

Reconsidering the World-system: The Agency and Material Geography of Gold

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If it is accurate that our current interest in the global is at least partially motivated by questions of capital flow due to trade and the economic bonds and asymmetries it creates, we would do well to examine pivotal ideas articulated in the 1970s by Immanuel Wallerstein under the rubric of world-systems theory. Heavily indebted to Fernand Braudel's *La Méditerranée et le monde méditerranéen à l'époque de Philippe II*, Wallerstein made a significant contribution to the study of world history that reinterpreted the post-medieval period along structural, if Eurocentric lines.¹ His main concern was presenting an analysis that traced the creation of the modern world. By this Wallerstein meant the world as propelled by Western Europe and North America's self-reproducing capitalist economies that—he argued—had their origination in Renaissance Europe. In focusing on a multipart system of a core, oriented in present-day Holland, England and northern France; a semi-peripheral ring; and a periphery, constituted by parts of the Mediterranean basin, Eastern Europe, and Latin America, Wallerstein insisted on a center periphery dynamic. This transnational world-system developed during the sixteenth century and set the stage for long-term disproportions of power. It consisted of a linked but unequal economy, with a mode of production that was broader than individual entities, thus weaving multiple cultures together, each organized through a developed division of labor. While this essay joins others that have sought to qualify Wallerstein's assertions, he offers two conjoined propositions that are significant: first, that change can occur outside of political formations, which is to say that trade can engender transformation and second, that it is productive to use the magnitude of the world, or the macro-scale, as a frame of reference for historical inquiry.²

1 Fernand Braudel, *La Méditerranée et le monde méditerranéen à l'époque de Philippe II*, 2 vols. (Paris, 1949); and Immanuel Wallerstein, *The Modern World-System: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century* (New York, 1974).

2 Robert DuPlessis, "Wallerstein, World Systems Analysis, and Early Modern European History," *The History Teacher* 21 (1988): 222.

Though Wallerstein's declarations quickly gained currency among historians of early modernity, others have offered assessments of his arguments that range from the claim that he overstated the scale of sixteenth-century international trade to the contestation that the center to periphery model lacks a consideration of interactive dynamics within his tri-partite categories.³ Engaging in debates about what constitutes modernity, Wallerstein's theory has also been questioned because he makes overly crisp distinctions between pre-modernity and modernity.⁴ Specifically, the dualism between pre-modern world economies, which were hampered by the territorial domain of their political authorities, versus later world capitalist economies that transcended the territorial boundaries of political power has been challenged. One of the most sustained and durable commentaries on Wallerstein in this regard came from Janet Lippman Abu-Lughod, who offered a well-supported critique of world-system theorization.⁵

Abu-Lughod rethought the rise of the West and forwarded the idea that nodal, urban archipelago formations flourished during the late medieval period with realms spread from China to India to Europe.⁶ The contact zones she described were connected to one another through long-distance trade that had no single center, but rather were composed of a non-hierarchical, complex structure. Europe was but one player in this world-system. There was no inherent reason for its later rise, which is to suggest that it was not Europe's movement away from feudalism that singularly resulted in its economic ascendancy, but the falter of other areas of the world after 1350. Abu-Lughod stressed the interconnection of cultures, which she argued shared structural similarities, especially in how merchants used money, credit, and partnerships, which all prevented singular domination. One of her main interests was in showing that there was a dynamic web of international trade that directly bound together cultures separated by radical distances.

Although it is fair to question Abu-Lughod's thesis that exogenous factors enabled the rise of Europe, her research nonetheless brings our attention to the importance of the vibrancy and coalescence of a late medieval world-system

3 For a summary of chief objections to Wallerstein's thesis, see *ibid.*, 225–27.

4 Finbarr Barry Flood et al., "Roundtable: The Global Before Globalization," *October* 133 (2010): 3–4.

5 Janet Abu-Lughod, *Before European Hegemony: The World System A.D. 1250–1350* (New York, 1989); and eadem, *The World System in the Thirteenth Century; Dead-End or Precursor?* (Washington, DC, 1993), 4–11.

6 Abu-Lughod's periodization itself should face scrutiny. Ongoing research using resources including the Geniza documents has revealed the intensity of medieval trade before 1250 in the Indian Ocean and Red Sea, also, in Black Sea trade, there was already a strong Italian presence at the outset of the eleventh century.

that questioned territorial integrity. This essay looks at trade that involved gold as a mechanism that propelled critical changes within financial instruments, specifically the reintroduction of successful systems of bimetallic coinage to the Italian peninsula during the thirteenth century. Suggesting the continuing relevance of Abu-Lughod's approach to world-systems thinking, the essay examines how gold was transported to Europe from the firmament of western and northern Africa. In addition to considering the production of gold coins as integral to the premodern world-system, the essay has a related endeavor: to examine the metamorphosis of coins into other media, as doing so raises the prospect that the materials that hemmed together the geopolitical system described by Abu-Lughod fostered sensibilities about far flung places as commodities moved through trade conduits.⁷ Embedded within this discussion is an argument that claims both that materials are meaningful in and of themselves and that they are a significant component of representation.⁸ As Ann-Sophie Lehmann recently has observed, this seemingly simple assertion belies how antithetical such an analysis is to the normative vision of art objects, which can be thought of as a "hylomorphic" conception of ideation.⁹ In this paradigm, ideal forms take conceptual precedence over material. As Lehmann points out, scrutinizing the hylomorphic model is not to flippantly reverse it by elevating materials and, from them, working back to ideation, but rather to undertake an analysis in which form and materials are sutured together in a reciprocal, dynamic relationship with one another.¹⁰

Giotto and Gold

Though a seemingly abstract paradigm, the world-system, for Abu-Lughod, was meant to be visible and tangible. It is fleshed out in one of the most celebrated of all early Renaissance fresco cycles, Giotto's distinctive works in the Scrovegni Chapel in Padua, which he probably painted between 1303 and 1305 (fig. 5.1).

7 I look here to Anne Dunlop, "Materials, Origins and the Nature of Early Italian Painting," in *Crossing Cultures*, ed. Jaynie Anderson (Melbourne, 2009), 472; and eadem, "On the Origins of European Painting Materials, Real and Imagined," in *The Matter of Art: Materials, Practices, Cultural Logistics, c. 1250–1750*, ed. Christy Anderson et al. (Manchester, 2015), 76–77.

8 Ann-Sophie Lehmann, "The Matter as the Medium: Some Tools for an Art-theoretical Interpretation of Materials," in *The Matter of Art*, ed. Christy Anderson et al. (Manchester, 2015), 21.

9 *Ibid.*, 22.

10 *Ibid.*, 26.



FIGURE 5.1 *Giotto di Bondone, Scrovegni Chapel, c. 1305, Padua.*
CAMERAPHOTO ARTE, VENICE / ART RESOURCE, NEW YORK

As is well known, Enrico Scrovegni, Padua's wealthiest moneylender, likely commissioned the private chapel to atone for the Christian sin of usury committed both by himself and by his father, Reginaldo, who amassed wealth through banking practices that were judged within contemporaneous culture to be moralistically exploitative.¹¹ The fresco cycle prominently stresses Judas's greed and the damnation associated with usury during the late medieval and Renaissance periods, thus acknowledging and therein attempting to expiate the Scrovegni family's sin of moneylending.¹² It has been argued that, in order to advance Enrico's aspiration for salvation, Giotto and his advisor(s) strategically juxtaposed the conceptual barrenness of moneymaking, and more specifically, the metal Judas received in the form of coins against the fruitfulness of the wombs of Mary and Elizabeth.¹³ This trope is featured in the narrative of the panels depicting *The Visitation* and *Judas Receiving Payment* for

11 Ursula Schlegel, "On the Picture Program of the Arena Chapel," *Zeitschrift für Kunstgeschichte* 20 (1957): 125–46.

12 Ibid.

13 Ibid.; and Anne Derbes and Mark Sandona, "Barren Metal and the Fruitful Womb: The Program of Giotto's Arena Chapel in Padua," *The Art Bulletin* 80 (1998): 274.

his Betrayal, which are paired on the wall that partitions the chancel from the nave, with the chancel itself cleaving space between the panels (figs. 5.2, 5.3). Within the narrative scenes, the figures are composed so as to echo and yet offset one another; Mary and Elisabeth's embrace foils the sliver of space severing Judas from the chief priest, just as each woman's fecund womb counters Judas's money satchel.

Coins, however, were not simply referenced through pictorial illusionism in the fresco's narrative. Technical analysis of the metal employed in the fresco reveals the gold leaf used by Giotto is nearly pure in its metallic content, indicating that it probably was derived from gold coins, although lower quality metal was also used for gilding less elevated figures and areas.¹⁴ Resplendent halos, often given dimension through a gesso substrate to which gold leaf was applied, decorative motifs on cloaks and armor, and even stars were likely depicted through the application of hammered coins as a technical study has revealed (fig. 5.4).¹⁵

There is thus a fascinating disruption between money in its role as ill-gotten gain, associated as it was with the sterility ascribed to it by Aristotelian tradition, and its fulgent and prominent use in the Chapel. Gold, and coins more specifically, which so often evinced metaphors of ardent desire, participated materially in Enrico's quest for spiritual fulfillment. This double set of connotations is not necessarily paradoxical; rather, it is an index of the powerful tensions located within money for those who engaged with it during the late medieval and Renaissance eras. It also begs a consideration of how the material geography of gold might enhance an interpretation of the cycle, a topic to be addressed later. First, however, it is important to underscore that Giotto was far from unique in his use of beaten coins as an artistic material.

