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The Organ with Paper Pipes of the Correr Museum in Venice: a Review and New Insights*

EMANUELE MARCONI AND JEAN-PHILIPPE ECHARD

Introduction

In 2007, the *Direzione Regionale* began a series of studies on the musical instruments in the Correr Museum in Venice, whose main aim was the preservation of the collection.¹ In 2011 a joint project was set up between the Italian Ministry for Cultural Heritage and the *Musée de la Musique*, for organological and scientific studies on selected instruments of the collection. This included the organ with paper pipes dated 1494, made in Venice by Lorenzo Gusnasco “da Pavia” (fig. 1a, 1b, 1c).

This instrument is remarkable for several reasons. First of all, it is one of the rare instruments that have survived from the late fifteenth century. Secondly, it bears the signature of “Laurentius Papiensis” (i.e., Lorenzo Gusnasco). The relatively numerous historical sources on his

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1. This program is financed by the *Maratonarte* project, promoted by the Italian Ministry for Cultural Heritage and Activities and has seven different Italian historical sites or collections to protect. Presently, the *Maratonarte* project has enabled a first phase of studies that involves the digitization of the archives, the creation of a database (containing all the previous information about the collection) and the filling out of the condition reports. It has also enabled experiments in new non-invasive diagnostic techniques working with the *Sincrotrone Elettra* Center in Trieste.

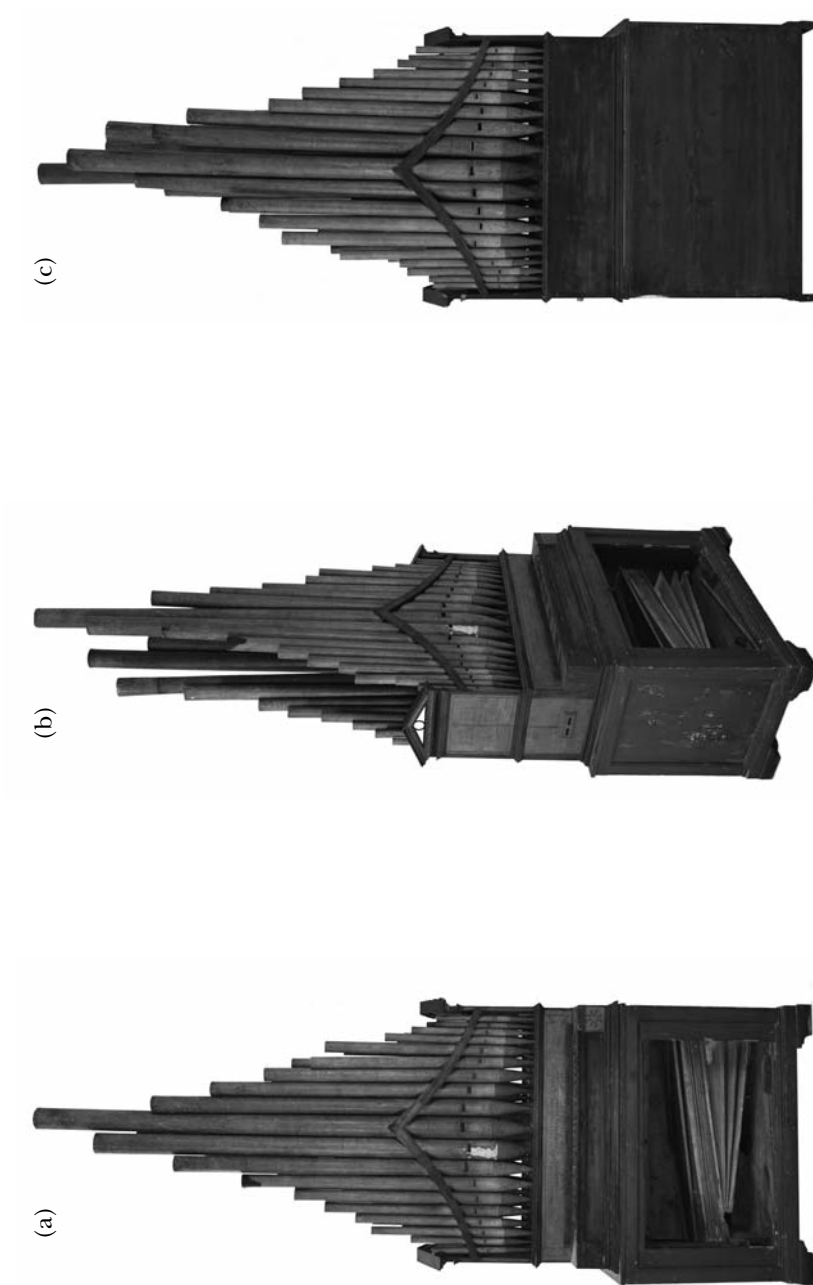


FIGURE 1. (a) Front view of the instrument (b) $\frac{3}{4}$ view (c) back view. Photos by Emanuele Marconi, © Ministero per i Beni e le Attività Culturali. See color photos p. 197.

life provide an almost unique description of an instrument-maker living in Venice around 1500. He was part of the cultural life of the time and associated with artists as Leonardo, Mantegna, Bellini, and Perugino; furthermore, his correspondence with Isabella d'Este, the Marquise in Mantua is well known.² Finally, the material used to make the pipes of the instrument–paper–is extremely rare in historical organs. The only other known organ with paper pipes that is extant is a German seventeenth-century (1627?) positive organ attributed to Gottfried Frizsche in Dresden.³ There is also a marquetry work dated 1476 in the Ducal Palace in Urbino, which shows an organ said to be “*da carta*” (i.e., having paper pipes), and which bears the name of “Ivhani Castellano” (Giovanni Castellano), an instrument maker who built an organ with paper pipes for Lorenzo the Magnificent.⁴

In the fifteenth century, there were many experiments with the materials for organ pipes. Not only various metals (gold, silver, and lead) but also alabaster, marble, wood, and paper were used to build organ pipes.⁵

2. Their correspondence is almost entirely preserved in the Mantuan archives, and a large part of it is published. Cf., Clifford M. Brown, *Isabella d'Este and Lorenzo da Pavia: Documents for the History of Art and Culture in Renaissance Mantua* (Genève: Droz, 1982); Jennifer M. Fletcher, “Isabella d'Este and Giovanni Bellini's ‘Presepio,’” *The Burlington Magazine* 113, no. 825 (1971): 703–13; “Carteggio Isabella d'Este - Lorenzo da Pavia (1496–1515),” <http://aiter.unipv.it/lettura/IL/>.

3. Penelope Gouk, “Meeting Report: Musical Instruments Technology in 17th Century England,” *FoMRHI Quarterly* No. 63 (April 1991): pp. 33–35. The 120 pipes of this organ are made of paper. This organ is now part of the collection of the Victoria and Albert Museum, London (inv. num. 2:1 to 3-1867).

