

# The Pigment Trade in Venice and the Mediterranean in the Second Half of the Fifteenth Century

ANDREA MOZZATO



**D**uring the Renaissance, Venice was a major supply market for products and raw materials. Among the latter were pigments and substances used for manufacturing artistic objects. A chronicle from 1537 reports that during *acqua alta* “the canals flowed with colored waves... where there were spices and apothecaries”.<sup>1</sup> In the ancient *Aromataria* near the Rialto there were indeed dozens of shops stocked with aromatic herbs and spices in grain or powder, dyes, perfumes, and cosmetics worth several thousand ducats.<sup>2</sup> According to Louisa Matthew, the lagoon city was renowned among Italian painters – such as Domenico Veneziano or Alesso Baldovinetti, who ordered blue from Venice – for quality, quantity, and reasonable prices.<sup>3</sup> In this context, we turn now to new

---

I am grateful to Margarete Weathers for her translation of this essay.

1. Biblioteca del Museo Civico Correr, Venice, MS Gradenigo 67, XXVII, fol. 2r. See also ANDREAS BURMEISTER and CHRISTOPH KREKEL, “*Azzurri oltramarini, lacche et altri colori fini: Auf der Suche nach der verlorenen Farbe*”, in *Tintoretto: Der Gonzaga-Zyklus*, ed. CORNELIA SYRE, Munich 2000, pp. 193–211.

2. See also DOMENICO MALPIERO, “Annali veneti dall’anno 1457 al 1500”, ed. and intr. AGOSTINO SAGREDO, *Archivio Storico Italiano*, VII, 1843–44, p. 700.

3. LOUISA C. MATTHEW, “*Vendecolori a Venezia: The Reconstruction of a Profession*”, *The Burlington Magazine*, CXLIV, 2002, pp. 680–686; EVE BORSOOK, “Art and Business in Renaissance Florence and Venice”, in EADEM, *Collected Writings*, Florence 2005, p. 149. See also SUSANNE KUBERSKY-PIREDDA, *Kunstwerke – Kunstwerke – Die Florentiner Maler der Renaissance und der Kunstmarkt ihrer Zeit*, Norderstedt 2005, pp. 81–176; JULIA A. DELANCEY, “Dragonsblood and Ultramarine: The Apothecary and Artists’ Pigments”, in *Renaissance Florence in the Art Market in Italy, 15th–17th Centuries / Il mercato dell’arte in Italia, sec. XV–XVII*, ed. MARCELLO FANTONI *et al.*, Modena 2003, pp. 141–150; JO KIRBY, “The Price of Quality: Factors Influencing the Cost of Pigments during the Renaissance”, in *Revaluing*

data from the account books of a Venetian apothecary, Agostino di Giovanni Altucci, whose activity is documented from 1463 to 1477.<sup>4</sup>

Hoping to profit from the shipping trade only the Serenissima could offer and from the sale of medicines in a populous city with a large demand for health services, Agostino moved from Arezzo to Venice in 1465. He worked in the Spezieria Grande della Croce on campo San Salvador until 1475, when he returned to Arezzo and opened a new apothecary's shop, called San Michele.<sup>5</sup>

With a starting capital of 350 ducats, he first went to Syria as an agent of other Venetian merchants.<sup>6</sup> With the support of his partner, the Venetian Pietro de Bezzi, his network and reputation grew, and he gained access to all the trade services reserved for citizens, such as the Fondaco dei Tedeschi for trans-Alpine trade and the galley lines. He set up several shipping ventures, exporting Italian textiles, Venetian glass artifacts, and inexpensive German haberdashery, and importing cotton, spices, aromatic woods, minerals, and exotic articles from the Levant or Africa. Despite the 1394 division of the Arte degli Speziali into non-medical (*spezieri da grosso*) and medical (*spezieri da medicine*) apothecaries, the Croce was allowed to sell not only drugs for medical use and spices for food but also poisonous substances utilized in pigments and other artistic artifacts.<sup>7</sup>

After his return to Arezzo, Agostino imported materials for artistic production, now supplied from Venice. For instance, in 1475 he sold a barrel of 155 pounds of *teriac*, the famous Andromaco's universal medicine, for 15 ducats, to Pantalon of the Spezieria delle Due Spade of Venice at the fair in Pesaro. From him he bought many commodities, including the following:<sup>8</sup>

---

*Renaissance Art*, ed. GABRIELE NEHER and RUPERT SHEPHERD, Farnham 2001, pp. 19–25.