14 The gold sampled is nearly pure and its thickness varies between 1.2 and 1.8 microns, which is consistent with the dimension metalworkers would obtain per sheet if they followed the dictates about gold leaf production set forth by Cennino Cennini and in various statutes that governed the *battilori*. See Lucia Traviani, "Monete battiloro e pittori. L'uso dell'oro nella pittura murale e i dati della Cappella degli Scrovegni. Coins, Gold-beaters and Painters. How Gold was used in Wall Paintings: Some Examples from the Scrovegni Chapel," *Bollettino d'Arte* (2005): 145, 149–50.

15 Maurizio Marabelli et al., "Le lamine metalliche utilizzate nella decorazione dei dipinti murali giotteschi; Metal leaves utilized for decoration of Giotto's mural paintings," *Bollettino d'Arte* (2005): 125–26.



FIGURE 5.2 *Giotto di Bondone, The Visitation, c. 1305, fresco, Scrovegni Chapel, Padua.*

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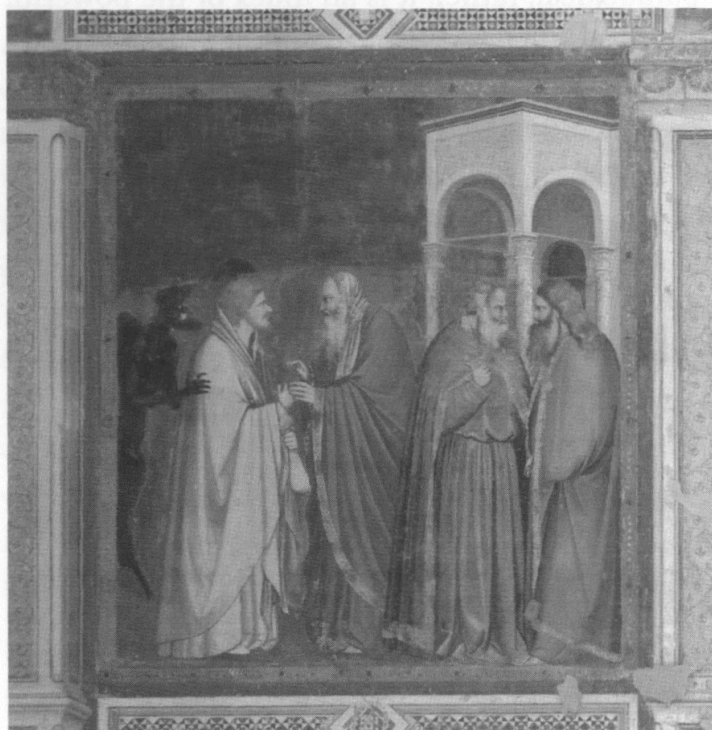


FIGURE 5.3 *Giotto di Bondone, Judas Receiving Payment for his Betrayal, c. 1305, fresco, Scrovegni Chapel, Padua.*

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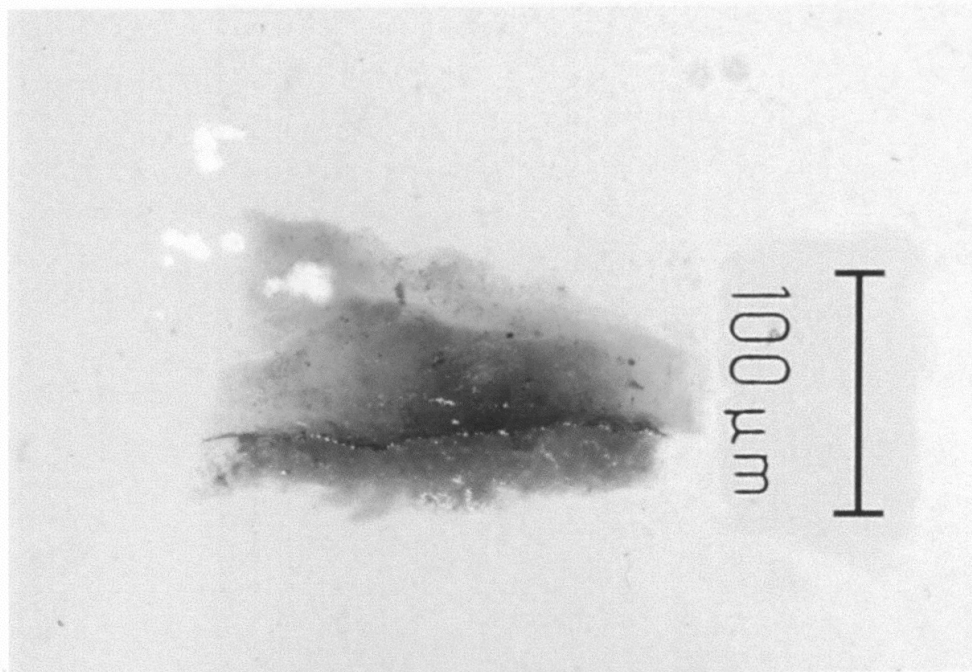


FIGURE 5.4 Cross-section of a sample from the halo of the Baptism of Christ observed under reflected light, from the Scrovegni Chapel, Padua.

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PHOTOGRAPHIC ARCHIVES

Coins as Medium

Obtaining gold from coins was a practice common to medieval and Renaissance art-making, as advice proffered in manuals, such as those written or compiled by Theophilus Presbyter (or the person writing under that pseudonym) and the painter Cennino Cennini, documentary evidence, and technical analysis affirm.¹⁶ Between 1370 and 1371, Jacopo di Cione and a member of his workshop made an altarpiece for the Benedictine nunnery of San Pier Maggiore in Florence (figs. 5.5, 5.6).

16 Several technical studies are adduced in Irma Passeri, "Gold Coins and Gold Leaf in Early Italian Paintings," in *The Matter of Art: Materials, Practices, Cultural Logistics, c. 1250–1750*, ed. Christy Anderson et al. (Manchester, 2015), 106. For examples of contracts that mention the purchase of gold leaf, see Traviani, "Monete battiloro," 148. Theophilus does not discuss the material origins of gold, but he distinguished between four categories of gold: that from the land of Havilah; Spanish gold; gold from the sand banks of the Rhine; and Arabian Gold, implying that the latter came from areas under Muslim control including parts of northern Africa. See Theophilus, *On Diverse Arts*, trans. John Hawthorne and Cyril Stanley Smith (Chicago and London, 1963), 118–21, book III, chapters 46–49. Cennino Cennini advised that Venetian ducats should be beaten to produce gold leaf at a rate of 100 leaves to the ducat, rather than 145 pieces. See Cennino Cennini, *The Book of the Art of Cennino Cennini*, trans. Christiana Herringham (London, 1930), 115, chapter 139.