4. The shape of the mouths of the pipes represented on the Urbino marquetry are quite similar to the Correr organ paper pipes. The Urbino marquetry is discussed in Pier Paolo Donati, “Nuovi Documenti sulle misure delle canne ad anima nell'arte organaria del primo Rinascimento in Toscana,” in *Restauro, conservazione e recupero di antichi strumenti musicali* (Firenze: Leo S. Olschki, 1986), 46–50; Ibid. and in Pier Paolo Donati, “1470–1490: Organi di Cartone degli studioli dei principi,” in *La musica a Firenze al tempo di Lorenzo Il Magnifico* (Firenze: Olschki, 1993), 275–80; and mentioned in Nicoletta Guidobaldi, “La musique du prince : figures et thèmes musicaux dans l'imaginaire de cour au XVe siècle,” *Médiévales*, no. 32 (1997): 59–75. It is also worth mentioning here Verbeek's recent analysis of the clavichord represented in the Urbino intarsia, in particular dealing with temperament and pitch. See: Pierre Verbeek, “The Urbino Clavichord revisited,” *De Clavicordio X. Proceedings of the Tenth International Clavichord Symposium, Magnano, 2012*, B. Brauchli, A. Galazzo, J. Wardma, eds. (Magnano: Musica Antica a Magnano, 2012): 205–24.

5. Emilio Haraszty, “L'organo di Mattia Corvino nel Museo Correr di Venezia,” *Archivio di scienze, lettere ed arti della società italo-ungherese Mattia Corvino. Supplemento a Corvina Rassegna Italo-ungherese* II, no. II (1940). This has also been published later in French, Emilio Haraszty, “A propos de l'orgue de Mathias Corvin du Musée Correr,

This probably explains why many organ makers and scholars have been interested in this instrument and why there have been so many studies and publications since the end of nineteenth century.⁶ The documents related to the Correr organ can be placed in three groups:

- (a) primary or direct sources mentioning the organ, for example: the correspondence between Lorenzo Gusnasco and Isabella d'Este, Sansovino's accounts of Venetian life in the end of the sixteenth century, references in newspapers, etc.
- (b) published works that report studies or views on the Correr organ's history, its functioning, and the cultural context at the time of its making and use

à Venise," *L'Orgue* 46 (1948): 7–17; Patrizio Barbieri, "Alchemy, Symbolism and Aristotelian Acoustic in Medieval Organ-pipe Technology," *The Organ Yearbook*, no. XXX (2001): 7–39. "Manufacturing porcelain pipes is particularly difficult since you not only have to construct a ceramic mould for each single pipe but also master the problem of possible shrinkage and changes in shape of the porcelain during the process of drying and firing. It had been tried around 1730 and later in 1920, but it did not work out. Now some years ago the Meissen porcelain factory in cooperation with Jehmlich Organbuilders (Dresden in Germany) finally succeeded in manufacturing and tuning a complete rank in porcelain," "Organs: Oddities and World Records," http://www.die-orgelseite.de/kurioses_e.htm.

6. Most of these studies are reviewed in this article. However, the following reference could not be accessed: *Nozze Civita - Franceschi. Miscellanea*, (Napoli, 1885). Also, the following works mention Gusnasco's organ: "Jahresberichte der Geschichtswissenschaft," ed. Historische Gesellschaft zu Berlin (Mittler & Sohn, 1889); "Archivio storico lombardo," ed. R. Deputazione di storia patria per la Lombardia and Società storica lombarda (Società storica lombarda, 1890); Alessandro Luzio and Rodolfo Renier, "Il lusso di Isabella d' Este marchesa di Mantova. - IV–VI. L' arredo degli appartamenti," *Nuova Antologia di Scienze, Lettere ed Arti* (Roma: Forzani e C. Tipografi del Senato, 1896), 231–60; Carlo Magenta, *La Certosa di Pavia* (Milano: Fratelli Bocca, 1897); Julia Mary Cartwright, *Isabella d'Este, Marchioness of Mantua, 1474–1539; a Study of the Renaissance* (London: J. Murray, 1915); E. Flade, "Literarische Zeugnisse zur Empfindung der "Farbe" und "Farbigkeit" bei der Orgel und beim Orgelspiel," *Acta Musicologica* 22, no. 3/4 (1950): 97–127; Renato Lunelli, "A che punto è in Italia la storia dell'arte organaria?" *Acta Musicologica* 30, no. 3 (1958): 137–69; *Un secolo di vita del Civico Istituto Musicale Franco Vittadini di Pavia (1867–1967). Consensi, saggi, scritti vari e sguardo storico delle attività musicali in Pavia* (Comune di Pavia, 1967); Emanuel Winternitz, "A Spinettina for the Duchess of Urbino," *Metropolitan Museum Journal* 1, The Metropolitan Museum of Art (1968): pp. 95–108; Clifford M. Brown, "New Documents concerning Andrea Mantegna and a Note Regarding 'Jeronymus de Conradis pictor,'" *The Burlington Magazine* 111, no. 798 (1969): 538–44; Clifford M. Brown and Jennifer Fletcher, "Giovanni Bellini and Art Collecting," *The Burlington Magazine* 114, no. 831 (1972): 404–05; Emanuel Winternitz, "Strange Musical Instruments in the Madrid Notebooks of Leonardo da Vinci," *Metropolitan Museum Journal* 2, The Metropolitan Museum of Art (1969): 115–26; Donald H. Boalch, *Makers of the Harpsichord and Clavichord, 1440–1840* (Oxford: Clarendon Press, 1974); Madeau Stewart, "Leonardo da Vinci as a Musician by Emanuel Winternitz," *Early Music* 11, no. 4 (1983): 537–41; Geoffrey Bridges, "Paper portative papes," *FoMRHI Quarterly* No. 65, (October 1991):

- (c) unpublished studies and correspondence gathered in the file in the Correr Curatorial Department.

There are two main aims to this article. The first is to present a critical review of the previous works—published or not—mentioned above. This is to bring together and summarize current knowledge of the history and provenance of this unique instrument, as well as the various hypotheses raised on its intonation, functioning, sound, and playing. The second is to present preliminary results that have been gathered while applying a methodology commonly used in the field of cultural heritage conservation, in particular of artifacts and the history of the materials and techniques of craftsmen and artists. This methodology encourages the cross-examination of the object's material nature and historical sources. In particular we will describe the state of conservation of the instrument and present insights into its material history with updated images and documentation.

