

“Sì in Muran come fuera de Muran”: Transcultural Itineraries and Material Counternarratives in Venetian Glass, c. 1450–1650

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Introduction

The years 1450–1650 CE saw not only a swell in the production and circulation of glass made in Venice for both luxury and widespread consumption, but also in the creation and dissemination of writings describing the material, its makers, and the legendary artisanal feats on the Venetian island of Murano (Fig. 1).¹ “There has never been found a more delightful art than that of glass, an invention which is indeed ingenious and very necessary to the world,” noted Leonardo Fioravanti, a Bolognese doctor and traveler, in his 1564 book on professions and trades, *Dello specchio di scientia universale*. Fioravanti states that this art has reached its heights in “the illustrious, and divine City of Venice, in a certain place near there which is called Murano ... a site which seems to have been made by God and by Nature to make these glasses, for under the Heavens there is no place similar to that for making such work.”²

1 Francesca Trivellato, “Murano Glass, Continuity and Transformation (1400–1800),” in *At the Centre of the Old World: Trade and Manufacturing in Venice and on the Venetian Mainland (1400–1800)*, ed. Paola Lanaro (Toronto: Centre for Reformation and Renaissance Studies, 2006), 143–184; 144. Although the majority of glass furnaces had been located on the island of Murano since the thirteenth century, glass was also made on Venice itself, particularly for types of work that did not require large furnaces, e.g., *lavorazione a lume* (lampworking) or bead stringing. As Trivellato has noted, this type of production was more likely to be taken up by women, immigrants, and others excluded from the privileged system of Murano’s glass guild.

2 Original: “inclita, & divina Città di Venetia, in un certo luogo ivi vicino, che si chiama Murano ... sito, che pare, che sia stato fatto da Dio, & dalla Natura per fare essi vetri; percioche sotto il Cielo non si truova luogo simile a quello per fare tale ebercicio.” Leonardo Fioravanti, *Dello specchio di scientia universale, Dell’Eccellente Medico, & Cirugico M. Leonardo Fioravanti Bolognese, Libri Tre. Nel primo de’ quali, si tratta di tutte l’arti liberali, & mecanice, & si mostrano tutti i secreti più importanti, che sono in esse. Nel secondo si tratta di diverse scientie, & di molto belle contemplationi de’ Filosofi antichi. Nel terzo si contengono alcune inventioni notabili, utilissime & necessarie da sapersi* [The mirror of universal science, by the Excellent Doctor and Surgeon M. Leonardo Fioravanti Bolognese, Books Three. The first is concerned with all of the liberal and mechanical arts, and all of the most important secrets within these arts are shown. The second is concerned with various sciences and of the very beautiful contemplations of the ancient Philosophers. The third contains some notable inventions,



Fig. 1. Jacopo de' Barbari, View of Venice (detail of “Muran”), 1500. Woodcut. Image courtesy of Cleveland Museum of Art.³

The esteem that Fioravanti held for Venice as a producer of glass was far from unique. During the sixteenth century, an intensified interest in materials, in technological changes, and in codifying artisanal production found purchase in emerging print genres such as the artisanal treatise and the *letteratura dei mestieri* (literature on trades and professions), and ruminations on glass, glassmaking, and Venice itself were not infrequent themes.⁴ In his widely-read treatise on metallurgy, *De la pirotechnia*, first published in 1540, Vannoccio Biringuccio wrote that on “Morano,” works of glass are made that, “more than in other places, [are] of excellent beauty and of variety of colors, and of marvelous workmanship.”⁵ Nearly fifty years prior, Marcantonio Coccio

very useful and necessary for one to know.], 10th ed. (Venice, 1660 [1564]), 75r. All translations are my own unless stated otherwise.

3 <https://www.clevelandart.org/art/1949.565>.

4 Luca Mocrelli, “Attitudes to Work and Commerce in the Late Italian Renaissance: A Comparison between Tomaso Garzoni’s *La Piazza Universale* and Leonardo Fioravanti’s *Dello Specchio Di Scientia Universale*,” in *The Joy and Pain of Work: Global Attitudes and Valuations, 1500–1650*, ed. Karin Hofmeester and Christine Moll-Murata, special issue, *International Review of Social History* 56, no. S19 (2011): 89–106; 106, <https://doi.org/10.1017/S0020859011000496>; Pamela H. Smith, “Nodes of Convergence, Material Complexes, and Entangled Itineraries,” in *Entangled Itineraries: Materials, Practices, and Knowledges across Eurasia*, ed. Pamela H. Smith (Pittsburgh: University of Pittsburgh Press, 2019), 5–24; 6.

5 Original: “piu che in altro luoco di eccellente bellezza di varietà di colori, e d’artificio mirabile si fa à Morano.” Vannoccio Biringuccio, *De la pirotechnia* [The art of fire] (Venice: Venturino Roffinello, 1540), 102.

Sabellico likewise remarked in his *De situ Venetae urbis* (About the area of the city of Venice) (c. 1495) on the immense material sensitivity one observes on the island. He writes that Murano “is especially famous for its glass factories ... the human genius undertook to give to the material a thousand varied colors and innumerable forms.”⁶ Such descriptions are typical for the period. They reveal much about Venice and Murano’s role as the most important center of glass production and export from the mid-fifteenth century to the first half of the seventeenth century. They also allude to the high status of Venice’s glass industry as well as the mythology that by this time surrounded the craft and its place of primary production.⁷ As Lucas Burkart notes, glass in the early modern period was viewed as a “specifically Venetian material,” with Murano as the dominant production center, an assertion that has more or less been maintained through centuries of historiography.⁸

Recent literature has deftly explored this material’s association with Venice, including the affective regimes and social relationships engendered both within the lagoon city and via the circulation and consumption of glass objects further afield.⁹ However, amid such a strongly articulated relationality between matter and its site of primary production, relatively little has been written about the process of *venezianizzazione* (Venetianization) that such glass underwent; that is, how exactly the material became associated with Venice and Venetian production. This article thus proposes a shift in perspective, centering the lively transcultural itineraries of raw materials alongside investigating the processes of negotiation that led to the social and

6 Quoted in Edouard Gerspach, *L’art de la verrerie* [The art of glassmaking] (Paris: A. Quantin, 1885), 161–162. Translating Sabellico, Gerspach writes that Murano “est surtout célèbre par ses fabriques de verres ... le genie humain entreprit de donner à la matière mille couleurs variées et d’innombrables formes.”

7 On the prevalence of mythology in Venetian economic history more broadly, see Lanaro, “At the Centre of the Old World. Reinterpreting Venetian Economic History,” in *At the Centre of the Old World*, 19–69. On the notion of secrecy as a prevailing part of the myth of Venice’s glassmaking industry, see Rachele Scuro, “Shaping Identity through Glass in Renaissance Venice,” in *Materialized Identities in Early Modern Culture, 1450–1750: Objects, Affects, Effects*, ed. Susanna Burghartz, Lucas Burkart, Christine Göttler, and Ulinka Rublack (Amsterdam: Amsterdam University Press, 2021), 99–134, <https://doi.org/10.1515/9789048554058>; Patrick McCray, *Glassmaking in Renaissance Venice: The Fragile Craft* (Brookfield, VM: Ashgate, 1999), 187n42.

8 Lucas Burkart, “Negotiating the Pleasure of Glass: Production, Consumption, and Affective Regimes in Renaissance Venice,” in *Materialized Identities in Early Modern Culture, 1450–1750, Objects, Affects, Effects*, 57–98; 58, <https://doi.org/10.1515/9789048554058>.

9 For the value vested in this specific cultural identity, see Corine Maitte, “*Façon de Venise*: Determining the Value of Glass in Early Modern Europe,” in *Concepts of Value in European Material Culture, 1500–1900*, ed. Bert De Munck and Dries Lyna, (Farnham, Surrey: Ashgate, 2015), 209–237; regarding the social, cultural, and affective dimensions of the material of Venetian glass, see Burkart, “Negotiating the Pleasure of Glass”; and Scuro, “Shaping Identity through Glass in Renaissance Venice.”

cultural designation of this glass as “Venetian.” By highlighting the agentive quality of materials, explored both in recent scholarship and in sixteenth-century thought, it becomes possible to re-position the cultural identity of Venetian glass as multi-nodal, transcultural, and entangled with human and non-human actors alike. Studies on the social and cultural dimensions of the material of Venetian glass generally begin in Venice itself and thus do not investigate aspects of the social or cultural identity of the raw materials, of glass before it was glass. The meandering itineraries of these plants and minerals thus raise new questions about the cultural “identities” and associations of both Muranese and *façon de Venise* production.

Essentially all ingredients used in Murano’s glass industry came from far outside the city, a fact that was certainly known to many glass producers and likely even some consumers. For instance, as early as 1290, Venice had imported plant ashes from the Levantine coast, while silica-rich pebbles had been sourced from the bed of the Ticino River near Milan.¹⁰ The ashes would be used by Murano’s glassmakers as a fluxing agent, the material that lowered the melting point of the glass, while the stones would be ground into a fine sand to be melted down. Manganese oxide, a crucial material for decolorizing brown or green tinted glass, was said to come from Piedmont, while some blue glass was tinted with *zaffera*, an oxide of crushed cobalt and quartz, sourced from deep within the Erzgebirge mountains in Saxony.¹¹ Given that each of these materials was also used in local production for a variety of uses in their source locations and thus had prior social and cultural associations, this article asks how, at which moment, and by whom such materials gained associations with Venice, and whether their prior cultural identities were erased. As I will demonstrate, the origins of raw materials were to a large extent sublimated during the alchemical glassmaking process in favor of a new Venetian identity. However, suggestions of their distant origins were not erased completely. The inclusion of geographic descriptors such as *di Soria* and *da Tesino* in early modern glass treatises suggest the possibility of an enduring material counternarrative, despite overwhelming associations of glass with Venice and Murano. The article therefore underlines that the

10 David Jacoby, “Raw Materials for the Glass Industries of Venice and the Terraferma, about 1370–about 1460,” *Journal of Glass Studies* 35 (1993): 65–90, <http://www.jstor.org/stable/24191061>; Eliyahu Ashtor and Guidobaldo Cevidalli, “Levantine Alkali Ashes and European Industries,” *Journal of European Economic History* 12, no. 3 (Winter 1983): 475–522.