4. Archivio della Fraternità dei Laici di Arezzo (hereafter AFL), 3470–3475.

5. ANDREA MOZZATO, “Uno speziale aretino a Venezia nel secondo Quattrocento”, *Annali aretini*, XV/XVI, 2009, pp. 117–148; IDEM, “Luxus und Tand: Der internationale Handel mit Rohstoffen, Farben, Brillen und Luxusgütern im Venedig des 15. Jahrhunderts am Beispiel des Apothekers Agostino Altucci”, in *Luxusgegenstände und Kunstwerke vom Mittelalter bis zur Gegenwart: Produktion – Handel – Formen der Aneignung*, ed. MARK HÄBERLEIN *et al.*, Konstanz 2011.

6. AFL 3470, fol. 1.

7. MOZZATO, “Uno speziale” (as in n. 5), p. 124.

8. AFL 3474, fol. 26; 3471, fol. 40.

Commodity	lb.	duc./100 lb.
Saltpeter ( <i>salnitro</i> )	3.00	8.16
Orpiment ( <i>oropimento</i> )	4.00	6.11
Liquid varnish ( <i>vernixe liquida</i> )	6.00	4.08
Lead white ( <i>biache</i> )	11.50	4.08
Indigo ( <i>endego</i> )	11.00	3.71
Minium ( <i>minio</i> )	5.00	3.26
Arsenic ( <i>arsenicho</i> )	6.00	1.70
Realgar ( <i>rixegallo</i> )	6.00	1.70
Liquid vitriol ( <i>vetriol liquido</i> )	100.00	1.30
Sponges ( <i>sponze</i> )	(1 sack)	0.28

Although the ledger of retail trade of the Croce, unlike that of San Michele in Arezzo, does not survive, we have found other data on the same wares in the Venetian ledger used for long-distance trade.

## Blue

A radiant blue was produced from lapis lazuli imported from Badakhshan and Ferghana; Venice established the main European market for ultramarine: *oltremare da Venecia* or *azzurro di Bagdad*.<sup>9</sup> In 1470 and 1471 Agostino exported 5.5 pounds of lapis for 3–4.5 ducats with the galleys of Aigues-Mortes sailing to Provence and Catalonia and acquired 1 pound for 3 ducats from Pietro di Leone da Molin.<sup>10</sup> Sometimes the lapis was sold ground, as with the 1.5 pounds exported in 1473 to Valencia for 6 duc./lb.<sup>11</sup> In the same year Neri di Bicci paid six times as much in Florence.<sup>12</sup>

9. WILHELM HEYD, *Geschichte des Levantehandels im Mittelalter*, II, Stuttgart 1877–1879, p. 582; MATTHEW (as in n. 3), p. 680.

10. AFL 3470, fols. 100, 118.

11. AFL 3470, fols. 2, 63, 122; 3473, fol. 61v. See also *Il libellus di Chicago. Un ricettario veneto di arte, artigianato e farmaceutica (secolo XV)*, ed. ADRIANO CAFFARO and GIUSEPPE FALANGA, Salerno 2006, pp. 5, 95.