***The written documents reveal a complex history:
is it one organ or are there several?⁷***

In the correspondence between Lorenzo Gusnasco and Isabella d'Este published by Brown in 1982, the term *organo* occurs nine times

4; Geoffrey Bridges, "Medieval Portatives: Some Technical Comments," *The Galpin Society Journal* vol. 44 (1991): 103–16; Geoffrey Bridges, "Medieval Portatives," *The Galpin Society Journal* vol. 45 (Mar., 1992): 107–08; D. S. Gill, "Paper organ pipes," *FoMRHI Quarterly* No. 64, (July 1991): 26–29; "Bollettino della Società pavese di storia patria," (Pavia: Tipografia del libro, 1994); Geoffrey Bridges, "Medieval Paper Organ Pipes," *The Galpin Society Journal* vol. 47 (1994): 163–65; M. Dellaborra, *Antonio Cagnoni e il suo tempo: vita e opere di un compositore all'epoca di Giuseppe Verdi* (Rugginenti, 1997); Bernard Brauchli and Christopher Hogwood, *The Clavichord*, Cambridge Musical Texts and Monographs (Cambridge University Press, 1998); "Herla computer archive project," (Mantova Capitale Europea dello Spettacolo Research Institute, 1999–2012); David Kinsela, "A Taxonomy of Renaissance Keyboard Compass," *The Galpin Society Journal* vol. 54 (May, 2001): 352–96; Giuseppe Chiarante, *Il patrimonio culturale musicale e la politica dei beni culturali*, vol. 14-2003, Annali dell'Associazione Ranuccio Bianchi Bandinelli fondata da Giulio Carlo Argan (Graffiti, 2003); Franco Rossi, *Gli strumenti musicali delle Collezioni dei Musei Civici Veneziani* (Venezia: Marsilio, 2006).

7. We attempted to make the history of the organ now in the Correr Museum more precise, gathering and comparing the historical documents that had already been published. The comparison of these documents with the sources to which they refer revealed inaccuracies and discrepancies. If not otherwise stated, we have preferred the primary sources of information instead of their numerous later references or re-interpretations. Parts of interest are quoted extensively when they come from difficult-to-access documentation.

from 1501 to 1506 (letters 37, 38, 105, 107, 108, 110, 118, 119 and 120).⁸ The first reference to organ pipes in this correspondence is dated April 2, 1501. Gusnasco simply mentions “a piece of a pipe made of paper, from the organ that [he] made” in which he packed and sent to Isabella twenty-eight ostrich feathers.

In her answer, two days later, the Marchesa thanks him, adding, “*La carta de le cane de l’organo non havemo già veduto*” (“We have not yet seen the paper of the pipes of the organ”).⁹ Based on these letters, it appears that before April 1501 Gusnasco made at least one organ fitted with paper pipes, hereafter called organ “A.”

The other references in their correspondence to an organ refer to the instrument belonging to the Venetian connoisseur Michele Vianello five years later. This man was Gusnasco’s benefactor, and he lived at his house in the Cannaregio district in Venice, from at least 1494 to 1506.¹⁰ As a collector of paintings, Vianello also helped Isabella d’Este contact Giovanni Bellini in 1501.¹¹ After his death, his estate was sold at public auction in May 1506.¹² Among certain other items, Isabella was interested in purchasing this organ, which she had already seen in Vianello’s house during her visit in March 1502:¹³

8. The most updated critical publication of the complete correspondence between Isabella d’Este and Lorenzo Gusnasco is still Brown, *Isabella d’Este and Lorenzo da Pavia: Documents for the History of Art and Culture in Renaissance Mantua*. Of use is also “Carteggio Isabella d’Este—Lorenzo da Pavia (1496–1515),” <http://aiter.unipv.it/lettura/IL/>.

9. [. . .] *pene de struco in uno peco de una cana de carta dele cane de l’organo che io fece* [. . .], lett. 37, Lorenzo Gusnasco to Isabella d’Este, April 2, 1501, <http://aiter.unipv.it/lettura/IL/lettere/0.37>. “*La carta de le cane de l’organo non havemo già veduto*” lett. 38, Isabella d’Este to Lorenzo Gusnasco, April 4, 1501, <http://aiter.unipv.it/lettura/IL/lettere/0.38>.

10. Ludovico Sforza, in a ducal letter dated February 22, 1494 mentioned that Lorenzo was an organ builder who was living at Vianello’s house (“in la chasa de Michele Janello in quella cita et è magistro de orghani”). See Emilio Motta, “Musici alla corte degli Sforza: ricerche e documenti milanesi,” *Archivio Storico Lombarda. Giornale della Società Storica Lombarda* 1887, 295. For the 1506 date, see William F. Prizer, “Isabella d’Este and Lorenzo da Pavia, ‘Master Instrument-Maker,’” *Early Music History* 2 (1982): 87–127.

11. The summary of current knowledge on Michele Vianello is gathered in an Appendix in Fletcher, “Isabella d’Este and Giovanni Bellini’s ‘Presepio,’” 703–13.

12. Archivio di Stato di Venezia, Archivio Notarili, Testamenti, Not. Ludovico Talenti, b. 956, n. 518 (cedola); b. 957, c. 175r e sgg.

13. Fletcher, “Isabella d’Este and Giovanni Bellini’s ‘Presepio,’” 703–13.

If the organ [. . .] is as good as was when I saw it in Vianello's house, I'll be happy to buy it [. . .].¹⁴

On May 25, 1506, Zoan Francesco Valier, the distinguished Venetian man of letters¹⁵ advised Isabella not to buy it:

The organ is still on sale and, as far as I can see, to me the best suggestion is to leave it (where it is).¹⁶

The same day, Taddeo Albano¹⁷ forwarded Valier's opinion on the organ to the Marchesa, clarifying that it was because of the instrument's relatively high price:

The organ has not been sold yet, but has been offered for a price of 260 *ducati* and at the moment it is still going up; it seems that is not a very good price, and so the above-quoted Zoan Francesco (Valier) it seemed better to leave it.¹⁸

Isabella d'Este then requested Gusnasco's advice on the condition and the price of the instrument. In this exchange of letters, we learn in particular that he had built Vianello's organ:

14. "Se l'organo [. . .] sij de quella bontà et Excellentia che l'era quando el vedessimo in casa del Vivianello, seremo contente de tuorlo [. . .]" lett. 119, Isabella d'Este to Lorenzo Gusnasco, November 2, 1506, <http://aiter.unipv.it/lettura/IL/lettere/0.119>. "Vivianello" is Isabella's spelling for Vianello.

15. Zoan Francesco Valier (Giovanni Francesco or Gianfrancesco Valerio in the current Italian transliteration) in particular, carried out the final editing of the *Cortegiano* of Baldassare Castiglione, in four volumes, published in 1528 in Venezia by Aldo Manuzio and Andrea d'Asolo with the friendly support of Pietro Bembo. See: "Castiglione, Baldassare," in *Enciclopedia dell'Italiano* (Roma: Istituto Enciclopedico Italiano Treccani, 2010).