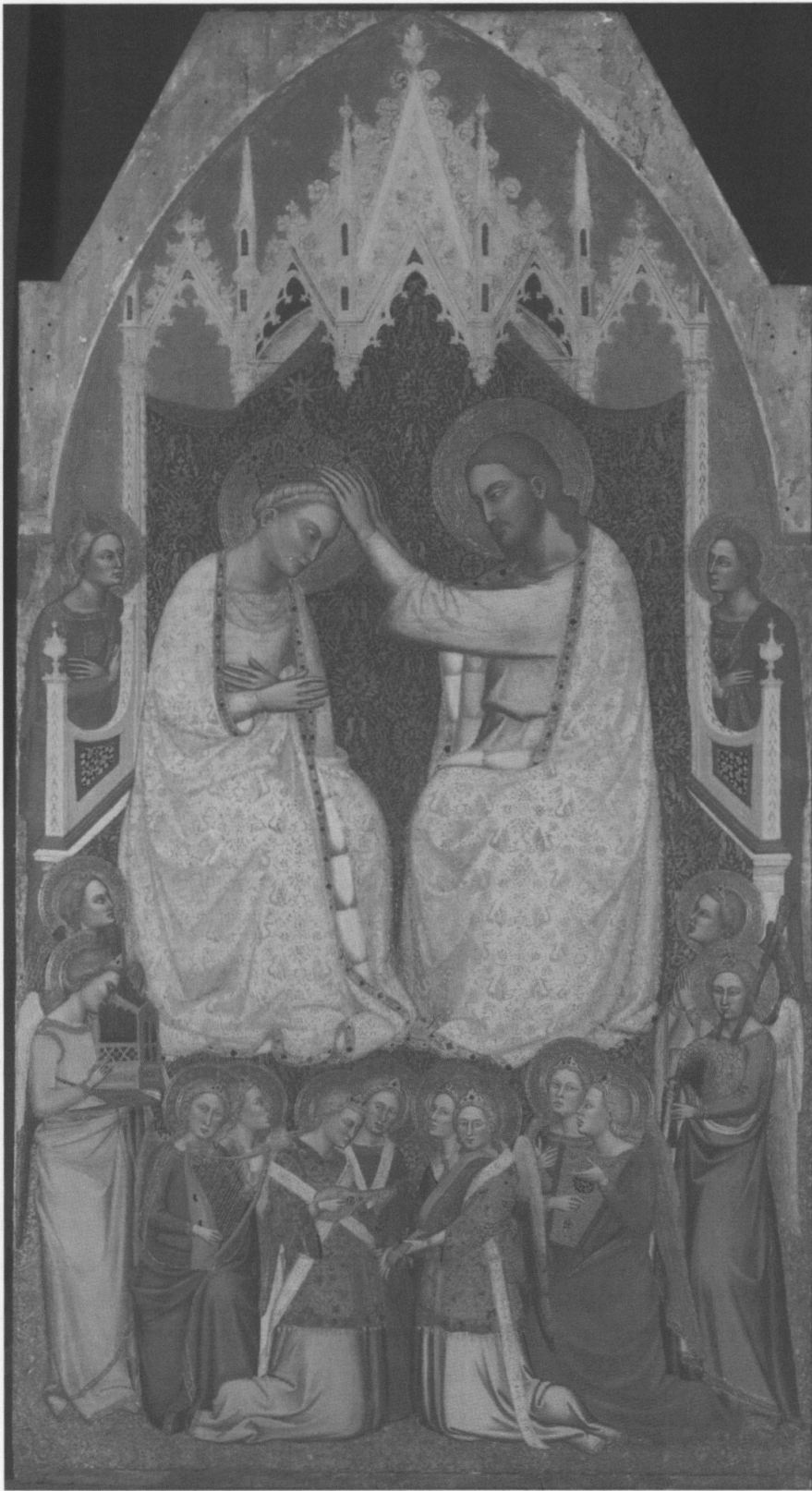


FIGURE 5.5 *Jacopo di Cione and Workshop, The Coronation of the Virgin, Central Tier Panel of the San Pier Maggiore Altarpiece, 1370–71, tempera on poplar.*

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RESOURCE, NEW YORK

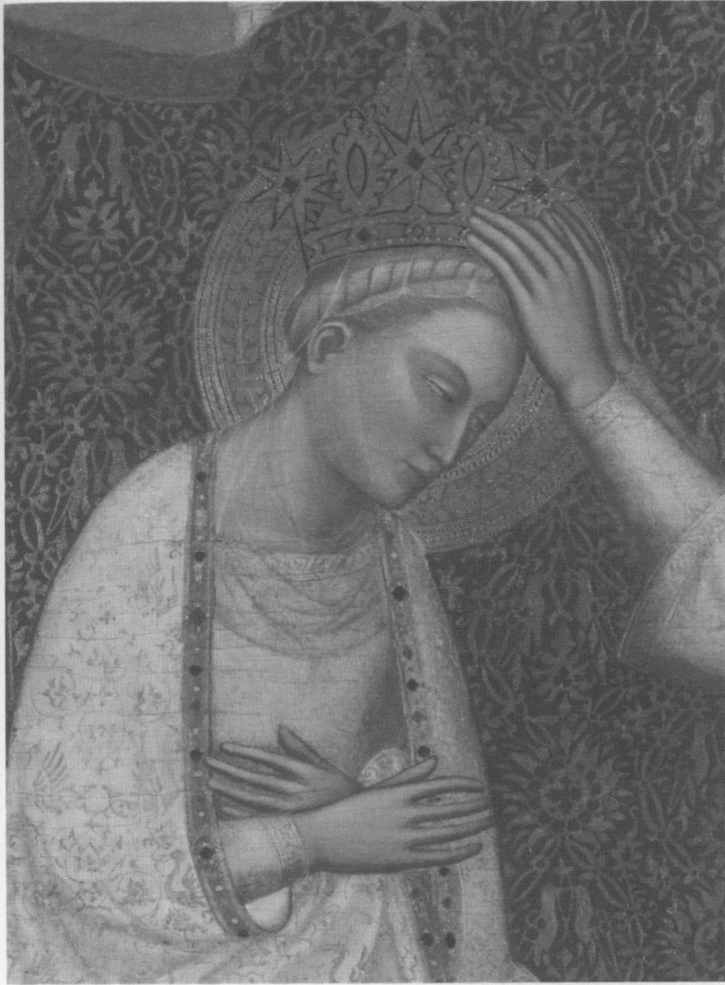


FIGURE 5.6 *Jacopo di Cione and Workshop, The Coronation of the Virgin, Central Tier Panel of the San Pier Maggiore Altarpiece, detail, 1370–71, tempera on poplar.*

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ART RESOURCE, NEW YORK

Records state that three payments were made at the rate of a florin apiece for 100 sheets of gold to detail the drapery of figures and representations of cloth fringes in the polyptych.¹⁷ Technical analysis of a fragment of gold leaf from the altarpiece revealed its thickness comports with directives recorded in treatises for the number of sheets that should be derived from gold coins, indicating

17 David Bomford, *Art in the Making: Italian Painting before 1400* (London, 1989), 182, 197. For the San Pier Maggiore Altarpiece, see Dillian Gordon, *The Italian Paintings before 1400* (London, 2011), 52–91.

coins were used to make the gold leaf employed in parts of the altarpiece.¹⁸ It is likely the gold leaf was applied to surfaces prepared with bole, a reddish clay ground onto which the gold squares or rectangles were burnished.

In a different instance in which coins were used to create gold leaf, when buying materials to embellish works commissioned by Francesco Datini, the Florentine painter Giovanni di Tano obtained three florins in 1403 that were noted as having been produced at Florence's mint; those coins probably were converted into gold leaf used for gilding.¹⁹ Scores of other late medieval and Renaissance contracts declare material used for gold leaf and gilding should be "*aurum purum*," "*aurum purissimum*," or "*optimum aurum*," all forms of pure gold, meaning gold leaf derived from coins that had been beaten into thin sheets.²⁰ For instance, in 1320 Pietro Lorenzetti entered into a contract to complete a polyptych for Santa Maria della Pieve in Arezzo that required him to use "*optimo auro*" (the best gold) for certain figures.²¹

Painters and gilders were far from the only practitioners who integrated pulverized coins into the objects they created; weavers and embroiders, too, used thread composed of thinly twisted filaments of metal, made from coins, that had been wrapped around a core.²² Gold thread was woven to form prized, luminous fabric and looped gold thread shimmered above silk and velvet pile on fabrics, some of which were called "*broccato*," a term specifying the addition of gold or silver.²³ Whereas in the Trecento the inner support

18 Bomford, *Art in the Making*, 22. The technical studies were undertaken at the National Gallery of Art, London and they accounted for differences in the weight of the florin from Cennini's time compared to the years in which the San Pier Maggiore Altarpiece was created.

19 Cesare Guasti, *Santa Maria del Fiore: la costruzione della chiesa e del campanile secondo i documenti tratti dall'Archivio dell'Opera Secolare e da quello di Stato* (Florence, 1887), 417; and Susanne Kubersky-Piredda, "The Market for Painters' Materials in Renaissance Florence," in *Trade in Artists' Materials: Markets and Commerce in Europe to 1700*, ed. Jo Kirby et al. (London, 2010), 230, n. 27.

20 Bomford, *Art in the Making*, 22; Jack Ogden, "The Technology of Medieval Jewelry," in *Ancient and Historic Metals: Conservation and Scientific Research*, ed. David Scott et al. (Los Angeles, 1994), 157; Christoph Merzenich, "Dorature e policromie delle parti architettoniche nelle tavole d'altare toscane tra Trecento e Quattrocento," *Kermes* 26 (1996): 56; and Traviani, "Monete battiloro," 146.

21 Pèleo Bacci, *Dipinti inediti e sconosciuti di Pietro Lorenzetti, Bernardo Daddi etc. in Siena e nel contado* (Siena, 1939), 76–79.

22 Anuradha Dey, "Filato metallico notizie storico-technologiche," in *Il paliotto di Sisto IV ad Assisi*, ed. Rosalia Varoli-Piazza (Assisi, 1991), 52.