11 Paul Engle, “Manganese from Piedmont Reprise,” *Conciatore: The Life and Times of 17th Century Glassmaker Antonio Neri* (blog), August 25, 2017, <https://www.conciatore.org/2014/08/manganese-from-piedmont-reprise.html>; on *zaffera*, see Marco Verità and Sandro Zecchin, “Scientific Investigation of a Venetian Polychrome Goblet of the 16th Century,” *Journal of Glass Studies* 50 (2008): 105–115; 12, www.jstor.org/stable/24191323; Johannes Kunckel, *Ars vitraria experimentalis, oder vollkommene Glasmacher-Kunst* [The experimental art of glass, or the art of perfect glassmaking] (Frankfurt a.M. and Leipzig: Christoph Riegel, 1689), 12.

process of *venezianizzazione* should not be taken as a given in studies of early modern Venetian glass, but rather as one dominant material narrative. The alternative I propose is that the interrelated liveliness of raw materials and their ensuing sublimation on Murano is a form of (trans)cultural production, brought about by moments of becoming and erasure between material, maker, and consumer.¹²

Agentive materials and de-naturalizing *venezianizzazione*

The so-called material turn in art history and related fields has engendered lively, cross-disciplinary dialogue about the power of materials to shape artisanal and artistic outcomes as well as wider social, cultural, and economic processes. As Monica Juneja and Anna Grasskamp have outlined, disciplinary norms within art history have often led to a lack of interaction between technical material analyses and sociocultural explorations of an object's history, reinforcing a false polarity between "intransigent materiality" and "the plasticity of meaning."¹³ To bring together matter and meaning, a call for a renewed "re-materialization" within early modern art history has emerged—made most vocally by Michael Cole, Ann-Sophie Lehmann, Rebecca Zorach, and Christine Göttler, among others. Re-materializing the field demands a consideration of both the formal and socio-cultural powers of a wide variety of materials, ranging from bronze, to clay, to gold, to blood. Lehmann has demonstrated, for example, that linseed oil takes on the role of a mediator in oil painting, working in-between artists and surfaces to create ways of seeing and of moving, effectively "training" the oil painter to act in concordance with the material's lucidity and viscosity.¹⁴ As articulated by Lambros Malafouris, there is "dynamic tension" between, for instance, a potter, a mass of wet clay, and a wheel, and this tension produces collaboration.¹⁵ The medium,

12 Bourdieu articulated a call for an analysis of artistic work that situates them within the larger social matrix of production, circulation, and consumption. Pierre Bourdieu and Randal Johnson, *The Field of Cultural Production: Essays on Art and Literature* (New York: Columbia University Press, 1993); on notions of "becoming," see Elizabeth M. Hallam and Tim Ingold, eds., *Making and Growing: Anthropological Studies of Organisms and Artefacts* (London: Routledge, 2016).

13 Monica Juneja and Anna Grasskamp, "EurAsian Matters: An Introduction," in *EurAsian Matters: China, Europe, and the Transcultural Object, 1600–1800*, ed. Anna Grasskamp and Monica Juneja (Cham, Switzerland: Springer International Publishing, 2018), 3–33; 3.

14 Ann-Sophie Lehmann, "The Matter of the Medium: Some Tools for an Art-Theoretical Interpretation of Materials," in *The Matter of Art: Materials, Practices, Cultural Logics, c. 1250–1750*, ed. Christy Anderson, Anne Dunlop, and Pamela H. Smith (Manchester: Manchester University Press, 2015), 21–41; 34–36.

15 Lambros Malafouris, "At the Potter's Wheel: An Argument for Material Agency," in *Material Agency*, ed. Carl Knappett and Lambros Malafouris (Boston: Springer, 2008), 19–36; 34, https://doi.org/10.1007/978-0-387-74711-8_2.

re-materialized, is not a mute tool for the representation of an idea, but is rather an agent who, through various material constraints and possibilities, participates in the realization and reception of a work of art.¹⁶

The question of how material agency works and how precisely glass behaves in affective and effective ways continues to be debated. Christopher Pinney has argued that objects are not “smooth” and placid, but are rather charged with affective agency of their own, as their vibrations generate new “wavy meanings” outside of human control.¹⁷ In the case of glass, such reverberations extend to a material and even molecular level: the liquid-like cellular structure of glass allows it to assume sinuous forms as it cools, an impossibility for other solids (e.g., rock crystal, marble) whose atoms are laid out in a rigid and organized crystalline pattern.¹⁸ These physical properties also make glass highly accommodating to the introduction of new materials such as metal oxides, which change the color, viscosity, and working properties of glass.¹⁹ As early as the first century, this chameleon quality was noted by Pliny the Elder, who observed that “there is no material of a more pliable nature than this, or better suited for coloring.”²⁰ Early modern writers also remarked on the ability of Muranese artisans to take the material of glass and blow, coax, and pull it into spectacular forms. In his *De re metallica* (On the nature of metals), Georgius Agricola remarks that on Murano “the glass-makers make divers [*sic*] things, such as goblets, cups, ewers, flasks, dishes, plates, panes of glass, animals, trees, and ships, all of which excellent and wonderful works I have seen when I spent two whole years in Venice some time ago.”²¹ The glassmakers of Venice gained a reputation not only for the formal composition of their glass, but also for the improbable forms it took. Surviving objects, such as in this mid-sixteenth-century Venetian glass vessel in the shape of a ship (Fig. 2), show that Agricola’s descriptions of the artistry of Murano’s artisans were far from exaggerated.

16 Lehmann, “The Matter of the Medium,” 21.

17 Bennett, *Vibrant Matter*; Christopher Pinney, “Things Happen: Or, From Which Moment Does That Object Come?” in *Materiality*, ed. Daniel Miller (Durham, NC and London: Duke University Press, 2005), 256–272; 268.

18 McCray, *Glassmaking in Renaissance Venice*, 35.

19 McCray, *Glassmaking in Renaissance Venice*, 31.

20 Pliny the Elder, “Book 36: The Natural History of Stones,” in *Naturalis Historia*, trans. John Bostock and Henry Thomas Riley (London: H. G. Bohn, 1855), <http://data.perseus.org/citations/urn:cts:latinLit:phi0978.phi001.perseus-eng1:36>.

21 Georgius Agricola, *De Re Metallica: Translated from the First Latin Edition of 1556*, trans. Herbert Hoover and Lou Henry Hoover, 2nd ed. (New York: Dover Publications, 1950), 592.



Fig. 2. *Nef Ewer, late sixteenth century. Colorless cristallo and blue glass vessel with gilded ornamentation. 31.12 cm x 26.67 cm x 12.7 cm. Image courtesy of Milwaukee Art Museum.²²*

Pushing beyond the tendency to speak of materials and objects as possessing anthropocentric agency, Tim Ingold instead advocates for a perspective of substances as caught up in an unceasing process of intermixing, mutating, breaking, and acting upon various surfaces via the substance's animated and shifting physical properties. That is, things have agency not because "they are possessed of spirit" or granted a "sprinkling of agency" by a human actor, "but because the substances which they comprise continue to be swept up in circulations of the surrounding media."²³ Such an acknowledgement of the agency of things is curiously commonplace in early modern treatises. The tendency to list various ingredients for glassmaking and comment upon their effectiveness demonstrates the stock placed in non-human components of the glassmaking process. For instance, Leonardo Fioravanti, in his explanation of why Venice is such a suitable site for glassmaking, references the salty lagoon water, the hardwood fueling the fires of the furnace, and even the "clear flame" produced by this environment.²⁴ All of these resources work, in tandem with

²² Accession no. M1988.135. http://collection.mam.org/vmedia/tms768/r_m1988_135.jpg.

²³ Tim Ingold, "Materials against Materiality," *Archaeological Dialogues* 14, no. 1 (2007): 1–16; 12, <https://doi.org/10.1017/S1380203807002127>.

²⁴ Fioravanti, *Dello specchio di scientia universale*, 75v–76r.

the artisan, to produce glass that, in Fioravanti’s view, “cannot be advanced much further” nor “made more beautiful than it is.”²⁵

In-step with Fioravanti and other early modern thinkers, Guy Turner has illustrated the agentive power not only of glass as a whole, but also one of its raw components, specifically *allume catino* soda ashes, the fluxing agent used to lower the melting point of early modern Venetian glass.²⁶ *Allume catino* was an essential part of the realization of *vetro cristallo*, a luxury glass type that emerged in Murano around 1450, named for its resemblance to rock crystal and renowned for its optical purity and colorlessness. *Vetro cristallo*, perhaps more than any other Venetian glass type, came to symbolize the ascent of Murano’s industry and played an immense role in its commercial success.²⁷ Turner demonstrates that before the widespread Venetian and *façon de Venise* use of *allume catino* in *vetro cristallo*, glass was not necessarily associated with transparency, colorlessness, or limpidity. The soda ashes can thus be considered a lead actor in an emerging new aesthetics and essential in the shift of early modern understandings of glass as a material.

The material properties of Venetian glass and its ingredients not only guided the artisan’s hand in the glass workshop (*vetrerie*), but they also shaped social relationships and cultural identities. The intense fragility of glass or formal qualities such as transparency, lightness, or sheen could produce awe or a sense of inflated value from the sixteenth-century beholder.²⁸ As Burkart and Evelyn Welch have argued, intricate material knowledge of glass was likely more common than one might assume in the early modern period: as an astute “material sensitivity” was a necessary part of the attuned “period eye” of the era, especially among producers, vendors, and consumers of the material in question.²⁹

25 Original: “che per me credo, che non possi passare molto avanti ... per abellirla piu di quello che è.” Fioravanti, 75r.

26 Guy Turner, “‘Allume Catina’ and the Aesthetics of Venetian ‘Cristallo,’” *Journal of Design History* 12, no. 2 (1999): 111–122, <http://www.jstor.org/stable/1316308>.

27 Luigi Zecchin, *Vetro e vetrai di Murano: Studi sulla storia del vetro* [Glass and glassmakers of Murano: Studies on the history of glass], vol. 1, I Grandi Libri (Venice: Arsenale Editrice, 1987), 227–246; Marco Verità, “L’invenzione del cristallo muranese: una verifica analitica della fonti storiche” [The invention of Murano *cristallo*: An analytical verification of the historical sources], *Rivista della Stazione Sperimentale del Vetro* 15, no. 1 (February 1985): 17–29; Paolo Zecchin, “Barovier: la più importante dinastia di vetrai muranesi” [Barovier: The most important dynasty of Murano glassmakers], *Journal of Glass Studies* 62 (2020): 105–126, <https://www.jstor.org/stable/26951076>.