16. "L'organo tutt' hora se incanta et, per quanto vedo, parmi che per meglior consiglio el si debbia lassare." Zoan Francesco Valier to Isabella d'Este in the letter dated May 25, 1506, Busta 1441, c. 429, Archivio di Stato, Mantova, Italy. The original document has been not examined, the citation is quoted from Brown, *Isabella d'Este and Lorenzo da Pavia: Documents for the History of Art and Culture in Renaissance Mantua*, 176.

17. Taddeo Albano was commissioned by Isabella to buy Giorgione's painting, "Nocte."

18. "Lo orgeno non è anchor venduto ma è sta' messo a ducati 260 et tuta hor va crescendo che ne par sia uno gran pretio, et al ditto Zoan Francesco è parso per lo meglio lasarlo stare." Taddeo Albano to Isabella d'Este in the letter dated Venice May 25, 1506. Busta 1891, c. 304, Archivio di Stato, Mantova, Italy. The original document has been not examined; the citation is quoted from Brown, *Isabella d'Este and Lorenzo da Pavia: Documents for the History of Art and Culture in Renaissance Mantua*, 176.

Your Excellency has something more trustworthy than the organ - you have me who made it.¹⁹

In November, when Gusnasco mentioned that the organ “will get damaged if it remains where it is” (*el se guasta a stare dove sta*²⁰)—probably because of the climatic conditions in Vianello’s house, Isabella reminded him that she had been told the instrument was “lacking in quality, and damaged,” and she would buy it only if he was able to repair it, leaving the decision in his hands.²¹

Gusnasco stated that he would be able to return it to playing condition in eight days of work and that he was the only one able to repair it:

Now, about the organ which belonged to Vianello, which you noticed is damaged: it is true that is not in tune, because [the organ] is missing its owner [as Vianello is dead]. Moreover, Antonio from Ferrara came to play it, and if the organ felt bad before, now it will feel even worse, but when [the organ] has seen me for eight days, it will be back in better shape than it ever has been. And people say, regarding its purchase, that no one but me is able to do it, and this is the truth. So, I very much suggest your Excellency to take it, as it is very rare, and in this my appetite does not govern me [i.e., I do not have a personal profit].²²

This is the last reference to the organ in the correspondence between Gusnasco and Isabella d’Este. It is, therefore, likely that in the end Isabella did not buy the instrument. No indication can be found on the next owner of this organ. The nature of the material of the pipes, or any

19. “La s.ria vostra à una cosa pù degna che l’organo, avete mi che l’ò fato.” Lett. 110, Lorenzo Gusnasco to Isabella d’Este, June 20, 1506, <http://aiter.unipv.it/lettura/IL/lettere/0.110>.

20. Lett. 118, Lorenzo Gusnasco to Isabella d’Este, October 24, 1506, <http://aiter.unipv.it/lettura/IL/lettere/0.118>.

21. “[. . .]ma ni era dicto che l[organo] era mancato di bontà et guasto, che, quando cussì fusse et non si potesse acconciare, non faessimo la spesa. Et perhò ne remettemo al iudicio vostro.[. . .],” lett. 119, November 2, 1506. <http://aiter.unipv.it/lettura/IL/lettere/0.119>.

22. “Or, cerca a l’organo che fo del vianelo che quela à inteso che l’è guasto, vero è che l’è deschorda’ perché l’à sentito la passione del mancare del suo patrone. E poi, per zonta, el vene antonio da ferara per sonarelo siché s’el stava male prima, el se sdegnà a stare ancora pego, ma, como el me veda mj per oto gornj, el tornarà melio che el fose maie. E le persone à respeto a comprarelo perché dicano che nesuno non lo sa concare salvo io, che parte dicano la verità. Siché conforto molto la ecelencia vostra a torelo per esere cosa rara, e in questo l’apetito non me guerna.” Lett. 120, Lorenzo Gusnasco to Isabella d’Este, November 29, 1506, <http://aiter.unipv.it/lettura/IL/lettere/0.120>. What was written between the Marchesa and her agent should be placed into the context of their formal relationship and the formal Italian written code at the beginning of sixteenth century.

other detail of the features of the instrument, is not mentioned anywhere in these documents. Hereafter, this instrument made by Lorenzo Gusnasco before March 1502 is referred to as organ “B.”²³

A member of the Zen family may have purchased this organ at the Vianello auction or a few years later. In 1538, Francesco Zen’s will, dated August 8, 1538,²⁴ mentioned an organ, which makes it attractive to connect organs “A” and “B”:

It is enjoined that after his death, the said organ, will stay and remain to the oldest of the Zen family.²⁵

In 1581, an organ belonging to Caterino Zen is referred by Francesco Sansovino in a passage of his *Venetia città nobilissima et singolare* [. . .]:

And above all that (referring to previous descriptions), we have many types of music, with excellent musical instruments and books, among which we have to point out that of the knight Sanuto, son of Gian Francesco, in S. Giovanni Decollato, and the studio of the above-quoted Catarin Zeno, in which, moreover, can be seen a organ which belonged to Matthias King of Hungary, so harmonic and perfect and high valued that his [relatives] set as condition in the will that it never will go out from the family.²⁶

The phrase *so harmonic and perfect* has a double meaning: it could be understood that this instrument has *a marvelous sonority* (harmonic) that is *sublime or unmatched* (perfect); from the aesthetic point of view, though, it also satisfies the canons of harmony and geometric perfections in its equilibrium between volumes. The instrument seen by Sansovino,

23. In the last letter, Lorenzo wrote that the organ “is very rare.” It does not mean necessarily that it is a one-of-a-kind instrument; the texts could refer to just one organ, the one that he made with paper pipes. It could also mean, more broadly, that not many people were making this type of instrument, or with such material for the pipes.

24. Archivio di Stato di Venezia, Archivio Notarile, Testamenti, Not. Jacopo Chiodo, b. 201, n. 148 (cedola), b. 203, c. 174 r e sgg, n. 200.

25. “É ingiunto che dopo la sua morte il detto organo stia e vada nel più vecchio della famiglia de Ca Zen.” As reported by Carlo Dell’Acqua, *Lorenzo Gusnasco e i Lingiardi da Pavia. Contributo allo Studio sull’arte degli organi nei secoli XV e XIX* (Milano: Tipografia della Perseveranza, 1886), 16.