12. KIRBY (as in n. 3), p. 34; KUBERSKY-PIREDDA (as in n. 3), pp. 136, 151.

Another, much less expensive, blue pigment was azurite. Acquired raw in Austrian and Balkan mines and manufactured with copper oxide (*Lazur* or *azzurro della Magna*), it did not have the intensity of lapis,<sup>13</sup> but some commissions included both substances.<sup>14</sup> For 1.25 duc./lb., Agostino acquired *azuro fine* (fine blue) from Matteo dei Colori, who probably identified himself as “*Matheus quondam Ioannis a coloribus*”, and who lived in the same parish as Agostino. This entry from 1471 sets back by 22 years what was previously thought to be the first mention, in 1493, of a *vendecolori*, a retailer specializing in painting materials.<sup>15</sup>

Painters and artisans who painted on leather also used indigo *di Bagadeo* (from Baghdad), a vegetable substance not to be mistaken for woad (*Isatis tinctoria*), which in the Middle Ages was sometimes also called ‘indigo’ and which was mainly used in dyeing woolen cloth.<sup>16</sup> The Venetians bought indigo leaves or powder in Trebizond, Bursa, or Negropont to re-export to Milan, Naples, Avignon, Valencia, and beyond.<sup>17</sup> Agostino’s supply market was Damascus, where he bought a lot for 100 ducats in 1465.<sup>18</sup>

*Zaffera*, or smalt (cobalt oxide with traces of lead), came from India and Ceylon. According to the famous *Tariffa* of Bartolomeo de Paxi, a guide for merchants published in 1503 containing conversion tables of the weights and measures used in different places and lists of traded commodities in the

---

13. *Vocabolari veneto-tedeschi del sec. XV*, ed. and intr. ALDA ROSSEBASTIANO BART, Cuneo 1983, p. 214; PIETRO ANDREA MATTIOLI, *I discorsi di M. Pietro Andrea Matthioli Sanese, Medico Cesareo, nei sei libri di Pedacio Dioscoride Anazarbeo della materia medicinale*, Venice 1597, chap. 65, “Della pietra cerulea”, p. 853.

14. CHARLES STERLING, *Enguerrand Quarton. Le peintre de la Pietà d'Avignon*, Paris 1983, p. 202: “l’azur doit estre fin asur d’Accre, excepté celui qu’on mettra en la bordure, lequel doit estre de fin asur d’Alamaine” (Avignon 1453).

15. AFL 3470, fols. 65, 113, 117; MATTHEW (as in n. 3), p. 681. See also ANTONIO P. TORRESI, “*Su carta*”. *Ricette per scrivere, disegnare, aquarellare, pulire e restaurare, dal XV al XVIII secolo*, Ferrara 2006, p. 29.

16. AFL 3473, fol. 2; 3475, fol. 28r. See also CENNINO CENNINI, *Il libro dell’arte*, ed. FRANCO BRUNELLO, Vicenza 1971, chap. XLVI, chaps. LIII and LXI; MATTHEW (as in n. 3), p. 682; FRANCO BRUNELLO, *L’arte della tintura a Venezia nel Rinascimento*, Biella 1973, p. 34; IDEM, *Marco Polo e le merci dell’Oriente*, Vicenza 1986, p. 83; MATTIOLI (as in n. 13), pp. 853–854.

17. BARTOLOMEO DE PAXI, *Tariffa de’ pexi e misure con gratia et privilegio*, Venice 1503, pp. 66, 111; Archivio di Stato di Venezia, Giudici di Petizion, Sentenze a Giustizia, r. 52, f. 92v; Archivio di Stato di Prato, Archivio Datini, b. 928, n. 514900.

18. AFL 3473, fol. 2; 3475, fol. 28r.

principal European and Mediterranean markets, “the blue paint [*zaffera*] was sold in Damascus and bought in Murano”.<sup>19</sup> In 1469, Agostino did indeed obtain six barrels of *zaffera* in the Syrian city, with a net weight of 3,700 pounds (1.5 tons) and worth 3 duc./100 lb., in a trade of various spices and medicines.<sup>20</sup> Most of this sizable account entry of *zaffera* was sold on the local market, and only a small portion was re-exported, particularly to the Recanati fair.<sup>21</sup> Between 1470 and 1473, Agostino sold 393 pounds at 3 duc./100 lb. to Santo di Francavilla at the fairs in Rimini and Lanciano.<sup>22</sup>