28 For a discussion of the reception in China of the medium of glass in the Berchtesgaden works, see Juneja and Grasskamp, “EurAsian Matters: An Introduction,” 12–25, especially 18.

29 Burkart, “Negotiating the Pleasure of Glass”; Evelyn Welch, “The Senses in the Marketplace: Sensory Knowledge in a Material World,” in *A Cultural History of the Senses in the Renaissance*, ed. Herman Roodenburg (London: Bloomsbury Academic, 2014), 61–86, <https://doi>.

Most recently, two articles have engaged directly and deeply with the agjective, socially constitutive qualities of early modern Venetian glass. Burkart takes a fresh look at multisensory consumption of Venetian glass to investigate how the material forged emotional and social communities, material lexicons, and patterns of behavior in fifteenth and sixteenth-century Venice.³⁰ Meanwhile, Rachele Scuro proposes that a culture of semi-open secretiveness on Murano, combined with the state's particularly privileged treatment of the industry, created a unique and shared identity among glassmakers on the island. She also analyzed governmental strategies for promoting the industry and identified that the tendency to emphasize the Venetian origin of luxury production resulted in the immense commercial success of both high-quality and mass-produced Murano glass.³¹

As Corine Maitte has demonstrated, this valorization-by-association was not limited to glass made on Murano: it also extended to that produced elsewhere in Europe in the *style* of Venice. Glass made in a so-called Venetian style came to be known as glass à la *façon de Venise*, a term in use since the middle of the sixteenth century. Due in part to the high levels of mobility among Murano's artisans, production centers from London, to Antwerp, to Barcelona, to Dubrovnik began producing glassware designed to assume some of the material and formal properties of that made on Murano.³² Burkart has argued that glass made à la *façon de Venise* was strongly associated with “the highest standards of formal innovation, artistic ingenuity, and material perfection,” and thus, there was no need for a formal brand—the product's seal of quality assurance was its civic origin, embedded within the material and visible through its workmanship.³³ The craft's reputation as “enchanted technology” and its concomitant value

[org/10.5040/9781474233217](https://doi.org/10.5040/9781474233217); Michael Baxandall, *Painting and Experience in Fifteenth Century Italy: A Primer in the Social History of Pictorial Style* (Oxford: Oxford University Press, 1988).

30 Burkart, “Negotiating the Pleasure of Glass.”

31 Scuro, “Shaping Identity through Glass in Renaissance Venice.”

32 Corine Maitte, “L'espace européen du travail des verriers italiens, XVII^e–XIX^e siècle. Dynamiques et structures de migrations spécialisées” [The European space of the Italian glassworkers' production, 16th–19th century. Dynamics and structures of specialized migrations], *Cahiers de la Méditerranée*, no. 84 (June 2012): 139–158, <https://doi.org/10.4000/cdlm.6413>; Jutta-Annette Page and Ignasi Domènech, eds., *Beyond Venice: Glass in Venetian Style, 1500–1750* (Exhibition, Titled “Beyond Venice,” New York: Distributed by Hudson Hills Press, 2004); Verena Han, *Три века дубровачког стакларства (XIV–XVI век) / Tri veka dubrovačkog staklarstva (XIV–XVI vek)* [Three centuries of glassmaking in Dubrovnik (14th–16th century)], ed. Radovan Samardžić, Посебна издања / Posebna izdanja [Special Editions], knj. 11 (Belgrade: Српска академија наука и уметности, Балканолошки институт / Srpska akademija nauka i umetnosti, Balkanološki institut [Serbian Academy of Sciences and Arts, Institute for Balkan Studies], 1981).

33 Burkart, “Negotiating the Pleasure of Glass,” 70.

was thus inseparable from the material’s cultural associations, its sense of belonging to and deriving from Venice.³⁴

This phenomenon by which the material of early modern glass gains a dominant layer of association with Murano and Venice can be described as *venezianizzazione*, a term that signals that this shift is processual and relational, rather than a given or inherent quality of the material. The term, borrowed from linguistic studies (where it is used to indicate dialectical shifts in medieval Dalmatia and other Venetian territories) and frequently used as shorthand to describe over-tourism in Italian cities, is here a fitting descriptor for the processual way this material takes on a central layer of meaning.³⁵ *Venzianizzazione* of glass made on Murano or that à la façon de Venise is emphatically a multi-scalar and multi-temporal process, taking shape not only in early modern workshops, but rearticulated and naturalized through the hand of the Venetian state (as Scuro has argued), via early modern travel writing and artisanal treatises, and, eventually, through art historical and exhibitionary apparatuses.

Within historiography, in-depth studies on Venetian glass have an outsized focus on Muranese technological innovation and luxury production, particularly from the period of 1450–1650. Many begin with the emergence of *vetro cristallo* in the middle of the fifteenth century, or with the subsequent development of numerous other luxury compositions, such as *vetro calcedonio*, which mimicked the appearance of hardstones such as chalcedony, or *vetro lattimo*, whose opaque white appearance recalled the appearance of hard paste porcelain. Still others focus on dynastic glassmaking families of the island or of relationships between the Venetian state and the glass guild on Murano.³⁶ Although such emphases are crucial to the understanding of this early modern craft, they also reinforce Venice as the sole site of significance, a perspective echoed in museological practices of assigning provenance to objects and categorizing them according to their most likely site of production.

34 Alfred Gell, “The Technology of Enchantment and the Enchantment of Technology,” in *Anthropology, Art, and Aesthetics*, ed. Jeremy Coote and Anthony Shelton (Oxford: Clarendon Press, 1994), 40–66.

35 “Il turismo a Treviso: ASCOM e lo sviluppo della città” [Tourism in Treviso: ASCOM and the development of the city], *Impegno Civile Treviso*, May 19, 2019, accessed May 28, 2022, <https://www.impegnocivile.eu/2019/05/20/il-turismo-a-treviso-ascom-e-lo-sviluppo-della-citta-20-maggio-2019/>; Flavia Ursini, “La Romania submersa nell’area adriatica orientale” [The *Romania submersa* in the eastern Adriatic region], in *Romanische Sprachgeschichte*, ed. Gerhard Ernst, Martin-Dietrich Gleßgen, Christian Schmitt, and Wolfgang Schweickard (Berlin: de Gruyter, 2003), 683–694; 693, <https://doi.org/10.1515/9783110146943.1.6.683>.

36 Zecchin, “Barovier: la più importante dinastia di vetrai muranesi”; Luigi Zecchin, *Vetro e vetrai di Murano: Studi sulla storia del vetro* [Glass and glassmakers of Murano: Studies on the history of glass], vol. 3 (Venice: Arsenale Editrice, 1990); Luigi Zecchin, *Vetro e vetrai di Murano: Studi sulla storia del vetro* [Glass and glassmakers of Murano: Studies on the history of glass], vol. 2 (Venice: Arsenale Editrice, 1989).

As Tony Bennett observed more than three decades ago, art history and its associated set of exhibitionary apparatuses are not neutral containers but rather “cultural technologies” that work to facilitate particular social outcomes.³⁷ Transcultural studies also sheds light on how the museological practices of collecting and taxonomizing re-historicize facets of an object while obscuring vital parts of its social life, demanding that objects bear the “burden of representation,” to stand in as monolithic samples of supposedly homogenous, nationally-bound conceptions of national, religious, or ethnic identities.³⁸ The limitations of asking objects to perform as representative “object lessons” are all the more evident when applied to the traveling artefact, whose pathways of circulation and meandering life stages cannot be satisfactorily listed on a single label or assigned to one wing of a museum.³⁹ This, too, applies to “Venetian glass,” a stylistic category whose name elevates the site of primary production as the center and assigns peripheral status to the locales that, despite often-great geographic distance from Murano, were nonetheless essential to the glass’s realization.

This section has thus far attempted to identify and de-naturalize *venezianizzazione*, the process by which Venetian glass (particularly heavily-researched luxury production from c. 1450–1650), has acquired a highly specific sense of notoriety linked to the idea of belonging to the island of Murano in the Venetian Republic. Through the artisanal and discursive process of acquiring this “Venetian-ness,” there comes a shedding of past associations and histories of its raw materials. Although the role of Venice in the valuation, consumption, and production of this glass is clearly a highly important one, its dominance also obscures other narrative possibilities. An additional interpretive model is thus needed that, to borrow the language from a convening of glassmakers in Venice in 1511, positions the material

37 Tony Bennett, “The Exhibitionary Complex,” *New Formations* 4 (Spring 1988): 73–102.

38 The notion of an object’s meaning being distributed throughout its social life comes from Arjun Appadurai, ed., *The Social Life of Things: Commodities in Cultural Perspective* (Cambridge: Cambridge University Press, 1986). Taking as her starting point the observation made in 1990 by Kobena Mercer, Juneja characterizes the “burden of representation” as the expectation placed particularly on non-Western contemporary artists to make work that can be “read” as a representational, discreet unit of the artist’s cultural, ethnic, or linguistic positionality in order to satisfy the demands of the neo-liberal art world. Monica Juneja, “Global Art History and the ‘Burden of Representation,’” in *Global Studies: Mapping Contemporary Art and Culture*, ed. Julia T. S. Binter and Hans Belting (ZKM Summer Seminar “Contemporary Art and the Global Age,” Ostfildern: Hatje Cantz, 2011), 274–297.

39 Donald Preziosi, *Brain of the Earth’s Body: Art, Museums, and the Phantasms of Modernity* (Minneapolis: University of Minnesota Press, 2003), 124; Eva R. Hoffman, “Pathways of Portability: Islamic and Christian Interchange from the Tenth to the Twelfth Century,” in *Late Antique and Medieval Art of the Mediterranean World*, ed. Eva R. Hoffman (Malden, MA: Blackwell, 2007), 317–349.

of Muranese and *façon de Venise* glass as both within and outside of Murano (“Si in Muran come fuora de Muran”).⁴⁰ This endeavor is emphatically and necessarily transcultural, as it rejects ubiquitous models of container culture (and with it the notion of a simplified identity or style) in favor of fluid, dynamic, and transient relationalities.⁴¹ This does not mean the rejection of Murano’s dominant position as a center of innovation and invention in fifteenth to seventeenth-century glassmaking, nor does it indicate a refusal to acknowledge the impact that the association with Venice had on finished objects. Rather, deconstructing the process of *venezianizzazione* demands us to look into the early modern glass object for alternative and additional notions of belonging. This requires the re-negotiation of naturalized stylistic categories as well as established chronological categories.⁴² Instead of predominantly evaluating glass objects along a thin, linear temporality, which rests on notions of progress and favors the place of primary or finalized production, an open time concept allows for the recognition of geographical complexity and co-productive making.⁴³ This highlights that the making of matter and meaning happens not only in the *vetrerie* of Murano, but also in eastern Mediterranean markets, along trade routes, at the bottom of rivers, and deep within Saxon mines, as the raw materials of Venice’s *vetro cristallo* change hands and chart their own itineraries.