23 Florence Elder de Roover, *L'Arte della Seta a Firenze nei secoli XVI e XV* (Florence, 1999), 88; Jacqueline Herald, *Renaissance Dress in Italy 1400–1500* (London, 1981), 84, 209; and

for gold thread commonly was gut, during the Quattrocento expensive fabrics used metal, sometimes gilt, wrapped around a linen or yellow silk nucleus.²⁴ Contemporaneous textiles from the fifteenth century also employed a continuous gold thread in the weft, while a later change in technique eked the thread through yellow silk, allowing for broad expanses of gold to appear to cover a swath of fabric.²⁵ “*Riccio sopra riccio*” (rich on rich) stitching, involved placing metal loops atop one another, resulting in large patches of gold work that varied in height, amplifying the allure of the fabric.²⁶ Velvet produced with different planes of gold was known as “*alluciolati*,” its name deriving from “*luciole*,” as fireflies seemed to swarm the textile’s surface.²⁷

Account books kept by a Florentine mercantile firm headed by Tommaso di Luigi Ridolfi and others in the middle of the fifteenth century demonstrate an insistence on using pure gold in the production of metal thread.²⁸ In 1447, the company received silk from a region bordering the Caspian Sea.²⁹ Within a few days of getting the shipment, the company purchased thirteen Genoese gold ducats from the local Medici bank and silver from a different bank to be hammered into sheets, which were then taken to nuns residing in the Florentine convent of the Murate near Santa Croce. The nuns cut the sheets, sheering them with scissors sharpened for such a purpose by the Ridolfi firm, then twisted the metal strips around the silk, which was later woven into fabric.³⁰ Through agents in Genoa, Rome, and Rimini, similar fabric was promoted abroad as some of the highest quality available, made as it was with “*oro fine filato*” (gold thread).³¹

Materials used to make textiles are both surface and support, giving them a particular semantic potency and flexibility.³² Worn or simply displayed, textiles made with gold thread imparted personal distinction and social prestige, yet their very materiality also bolstered civic stature. When goods glimmering

Franco Franceschi, “Florence and Silk in the Fifteenth Century: The Origins of a Long and Felicitous Union,” *Italian History and Culture* 1 (1995): 11, n. 44.

24 de Roover, *L'Arte della Seta*, 88.

25 Lisa Monnas, “Italian Silks (1300–1500),” in *5,000 Years of Textiles*, ed. J. Harris (London, 1993), 170.

26 *Ibid.*

27 Franceschi, “Florence and Silk,” 11, n. 45.

28 de Roover, *L'Arte della Seta*, 90–91.

29 *Ibid.*, 90.

30 *Ibid.*, 91.

31 *Ibid.*, 95.

32 Tristan Weddigen, “Textile Spaces, Interior and Exterior,” in *Display of Art in the Roman Palace, 1550–1750*, ed. Gail Feigenbaum (Los Angeles, 2014), 163.

with mutated coins circulated regionally and transnationally, the status of Italian city-states was advanced through the fineness of gold. As the Florentine Consuls of the Arte di Por Santa Maria would boast in 1416, “at present in this good city of Florence the most beautiful and perfect gold and silk fabrics in the world are produced.”³³ In promulgating claims such as that, it was critical to stress and assert gold’s inherent purity, a concern to which we now turn.

Affordance

In considering how materials, along with human creativity, participate in art-making, it is useful to invoke the notion of affordances as theorized by James J. Gibson.³⁴ According to Gibson, properties of things provoke specific actions; for example, a window is made of glass because of the properties glass affords. Within this line of thought, the enduring gleam of gold, its lasting color, and its ductility are among the various properties that actuate its use. Another affordance of gold, its chemical purity, motivated its use as money and the transmutation of coins into an artistic medium. Gold’s purity was tightly bound to its point of geographic origin, and this was one of gold’s properties that was promoted in late medieval and early Renaissance works where transmogrified gold coins were used. Returning to the Scrovegni Chapel, the physical employment of mutated coins in the work raises the possibility that the representation of Judas’s moneybag indeed evoked barrenness, but also that as an artistic medium, the use of gold evinced the productivity of trade and the circulation of commodities, purging money of the vices associated with it. In the fourteenth century, the jurist Bartolus of Sassoferrato, a contemporary of Dante and Petrarch, declared that cities needed a healthy contingent of merchants, and that trade and commerce were the cornerstones of political power.³⁵

33 Umberto Dorini, ed., *Statuti dell’Arte di Por Santa Maria del tempo della Repubblica* (Florence, 1934), 443: “*in hac alma florentina civitate hodiernis tempoibus drappi de auro et siricho pulcrius et perfectius quam in toto orbe terrarum conficiuntur et fiunt.*” See also Franceschi, “Florence and Silk,” 10.

34 James J. Gibson, “The Theory of Affordances,” in *Perceiving, Acting and Knowing: Toward and Ecological Psychology*, ed. Robert Shaw and John Bransford (New York, 1977), 67–82; idem, *The Ecological Approach to Visual Perception* (Boston, 1979); and Lehmann, “The Matter as the Medium,” 31–34.

35 Hans Baron, “Franciscan Poverty and Civic Wealth as Factors in the Rise of Humanistic Thought,” *Speculum* 13 (1938): 17–18; and Diana Wood, *Medieval Economic Thought* (Cambridge and New York, 2002), 118.

Gold coins were used as an artistic medium because they assured the caliber of their own material, which suggests that through their use they evoked their geographic origins and the trajectory of their movement through trade, itself predicated on the world-systems interaction described by Abu-Lughod. Following the privileging of minting silver in Western and Central Europe for nearly five hundred years, in 1252, the Genoese and Florentines radically altered the course of European monetary history with the reintroduction of successful bimetallic coin types within each city's own monetary system.³⁶ By the close of the thirteenth century, the issuing of gold coins was common throughout the Italian peninsula.

Although a lack of contemporaneous documents describing rationale leaves room for speculation, the return to the minting of gold appears to have had several causes.³⁷ Emerging cities and towns needed a stable coinage that could be utilized transnationally and which would hold sway over a broad territorial domain. During the late antique and early medieval period, silver coins deteriorated in weight and pure metallic content; thus, they were hard pressed to support the boom in trade that occurred in the thirteenth century and which shaped world-systems dynamics.³⁸ As Peter Spufford has observed, silver coins were "no longer fit to serve as supra-national tender," creating the opportunity for a different, high value unit of monetary measurement, as well as other financial mechanisms such as the bill of exchange, to surface.³⁹ The incredibly vast production of coins was predicated on having a ready supply of material to support such an endeavor, as well as a political structure that designated that metal should be used as money.

Metal is of course remnant in both old coins and numerous kinds of luxury objects. There is nothing to say that many of the gold coins produced on the Italian peninsula during the late thirteenth century and onward were not made of recycled material. Indeed, to make coins Florentines haughtily melted down a votive statue of Saint John the Baptist created after they acquired Pisa, an action that stresses the point that coins were not always made from metal

36 The Genoese *genovino* and the Florentine *florino d'oro* were not the first post-antique gold coins issued in the medieval West; however, their impact was much greater than that of the gold coins minted previously.

37 Thomas Walker, "The Italian Gold Revolution of 1252," in *Precious Metals in the Later Medieval and Early Modern Worlds*, ed. J. F. Richards (Durham, NC, 1983), 30.

38 Ibid.

39 Robert S. Lopez, "Back to Gold, 1252," *The Economic History Review* 9 (1956): 219.

carried and shipped over long distances.⁴⁰ Pulled by the draw of monetary gain made through liquidity, gold, silver, and alloyed objects in the late medieval and Renaissance worlds were capital in temporary stasis, protean forms ready to be de-hoarded, converted, and reused at will. Nonetheless, late medieval and early Renaissance trade was a significant, if variable, material source of raw metal used to make coins.

Medieval gold mining came of age when mining technology in Hungary, Bohemia, and Silesia was developed to further exploit natural resources there. The first major gold mine opened in Serbia in 1252 and subsequently there was a quick expansion of Balkan gold mining. However, Europe also looked to imported metal to mint gold, with most of its supply coming from various places in the Levant and Africa.⁴¹ While it is beyond the scope of this essay to address the thorny question of the comparative volume of newly available gold that came to Europe from either area, or the price increases that theoretically would have occurred with an increase in bullion, it is worth pointing out that proxy evidence suggests a readiness of gold in Africa.⁴² West Africa had long, albeit indirectly, provided gold to Italy through trade with the Maghrib, especially by way of Spain and Sicily.⁴³ By the mid-thirteenth century the purity of coins minted by the Almohads in Morocco, the Hafsids in Tunisia, and the Ayyubids in Egypt reached nearly 24 carats, whereas gold coins had been debased dramatically in the kingdom of Sicily, territories in the Crusader domain, and at Nicaea, where the Byzantine empire was relegated.⁴⁴

As this essay is part of a growing body of literature that seeks to attend to how objects can reify networks, migration, and cultural contact, before addressing the most significant of the multiple trade routes by which gold was transported northward to Europe, it is important to outline a framework for understanding premodern trade systems.⁴⁵ The network as a paradigm for

40 Cesare Guasti, *Le Feste di S. Giovanni Batista in Firenze: descritte in prosa e in rima da contemporanei* (Florence, 1884), 18.

41 Lopez, "Back to Gold," 233.

42 Michael M. Postan, "The Rise of a Money Economy," *Economic History Review* 14 (1944): 128.

43 Walker, "The Italian Gold Revolution," 43–44.

44 Lopez, "Back to Gold," 225–26; Walker, "The Italian Gold Revolution," 39, 43; and Peter Spufford, "The First Century of the Florentine Florin," *Rivista italiana di numismatica e scienze affini* 107 (2006): 423, n. 53.