Dissolved in water, smalt becomes a dense glaze, which was used to decorate glasses, goblets, and ceramics.<sup>23</sup> Agostino’s Venetian customers included the master Renier da Pesaro, producer of cups on campo San Polo, and Francesco Savigniano; Renier bought a barrel of 680 pounds at 3.2 duc./100 lb. and Savigniano bought one of 113 pounds at 3.5 duc./100 lb.).<sup>24</sup>

But Agostino’s main customer in Venice was the Barovier family from Murano, the famous glass dynasty that has produced *crystallo* since the first half of the Quattrocento.<sup>25</sup> In 1467 Agostino sold “blue-violet and light blue” (*pavonazzo e biavo*) paints and black and green glass “in the form of glaze” (*in forma di smalto*), which was much less expensive, for 14.28 and 5 duc./100 lb., respectively, to Taddeo Barovier.<sup>26</sup> In 1470 and 1472, Taddeo, Pietro, and Nicolò bought 2,000 pounds of *zaffera* for 3 duc./100 lb., with a written commitment to manufacture glass for Agostino, who exported it to Syria.<sup>27</sup> Since a large part of his business involved glass in various forms, it cannot be ruled out that Agostino also bought broken glass or glass for painting, which was then incorporated into oil paints: in 1472 he acquired 280 cases of “vero de cholori” (multicolored glass) from the Baroviers for 86 ducats.<sup>28</sup>

---

19. PAXI (as in n. 16), p. 57.

20. AFL 3470, fols. 74, 86; 3471, fol. 17.

21. AFL 3470, fol. 86.

22. AFL 3470, fol. 127; 3471, fol. 12.

23. HEYD (as in n. 9), p. 657; KIRBY (as in n. 3), p. 26.

24. AFL 3470, fols. 86, 121.

25. For the glass industry, see PAOLO ZECCHIN, “I fondenti dei vetrai muranesi. I parte: l’allume catino”, *Rivista della Stazione Sperimentale del Vetro*, I, 1996, pp. 41–54.

26. AFL 3470, fols. 23, 33.

27. AFL 3470, fols. 54, 109, 138; 3473, fol. 2r.

28. AFL 3470, fol. 151; 3474, fol. 1v.

## Red

Red, in various hues, was perhaps the most famous Venetian color. The well-known scarlets (*scarlatti*), or cloth dyed with *grana*, or cochineal, played an important role as luxury items on the international market.<sup>29</sup> This red was extracted from the dried bodies of kermes lice, insects found in the eastern Mediterranean. Dyers and painters then mixed it with water, alum, and soda to produce the dyestuff. In 1469, Agostino imported 930 pounds of the pigment (also known as *carmine*) from Valencia and sold it to clients in Florence and Verona (including 300 pounds to Filippo Rucellai and 225 to Gabriele di San Miniato of Verona for 25–30 duc./100 lb.).<sup>30</sup> He also imported 275 pounds from Spain in 1471, which was stored in powder form in three goatskins (*otri*).<sup>31</sup>

Another red was extracted from brazilwood (*verzino*), a wood of reddish color that, scraped clean and mixed with urine, alum, and quicklime, was sold in pellets.<sup>32</sup> Used extensively in textile production and in dye works, the pigment sold well in Venice and Agostino acquired it easily at the Rialto. In 1473 he purchased 410 pounds from two Venetian merchants for 10 duc./100 lb., on behalf of Mariotto and Angelo del Monte in Verona.<sup>33</sup> He charged more in his own shop for smaller amounts, and in 1465 he sold six pounds of brazilwood for 75 duc./100 lb. to Arsenio di Matteo of the apothecary's shop Al Moro on the Rialto bridge.<sup>34</sup>

Highly valued was the mysterious Dragon's Blood, a red gum resin originating from the plant *Calamus draco*. In 1468 and 1473 Agostino bought a total of 140 pounds at 27 duc./100 lb. from Orlando da Riva, consul in Damascus, and from Bartolomeo di Zorzi, which he then exported to Catalonia.<sup>35</sup>

The shop of the Croce also dealt in rubies, which when ground produced a powder used for red pigment. The price was high: in 1475, before he left

---

29. ANDREA MOZZATO, "The Production of Woollens in Fifteenth and Sixteenth Century Venice", in *At the Center of the Old World: Trade and Manufacturing in Venice and the Venetian Mainland, 1400–1800*, ed. PAOLA LANARO, Toronto 2006, pp. 73–107.