Transcultural itineraries: “Rendered pebbles” and “ashes of a certain herb”

Seeing an opportunity in the mobile object, Marta Ajmar has notably proposed that we should perceive such artifacts as “multi-layered compounds,” whose material and technological complexity take shape not in one place or time, but over the course of geographically and temporally distributed practice.⁴⁴ This can be applied to the technological development and material history of Venetian glassmaking, as various foundational aspects of its production were shaped and informed by the glass industries in the Muslim states of the southern

40 Zecchin, *Vetro e vetrai di Murano* vol. 2, 2:205.

41 Lucy Bond and Jessica Rapson, eds., *The Transcultural Turn: Interrogating Memory Between and Beyond Borders* (Boston: de Gruyter, 2014), 9.

42 Marta Ajmar, “Looking INTO the Transcultural Object,” in *EurAsian Matters: China, Europe, and the Transcultural Object, 1600–1800*, ed. Anna Grasskamp and Monica Juneja (Cham, Switzerland: Springer International Publishing, 2018), 247–253.

43 Ajmar, “Looking INTO the Transcultural Object,” 250.

44 Marta Ajmar, “The Renaissance in Material Culture: Material Mimesis as a Force and Evidence of Globalization,” in *The Routledge Handbook of Archaeology and Globalization*, ed. Tamar Hodos (New York: Routledge, 2017), 669–686.

and eastern Mediterranean coasts. Rosa Barovier Mentasti and Stefano Carboni have highlighted that glassmaking in Venice became an economically viable industry in the thirteenth-century largely due to the city's close and longstanding mercantile relationships in Egypt and Syria.⁴⁵ The authors have further described how medieval Venetians exchanged “technological and technical information” along transmission routes leading to Alexandria, Acre, Antioch, and Tyre, and it was through these transmission routes that Murano inherited a preference for certain raw materials and familiarity with certain shapes and decorative techniques.⁴⁶

By the fifteenth century, the glass furnaces of the Eastern Mediterranean and North Africa had slowed substantially or had put their fires out completely; however, returning to the raw materials of early modern Venetian glassmaking and lingering on the dynamics of their collection, importation, and manipulation nonetheless allow the multi-layered facets of this transcultural material to come to the fore. As Juneja and Grasskamp have articulated, materials themselves have the ability to act as mediators, facilitating encounters between temporally and geographically distant human actors.⁴⁷ The materials in motion used in Venetian glassmaking become a conduit for transculturation, as their dynamic pathways from one locale to another shape new relational fields among those who collect, care for, and work with them.⁴⁸ As a counterpoint to the last section, which focused largely on the development of *venezianizzazione*, this section will look to the interactive zones and spaces of encounter between raw materials and their collectors, buyers, and stewards before they arrived on Murano.

By centering the transcultural itineraries of humble and largely unassuming glassmaking components, such as river stones, metal oxides, and salt-tolerant plants, there is an opportunity to make legible silenced, overridden, or forgotten interactions across protracted timescales. As discussed, the materials of early modern Venetian glass were highly mobile and active constituents in processes of transculturation; however, this movement was not steered by a “sprinkling” of anthropomorphic agency, as Ingold cautions, but rather a set of push-pull factors.⁴⁹ Hans Peter Hahn and Hadas Weiss propose the use of “itineraries” to describe the complex, nonlinear, and

45 Rosa Barovier Mentasti and Stefano Carboni, “Enameled Glass between the Eastern Mediterranean and Venice,” in *Venice and the Islamic World, 828–1797*, ed. Stefano Carboni (New Haven: Yale University Press, 2007), 252–275; 253.

46 Barovier Mentasti and Carboni, “Enameled Glass between the Eastern Mediterranean and Venice,” 255.

47 Juneja and Grasskamp, “EurAsian Matters: An Introduction,” 5.

48 Smith, “Nodes of Convergence, Material Complexes, and Entangled Itineraries,” 5.

49 Ingold, “Materials against Materiality,” 5.

interrelated dimensions of things in motion.⁵⁰ Rather than the “metaphor of biography” of an object, which suggests a linear lifespan punctuated by an object’s “birth” and “death,” or the notion of simply “traveling things,” which again suggests that movement is a universal, normative property, the framework of itineraries allows for materials to meander into and out of transcultural becomings.⁵¹ This seems appropriate for the raw materials of Murano’s glass industry of the fifteenth–seventeenth centuries, as such materials do not exactly “die,” nor are they always in motion. Itineraries as a metaphor furthermore encourages attention to “subsequent changes in [a thing’s] contexts and roles,” such as the moment that these ingredients are sold to merchants or melted in a furnace.⁵²

Subsequent changes were rife in the itineraries of crucial raw materials for fifteenth to seventeenth-century Muranese glass, specifically those necessary for the realization of transparent, colorless production. By the latter half of the fifteenth century, two types of colorless glass had emerged in the furnaces of Murano: *vitrum blanchum* and the aforementioned luxury *vetro cristallo*.⁵³ *Vitrum blanchum*, or “white glass,” was a medium-tier, transparent glass that was well established in Venice by the late thirteenth-century.⁵⁴ It differed from “common glass” (*vetro comune*, used for the general production of mass-produced bottles or some window glass) in both its specialized raw materials and the complexity of its manufacturing process, and the end result was not opaque white, as the name may suggest, but rather a reasonably colorless and transparent material, frequently with a grayish cast.⁵⁵ Around 1450, *vetro cristallo*, the aforementioned “crystal glass,” began to appear in archival sources as a new, luxury material.⁵⁶ Due to its precise ingredients

50 Hans Peter Hahn and Hadas Weiss, eds., *Mobility, Meaning, and the Transformations of Things: Shifting Contexts of Material Culture Through Time and Space* (Oxford: Oxbow Books, 2013).

51 Hahn and Weiss, *Mobility, Meaning and the Transformations of Things*, 4, 6–7.

52 Hahn and Weiss, *Mobility, Meaning and the Transformations of Things*, 8.

53 Marco Verità and Sandro Zecchin broadly sketch the chemical and technological differences between all three types of glass, Marco Verità and Sandro Zecchin, “La tecnologia vetraria veneziana del XV–XVI secolo attraverso le analisi di reperti in vetro d’uso comune” [Venetian glassmaking technology of the fifteenth–sixteenth century through the analysis of finds of glass of common use], *Quaderni Friulani di Archeologia* 19 (2009): 237–248; McCray, *Glassmaking in Renaissance Venice*, 140–149 provides an overview of the value of different glass types at various times and includes a discussion on Renaissance consumerism and the market for luxury goods.

54 Zecchin, *Vetro e vetrai di Murano vol. 3*, 1990, 239–49.

55 McCray, *Glassmaking in Renaissance Venice*, 116–117.

56 Marco Verità, “Secrets and Innovations of Venetian Glass between the 15th and 17th Centuries: Raw Materials, Glass Melting and Artefacts,” ed. Rosa Barovier Mentasti and Cristina Tonini, *Study Days on Venetian Glass: Approximately 1600s*, ATTI. Classe di scienze fisiche, matematiche e naturali / Istituto veneto di scienze, lettere ed arti 172, no. 1 (2014): 57.

and complex manufacturing process, *vetro cristallo* likely lacked the grey undertones of *vitrum blanchum* and rather appeared truly colorless to the early modern eye, as if it were coagulated air.⁵⁷ This aesthetic sensibility must have been particularly striking on the lightweight and unadorned blown *cristallo* wineglasses produced throughout the second half of the sixteenth and the seventeenth centuries, such as the example in the Corning Museum of Glass (Fig. 3). The optic properties of transparency, colorlessness, and clarity made *vetro cristallo* something of an aesthetic and technological sensation in the fifteenth and sixteenth centuries and catapulted the Muranese glass industry to new heights of success and notoriety.⁵⁸ This particular glass was made in three pieces: a blown, conical bowl, a blown, disk-like foot, and a characteristic hollow stem, the shape of which further encouraged the refraction of light through the vessel. It is entirely without other hot-worked embellishments, enameling, or engraving: there is nothing distracting from the material itself and the wine for which it was intended. Although *vetro cristallo* and *vitrum blanchum* differed in their production processes, both depended upon the same, distant sources for their dominant raw materials. The early modern Venetian glass industry, in turn, depended upon these materials to produce the optically pure, colorless glass types for which it had become well-known.⁵⁹ Although relatively few in-depth studies have been conducted on these materials, a few fundamental works remain, most notably those by Marco Verità, David Jacoby, Eliyahu Ashtor, and Guidobaldo Cevadalli.⁶⁰ From their works, one can extrapolate the transcultural interactions and formations these raw materials engendered.

57 It is today, however, extremely difficult to reliably differentiate between *vetro cristallo* and *vitrum blanchum* with the naked eye. This may be due to weathering and corrosion over time, although it is also possible that contemporary beholders have less of an eye for the differences between the two and cannot as readily perceive the heightened clarity of *vetro cristallo*. *Cristallo* pieces also tend to be feel lighter in weight since their chemical composition allows them to be blown thinner. McCray, *Glassmaking in Renaissance Venice*, 195n68. For a discussion of how the optical purity of *cristallo* may have been perceived in its time, see Turner, "'Allume Catina' and the Aesthetics of Venetian 'Cristallo'."

58 For discussions on various facets of the popularity of *cristallo*, see Rosa Barovier Mentasti, Luciano Borrelli, and Cristina Tonini, "Venetian Conical Goblets of the Renaissance," *Journal of Glass Studies* 61 (2019): 157–196; 157–159, <https://www.jstor.org/stable/26862833>; McCray, *Glassmaking in Renaissance Venice*, 96–140; Turner, "'Allume Catina' and the Aesthetics of Venetian 'Cristallo'."

59 Scuro, "Shaping Identity through Glass in Renaissance Venice"; Turner, "'Allume Catina' and the Aesthetics of Venetian 'Cristallo'."

60 Verità, "L'invenzione del cristallo muranese: una verifica analitica della fonti storiche"; Jacoby, "Raw Materials"; Ashtor and Cevadalli, "Levantine Alkali Ashes and European Industries."