45 For recent contributions, see Dunlop, "Materials, Origins," 472–76; eadem, "Carrying the Weight of Empire," in *Matters of Weight: Force, Gravity, and Aesthetics in the Early Modern Period*, ed. David Young Kim (Emsdetten, 2013) 84; and Alina Payne, introduction to *Dalmatia and the Mediterranean: Portable Archaeology and the Poetics of Influence*, ed. Alina Payne (Boston and Leiden, 2014), 1–18.

comprehending the circulation of objects in premodernity has been critiqued for its facility, which tends to construct a seemingly fluent exchange of objects wherein goods act as proxies for people who in reality are at odds with one another.⁴⁶ Likewise, conceptualizing interactions as networks can flatten exchange so that it is presented as linear and singularly directional in flow. Trade involving gold did not move in a unidirectional manner. Objects that made their way from north to south included salt, perhaps most importantly, as well as textiles produced in Europe and Egypt, glass, spices, and copper.⁴⁷ Nor was precious metal carried exclusively northward: metal itself occasionally (although not commonly) was transported south due to relative valuations, as occurred in the 1250s and 1260s when Catalan, Provencal, and north Italian merchants carried minted silver to north Africa to exchange it for gold dust.⁴⁸ As I describe the geographic origins of gold and attend to an array of connections between actors, both human and material, it is productive to invoke what has been described as a “worknet.” Imagining a fictive conversation between a professor versed in actor-network theory and a doctoral student, Bruno Latour outlined the concept in *Reassembling the Social*.⁴⁹ The professor observes that the metaphor of the worknet has more credence than that of a network because it more fully accords with the fluxes and changes that occur between agents linked to one another.⁵⁰

The Worknet of Medieval Gold

While research about medieval trade between the Italian peninsula and the Levant is robust, such scholarship concerning the movement of gold from south to north across the Mediterranean remains fragmented or is often glossed over; however, its complicated trade patterns can be narrated. Because gold was derived from auriferous quartz-gravel deposits swept downstream along rivers in water run-offs that were impacted by climatic fluctuations, medieval gold

46 Flood et al., “Roundtable: The Global Before Globalization,” 6–7.

47 Peter Spufford, *Money and its Use in Medieval Europe* (Cambridge and New York, 1988), 163.

48 Spufford, “Local Coins, Foreign Coins in Late Medieval Europe: An Overview,” in *Moneta locale, moneta straniera: Italia ed Europa, XI–XV secolo. The Second Cambridge Numismatic Symposium*, ed. Lucia Travaini (Milan, 1999), 30.

49 Bruno Latour, *Reassembling the Social* (New York and Oxford, 2005), 143. Ann-Sophie Lehman insightfully has discussed Latour’s concept. See Lehmann, “The Matter as the Medium,” 34.

50 Latour, *Reassembling the Social*, 143.

production was not always stable by location, unlike mined gold; nonetheless, its sources in West Africa have geographic specificity that can be detailed.⁵¹

Muslim commentators and geographers, beginning in the late eighth century described the presence of gold in Ghana, calling it “the land of gold.”⁵² In the mid-twelfth century, al-Idrisi reported that the gold itself came from “Takrur” and “Wangara,” the famed Island of Gold, which was, he wrote, “celebrated for the purity and abundance of its gold.”⁵³ In addition to a place discussed by al-Idrisi and others, Wangara also referred to a group whose ancestors were Soninke long-distance traders, widely dispersed throughout West Africa due to diaspora.⁵⁴ They sometimes relied on local workers to extract metal. Occasionally, they then met Arab and Berber merchants in places where the grasslands of Western Sudan bled into the southern rim of the Sahara, and from there gold flowed from West Africa to Morocco, Italy, Andalusia, and Christian Spain.⁵⁵ Traders from the Italian peninsula exchanged goods for gold in designated places in north African towns, including fonduks/funduqs, and gold was then transported across the Mediterranean to the north, although sometimes in a circuitous manner.⁵⁶ As Thomas Walker has commented, “The pattern of Italian trade in the Mediterranean, however, was far more complex. With Italian trading colonies all over the Mediterranean, trade often passed directly from one port to another without ever being registered by an Italian notary at home.”⁵⁷

With help from the Pisans, Florentines established banking operations in Tunis beginning in 1250.⁵⁸ By 1253, the Florentines were trading wool and woven fabric with Tunisia by way of Genoa and records from 1275 reveal that the Florentines entered into business partnerships with the Genoese to

51 Ian Blanchard, *Mining, Metallurgy and Minting in the Middle Ages* (Stuttgart, 2005), vol. 3, 1129.

52 Richard L. Smith, “Medieval Coins, West African Gold: Secrets and Lies behind the Trans-Saharan Trade, Part 1,” *Celator* 18 (2004): 6, 10; and Dunlop, “On the Origins,” 77. Medieval Ghana was geographically distinct from modern Ghana; the medieval area was in what is now western Mali and southern Mauretania.

53 E. W. Bovill, *The Golden Trade of the Moors* (Oxford, 1968), 119; and Joseph M. Cuoq, *Recueil des sources arabes concernant l’Afrique occidentale du VIII^e au XVI^e siècle* (Paris, 1975), 134–35.

54 Susan Keech McIntosh, “A Reconsideration of Wangara/Palolus, Island of Gold,” *The Journal of African History* 22 (1981): 153.

55 Smith, “Medieval Coins,” 14, 21.

56 Walker, “The Italian Gold Revolution,” 44, n. 71; Smith, “Medieval Coins,” 14; and McIntosh, “A Reconsideration,” 152, 152, n. 33.

57 Walker, “The Italian Gold Revolution,” 45.

58 *Ibid.*, 52.

sell wool in North Africa, probably in exchange for gold, among other goods.⁵⁹ At other points during the thirteenth century Florentine traders worked with Pisan ones, taking advantage of their overseas prowess and their rights to *fondacos* in Ifriqiya at La Groletta, the port of Tunis, as well as trading sites in Gabes, Sfax, and also in the port towns of Bona and Tripoli to access Almohad gold from the Maghrib region.⁶⁰

The Wangara were not Africa's only gold traders. Gold became available in significant quantities in late medieval Europe when parts of sub-Saharan Africa were opened to trade in part due to newly founded and formed political states.⁶¹ After the remnants of Ghana fell by 1224 under longstanding pressure from the Almoravid rulers, by the middle of the thirteenth century a tributary emirate on the upper Bakhoy River, the formerly small and now large Malinke kingdom of Mali (or Melle), grew in significance and potency, assembling an expansive savannah empire between the mouth of the Senegal eastwards beyond the Niger, sparking an increase in gold exports moving north of the Maghreb into Europe, in part because of the political unity the kingdom brought to the area.⁶² The Melle empire, nominally Islamic by the rule of the usurper Sakura, was expanded under Sundjata (ca. 1217–ca. 1255), who, among his other conquests, defeated the Wangara and ruled their gold fields from his capital, Melle.⁶³ Trade routes were realigned (ca. 1315–1370) to direct routes across the arid dunes of the Sahara to Egypt on one side and the Maghreb on the other.⁶⁴ Some historians of the Western Sudan have ascertained that the cities that became important to the gold trade and which the medieval commentators referred to by “Wangara” are Bambuk, a site on the upper Senegal,

59 Davidsohn, *Storia di Firenze*, 6, 745.

60 *Ibid.*, 745–46; and Walker, “The Italian Gold Revolution,” 51–52.

61 David Abulafia, *The Great Sea: A Human History of the Mediterranean* (New York, 2011), 298; and Dunlop, “On the Origins,” 77.

62 J. H. Goodwin, “The Medieval Empire of Ghana,” *The South African Archaeological Bulletin* 12 (1957): 109; Walker, “The Italian Gold Revolution,” 37; Spufford, *Money and its Use*, 164; and Blanchard, *Mining, Metallurgy and Minting*, 1117.

63 Goodwin, “The Medieval Empire of Ghana,” 109–110. The area's wealth became notorious under Mansa Musa (d. 1337), who voyaged with tens of thousands of people and camels laden with gold dust on his hajj, evidently flooding the market with so much Sudanese gold that it caused devaluation. See also Blanchard, *Mining, Metallurgy and Minting*, 1117–18.

64 Blanchard, *Mining, Metallurgy and Minting*, 1114–15.

and Bure, near the Futa Jallon region on the north bank of the Tinkisso, a tributary of the Niger.⁶⁵

While political dynamics no doubt were key to the availability of gold in the central and northern Italian peninsula, actors in both Genoa and Florence were also a critical part of the worknet that sparked the production of coins in the Italian peninsula. Such money first reappeared in Genoa when three types of gold coins were issued at the mint; the most prized was the genoin (*ianuinus, genovino*) weighing 3.52 grams and nearly pure in its gold content.⁶⁶ Robert Lopez astutely observed that a Piacenzentine, Guglielmo Leccacorvo, whose bank was in Genoa, and who had assorted business interests that intersected with minting and mining, perhaps alongside other bankers, might have instigated the far-reaching monetary reforms in Genoa in 1252.⁶⁷ Leccacorvo, acting on behalf of prominent members of the family of Pope Innocent IV, the Fieschi, pushed capital into pioneering trade with West African through the port of Safi, the end point of a caravan route that stretched to the interior along which paleola gold was conveyed.⁶⁸ According to Lopez, in addition to Leccacorvo's personal drive for profit, the Genoese probably issued gold coins in order to better compete for trade in Sicily and the Levant.⁶⁹

Months after the Genoese gold coins were made, and less than two decades after they first began to produce their own coins, in November 1252 the Florentines leveraged a decline in the relative value of gold to silver to produce an ever-stable mechanism of medieval and Renaissance trade: the gold florin (*florenus, fiorino*), which would remain nearly constant in fineness and weight for nearly three centuries.⁷⁰ Writing in his chronicle roughly seven decades after the florin was minted, the Florentine merchant and one-time head of the city's mint, Giovanni Villani, recorded that a union of three groups of Florentines were responsible for first minting the florin: merchants, the people,

65 Bovill, *The Golden Trade of the Moors*, 119–31; Spufford, *Money and its Use*, 163; and Smith, "Medieval Coins," 18. Maurice Delafosse identified Wangara as Bambuk and Bure, although more recently Susan Keech McIntosh asserts an alternative and more satisfactory identification of Wangara with the Inland Niger Delta. See Maurice Delafosse, *Haut-Sénégal-Niger* (Paris, 1912), 1, 55; Walker, "The Italian Gold Revolution," 33; and McIntosh, "A Reconsideration," 145–46.