30. AFL 3470, fols. 43, 44.

31. AFL 3470, fol. 141.

32. TORRESI (as in n. 15); KUBERSKY-PIREDDA (as in n. 3), p. 450.

33. AFL 3470, fol. 166; 3471, fol. 11.

34. AFL 3470, fol. 16.

35. AFL 3470, fols. 37, 58, 139.

Venice, Agostino sold six ounces to another San Salvador apothecary, Vido Venturin dall'Angelo, at 125 duc./lb.<sup>36</sup> But there were other less expensive pigments for red, such as minium, or lead oxide, which was widely used in illuminations (100 pounds sold in 1470 in Spain for 2.5 ducats), or Indian red sandalwood (in 1471 Agostino acquired 107 pounds from Antonio Grimani at 7.5 duc./100 lb., which sold later in Spain at 8 duc./100 lb.).<sup>37</sup> As for vermilion (*cinabro*), the account books do not contain any data on its trade.

## Yellow

Gold from Sudan was sold as *pezze* (leaves) to decorate frames, candlesticks, paintings, and many other objects. In 1469 Agostino ordered gold from North Africa at 1.3 duc./30 carats through his agent.<sup>38</sup> Gold leaf measuring six by six to eight by eight centimeters could be made from old ducats or florins; according to Cennino Cennini, a florin weighing 3.5 grams produced 100 to 145 *pezze*.<sup>39</sup> In 1464, Agostino sold 50 *pezze* for 50 dirhams (1 ducat) to the apothecary's shop of Pietro di Antonio di Secchi of Milan in Nicosia,<sup>40</sup> and in 1465 he sold 100 *pezze* for two ducats to Taddeo Barovier, who simultaneously purchased 140 large *pezze* from Agostino's associate, Giovanni di Antonio dall'Oro, for three ducats.<sup>41</sup> The same year, Taddeo ordered another 50 *pezze* expressly for decorating crystal glass, which Agostino exported to Syria upon completion, in 1471.<sup>42</sup>

Pigments used to imitate gold included realgar, lead-tin yellow, and saffron.<sup>43</sup> In his Venetian period, Agostino did not mention the first two products, but in 1471 he bought seven pounds of saffron at 1 duc./lb., which produced an intense yellow when mixed with alum and egg yolk.<sup>44</sup>

---

36. AFL, 4371, fol. 29; 3474, fol. 19r.

37. HEYD (as in n. 9), p. 646; AFL 3470, fols. 99, 116.

38. AFL 3470, fol. 56 bis.

39. KUBERSKY-PIREDDA (as in n. 3), pp. 82–87.

40. AFL 3470, fol. 8.

41. AFL 3470, fol. 65, 69.

42. AFL 3470, fols. 69, 133.

43. HEYD (as in n. 9), p. 645.

44. AFL 3470, fol. 93. TORRESI (as in n. 15), p. 70; CENNINI (as in n. 16), cap. XLVI.

## White, green, and black

Lead white (*biacca*), a highly poisonous pigment, produced a brilliant white in oil and tempera paintings.<sup>45</sup> In 1469 Benedetto della Piazza bought ten large barrels at the Croce containing 2,000 pounds of *biacca* for 3.12 duc./100 lb., which he sent to Marco de Brachi in Milan.<sup>46</sup> Agostino also sent lead white to Arezzo. In the same city, in 1464, the apothecaries Benedetto di Matteo del Totto and Gregorio di Giovanni dell'Arena imported *biache veneziane*, as did the medical doctor Carlo di Antonio, in 1477.<sup>47</sup>