Fig. 3. Glass goblet with conical cup (Kelkglas met trechtervormige kelk), c.1575–c. 1600. Blown and tooled *crystallo* glass with applied stem and foot. 19.8 cm x 9.0 cm x 9.0 cm. Image courtesy Rijksmuseum, Amsterdam.⁶¹

The visual impact of *vetro cristallo* was made possible through the reliable importation of two ingredients: a silica-rich vitrifier and a sodium carbonate-rich fluxing agent. The first came in the form of stones from the Ticino River, while the second came from plant ashes, most notably sourced from Syria. For the vitrifier, i.e., the mineral that is crushed, incorporated with other materials, and melted in the furnace to make the semi-finished product known as glass frit, Murano’s glass industry looked west toward Milan. Venice’s premier source of silica was smooth, white quartz stones called *cogoli*,⁶² which were

61 Object no. BK-NM-10754-40. http://hdl.handle.net/10934/RM0001_COLLECT.325703.

62 In archival sources, these stones are spelled a variety of ways, including *cuogol*, *chuogolli*, *cuocoli*, and, in Tuscan sources such as Antonio Neri’s *L’arte vetraria*, sometimes as *quocoli*. Antonio Neri, *L’arte vetraria distinta in libri sette: Ne quali si scoprono, effetti marauigliosi, & insegnano segreti bellissimi, del vetro nel fuoco & altre cose curiose, all’Illust.mo et Eccell.mo Sig., Il Sig. Don. Antonio Medici* [The art of glass in seven books: In which one is shown marvelous effects and is

dredged from the bed of the Ticino River, particularly near today's *comune* of Sesto Calende, just west of Milan. The powder resulting from crushed and sieved *cogoli* was very high in silica and free of other impurities, such as iron, making them ideal for serial production of Muranese and *façon de Venise* colorless glass.

Transporting these stones from the bottom of a river to Venice was a complex task that was dependent on negotiation between and labor from a wide network of participants. *Cogoli* were scooped from the bed of the Ticino, selected, weighed, and transported to Venice on an over-water route, first through the rapids of the Ticino and then over the treacherously shallow Po River. Although early modern depictions of this labor are scarce, such stones were as recently as the 1980s retrieved from the riverbed of the Ticino; an ethnographic project has produced photographs of workers manually fishing the stones from the bottom of the river and placing them in boats that appear very similar to early modern descriptions (Figs. 4 and 5).⁶³ Cornelio Bruscherini has described that, in the early modern period, massive shipments of *cogoli* were ferried in black, flat-bottomed boats captained by experienced oarsmen known as *paroni*, a word of Venetian origin.⁶⁴ After reaching the mouth of the Po River and circling northward to the Venetian lagoon, the empty boats were brought back upstream with the help of horses, a round trip that took no less than fifteen days.

The unique value of these stones to the Venetian glass industry propelled not only transcultural interaction between Venetian and Milanese traders, it also created a chain of exchange through which other objects were set in motion. Venetian glassmakers were not the only ones to take note of the value of such a pure source of silica, and obtaining exclusive rights to the material proved impossible, since access to the Ticino lay under Milan's control. The most significant Milanese claim to the stones of the Ticino came in 1559, when Piero Francesco Busca of Milan gained unrestricted and exclusive access to gathering and exporting *cogoli*, a monopoly that remained in effect until the first half of the eighteenth-century.⁶⁵

taught beautiful secrets, of the glass in fire and other curious things, for the most Illustrious and most Excellent Sir, the Sir Don. Antonio Medici] (Florence: Stamperia de' Giunti, 1612), 4.

63 Giovanni Giovannetti, "Gente del Ticino. Vecchi mestieri e nuova composizione nel Borgo Ticino di Pavia," *La ricerca folklorica*, no. 12 (1985): 113–123, <https://doi.org/10.2307/1479254>.

64 The process of preparing and transporting the *cogoli* is described in Cornelio Bruscherini, "Breve storia dell'industria del vetro sul Verbano e particolarmente a Sesto Calende" [Brief history of the glass industry in Verbano and particularly in Sesto Calende], *Rivista della Società Storica Varesina*, no. 5 (1956): 221–228; 224.

65 Bruscherini, "Breve storia dell'industria del vetro sul Verbano e particolarmente a Sesto Calende," 223.

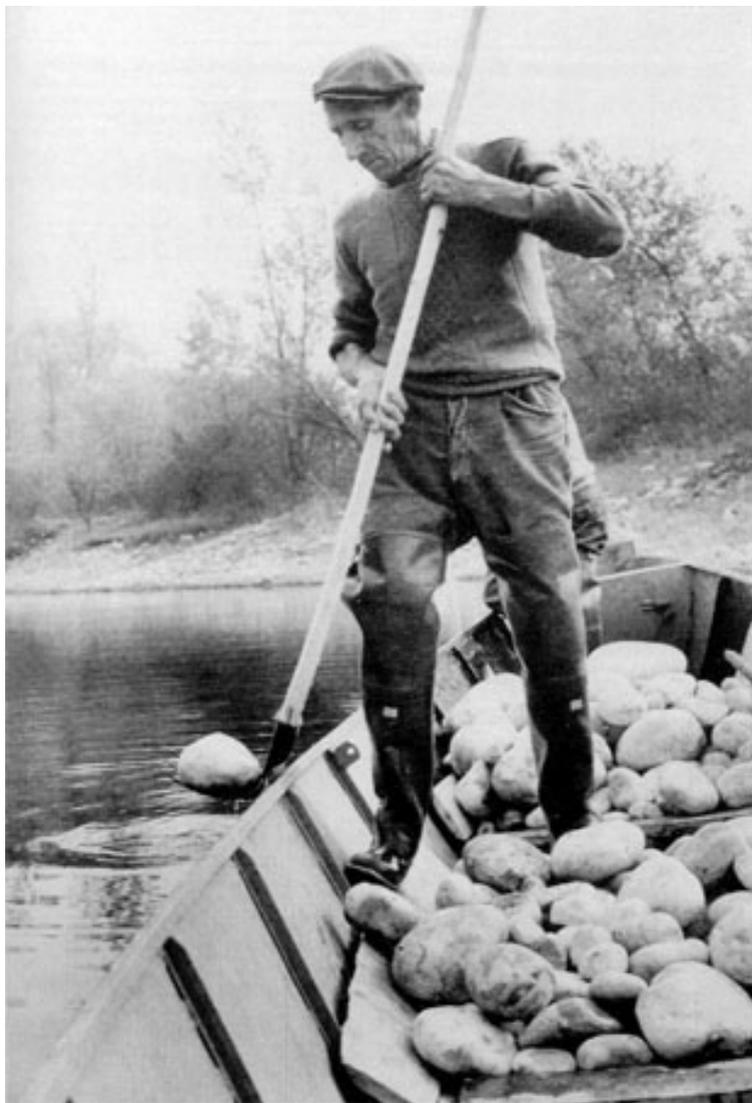


Fig. 4. Enzo Minervini, Sergio Cordani, Raccolta di sassi nell'alveo del fiume Ticino (Sergio Cordani, the collection of the stones from the riverbed of the Ticino River), 1987. Image courtesy of Archivio di Etnografia e Storia Sociale: Regione Lombardia.⁶⁶

66 https://aess.regione.lombardia.it/ricerca/ricerca_src/scheda_ric.php?idk_id=SER-LOM60-0000074&sigla=aess_all.



Fig. 5. Enzo Minervini, Sergio Cordani, Raccolta di sassi nell'alveo del fiume Ticino (Sergio Cordani, the collection of the stones from the riverbed of the Ticino River), 1987. Image courtesy of Archivio di Etnografia e Storia Sociale: Regione Lombardia.⁶⁷

Due to the geographical and political challenges Venetian artisans faced accessing the material, some went to great lengths to obtain a secure and steady supply. A notarized contract from March 8, 1581, tells a particularly interesting tale of entangled material itineraries: two Milanese brothers, Carlo and Francesco Busca, agreed to provide Gaspare Brisighella, a glassmaker in Murano, with a substantial, fixed quantity (*di fermo*) of 500 *migliaio* of *cogoli*, and, on top of that, another conditional 300 *migliaio* (*di rispetto*), all of which would be delivered to Brisighella over a period of nine years. In return, Brisighella would compensate the Busca brothers at a rate of six *lire per migliaio*, “plus the following presents.”⁶⁸ The contract then lists a wide array of luxury objects and consumables. The selection is worth reproducing in full, as the gifts, many products of Venice’s far-reaching contacts to the East and the Republic’s own artisanal manufacture, not only demonstrate the value of these stones, but also illustrate the extent of the commercial networks in which raw materials were embroiled. In exchange for sending a fixed supply of *cogoli* to Murano, the Busca family of Milan received the following:

67 https://aess.regione.lombardia.it/ricerca/ricerca_src/scheda_ric.php?idk_id=SER-LOM60-0000074&sigla=aess_all.

68 Original: “più le seguenti regalie.” Bruscherini, “Breve storia dell’industria del vetro sul Verbano e particolarmente a Sesto Calende,” 224.

A painted chest full of drinking glasses, beautiful and befitting a gentleman, seven of eight sealed casks of Candia Moscatello [a wine produced from grapes grown on the Venetian colony of Crete], twelve wax torches of six pounds each, seventy-two pounds of blocks of refined sugar, twenty-five pounds of pistachios in their shell, five pounds of whole black peppercorns [*pevere intero*], and six pounds of spices, divided into twenty-four sachets of three ounces each.⁶⁹

The itinerary of *cogoli* thus intersects with other items and fosters transcultural mobility. Some of these items, notably the Moscatello wine and the sachets of spices, were luxury consumables to which the Milanese did not have direct access but the Venetians did, due not only to the Venetian Republic’s connections to the Eastern spice trade, but also to Venice’s numerous imperial outposts in the Adriatic and Mediterranean.⁷⁰ The inclusion of these well-known rarities in the payment plan allowed Gaspare Brisighella to strengthen his own relationship with Milan’s Busca family: refined sugar, spices, and wine from the vineyards of Venetian Candia (Crete) may have flattered Busca with assumptions of his good taste (indeed, some items given are described as “da zentilhomo”), while the drinking glasses given as part of the gift specifically showed off both the products of Murano’s glassworks and the quality of the Ticino’s silica pebbles. Such an act highlights the connection between the raw material and its *venezianizzazione*. In this circuitous itinerary, *cogoli* are fished from the Ticino and sent to Murano, where they are melted, combined with other materials, and crafted into glass drinking vessels, only to be labeled Venetian and sent back to their starting point.