66 Marco Cattini, "Argento, oro e monete in Europa dal IX al XV secolo," in *Lo scudo d'oro*, ed. Silvana Balbi de Caro (Rome, 1996), vi.8.

67 Lopez, "Back to Gold," 231, 235.

68 *Ibid.*, 231.

69 *Ibid.*, 228.

70 Philip Grierson, "The Weight of the Gold Florin in the Fifteenth Century," *Quaderni ticinesi di numismatica e antichità classiche* 10 (1981): 421–31.

and the government.⁷¹ It was the merchants, he stressed, who inculcated interest in coining the florin to honor the city. As probably occurred in Genoa, an individual, Lamberto di Guido dell'Antella, possibly spearheaded or at least helped to orchestrate the introduction of the Florentine florin.

By profession Lamberto was a merchant banker with international interests that were probably well established by 1252. Perhaps most tellingly, Lamberto was in charge of the mint when the florin first was issued.⁷² He matriculated into the powerful Calimala guild in 1242.⁷³ He and other members of his family formed a business partnership (*società*) that in the 1260s had international branches in Naples, Nimes, and Paris.⁷⁴ During that time, Lamberto's son apprenticed at a family branch bank in Genoa owned by his father; he later went to Venice to work in a Florentine bank and then to Ravenna, where he lent on his father's account.⁷⁵ In the decades following the introduction of the florin, Lamberto twice held office as a prior, indicating his continued importance. As befits a worknet, politics, individuals, and material itself each were a significant component in the creation of one of the most significant financial instruments that enabled goods to move through the medieval world-system. What remains to be seen is how material geography, however subtly, might reflect the medieval world-system.

71 Cronica di Giovanni Villani, Book VI, chapter 53. Villani, head of an important Florentine merchant banking house and overseer of the Florentine mint, wrote, "*I mercatanti di Firenze per onore del comune, ordinario col popolo e comune che si battesse moneta d'oro in Firenze; e egli no promisono di fornire la moneta d'oro ... e allora si comincio la buona moneta d'oro fine di ventiquattro carati, che si chiamano fiorini d'oro ... e allora si comincio la ful al tempo [as podestà] del ... messer Filippo degli Ugoni di Brescia, del mese di Novembre gli anni di Cristo 1252. I quali fiorini, gli otto pesarono una oncia, e dall'uno lato era la'mpronta del giglio, e dall'altro il san Giovanni.*"

72 Robert Davidsohn, *Storia di Firenze*, vol. 2, 555, 570; Massimo Casprini, *I dell'Antella: cinquecento anni di storia di una grande famiglia fiorentina, secoli 12-17* (Florence, 2000), 136-37.

73 Clare Maria Baggott, "Business, Politics and Family Ties. Three Case Studies: The Cerchi, dell'Antella and Portinari of Florence, 1260-1360" (PhD diss., University of Keele, 1985), 64.

74 Robert Davidsohn, *Storia di Firenze*, vol. 4, 426, 481; and Baggott, "Business, Politics and Family Ties," 69.

75 Robert Davidsohn, *Storia di Firenze*, vol. 6, 356-57.

The Material Geography of Gold

The portability of materials used for making things evokes a lack of place elicited by the fact that objects often travel with ease, which accords with notions of transculturality wherein an essential “non-place” is invoked.⁷⁶ While simultaneously bound to placelessness, things paradoxically bear traces of their identity and narratives of location, as well as the migratory movement of their travel. As Igor Kopytoff has affirmed, objects have vibrant life phases.⁷⁷ Facilitated by the affordance of metal, coins, in particular, are made explicitly for circulation and liquidation. Leading a malleable life as an object, coins are at once durable and portable, yet they can be melted down, “liv[ing] in precarious reference to [their] substance.”⁷⁸ After it was extracted from the earth, gold went through a series of formal transformations. One way to interpret this is that its history was constantly erased; another perspective to offer, however, is that as its object biography constantly shifted, certain refrains were reinforced. An aspect of nearly pure medieval gold that seems to have adhered to it was its generic geographic source.

Merchants from Europe readily sought gold that came from Africa because of its purity, and they identified that metal by several terms, particularly paleolan gold. Europeans associated the most esteemed gold with a geographic place. Notarial documents reveal that paleola gold from North Africa was recognized as such in Genoa as early as the 1180s.⁷⁹ By the late thirteenth century an inland area in West Africa was designated as “Palolus.”⁸⁰ Giovanni di Carignano, a Genoan, depicted the area and identified it by inscription on a portolan chart of approximately 1320.⁸¹

Shortly after its extrication from the earth, gold was manipulated in ways that increased its purity and which helped to embed geography into matter

76 Marc Augé, *Non-Places: An Introduction to Supermodernity*, trans. John Howe (Brooklyn and London, 2008), 61–93.

77 For more on the object biography, see Igor Kopytoff, “The Cultural Biography of Things,” in *The Social Life of Things: Commodities in Cultural Perspective*, ed. Arjun Appadurai (Cambridge and New York, 1986), 64–91.

78 Sean Silver, “John Evelyn and Numismata: Material History and Autobiography,” *Word & Image* 31 (2015): 333.

79 Ugo Tucci, “Le monete in Italia,” in *Storia d'Italia* (Turin, 1973), vol. 5, 541; David Abulafia, *The Two Italies: Economic Relations between the Norman kingdom of Sicily and the Northern Communes* (Cambridge, 1977), 267–73; and Spufford, *Money and its Use*, 177–70.

80 E. G. R. Taylor, “Pactolus: River of Gold,” *Scottish Geographical Magazine* 44 (1928): 134.

81 McIntosh, “A Reconsideration,” 151–52. The portolan chart, held in the Archivio di Stato in Florence, was destroyed during a bombing in 1943.

through marking, stamping, and packaging it. Once the gold bearing quartz was extracted in West Africa, if not filtered as dust or left as specks and nuggets, it was on occasion treated in an amalgamation process used from the twelfth century onwards in which workers mixed the quartz with mercury over an open charcoal fire, after which the mercury would evaporate, leaving a mass of pure gold.⁸² To be made ready for transit, at times it was pounded and washed. The lumps of gold appear not to have been coined initially—archaeologists have found no trace of dies or mints in the area to the south of the Sahara.⁸³ The refined gold, gold dust, flakes and lumps were then transported across the Sahara.⁸⁴ After reaching North Africa, a great deal of gold was coined into dinars, which were then traded northward. Notarial evidence reveals sealed bags of gold dust and gold rods, all from Africa, arrived in Genoa by 1229.⁸⁵ By the end of the twelfth century, gold from West Africa, mostly in the form of ingots and dust collected in satchels, was also available in Pisa, and it is probable that large quantities of that gold made its way to Florence to be further manipulated into florins.⁸⁶

Once gold arrived in Europe, its purity and thereby its geographic origins were asserted through a variety of mechanisms. The quality of gold was avowed in a variety of ways in the public realm verifying that it was what it purported to be, rather than a debased or imposter material. Gold-beaters, or *battilori*, were specialized workers who supplied beaten gold to painters, gilders, embroiders, and others working with precious materials.⁸⁷ Soon after silk weavers formed

82 Blanchard, *Mining, Metallurgy and Minting*, 1130, 1147. With a bounty of land and high labor mobility, miners resisted continual attempts to control labor. When such efforts were mobilized, the miners would migrate or cease to work, staving off ambitions to control them by successive sub-Saharan kingdoms.

83 Jan Devisse, "Trade and Trade Routes in West Africa," in *General History of Africa* (London and Paris, 1998), vol. 3, 387.

84 Spufford, *Money and its Use*, 165. An exception to this are a small percentage of ingots that were smelted and cast into bars.