Verdigris was one of a number of green pigments. In 1465 Agostino sold nine pounds of it to various apothecaries in Arezzo at 20 duc./100 lbs, and in 1467 he also exported it to Damascus and Bursa.<sup>48</sup> The price he procured in his Venetian shop was lower; in 1471 he sold four pounds to Andrea di maestro Francesco of Salò at 12.5 duc./100 lb.<sup>49</sup> In 1474 Agostino stocked a total of 30 pounds.<sup>50</sup>

Among the many types of black, the Altucci account books mention the *spodio di cane*: this came from bone black, a charcoal obtained from the dry distillation of animal remains.<sup>51</sup> Agostino bought it in Damascus and in Venice (for instance, 13 pounds in 1472 from Alvise di Nicolò of Molin at 52 duc./100 lb.) and sold it in Catalonia or Cyprus: in 1464 he sold two pounds of bone charcoal to one apothecary in Nicosia for 40 dirhams (0.38 duc./lb. at a rate of 52 dirhams/duc.).<sup>52</sup>

In addition to a great variety of pigments, Agostino traded in substances used for preparing paints. The *pietra fiel* (gallstone) was a yellow-brown substance extracted from eel or tench gall and used to liquefy paints.<sup>53</sup> He

---

45. See also CENNINI (as in n. 16), capp. VI, LXXII.

46. AFL 3470, fol. 63. In 1468 a pound of lead white sold in Florence for four *soldi di piccioli* (approx. 0.045 duc.); KUBERSKY-PIREDDA (as in n. 3), pp. 417, 446.

47. AFL 3470, fols. 13, 14.

48. AFL 3470, fols. 11, 13, 28.

49. AFL 3470, fol. 131. In 1468 one pound of verdigris sold in Florence for 24 *soldi di piccioli* (approx. 0.26 duc.); KUBERSKY-PIREDDA (as in n. 3), p. 448.

50. AFL 3471, fol. 36.

51. BURMEISTER and KREKEL (as in n. 1), p. 196; TORRESI (as in n. 15), p. 25.

52. AFL 3470, fols. 8, 33, 141.

53. TORRESI (as in n. 15), p. 77.



bought this in 1470 for 2.5 duc./lb. There was also *arzento vivo*, or mercury, which was used not only for therapeutic purposes but also as an ingredient of egg tempera, together with tin and *armoniaco* (ammonium chloride) to obtain a golden ink.<sup>54</sup> In 1471 Agostino bought 200 pounds of mercury in Nicolò Rizzo's Sesamo apothecary's shop at 13.5 duc./100 lb. In the same year, he bought 110 lb. of *armoniaco* or *amonio fino* in Syria, which he sold in Venice and Spain at 20 duc./100 lb.<sup>55</sup>

In conclusion, Agostino, like other medieval apothecaries, dealt in a large variety of products. On the whole, materials for artistic production represent eight per cent of his turnover, which corresponds with the seven per cent Julia Delancey calculates in her analysis of the inventories of Florentine *speziali da grosso*.<sup>56</sup> We could continue to list resins, gums, and jewels appearing in his account books. But surely we have shown his great interest in the pigment trade: on the one hand, re-exporting materials to Northern and Central Italy – he supplied nearly fifty apothecaries and cloth dyers in Arezzo<sup>57</sup> – and Catalonia, and on the other, retailing only certain materials, such as smalt, on the local market. With its powerful glass industry, Venice was a great laboratory for experiments and shared knowledge among craftsmen and artists who, in the search for more radiant colors, mixed traditional pigments with glass powder, ceramic powder, or textile dyes to decorate luxury objects, a practice which Paul Hills mentions in the context of a Venetian aesthetic of colors.<sup>58</sup> Apothecaries such as Agostino Altucci therefore contributed decisively to the luminosity of Venetian art.

---

54. TORRESI (as in n. 15), pp. 11–12.

55. AFL 3470, fols. 5, 115.

56. DELANCEY (as in. 3), p. 147.

57. AFL, 3474, fol. 73.

58. PAUL HILLS, *Venetian Colour: Marble, Mosaic, Painting and Glass 1250–1550*, New Haven and London 1999.