The second essential component of any early modern glass was the fluxing agent, which comprised fifteen to thirty-five percent of the glass batch and served to lower the melting point of the glass, allowing it to become molten and workable.⁷¹ The dominant alkali in the glasshouses of both the Levant and

69 Original: “una cassa da camera depenta piena de bichieri fini che sia robba bella et da zentilhomo, uno caratello di tenuta di sette in otto secchi venetiani di moscatello di Candia, dodici torze di cera de peso de lib. sei l’una, lib. setantadue de zuchari refini, libre venticinque de pistachi de due scorce, lib. cinque di pevere intero et lib. sei di specie in ventiquattro sachetti di oncie tre l’uno.” My sincere thanks to Rebecca Müller for her help in correctly identifying *pevere* as black pepper. Bruscherini, “Breve storia dell’industria del vetro sul Verbanò e particolarmente a Sesto Calende,” 224.

70 Luciano Pezzolo, “The Venetian Economy,” in *A Companion to Venetian History, 1400–1797*, ed. Eric Dursteler, (Leiden: Brill, 2013), 264–276; Allaire B. Stallsmith, “One Colony, Two Mother Cities: Cretan Agriculture under Venetian and Ottoman Rule,” in *Between Venice and Istanbul: Colonial Landscapes in Early Modern Greece*, ed. Sirlol Davies and Jack L. Davis (Princeton: American School of Classical Studies at Athens, 2007), 151–171.

71 “Alkali,” Corning Museum of Glass, 2002, accessed May 27, 2022, <https://www.cmog.org/glass-dictionary/alkali#>.

Venice was made from plant ash that was rich in sodium carbonate, or “soda.”⁷² These plants and their ashes had various names in the regions they were grown: they were known in literary Arabic as *ushnān*, while in the Levantine dialect they were called *kali* or *keli* (also transcribed as *qilw*, *qily*), from which alkali takes its name.⁷³ The ash from these plants was frequently mentioned in Venetian sources, where it is most commonly referred to as *allume catino*.⁷⁴

Chemical analyses of various types of plant ash have suggested that the Syrian variety of ash that was prized by Venetian glassmakers came from plants of the *Kali* and *Salsola* genera, particularly the species *Salsola soda* L.⁷⁵ These plants are small halophytic (salt-tolerant) shrubs that thrive in the salty coastal soils of the Mediterranean littoral. Due to where they grow and their ability to thrive in salty environments, their ashes contain a high percentage of sodium carbonate (soda). Their use in the soap, glass, and maiolica industries and thus their value to both domestic and international markets was well known in the regions where they grew: as early as 985, the geographer al-Muqaddasī (c. 945/946–991) mentions their export from Aleppo.⁷⁶ In his travelogue published in 1582, Bavarian botanist and physician Leonhard Rauwolff (1535–1596) described and rendered a dense, flowering shrub that he encountered in Tripoli, Syria in 1573. He called the plant *Kali Arabum*, noting that the inhabitants of the region use the name “Schinan” (e.g., *ushnān*) and that it is burnt to ashes for the manufacture of soap and glass.⁷⁷ The plant has been recorded not only

72 In the case of the Levantine glass industries, the shift from mineral-based natron to soda-rich plant ashes most likely occurred in the ninth century. “The Transition from Natron to Plant Ash in the Levant,” *Journal of Glass Studies* 44 (2002): 193–196, <http://www.jstor.org/stable/24190880>.

73 Manfred Ullmann, *Aufsätze zur arabischen Rezeption der griechischen Medizin und Naturwissenschaft* [Essays on the Arabic reception of Greek medicine and natural science], ed. Rüdiger Arnzen (Berlin: de Gruyter, 2016), 314–315, <https://doi.org/10.1515/9781614518457>.

74 The Levantine ashes are also referred to in Italian written sources as *lume catino*, *allume catina*, *cenere di Levante* (ashes of the Levant), *rocchetta* (when in compacted pieces), and *polverino* (in powdered form). Purified soda ashes suitable for making *crystallo* and other luxury glass compositions are often referred to as *sal di alkali* (alkali salt). See Seth C. Rasmussen, “Advances in 13th Century Glass Manufacturing and Their Effect on Chemical Progress,” *Bulletin for the History of Chemistry* 33, no. 1 (2008): 28–34; 34n19.

75 The precise range of species used in the Levantine plant ash trade has not been identified conclusively. However, Ashtor and Cevdalli convincingly argue that *Salsola soda* L.’s extremely high soda content makes it a likely source for Venetian *allume catino*. For a presentation of the aforementioned chemical analyses and a discussion of the challenges of matching existing species to historical sources, see Ashtor and Cevdalli, “Levantine Alkali Ashes and European Industries,” 491–501.

76 Ashtor and Cevdalli, “Levantine Alkali Ashes and European Industries,” 482.

77 In Rauwolff’s words, the plant “wirdt von inwohnern auch Schinan genant, daraüs inn Morgen Ländern äschen gebrandt wird zuen Seiffen vnnnd gläsern zü machen ganz dienstlich, . . . auß welches äschen weysse gläser gemacht werden” [The plant “is also called ‘Schinan’ by the inhabitants, in

in Rauwolf’s herbarium, but also in a wide breadth of botanical treatises. In his *Historia generalis plantarum* (1586), Dalechamps likewise identified the plant *Kali arabum*, which he describes as having many scattered branches and a thick, gray root. It is rendered it beside the species *Conyza syriæ*, underlining the plants’ shared habitat in Syria (Fig. 6). Likewise, in an Ottoman manuscript from 1717, the scribe Muhammad ibn Muhammad Shakir Ruzmah-’i Nathani identifies the plant by its literary Arabic name *ushnān*, which he renders with slender, closely spaced leaves (Fig. 7).



Fig. 6. “Kali Arabum secundum genus” and “Conyza syriæ,” 1586. Page 20 of *Historia Generalis Plantarum* by Jacques Dalechamps. Image courtesy of Bibliothèques d’Université Paris Cité.⁷⁸

the Near East, the ash from (this plant) is burned to make quite serviceable soap and glass, ... from these ashes white glass is made’]. Quoted in Adolbaset Ghorbani et al, who also identify the plant Rauwolf describes as *Salsola soda* L. See Adolbaset Ghorbani, Jan J. Wieringa, Hugo J. de Boer, Henk Porck, Adriaan Kardinaal, and Tinde van Andel, “Botanical and Floristic Composition of the Historical Herbarium of Leonhard Rauwolf Collected in the Near East (1573–1575),” *Taxon* 67, no. 3 (June 2018): 565–580; 571, <https://doi.org/10.12705/673.7>.

78 https://www.biusante.parisdescartes.fr/histmed/image?medpharma_res000057x02x0925.



Fig. 7. Muhammad ibn Muhammad Shakir Ruzmah-'i Nathani (Scribe), A plant called Ishrash, Saltwort, and Wormwood, 1717. Illustrated from manuscript. Image courtesy of The Walters Art Museum, Baltimore.⁷⁹

In his travelogue, Rauwolff recounts how Bedouin traders participated in this profitable industry, describing their process of collecting massive quantities of *ushnān*, incinerating them, and compacting the ashes into solid cakes.⁸⁰ A source also describes the way that the Bedouin collected and transported this ash via the “caravans of the *keli*,” which ran ten times per year to Nablus, Aleppo and other market centers.⁸¹ They sold the ashes to Arab middlemen,

79 Manuscript W.659. <https://art.thewalters.org/detail/84137/a-plant-called-ishrash-saltwort-and-wormwood/>.

80 Leonhard Rauwolff, *Aigentliche Beschreibung der Reiß inn die Morgenländerin* [Actual description of travels in the eastern countries] (Lauingen, 1582), 37.

81 Albert de Boucheman, *Une petite cite caravanière: Suhné* [A small caravan city: Suhné] (Damascus: L'institute francais de Damas, 1937), 88–89. Quoted in Ashtor and Cevidalli, “Levantine Alkali Ashes and European Industries,” 487–488.

who then sold the substance to third parties such as Venetian traders, albeit with a heavy markup.⁸² As Ashtor and Cevidalli note, Syria held a “monopoly” on the sale of these ashes in the sixteenth century: A large part of these was sold to European merchants, specifically Venetians, who are documented to have bought the ashes not only from the Ottomans in sixteenth-century Syria, but also previously from Mamluk authorities, such as the governor of Tripoli.⁸³ In the early nineteenth century, the traveler John Lewis Burckhardt reported a strikingly similar process, though here the ashes, processed centuries later, were destined for the soap trade, not glassmaking:

The Arabs of the Belka, especially the Beni Szakher, bring here Kelly or soap-ashes, which they burn during the summer in large quantities: these are bought up by a merchant of Nablous, who has for many years monopolized the trade in this article. The soap-ashes obtained from the herb Shiman [e.g., *ushnān*], of the Belka, are esteemed the best in the country, to the S. of Damascus, as those of Palmyra are reckoned the best in northern Syria. They are sold by the Arabs for about half a crown the English cwt., but the purchaser is obliged to pay heavy duties upon them.⁸⁴

Beshara Doumani has proposed the Palestinian city of Nablus as a crucial node in the exchange of *keli*, and has noted that, although interactions between the Bedouin and Arab middlemen were not symmetrical in power, the two groups mutually depended upon one another, as “consistent supplies of this raw material depended primarily on the relationship between Nablus and the Bedouins of the eastern bank of the River Jordan, especially members of the Bani-Sakhr tribe.”⁸⁵ Raouf Sa’d Abuaber, whose ancestors worked in the *keli* trade, has argued that this activity was a crucial source of income for the Bedouin until the 1860s, although the continuity of this activity from the early modern period until the nineteenth century has not been verified.⁸⁶

Similar to the case with *cogoli*, wherein the Busca family of Milan received additional gifts for selling their stones to the Venetians, the caravan leaders also received material incentives for delivering the *keli* on time

82 Beshara Doumani, *Rediscovering Palestine: Merchants and Peasants in Jabal Nablus, 1700–1900* (Berkeley: University of California Press, 1995), 197.

83 Ashtor and Cevidalli, “Levantine Alkali Ashes and European Industries,” 488.

84 John Lewis Burckhardt, *Travels in Syria and the Holy Land, by the late John Lewis Burckhardt* (London: John Murray, 1822), 354–355. Quoted in Doumani, *Rediscovering Palestine*, 203–204.