26. “Et oltre a ciò ci habbiamo diversi studi di Musica, con stromenti & libri di molta eccellenza, de quali è notando lo studio del cavalier Sanuto, figliuolo già di Gian Francesco, a San Giovanni Decollato, & lo studio del predetto Catarin Zeno: nel quale, fra l’altre cose, si vede un organo che fu di Matthias Re di Ungaria, tanto harmonico & perfetto & di tanto prezzo, che i suoi lo conditionarono per testamento, che non uscisse giamai di quella famiglia.” *Francesco Sansovino, Venetia città nobilissima et singolare, Descritta in XIII Libri da M Francesco Sansovino, nella quale si narrano [. . .] degne di memoria.*, XIV vols., vol. VIII (Venezia: Iacomo Sansovino, 1581), 292–93. http://ia700709.us.archive.org/5/items/venetiaccittanobi00sans/venetiaccitta_nobi00sans.pdf.

whether he was dealing with the Correr or a similar organ, satisfied these architectural canons. This implies that the instrument mentioned by Sansovino was not necessarily in playing condition. Its aesthetic impact may have been strong enough to overcome its non-functioning aspect, especially when seen by an intellectual as Sansovino, who was fascinated by its symbolism. At the time the organ may, therefore, not have been able to produce sounds or may have been in a very poor state.

It seems reasonable to assume that once the organ had belonged to Francesco Zen it was passed down to Caterino Zen. The hypothesis, however, that the organ preserved at the Correr Museum belonged to Mathias Corvino, is unfounded, since Mathias died in 1490, four years prior to the date inscribed on the instrument.²⁷ If Sansovino's report is correct about the provenance of the instrument he saw at Caterino Zen's, it means that this organ was a different one than the Correr organ (organ "C").

*The Entry of the Organ into the Correr Collection
and First Studies, 1873–1932*

The mention of the "remains of an organ" (*resti di un organo antico*) in the holograph will of Zenone Zen (probably the last descendant of the noble family), dated July 9, 1873,²⁸ is the earliest that can be associated definitely with the artifact now preserved in the Correr Museum. At Zenone Zen's death in June 1874, he bequeathed the instrument, among other works of art to the Venice *Museo Civico*. This was reported in the October 2, 1874 edition of the daily *Gazzetta di Venezia*:

The noble Zenone Zen, deceased in June, with handwritten will dated July 9, 1873 bequeathed by proxy to the civic museum - together with 8 ornamental, oil painted portraits, of some of his ancestors - some remains of an early organ, composed of 4 ranks of pipes, made in 1494 by Lorenzo da Pavia, which - according to what was said by the donor and his ancestors and some experts of Venetian archaeology - belonged to the King of Hungary, Mattia Corvino, and was donated by the latter to Catterino Zen.

The municipality, in gratefully accepting the valuable gift, gives public notice of it, in honour of the deceased noble.

27. The probability of various hypotheses on this matter is discussed in Dell'Acqua, *Lorenzo Gusnasco e i Lingiardi da Pavia* and Haraszty, "L'organo di Mattia Corvino nel Museo Correr di Venezia." See the following section.

28. Archivio di Stato di Venezia, Archivio Notarili, II serie, Notaio Giovanni Perovich, b. 1528, n. rep. 3378.

The announcement was repeated three days later in the Roman *Gazzetta Ufficiale del Regno d'Italia*.²⁹ It is striking that the organ's provenance was still strongly associated with Mathias Corvino. That same year (1874), the instrument entered the Correr collection.

To summarize, organ "A" was made by Gusnasco before 1501 and has pipes made of paper. Organ "B" was made by Gusnasco before 1502, belonged to Michele Vianello until his death in 1506, and was on sale shortly thereafter. Isabella, though she saw it in 1502, chose not to buy this organ "B" in 1506. Organ "C" was owned by Francesco Zen until his death in 1538 and was to stay in the Zen family. It is probable that this organ "C" was the one seen by Sansovino in 1581 at Caterino Zen's. Organ "C" was never said to have been made by Gusnasco, nor that its pipes were made of paper. The organ preserved at the Correr Museum bears the inscription "Laurentius Papiensis faciebat MCCCCLXXXIII" (1494) and has paper pipes.

The descriptions of organs "A," "B," and "C" all could correspond to the only surviving instrument, the Correr organ, but Gusnasco may have built several organs with pipes made of paper and/or other materials. It is also possible that organ "C" was not by Lorenzo. However, there is a strong chance that only one organ was passed down through the Zen family. This would imply that the Correr organ is organ "C" as described by Sansovino, and could then be traced back to Francesco Zen in 1538.

In 1880 the museum curator, Niccolò Barozzi,³⁰ described the organ among the recent bequests to the museum (fig. 2). He reports almost exactly what was in the 1874 newspapers, but also provides some additional information:

This organ was repaired in the best possible manner, by the skilled artist, signor Biasiotto.³¹

which he repeated a few pages later:

29. The *Gazzetta Ufficiale del Regno d'Italia* was the newspaper in which the laws and decrees of the Kingdom of Italy were officially published. The *Gazzetta* was published from January 4, 1860 to June 23, 1946. http://augusto.digitpa.gov.it/gazzette/index/download/id/1874237_PM. Note the mistake in the publication date in the *Gazzetta di Venezia*: The correct date is October 2, not October 3.

30. Niccolò Barozzi (1826–1906) worked as Curator of the Correr Museum from 1866 to 1882. Niccolò Barozzi, "Doni fatti al museo dalla sua fondazione fino al 1880 e cenni intorno al suo collocamento nel nuovo edificio, Museo Civico e Raccolta Correr di Venezia" (Venezia: Prem. Stab. Tip. di P. Naratovich, 1880), 39, 58.

31. "Quest'organo venne nel miglior possibile riparato dal valente artista signor Biasiotto." *Ibid.*, 38.

1874. Il nobile *Zenone Zen* morto nel giugno del 1874 lasciava in legato al Museo assieme ad otto ritratti decorativi di alcuni suoi antenati, un antico organo, già composto di quattro ordini di canne, fabbricato nell'anno 1494 da Lorenzo da Pavia, e che avrebbe appartenuto a Mattia Corvino re d'Ungheria, e da questo regalato a Catterino Zen, che fu presso di lui ambasciatore straordinario della Repubblica Veneta.

Quest'organo venne nel miglior modo possibile riparato dal valente artista signor Biasotto.

Istrumenti musicali.

Fra gli istrumenti qui raccolti merita speciale osservazione l'Organo, che apparteneva alla famiglia Zen come dono di Mattia Corvino a Catterino Zen, che fu alla corte di lui — Z. Zen. — Fu restaurato da Antonio Biasotto.

