of his patron at the court of Carrara.

In the mid-sixteenth century, however, and especially after the final session of the Council of Trent in 1563, Church reformers redirected artistic license to serve religious ideals aimed at a universal audience, monitored at least in theory by ecclesiastics with the power to censure artistic production. The earlier praise of the artist's quick-wittedness and license to invent was suppressed in favor of emphasizing fidelity to nature as necessitated by human modes of cognition proceeding from sense experience, which, as noted above, had been the primary justification for religious images since Augustine. Leonardo's extensive discussions of the discursive powers of the *ingegno,* a significant case in point, were greatly reduced along these lines by an anonymous, reform-minded editor circa 1570 in the version of his compendium on painting that circulated in manuscript for eighty years before the appearance of the first printed edition in 1651.[62] In a recent

study of post-Tridentine texts on art, art historian Pamela Jones cites seventeenth-century testimony by Francesco Scannelli, 1657; Carlo Cesare Malvasia, 1678; Luigi Pellegrino Scaramuccia, 1674; and Giovanni Battista Passeri, the poet and painter, ordained a priest in 1672, who often cited theological sources. She compares their language with numerous seventeenth-century prayers and poems (including Antonio Glielmo, *Le grandezze della Santissima Trinità* [Venice, 1658]) in which the same terms are used to draw connections between the theological and visual connotations of grace, long associated with the artist's elevated *ingegno.* The artist was credited with the ability to evoke in paint on canvas the beautiful, bright, loving, charming, majestic, grand, and eternal God filled with grace, as if seen in a vision (*bellissima, vaga, gioconda, svelata, chiara, amorosa, goiosa, gaudio, felicita, lume superno; lume puro; fiamma gioconda; gioia immense; amore felice; belo vis*).[63]

As Jones notes, even in antiquity, grace was considered a gift with both stylistic and spiritual resonances.[64] However, it was not until the questioning of the academic system of institutionalized instruction beginning in the later eighteenth century and associated with the label "Romanticism" that the previous appreciation for the artist's quick-witted creative powers based on embodied knowledge resurfaced in the Modern idea of artistic genius as individual giftedness—grace endowed by a higher power, perhaps, but not subservient to the institutional controls of religion or the state.

This history is not innocent. The persuasive visual rhetoric that was manufactured by Church- and later state-run institutions of artistic instruction throughout Europe and far beyond was an effective tool of empire capable of generating enormous economic profit as well as universally imposed, but actually culturally specific, attitudes about art.[65] "Ingenuity" was a culturally specific category that was applied to extra-European artists. I cite the example of Fray Bartolomé de las Casas, the most famous sixteenth-century European apologist for Amerindians, who compared the arts of the Old and New worlds to prove the rationality of Amerindian peoples. Acutely aware of the danger of classifying outsiders as inferiors and believing that Amerindians possessed full potential for civility, Las Casas cited as evidence their skill in the mechanical arts which, he argued, were, like the liberal arts, a function of the rational soul (*habitus est intellectus operativus*).[66] His arguments echoed ideas recorded around the same time by Italian art theorists who claimed that painting, sculpture, and architecture, which had been classified as mechanical arts in Medieval texts, deserved the same status as the liberal arts.

Yet even as Las Casas defended the Amerindians' humanity, he helped to construct an inferior collective identity for the "New World." In his view, the Indians were merely capable of assimilating European culture under European guidance.[67] Moreover, his praise of Amerindians for their skill in the mechanical arts positioned their capabilities at a level inferior to the liberal arts status argued for painters, sculptors, and architects in contemporary European debates on the visual and spatial arts.[68]

Many new research questions are vying for attention. The compositional procedures and representational skills that we still associate with individual Renaissance artists were disseminated around the globe, above all through printed texts and images. Engravings more than paintings provided the necessary spectacle because prints could be multiplied inexpensively and quickly and disseminated broadly.[69] The technical innovations of the print media also speak to the continuing importance of ingenuity in the Early Modern state. The great age of French printmaking during the reign of Louis XIV is a testament to the artistic and economic success of his policies; today we might call it branding. In France, prime ministers Richelieu and Colbert were pointedly emulating the Plantin-Moretus Press in Antwerp, publisher for the Spanish Habsburg Empire. The art book—illustrated compilations of natural history specimens, and equally lavishly illustrated, large-format cultural geographies of the world or of specific extra-European peoples—also attracted a considerable market share by the late sixteenth century, and sales were booming in the 1600s.[70]

What became the institutional authority of European art, media, and technology deserves to be told differently if the aim is to create more inclusive understandings of how the past reverberates in the present. Broader arguments about the work of art in the age of its mechanical reproducibility can easily apply to the sixteenth century.[71] Accelerating the process of global connectedness, printed images and texts alongside manuscript sources and other mobile objects made a multi-forked trek across Europe and the Mediterranean, the Americas, Asia, and the entire planet beginning in the sixteenth century.[72] The material texts, images, objects, and human agents that established the authority of Western representation and technology for hundreds of years are a magnificent but also troubling and contested legacy entangled with European imperialism. Our present challenge is to find ways to write history anew from many previously unexplored angles. This short essay has defined themes and arguments about ingenuity at the initiation of these complex trajectories in some important Italian sources with the aim of encouraging the investigation of artisanal epistemologies in a transcultural context.