85 Doumani, *Rediscovering Palestine*, 193.

86 Raouf Sa’d Abuaber, *Pioneers Over Jordan: The Frontiers of Settlement in Transjordan, 1850–1914* (I.B. Tauris & Co. Ltd, 1993), 135.

and according to specifications. Ihsan al-Nimr, an early twentieth century historian of the Nablus area, reported that for every one hundred camel loads, the leader of the *keli* caravan received not only money, but also quantities of tobacco, sugar, soap, coffee, as well as “a cloak, a pair of boots, and a fur saddle blanket.”⁸⁷ Here, as well, the transcultural itineraries of these plant ashes facilitated bi-directional transfer: the ashes themselves made their way to Syrian market towns, wherein some journeyed on to Venice; meanwhile, Bedouin traders brought back globalized commodities such as coffee and sugar. It is therefore remarkable how these plants shaped not only patterns of labor, of mobilities, and ecologies, but also shaped the consumption and exchange of other objects. This material thus carried a multitude of meanings and uses before its *venezianizzazione*, and that these uses persisted, in parallel to Murano’s glass industry, in Ottoman Syria and Palestine until well into the nineteenth century.

In market towns such as Tripoli and Damascus, Venetian merchants regularly bought massive quantities of *keli* soda ash and transported it on the cog convoys bound for the lagoon city, where it semantically shifted to become *allume catino*. These bulky freighters also frequently carried shipments of lightweight Syrian cotton, and as such, the dense cakes of soda ash were used as ballast to balance the cargo’s weight.⁸⁸ Since these cog shipments were tied to a fixed, state-sanctioned timetable, the glass and soap making industries in Venice were assured of regular, predictable shipments of *allume catino*, and data on these shipments indicate that their importation increased sharply over the course of the fifteenth century, with as many as 10,000 sacks (c. 1,750 tons) imported in a single year.⁸⁹

In studies of early modern Venetian glass, scholars frequently remark upon the low value and supposed ubiquity of its raw materials. The tongue-in-cheek claim that these substances are “almost ‘worthless’” contrasts the supposedly humble origins of glass—ground pebbles, plants, a range of metal oxides—with the finished object and its associated value, and to emphasize the aesthetic shift taking place in Renaissance Venice, wherein objects began to be appreciated not solely for their material value, but rather for the artful *invenzione* and technical skill of the artisan.⁹⁰ However, *allume*

87 Doumani, *Rediscovering Palestine*, 204.

88 Jacoby, “Raw Materials,” 70.

89 Jacoby, “Raw Materials,” 70; Ashtor and Cevdalli, “Levantine Alkali Ashes and European Industries,” 513. This corresponds to 1,587,573 kilograms, an inconceivable amount.

90 Susanna Burghartz, Lucas Burkart, Christine Göttler, and Ulinka Rublack, “Introduction: Materializing Identities: The Affective Values of Matter in Early Modern Europe,” in *Materialized Identities in Early Modern Culture, 1450–1750, Objects, Affects, Effects*, 23–56; 42, <https://doi.org/10.1515/9789048554058>; Maitte, “*Façon de Venise*”; Sven Dupré, “The Value of Glass and

catino, in particular was not as inexpensive as is often assumed: although it was shipped from Syria to Venice at relatively low cost, certainly compared to precious materials used in other industries, such as gold, these ash cakes were still among the priciest item to appear in the inventories of early modern Venetian glassworks.⁹¹ *Cogoli*, although relatively inexpensive by weight, was frequently imported in massive amounts, testifying to its significance. For instance, for a note presented to the Venetian *podesteria* in August of 1470, a certain Iacobo di Mestre demanded payment from Lorenzo Barovier for goods delivered over the last years, including 900 *libbre* of “chuogolli de Texin.”⁹² Additionally, when these ingredients are viewed along their complex and transcultural itineraries, it is difficult to overstate the value of *allume catino* and *cogoli*, not only to the Muranese glass industry, but also to other circuits of exchange and consumption in the Eastern Mediterranean and in Lombardy.

Due to the role these raw materials played in the innovation of *vitrum blanchum* and *cristallo* and their role in creating distinctive standards of transparency, crucial to the process of *venezianizzazione*, it is all the more essential to de-center the sites of Venice and Murano in telling the histories of early modern glass. Instead, new interpretive fields are exposed by considering the co-production of many types of labor, such as the Bedouins who collected and refined the *ushnān* plant into *allume catino*, the *paroni* captains who navigated boatloads of *cogoli* over the Ticino, as well as non-human actors, such as the horses who brought the same boats back to Lombardy or the salt-tolerant plants whose ashes made glass melt at lower temperatures. Through their transcultural itineraries, these materials, which “start out very local,” nonetheless manage to destabilize “older art-historical ideas of discrete cultures, nations, or schools” through their circulation.⁹³

the Translation of Artisanal Knowledge in Early Modern Antwerp,” *Nederlands Kunsthistorisch Jaarboek (NKJ) / Netherlands Yearbook for History of Art* 64 (2014): 138–161, www.jstor.org/stable/43884398.

91 At between five and seven ducats per *migliaio*, *allume catino* was nearly four times more expensive than *cogoli*. See McCray, *Glassmaking in Renaissance Venice*, 105.

92 Patricia Fortini Brown notes that “in Venice, 1 *libbra grossa* = 477 grams or 1.0516 lbs, and 1 *libbra sottile* = 301 grams or 0.66 lbs.” Thus, 900 *libbre grosse* of *cogoli* would be equivalent to nearly 4300 kilograms, while 900 *libbre sottili* would be equivalent to 2709 kilograms, a significant shipment of silica in either case. Patricia Fortini Brown, *The Venetian Bride: Bloodlines and Blood Feuds in Venice and Its Empire* (Oxford: Oxford University Press, 2021), 220n61.

93 Christy Anderson, Anne Dunlop, and Pamela H. Smith, “Introduction,” in *The Matter of Art* (Manchester: Manchester University Press, 2015), 7.

Material counternarratives and negotiation within the *vetreria*

As discussed previously, the *venezianizzazione* of early modern glass was protracted: the material acquired its associations with Venice and Murano by adopting novel stylistic and technological qualities, such as the optical purity of *vetro cristallo*. Links between matter and meaning were reinforced via “valorization” processes by the guild and state, within early modern treatises, and later through practices of historiography and the exhibitionary apparatuses, all of which reproduced the idea that these material qualities were “Venetian.”

Perhaps the most dramatic of these moments of *venezianizzazione* was the material transformation of *allume catino*, *cogoli*, and other substances within the Venetian glass workshop. The workshop, a node embroiled in larger networks of transculturation, was a site not only of “intense ‘technology transfer,’” as Pamela Smith has noted, but also one in which the meaning of materials was heavily altered.⁹⁴ An obvious reason for this has to do with the nature of the glassmaking process itself. Unlike, for instance, painted maiolica or embellished book covers, which were fashioned via additive measures such as painting or sewing one substance onto another, glassmaking entirely subsumed its materials. Via extreme heat, its components were melted down and dissolved into a semi-liquid batch, and thus effectively rendered invisible.

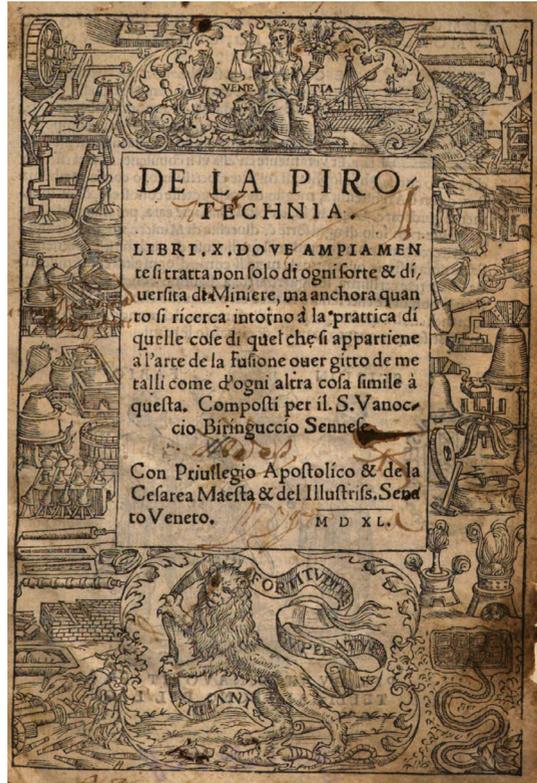
This absolute transformation of the raw materials of glass sparked fascination during the sixteenth century, and the process was often compared to alchemy. Observing this, Maitte has suggested that one reason for this link is that “knowledge of the reaction of metal oxides” was crucial to the craft’s success. In her analysis of a Muranese glassmaker’s legal testimony, Scuro has observed that the craft was not viewed by authorities as an *ars mechanica*, as were most other types of early modern artisanal production, but rather as an *industria*, just like alchemy.⁹⁵ This association was also emphasized in *De la pirotechnia* (1540), Vannoccio Biringuccio’s comprehensive metallurgical treatise of the sixteenth century (Fig. 8). In his chapter on glass, Biringuccio positions this material as an “art of fire,” adjacent to metalwork and mining and closely tied to the products of the earth from which it came. He specifically clarifies that glass is not a mineral per se, nor a metal, but rather a “fusible material,” one that is “made almost mineral from craftsmanship [*arte*], and from the potency and virtue of fire, born from the *speculation of alchemical*

94 Pamela H. Smith, “In a Sixteenth-Century Goldsmith’s Workshop,” in *The Mindful Hand: Inquiry and Invention from the Late Renaissance to Early Industrialisation*, ed. Lissa Roberts, Simon Schaffer, and Peter Dear (Amsterdam: Koninklijke Nederlandse Akademie van Wetenschappen, 2007), 33–57; 38n12.

95 Scuro, “Shaping Identity through Glass in Renaissance Venice,” 129.

wits [*ingegni alchemici*].”⁹⁶ This description is telling. For Biringuccio, glass is characterized by its close relationship to the craftsmanship (*arte*) of the artisan and the investigative, alchemical approach to production. In this evocative description, the materials are guided and coaxed into new forms through transcultural contact and intervention. The allusion to *speculation* additionally carries the connotation of exploration or philosophical inquiry: it is not the case of an artist revealing or releasing form from material, but rather the admonition that the materials are unpredictable and co-productive. They may take on new characteristics, but only through a struggle of craftsmanship, experiment, and skill.