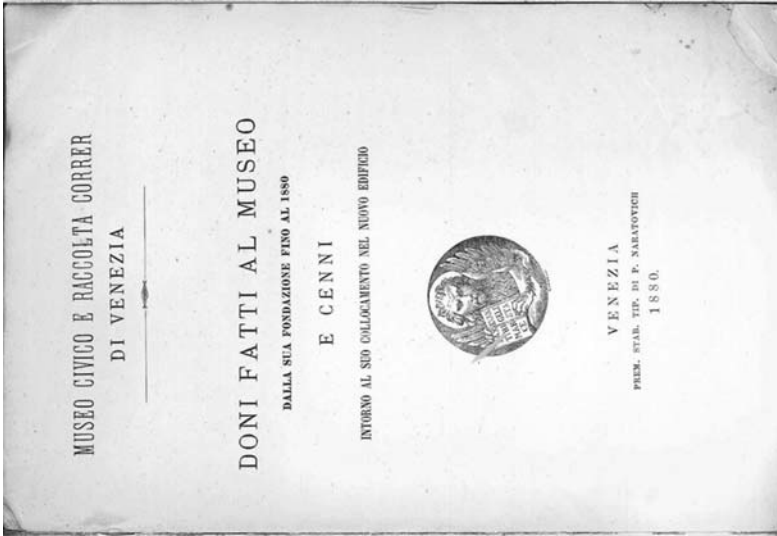


FIGURE 2. BAROZZI, N. 1880. *Doni fatti al museo* [...]. Cover pages of the catalog. Photo by Emanuele Marconi, © Ministero per i Beni e le Attività Culturali.

It was restored by Antonio Biasiotto.³²

These references indicate that the instrument was restored sometime between the time of entering the collection in 1874 and the publication of Barozzi's book in 1880. However, no more information can be found about the nature of the restoration work or about the restorer, either in Barozzi's book or in the museum's archives. To date, no Biasiotto has been discovered as an organ maker or instrument repairer in Venice in the nineteenth century. It is extremely surprising to note that among the previous studies of the Correr instrument, some noticed and took into account this fact,³³ while others did not.³⁴ More research in Venetian archives may shed more light on Antonio Biasiotto, his work, and skills and could greatly contribute to the understanding of the material history of the instrument.

The organ with paper pipes is mentioned in the 1885 collections guide (fig. 3a and 3b)³⁵ and in the 1899 "Catalogue of exhibited artifacts" (*Elenco degli oggetti esposti*)³⁶ with the following brief description (fig. 4a and 4b):

Organo – opera di Lorenzo da Pavia – 1494 – Zen

At that time, the organ was exhibited in the section for "scientific and musical instruments" (*Istrumenti scientifici e musicali*). Dell'Acqua was the first scholar to return to Gusnasco's instrument, three centuries after Sansovino's mention of it. His study relates to its acquisition by the

32. "Fu restaurato da Antonio Biasiotto." *Ibid.*, 59.

33. Carlo Dell'Acqua, *Lorenzo Gusnasco e i Lingiardi da Pavia*; Sandro Dalla Libera, *L'arte degli organi a Venezia*. (Milan, 1886, Reprint, Firenze: Istituto Per La Collaborazione Culturale Venezia-Roma, Olschki, 1962); Luisa Cervelli, "Un prezioso organo del '400 alla ricerca della sua voce perduta," *Bollettino dei Musei Civici Veneziani*, no. 4 (1969): 21–36; Marco Tiella, "L'organo di Lorenzo da Pavia," *Bollettino dei Musei Civici Veneziani* 1, 2, no. XVII (1972): 26–53; Marco Tiella, "The positive organ of Lorenzo da Pavia," *The Organ Yearbook* VII, no. 7 (1976): 4–15.

34. Luigi Collarile and Francesco Zanin, "Organo "Gusnasco da Pavia" (1494), Venezia, Museo Correr. Relazione dei sopralluoghi effettuati da L. Collarile e Francesco Zanin" (2004); Pier Paolo Donati, "Relazione sull'organo di Lorenzo da Pavia, 1494, del Museo Correr di Venezia," *Gabinetto Restauro Organi—Palazzo Pitti*, Firenze (Firenze 1991); Haraszty, "A propos de l'orgue de Mathias Corvin du Musée Correr, à Venise," 7–17; Maurizio Ricci, "Relazione sull'organo di Lorenzo Gusnasco da Pavia (1494) del Museo Correr di Venezia," (Pavia 1998).

35. "Guida del Museo Civico e Raccolta Correr di Venezia," ed. Museo Correr (Venezia: Tipografia Emiliana, 1885), 16.

36. "Museo Civico e Raccolta Correr Venezia. Elenco degli oggetti esposti," ed. Museo Correr (Venezia: Prem. Stab. di C. Ferrari, 1899), 279.

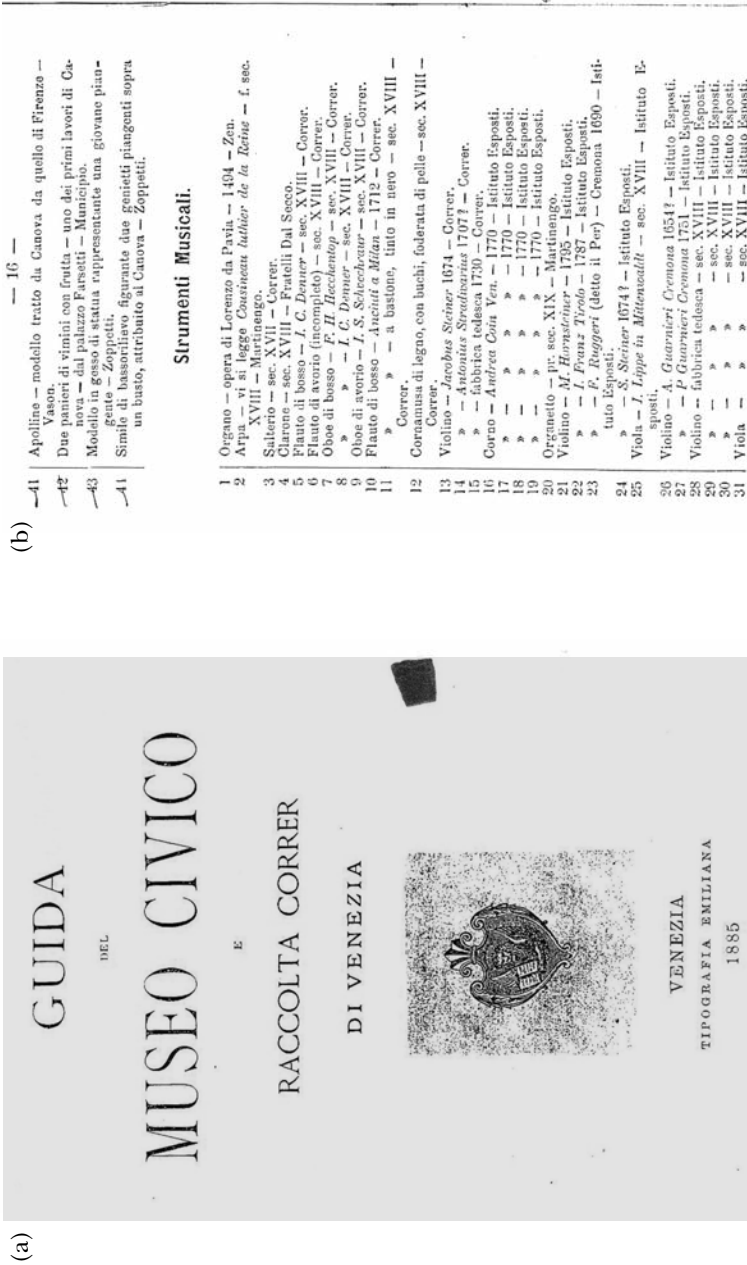


FIGURE 3. (a) *Guida del Museo Civico e Raccolta Correr Venezia*, 1885. Cover page of the catalog. (b) *Guida del Museo Civico e Raccolta Correr Venezia*, 1885, 16. List of the instruments belonging to the Correr Museum in 1886. Photos by Emanuele Marconi, © Ministero per i Beni e le Attività Culturali.