85 Spufford, "The First Century," 423.

86 Lopez, "Back to Gold," 227; and Spufford, *Money and its Use*, 170.

87 For more on the *battilori*, see Alessandro Guidotti, "Battiloro e dipintori a Firenze fra Tre e Quattrocento: Bastiano di Giovanni e la sua clientela (dal catasto del 1427)," in *Scritti di storia dell'arte in onore di Roberto Salvini*, ed. Roberto Salvini (Florence, 1984): 239–49; Jilleen Nadolny, "Some Observations on Northern European Metalbeaters and Metal Leaf in the late Middle Ages," in *The Materials, Technology, and Art of Conservation: Studies in Honor of Lawrence J. Majewski on the Occasion of his 80th Birthday*, ed. R. A. Rushfield and M. W. Ballard (New York, 1999): 134–60; and Bruno Dini, "I battilori fiorentini nel Quattrocento," in *Medioevo, Mezzogiorno, Mediterraneo: studi in onore di Mario Del Treppo*, ed. Mario Del Treppo (Naples, 2000), 139–61.

a guild in Venice in 1265, they modified their statutes to declare that inferior pieces of fabric, including textiles made of gold, should be destroyed by burning them in public on the Rialto Bridge.⁸⁸ Cities that had a strong cloth industry saw the organization of associations for *battilori* and others who worked with precious metals. By 1320 in Florence the guild of physicians and apothecaries (the *Arte dei Medici e Speziali*) oversaw *battilori* who worked on gilding.⁸⁹ Their statutes of 1335 declared that gilding must be done with the purest gold, further specifying that florins should be used as the base material.⁹⁰ A reform to their statutes in 1403 included stipulations specifying the dimensions of the leaf they produced, as well as a provision encouraging the *battilori* to register their signatory trademark with the guild or its notary so that those who violated regulations could be punished.⁹¹ In late medieval Europe there was, in short, a near universal concern with stressing the quality of gold, implicitly reinforcing the idea that it came from afar.

Material Agency

While gold's semantic meaning as a color has long held interpretive allure and indeed is laden with significance, its material iconography has only very recently begun to be addressed. This skewed attention pushes gold into the realm of mimetic representation wherein physical substance is viewed as an intermediary, much as oil has been subjugated to interpretations that stress that it elicits, but does not cause, realistic representation.⁹² Gold normatively is taken to be a medium that simply conveys meaning, signaling in particular the intangible and pointing to the beyond. Indeed, scholars attuned to aspects of conspicuous consumption have long addressed the way gold holds the viewer's gaze, stressing the wealth bound to commissions and often denoting

88 Anna Muthesius, "Silk in the Medieval World," in *The Cambridge History of Western Textiles*, ed. David Jenkins (Cambridge and New York, 2003), 337.

89 Raffaele Ciasca, *L'Arte dei medici e speziali nella storia e nel commercio fiorentino dal secolo XIII al XV* (Florence, 1927), 59. For the statutes of the guild of apothecaries, see Raffaele Ciasca, *Statuti dell'arte dei medici e speziali* (Florence, 1922), 371.

90 Dorini, *Statuti dell'Arte di Por Santa Maria*, 147; Dini, "I battilori fiorentini," 141; Giulia Chiarot, *L'arte orafa a Padova. Opere, tecniche e norme tra Medioevo e Rinascimento* (Padua, 2001), 17; and Traviani, "Monete battiloro," 148.

91 Ciasca, *Statuti*, 371; and idem, *L'Arte dei medici e speziali*, 59.

92 Lehmann, "The Matter as the Medium," 28.

spiritual richness.⁹³ Yet as a particular medium informed by the conditions of its making and its material history, gold has received limited attention.

Though it is impossible to prove conclusively that the origination story of medieval gold was engendered in matter and travelled with gold in its various guises, it remains plausible that associations about its object biography were carried with it in the new realms in which it operated as it traversed territorial boundaries. Gold has the ability to maintain a certain otherness as one of its tropes, which implies distance. The idea of that faraway-ness intersected with the material's signification as it was layered onto panels, pressed onto sculpture, twined into fabrics, and so forth. In that vein, the towns and sites where gold was carried in North Africa sometimes had biblical associations, thus the use of gold might have been evocative of place when used in the depiction of sacred scenes, such as those of Giotto's Scrovegni Chapel. It is likely that such ideas, even if faintly registered, about the southern Mediterranean world, and Africa more precisely, were retained. Alterity possibly was reflected upon, albeit subtly, as ostensibly pure gold was crafted into new forms. Thus, both how and the extent to which objects such as the halos in the Scrovegni Chapel, the San Pier Maggiore Altarpiece, textiles made of gold thread, the genoin, the florin, and their successors and imitators engendered the idea of geographic otherness, bespeaking the premodern world-system, lingers as an open question.

Bibliography

- Abulafia, David. *The Great Sea: A Human History of the Mediterranean*. New York, 2011.
- Abu-Lughod, Janet Lippman. *Before European Hegemony: The World System A.D. 1250–1350*. New York, 1989.
- Abu-Lughod, Janet Lippman. *The World System in the Thirteenth Century: Dead-End or Precursor?* Washington, DC, 1993.
- Abu-Lughod, Janet Lippman. *The Two Italies: Economic Relations between the Norman Kingdom of Sicily and the Northern Communes*. Cambridge, 1977.
- Augé, Marc. *Non-Places: An Introduction to Supermodernity*. Translated by John Howe. Brooklyn and London, 2008.
- Bacci, Pèleo. *Dipinti inediti e sconosciuti di Pietro Lorenzetti, Bernardo Daddi etc. in Siena e nel contado*. Siena, 1939.

93 Rebecca Zorach, "Everything Swims with Excess: Gold and Its Fashioning in Sixteenth-century France," *RES: Anthropology and Aesthetics* 36 (1999): 125.

- Baggott, Clare Maria. "Business, Politics and Family Ties. Three Case Studies: The Cerchi, dell'Antella and Portinari of Florence, 1260–1360." PhD diss., University of Keele, 1985.
- Baron, Hans. "Franciscan Poverty and Civic Wealth as Factors in the Rise of Humanistic Thought." *Speculum* 13 (1938): 1–37.
- Blanchard, Ian. *Mining, Metallurgy and Minting in the Middle Ages*, vol. 3. Stuttgart, 2005.
- Bomford, David. *Art in the Making: Italian Painting before 1400*. London, 1989.
- Bovill, Edward W., and Robin Hallett. *The Golden Trade of the Moors*. London, 1968.
- Braudel, Fernand. *La Méditerranée et le monde méditerranéen à l'époque de Philippe II*, 2 vols. Paris, 1949.
- Brown, Bill. "Thing Theory." *Critical Inquiry* 28 (2001): 1–22.
- Casprini, Massimo. *I dell'Antella: cinquecento anni di storia di una grande famiglia fiorentina, secoli 12.–17*. Florence, 2000.
- Cattini, Marco. "Argento, oro e monete in Europa dal IX al XV secolo." In *Lo scudo d'oro*, edited by Silvana Balbi de Caro, vi.3–vi.14. Rome, 1996.
- Cennini, Cennino. *The Book of the Art of Cennino Cennini*. Translated by Christiana Herringham. London, 1930.
- Chiarot, Giulia. *L'arte orafa a Padova. Opere, tecniche e norme tra Medioevo e Rinascimento*. Padua, 2001.
- Ciasca, Raffaele. *L'Arte dei medici e speciali nella storia e nel commercio fiorentino dal secolo XII al XV*. Florence, 1927.
- Ciasca, Raffaele. *Statuti dell'arte dei medici e speciali*. Florence, 1922.
- Compagni, Dino. *La cronica, e passi scelti dalla "Cronaca" di Giovanni Villani*. Edited by Fabio Cusin. Milan, 1945.
- Cuoq, Joseph M. *Recueil des sources arabes concernant l'Afrique occidentale du VIII^e au XVI^e siècle*. Paris, 1975.
- Davidsohn, Robert. *Storia di Firenze*. Translated by Giovanni Battista Klein, 8 vols. Sansoni, 1956–68.
- de Roover, Florence Elder. *L'Arte della Seta a Firenze nei secoli XVI e XV*. Florence, 1999.
- Delafosse, Maurice. *Haut-Sénégal-Niger*. Paris, 1912.
- Derbes, Anne, and Mark Sandona. "Barren Metal and the Fruitful Womb: The Program of Giotto's Arena Chapel in Padua." *The Art Bulletin* 80 (1998): 274–91.
- Devisse, Jan. "Trade and Trade Routes in West Africa." In *General History of Africa*, vol. 3, 367–435. London and Paris, 1998.
- Dey, Anuradha. "Filato metallic notizie storico-tecnologiche." In *Il paliotto di Sisto IV ad Assisi*, edited by Rosalia Varoli-Piazza, 51–80. Assisi, 1991.
- Dini, Bruno. "I battilori fiorentini nel Quattrocento." In *Medioevo, Mezzogiorno, Mediterraneo: studi in onore di Mario Del Treppo*, edited by Mario Del Treppo, 139–61. Naples, 2000.