Fig. 8. Title page of *De la Pirotechnia* by Vannoccio Biringuccio, 1540. Image courtesy of Deutsches Museum, Munich.⁹⁷



96 Original: “Et così in questo capitolo vi dirò desso non come mezzo minerale proprio, né anche come metallo, ma come materia fusibile & quasi fatta minerale da arte & dalla potentia & virtù del fuoco, nata dalla speculazione dei buoni ingegneri alchimici.” Emphasis my own. “Ingegneri,” here translated as “wits,” carried a connotation of both “skill” and “mind.” Biringuccio, *De la pirotechnia*, 42.

97 <https://www.deutsches-museum.de/forschung/bibliothek/unsere-schatze/technik/de-la-pirotechnia>.

However stark a shift in formal properties the comparison to alchemy implies, this does not entirely erase the itineraries of the materials of Venetian glass, neither for our contemporary purposes of interpretation nor for the early modern understandings of the material. As Ingold observes, materials “may lie low but are never entirely subdued,”⁹⁸ and although *allume cattino* and *cogoli* were rendered invisible by the glassmaking process, their origins were not entirely unknown. Within a range of sixteenth-century artisanal treatises and literature of trades (*letteratura dei mestieri*), the materials are identified both by their Venetian names as well as their origins. We can understand these mentions as the presence of a faint but sustained counternarrative, to borrow from Rodney Harrison and John Schofield’s archaeological approach to reading material culture.⁹⁹ The dominant narrative within these objects is legible in their post-production materiality: the characteristics of glass that were associated with belonging to Venice and Murano. However, even authors such as Leonardo Fioravanti instruct readers in the process for making glass as they do on Murano (“come si faccia dett’arte a Murano”) so, too, do they allude to the transcultural pathways and relationships that have shaped the material.¹⁰⁰

The renown of *cogoli*, for instance, and by extension the Ticino River, appears again and again both in recipe books for private use and in circulated, published materials on Venetian glass. The importance that these stones come specifically from the Ticino is emphasized in a number of contemporary sources. In the *Ricettario Montpellier*, an anonymous Venetian recipe book dated to 1536, the author emphasizes the superiority of pebbles from the Ticino over those of Verona, especially for making “vetro cristallino,” noting that “the *cogoli* of the Tesin make a superior white color, the *cogoli* of Verona [are] oilier but make [the glass] yellow.”¹⁰¹

Similarly, in *L’arte vetraria*, the first widely circulated glassmaking manual, published in 1612 by Florentine Antonio Neri, it is reported that in order to make a *cristallo* that is “beautiful, and of total perfection” one must use “Tarso bianchissimo,” a kind of white marble accessible to his readership in Tuscany; Neri goes on to specify, however, that glassmakers in Murano instead use the stones taken from the “Tesino.”¹⁰² He also provides insight

98 Ingold, “Materials against Materiality,” 9–10.

99 Rodney Harrison and A. J. Schofield, *After Modernity: Archaeological Approaches to the Contemporary Past* (Oxford: Oxford University Press, 2010).

100 Fioravanti, *Dello specchio di scientia universale*, 75v.

101 Original: “li cògoli de Tesin fanno miglior bianco, li cògoli de Verona [sono] piu grassi ma fan zalo.” Original text provided in Zecchin, *Vetro e vetrai di Murano vol. 2*, 1: 239.

102 Original: “bello, e di tutta perfettione” and “A Murano usano quoccoli del Tesino, pietra abbondante nel fiume Tesino.” Neri, *L’Arte Vetraria*, 4.

into the complex and laborious process of selecting and preparing such stones, noting that only the *cogoli* that sparked when struck with a flint were said to be suitable for glassmaking.¹⁰³

The origins and importance of *allume catino* were likewise scattered throughout artisanal texts and governmental proceedings: in 1290, the Venetian furnace owner Guglielmo Deolay was called to the Podestà (chief magistrate) concerning an unpaid quantity of “allume di Siria,” the earliest known source testifying to the origin of the plant ash used by Muranese glassworkers.¹⁰⁴ Given the date, it seems that *allume catino* was in-demand among the glassmakers of Murano around the same time that *vitrum blanchum* emerged as the first reliably colorless glass type. This Venetian preference for soda ash from Syria also spanned specific industries: in his manual on the art of the potter, Cipriano Piccolpasso (1524–1579) notes that Venetian maiolica was different from that made elsewhere, as in Venice they used “Levant ash.”¹⁰⁵ Other early modern artisanal manuals and recipe books (*ricettari*) extol the virtues of Levantine *allume catino* above all others. Egyptian plant ash, though widely available, was said to be inferior: the Florentine merchant Francesco Balducci Pegolotti described the black color of Egyptian ashes and notes that they were transported in blocks, without being put into sacks first. He valued them at a third of the price of the Syrian variety, an opinion echoed by a sixteenth-century Venetian merchant, who found them suitable for use in soap but unacceptable for glassmaking.¹⁰⁶ Soda ashes from the southern coast of Spain were also available, but this material, known as *barilla* or *soda di Spagna*, was criticized by Florentine Antonio Neri, who notes that it left glass with a blue tinge (“*tira al azzurigno*”) and couldn’t match the beauty or clarity (“*quel candore, e bellezza*”) of *allume catino* from the Levant.¹⁰⁷

This knowledge of soda ash was possessed not just among glassmakers but was also shared by the state: it was repeatedly decreed by the Venetian government that the use of high-quality *allume catino* as a flux was mandatory.¹⁰⁸ Meanwhile, other types of ash, such as potash, used extensively in workshops north of the Alps to make so-called *Waldglas*, were repeatedly

103 Neri, *L'Arte Vetraria*, 4.

104 Zecchin, *Vetro e vetrai di Murano* vol. 2, 1: 9.

105 McCray, *Glassmaking in Renaissance Venice*, 103.

106 Ashtor and Cevdalli, “Levantine Alkali Ashes and European Industries,” 507.

107 Neri, *L'Arte vetraria*, 1. “La soda di Spagna, come più grassa, sebene da più sale, tuttavia il cristallo fatto con il suo sale sempre tira al azzurigno, e non ha quel candore, e bellezza, come quando è fatto con il polverino, o roccetta di Levante.”

108 Hugh Tait, *5000 Years of Glass*, 2nd ed. (London: British Museum Press, 2012), 149.

forbidden. For example, in a decree from 1306, Muranese glassmakers were threatened by the Maggior Consiglio that “in no matter or mind may you make glass from *fuligine* [potash-rich ashes of fern], under the penalty of thirty *lire* and twelve *soldi*.”¹⁰⁹ This statement of the Maggior Consiglio not only reflects a top-down attempt to encourage standardized production of *crystallo*, but also the state’s association of this Levantine material with quality production.

Leonardo Fioravanti, with whom we began, writes:

I was told by Monsignor Altovito Archbishop of *Fiorenza*, a most gifted man, and rare in all sciences, and very expert in the art of glass, that this soda ash is made from an herb ... brought from Syria, or from France, and of these two, that of the Levant is the best.¹¹⁰

This was likely Antonio Altoviti, a member of a prominent noble family in Tuscany and archbishop of Florence at the time Leonardo Fioravanti published his *Dello specchio di scientia universale* in 1564.¹¹¹ Fioravanti’s claim that this knowledge was shared by Monsignor Altovito not only lends to his text a certain legitimacy, but also provides a record that the Syrian origins of *allume catino* were known and discussed among non-glassmakers outside of Murano.

The circulations and prior cultural associations of these materials were greatly subdued by the drama of the Venetian glass object, yet knowledge of their origins persisted on through their frequent mention in early modern artisanal treatises. Although the quality of being Venetian was certainly the dominant narrative of cultural belonging in early modern Muranese glass, it did not entirely eclipse the prior transcultural itineraries of its materials. Furthermore, these material counternarratives were known not only to Muranese glassmakers, but also to a range of other actors, including to the Venetian state, writers who came from neighboring Italian states (such as Fioravanti’s Bologna and Neri’s Tuscany), as well as learned individuals such as Antonio Altoviti, the archbishop of Florence. There is evidence, therefore, that the mobility within the multi-layered compound of Venetian glass was recognized in the sixteenth century.

109 Original: “in nessun modo o ingegno possa esser fatto vetro di fuligine, sotto pena di lire 30 e soldi 12.” Quoted in Zecchin, *Vetro e vetrai di Murano* vol. 2, 2:18.

110 Original: “che mi referì gia Monsignore Altovito Arcivescovo di Fiorenza, huomo dotissimo, & raro in tutte le scientie, & molto esperto nella arte de vetri; questa cenere soda, si fa di una herba, ... & detta cenere si porta di Soria, overo di Francia; & di queste due, quella di Levante è la migliore.” Fioravanti, *Dello specchio di scientia universale*, 76r.

111 Luigi Passerini, *Genealogia e storia della famiglia Altoviti* [Genealogy and history of the Altoviti family] (Florence: M. Cellini, 1871), 60.

Conclusion

This article has sought to offer a few case studies that position early modern Venetian glass as a transcultural, relational material, one which is both “Venetianized” at the site of its primary production and that retains certain counternarratives and material histories. Over the course of the medieval and early modern period, ingredients such as quartz-rich pebbles or saltwort plants, “things” in their own right, may have journeyed on a riverboat or a trans-Mediterranean cog to the Venetian Lagoon before being sifted, crushed, and melted in the furnace of the *vetreria*. By investigating these itineraries more deeply, with a particular focus on *cogoli* pebbles and *allume catino* soda ashes, it becomes clear that these materials facilitated transcultural encounters.

Through the transcultural methodology of adopting non-linear time, I have attempted to dismantle the early modern Venetian glass object to shed light on two key aspects of its interpretation: the phenomenon of *venezianizzazione*, which takes place both during and after an object’s realization in the workshop, and the multi-layered material compounds that emerge when one traces the itineraries of its raw materials, of glass before it was glass. Fruitful directions for further scholarship would include tracing the material histories of the minerals used in the fashioning of other luxury early modern glass compositions, especially those that mimicked hardstones and gems, such as *vetro calcedonio*, *rubino*, or *verdeporro*. Another line of inquiry outside the scope of this study would explore the potential shedding of *venezianizzazione* once a glass object left the workshops in Murano and Venice, and travelled great distances, taking on in the process new layers of significance and experience. Such research might consider why some types of glass objects retained a sense of Venetian-ness in their new locales, or even gained an amplified association with the city, while others shed this designation through new layers of belonging, through (mis)translation in new contexts, or upon the material breaking and being buried or recycled. The core aim of this approach is to provide a pathway for objects to speak from the full breadth of their entanglements, in a manner that illuminates the entire scope of their material journeys and transformations, within and beyond Murano.