(a)



(b)

33 Ta'vola turca d' uso marittimo, posta in una specie di tritico. Superiormente rappresenta la Caaba della Mecca circondata da tende dei pellegrini, inferiormente una cartta geografica: posta orizzontalmente segnava coll' ago magnetico la direzione della Mecca, cui il maomettano dee volgersi nella preghiera. E' invenzione e lavoro di El-Hatra con la collaborazione di Mustafà Effendi — 1740 — Mollin.

34 Contrabbasso — sec. XXIII — Acq.

35 Flauto di bosso — a bastone, tinto in nero — sec. XVIII — R. C.

36 Clavone — sec. XVIII — Filii Dal Secco.

37 Cornamusa di legno, con buchi, foderata di pelle — sec. XVIII — R.

38 Flauto di bosso — *Ancient à Milan 1753* — R. C.

39 Oboe di avorio — *I. S. Schrechrant* — sec. XVIII — R. C.

40 Oboe di bosso — *I. C. Denner* — sec. XVIII — R. C.

41 Simile — *F. H. Heckenlopf* — sec. XVIII — R. C.

42 Flauto di bosso — *I. C. Denner* — sec. XVIII — R. C.

43 Simile di avorio (incompleto) sec. XVIII — R. C.

44 Cetera armonium — p. sec. XIX — Martinengo.

45 Salterio — sec. XVII — R. C.

46 Corni — *Andrea Cain Ven. 1770* — Istituto Esposti.

47 a

48 Salterio — sec. XVIII — Martinengo.

49 Violoncello — *M. Goffriller Ven.* — sec. XVIII — Istituto Esposti.

50 Come il N. 51.

51 Astucci da violino e salterio — sec. XVIII — Martinengo — Acq.

52 Arpa — *Consueau Inlitter de la Reine* — f. sec. XVII — Martinengo.

53 Organo — opera di Lorenzo da Pavia — 1494 — Zen.

FIGURE 4. (a) *Museo Civico e Raccolta Correr Venezia. Elenco degli oggetti esposti, 1899.* Cover page of the catalog. (b) *Museo Civico e Raccolta Correr Venezia. Elenco degli oggetti esposti, 1899, 279.* List of the instruments exhibited in the Correr Museum in 1899. Photos by Emanuele Marconi, © Ministero per i Beni e le Attività Culturali.

Correr Museum, fourteen years earlier.³⁷ While it was in the Zen family, scholars and musicians probably forgot the organ until it reappeared upon the death of the last Zen.

Dell'Acqua conducted a preliminary historical analysis of Gusnasco, quoting the written sources that deal with him and the relevant passages.³⁸ He examined the possible connection to Mathias Corvino, declaring that it was impossible since the Hungary king had died four years before the date of the organ. Apart from this, he also quoted and studied Francesco Zen's 1538 will, as well as some letters between Gusnasco and Isabella. At the end of the nineteenth century there were many studies about Isabella d'Este, which all referred to Dell'Acqua's publication but did not bring any new information about the instrument's material history or the relationship between Isabella and Gusnasco.

Two early photographs of the organ are in the instrument's file at the Correr Curatorial Department. The earliest one may date from the end of the nineteenth century or the beginning of the twentieth century and is probably the earliest photographic documentation of the instrument. It is printed on a very light-weight paper, and sepia-toned (fig. 5). On the right side a lower bout of a double bass can be seen, but this instrument is not identifiable as one of the two in the Correr collection today. It is easy to conclude that the organ is photographed following the repairs carried out by Antonio Biasiotto between 1874 and 1880. A second photograph, taken by Pietro Fiorentini³⁹ in 1932, depicts the instrument apparently in the same condition as the first image (fig. 6).

37. Dell'Acqua, *Lorenzo Gusnasco e i Lingiardi da Pavia*.

38. Teseo Ambrogio degli Albonesi, *Introductio in Chaldaicam linguam, Syriacam atque Armenicam et decem alias linguas characterum differentium Alphabeta circiter quadraginta et eorundem invicem conformatio. Mystica et cabalistica quamplurima scitu digna. Et descriptio ac simulachrum Phagoti Afranii. Theseo Ambrosio ex Comitibus Albonesi I. V. Doct. Papien. Canonico Regulari Lateranensi ac Sanai Petri in Coelo Aureo Papias Praeposito, Authore*. (Pavia: Giovanni Maria Simonetta, 1539); Sabba da Castiglione, *Ricordi di monsignor Sabba da Castiglione cavalier gerosolimitano, di nuovo corretti, et ristampati, con una tauola copiosissima nuouamente aggiunta. Et appresso breuemente descritta la vita dell'auttore, e indirizzata a monsignor Iosepho Cambiano, recipitor maggiore della sacra religione gerosolimitana*. (Venezia: Paulo Gerardo, 1560).

39. Pietro Fiorentini (1873–1945), Paduan photographer, worked in Venice at the address: S. Marco - Calle S. Basso 308 A. Several of his pictures are still conserved, taken on commission of the *Soprintendenza* (regional board of the Ministry of Cultural Heritage and Environmental Conservation) and illustrate conditions of paintings, sculptures and buildings. Images can be viewed at: <http://www.lombardiabeniculturali.it/fotografie/autori/3589/> and http://fe.fondazionezeri.unibo.it/catalogo/ricerca.jsp?decorator=layout&apply=true&percorso_ricerca=F&tipo_ricerca=avanzata&mod_AUFN_F=esatto&AUFN_F=Fiorentini,+Pietro&componi_F=AND&ordine_F=rilevanza.



FIGURE 5. Anonymous photograph, after 1880, probably not later 1920. Photo courtesy of Museo Correr.



FIGURE 6. Photo by Pietro Fiorentini, 1932. Photo courtesy of Museo Correr.