- Dini, Bruno. "L'industria serica in Italia. Secc. XIII–XV." In *La Seta in Europa, sec. XIII–XX*, edited by Simonetta Cavaciocchi, 91–123. Prato, 1993.
- Dorini, Umberto, ed. *Statuti dell'Arte di Por Santa Maria del tempo della Repubblica*. Florence, 1934.
- Dunlop, Anne. "Carrying the Weight of Empire." In *Matters of Weight: Force, Gravity, and Aesthetics in the Early Modern Period*, edited by David Young Kim, 78–88. Emsdetten, 2013.
- Dunlop, Anne. "Materials, Origins and the Nature of Early Italian Painting." In *Crossing Cultures*, edited by Jaynie Anderson, 472–76. Melbourne, 2009.
- Dunlop, Anne. "On the origins of European Painting Materials, Real and Imagined." In *The Matter of Art: Materials, Practices, Cultural Logistics, c. 1250–1750*, edited by Christy Anderson, Anne Dunlop, and Pamela H. Smith, 68–96. Manchester, 2015.
- DuPlessis, Robert. "Wallerstein, World Systems Analysis, and Early Modern European History." *The History Teacher* 21 (1988): 221–32.
- Flood, Finbarr Barry, David Joselit, Alexander Nagel, Alessandra Russo, Eugene Wang, Christopher Wood, and Mimi Yiengpruksawan. "Roundtable: The Global Before Globalization." *October* 133 (2010): 3–19.
- Franceschi, Franco. "Florence and Silk in the Fifteenth Century: The Origins of a Long and Felicitous Union." *Italian History and Culture* 1 (1995): 3–22.
- Gibson, James J. *The Ecological Approach to Visual Perception*. Boston, 1979.
- Gibson, James J. "The Theory of Affordances." In *Perceiving, Acting and Knowing: Toward and Ecological Psychology*, edited by Robert Shaw and John Bransford, 67–82. New York, 1977.
- Goodwin, J. H. "The Medieval Empire of Ghana." *The South African Archaeological Bulletin* 12 (1957): 102–12.
- Gordon, Dillian. *The Italian Paintings before 1400*. London, 2011.
- Grierson, Philip. "Il fiorino d'oro: la grande novità dell'Occidente medievale." *Rivista italiana di numismatica e scienze affini* 107 (2006): 415–19.
- Grierson, Philip. "The Weight of the Gold Florin in the Fifteenth Century." *Quaderni ticinesi di numismatica e antichità classiche* 10 (1981): 421–31.
- Guasti, Cesare. *Le Feste di S. Giovanni Batista in Firenze: descritte in prosa e in rima da contemporanei*. Florence, 1884.
- Guasti, Cesare. *Santa Maria del Fiore: la costruzione della chiesa e del campanile secondo i documenti tratti dall'Archivio dell'Opera Secolare e da quello di Stato*, vol. 2. Florence, 1887.
- Guidotti, Alessandro. "Battiloro e dipintori a Firenze fra Tre e Quattrocento: Bastiano di Giovanni e la sua clientela (dal catasto del 1427)." In *Scritti di storia dell'arte in onore di Roberto Salvini*, edited by Roberto Salvini, 239–49. Florence, 1984.
- Herald, Jacqueline. *Renaissance Dress in Italy 1400–1500*. London, 1981.

- Holden, Peregrine, and Nicholas Purcell. *The Corrupting Sea: A Study of Mediterranean History*. Malden, MA and Oxford, 2000.
- Kessler, Herbert. *Seeing Medieval Art*. Peterborough, Ontario and Orchard Park, NY, 2004.
- Kopytoff, Igor. "The Cultural Biography of Things: Commoditization as Process." In *The Social Life of Things: Commodities in Cultural Perspective*, edited by Arjun Appadurai, 64–91. Cambridge and New York, 1986.
- Kubersky-Piredda, Susanne. "The Market for Painters' Materials in Renaissance Florence." In *Trade in Artists' Materials: Markets and Commerce in Europe to 1700*, edited by Jo Kirby, Susie Nash, and Joanna Cannon, 223–44. London, 2010.
- Latour, Bruno. *Reassembling the Social*. New York and Oxford, 2005.
- Lehmann, Ann-Sophie. "The Matter as the Medium: Some Tools for an Art-theoretical Interpretation of Materials." In *The Matter of Art: Materials, Practices, Cultural Logistics, c. 1250–1750*, edited by Christy Anderson, Anne Dunlop, and Pamela H. Smith, 21–41. Manchester, 2015.
- Levtzion, Nehemia. *Ancient Ghana and Mali*. London, 1973.
- Lopez, Robert S. "Back to Gold, 1252." *The Economic History Review* 9 (1956): 219–40.
- Marabelli, Maurizio, Paola Santopadre, Marcella Ioele, Alfredo Castellano, Roberto Cesareo, and Marco Verità. "Le lamine metalliche utilizzate nella decorazione dei dipinti murali giotteschi; Metal leaves utilized for decoration of Giotto's mural paintings." *Bollettino d'Arte* (2005): 121–44.
- McIntosh, Susan Keech. "Reconceptualizing Early Ghana." *Canadian Journal of African Studies/Revue Canadienne des Études Africaines* 42 (2008): 347–73.
- Merzenich, Christoph. "Dorature e policromie delle parti architettoniche nelle tavole d'altare toscane tra Trecento e Quattrocento." *Kermes* 26 (1996): 51–71.
- Monnas, Lisa. "Italian Silks (1300–1500)." In *5,000 Years of Textiles*, edited by J. Harris, 167–75. London, 1993.
- Muthesius, Anna. "Silk in the Medieval World." In *The Cambridge History of Western Textiles*, edited by David Jenkins, 325–54. Cambridge and New York, 2003.
- Nadolny, Jilleen. "Some Observations on Northern European Metalbeaters and Metal Leaf in the late Middle Ages." In *The Materials, Technology, and Art of Conservation: Studies in Honor of Lawrence J. Majewski on the Occasion of his 80th Birthday*, edited by R. A. Rushfield and M. W. Ballard, 134–60. New York, 1999.
- Ogden, Jack. "The Technology of Medieval Jewelry." In *Ancient and Historic Metals: Conservation and Scientific Research*, edited by David Scott, Jerry Podany, and Brian B. Considine, 153–82. Los Angeles, 1994.
- Passeri, Irma. "Gold Coins and Gold Leaf in Early Italian Paintings." In *The Matter of Art*, edited by Christy Anderson, Anne Dunlop, and Pamela H. Smith, 97–118. Manchester, 2015.

- Payne, Alina. Introduction to *Dalmatia and the Mediterranean: Portable Archaeology and the Poetics of Influence*, edited by Alina Payne, 1–18. Boston and Leiden: 2014.
- Postan, Michael M. “The Rise of a Money Economy.” *Economic History Review* 14 (1944): 123–34.
- Raff, Thomas. *Die Sprache der Materialien: Anteitung zu einer Ikonologie der Werkstoffe*. Munich, 1994.
- Schlegel, Ursula. “On the Picture Program of the Arena Chapel.” *Zeitschrift für Kunstgeschichte* 20 (1957): 125–46.
- Silver, Sean. “John Evelyn and Numismata: Material History and Autobiography.” *Word & Image* 31 (2015): 331–42.
- Smith, Richard L. “Medieval Coins, West African Gold: Secrets and Lies behind the Trans-Saharan Trade, Part I.” *Celator* 18 (2004): 6–21.
- Spufford, Peter. “Local Coins, Foreign Coins in Late Medieval Europe: An Overview.” In *Moneta locale, moneta straniera: Italia ed Europa, XI–XV secolo. The Second Cambridge Numismatic Symposium*, edited by Lucia Travaini, 25–40. Milan, 1999.
- Spufford, Peter. *Money and its Use in Medieval Europe*. Cambridge and New York, 1988.
- Spufford, Peter. “The First Century of the Florentine Florin.” *Rivista italiana di numismatica e scienze affini* 107 (2006): 421–36.
- Stahl, Alan. *Zecca: The Mint of Venice in the Middle Ages*. Baltimore and London, 2000.
- Taylor, E. G. R. “Pactolus: River of Gold.” *Scottish Geographical Magazine* 44 (1928): 129–44.
- Theophilus. *On Diverse Arts*. Translated by John Hawthorne and Cyril Stanley Smith. Chicago and London, 1963.
- Travaini, Lucia. “Monete battiloro e pittori. L'uso dell'oro nella pittura murale e i dati della Cappella degli Scrovegni. Coins, Gold-beaters and Painters. How Gold was used in Wall Paintings: Some Examples from the Scrovegni Chapel.” *Bollettino d'Arte* (2005): 145–52.
- Tucci, Ugo. “Le monete in Italia,” in *Storia d'Italia*, vol. 5, 533–79. Turin, 1973.
- Walker, Thomas. “The Italian Gold Revolution of 1252.” In *Precious Metals in the Later Medieval and Early Modern Worlds*, edited by J. F. Richards, 29–52. Durham, NC, 1983.
- Wallerstein, Immanuel. *The Modern World-System: Capitalist Agriculture and the Origins of the European World-Economy in the Sixteenth Century*. New York, 1974.
- Weddigen, Tristan. “Textile Spaces, Interior and Exterior.” In *Display of Art in the Roman Palace, 1550–1750*, edited by Gail Feigenbaum, 162–65. Los Angeles, 2014.
- Wood, Diana. *Medieval Economic Thought*. Cambridge and New York, 2002.
- Zorach, Rebecca. “Everything Swims with Excess: Gold and Its Fashioning in Sixteenth-century France.” *RES: Anthropology and Aesthetics* 36 (1999): 125–37.