Studies on the Instrument, 1940–2006

In 1940—more than half a century after Dell’Acqua’s work—Emilio Haraszty wrote an article entitled *L’organo di Mattia Corvino nel Museo Correr di Venezia*⁴⁰ in which Barozzi’s publication and the *Regia Gazzetta* are quoted. The author interestingly mentioned that a single engraved key of the early keyboard was preserved (*[. . .] du clavier il reste une unique touché gravée [. . .]*). This is later reported in the DEUMM:

Of the original elements of the instrument (which, according to Sansovino but incorrectly so, belonged to Mathias Corvino King of Hungary) there remained one key and some pipes, in wood and paper.⁴¹

Only Tiella reported this reference (saying that at the moment of his survey, no original keys were visible); the later scholars did not mention it at all. Haraszty indicated that one surviving sculpted key had been preserved on the instrument.⁴² One may wonder about Haraszty’s grounds for such a reference. Had he examined the instrument and thought he had recognized the earlier key? Had he found some documents in the archives that no longer exist? He may also have been in touch with someone who worked at the museum at the time of Biasiotto’s repair work and who could have given him this information directly. It could also just have been a rumor, repeated over decades by museum attendants. Nevertheless, it seems that no earlier key was ever built into the keyboard as it is today.

In the 1950s, the museum commissioned a series of photographs when the organ was partially disassembled.⁴³ In the archives today are nineteen undated and unsigned black and white photographs, which are part of this series (see, for example, fig. 7). Twenty years later, in 1969,

40. Haraszty, “L’organo di Mattia Corvino nel Museo Correr di Venezia;” Haraszty, “A propos de l’orgue de Mathias Corvin du Musée Correr, à Venise,” 7–17.

41. *Degli elementi originari dello strumento (che secondo Sansovino, erroneamente, appartenne a Matteo Corvino re d’Ungheria) restavano solo più 1 tasto e alcune canne, di legno e di cartone.* “Gusnasco,” in *Le Biografie, Dizionario Enciclopedico Universale della Musica e dei Musicisti (DEUMM)* (Torino: UTET, 1985–1990).

42. It has not been possible to read Haraszty, “L’organo di Mattia Corvino nel Museo Correr di Venezia.” The French publication (Haraszty, “A propos de l’orgue de Mathias Corvin du Musée Correr, à Venise,” 7–17) suffers from an imperfect translation from the Italian. It seems to indicate that the citation of the surviving key appeared in the Barozzi’s book or in the *Regia Gazzetta*, but, as visible in Haraszty’s figures 5, 6 and 7, traces of that quote cannot be found in the documents mentioned.

43. Rossi, *Gli strumenti musicali delle Collezioni dei Musei Civici Veneziani*.



FIGURE 7. Anonymous photograph of the instrument partially disassembled, 1950s. Photo courtesy of Museo Correr.

Luisa Cervelli wrote in *Bollettino dei Musei Civici Veneziani* an article entitled “Un prezioso organo del ‘400 – Alla ricerca della sua voce perduta,”⁴⁴ which she intended to be the first of a series of studies preliminary to a functional restoration. It was, however, the only issue published. This article is mostly historical but includes general remarks on the instrument. Unfortunately, not all the pictures published in the article are present in the Museum’s archives. Some of the observations are quite superficial (“the pipes do not appear to be altered”), while others are more specific, such as the reference to the marquetry of the *Basilica Superiore di San Francesco d’Assisi*, which is never mentioned again.

In 1972 Marco Tiella examined the instrument and published a good description of the organ’s condition. He also included drawings of the pipes’ section, and some of the instrument’s dimension, in attempt to answer to the question of temperament. He also offered a theoretical solution of a double tuning organ, with the first rank of pipes tuned Pythagorean and the second one meantone.⁴⁵ He hypothesized that the instrument originally had ninety-two or ninety-three pipes, with forty-eight keys and ninety-six wind conducts. He probably did not recognize the four wind holes—one at each corner of the wind-chest—that had been closed. He is the only scholar to have noted, even in passing, the presence of a watermark on a pipe (an anchor in a circle).

Following Tiella, from 1991 onward, there has been increasing attention in the organ, with various restoration projects proposed, but none has been implemented. Pier Paolo Donati conducted a survey in 1991,⁴⁶ writing a report dated April 15, in which he disproved Tiella’s statements on temperament and provided new explanations:

Marco Tiella’s hypothesis, that it was an instrument with two 6’ registers, tuned differently, the first one Pythagorean and the second one meantone, is unfounded. On the contrary, the two registers are a 6’ Principal, placed in the front and back and a 3’ Octave placed between the Principal’s cusps, making a total of 96 pipes, corresponding to an F1–F5 keyboard, without F#1.

44. Cervelli, “Un prezioso organo del ‘400 alla ricerca della sua voce perduta,” 21–36.

45. Marco Tiella, “L’organo di Lorenzo da Pavia,” *ibid.* 1, 2, no. XVII (1972): 26–53, republished in English: Tiella, “The positive organ of Lorenzo da Pavia,” 4–15.

46. Pier Paolo Donati was founder of the *Gabinetto Restauro Organi Storici* by the *Opificio delle Pietre Dure della Soprintendenza ai Beni Artistici e Storici di Firenze*, active from 1979 to 1993 at Palazzo Pitti.

Contrary to what is stated by Marco Tiella, the paper pipes still have, almost completely, their original length and can be profitably used to determine registers and their position on the wind chest.⁴⁷

Later in the report, Donati explains:

The best approximations of the real lengths of the sounding tubes by theoretical values are: $1/2$ for the octave, $2/3$ for the fifth, $3/4$ for the fourth, $4/5$ for the third, $24/25$ for the minor second (little chromatic half-tone). Both the great tone $8/9$ and the small tone $9/10$ are present. [. . .] It is noticeable that existing pipes fully cover the 6' register's range, from F1 to C4 (2 octaves and a fifth) and the 3' register's range, from F1 to C3, with only 3 missing pipes. The gap is therefore less serious than it may appear (52 existing pipes on 96) [. . .] The existence of Principal register and Octave register, corresponds to what was used in the Renaissance for small chamber or *Studiolo* instruments. The probable meantone temperament adopted by Lorenzo da Pavia in this instrument, would confirm the tendency, between 14th and 16th centuries, to abandon the "gothic temperament" for keyboard instruments and the acceptance of the $4/5$ consonant ratio for the major third, as stated in the attachment by Professors Oscar Mischiati, Luigi Ferdinando Tagliavini and Agostino Ziino, who were all present at the survey carried out the 13th of November 1990.⁴⁸

47. "L'ipotesi formulate dall'arch. Marco Tiella che si tratti di uno strumento dotato di due registri di 6' differenziati nell'accordatura, l'una pitagorica, l'altra di 'tono medio' risulta destituita di fondamento. I registri dell'organo sono invece un Principale di 6' distribuito nelle facciate anteriore e posteriore e di una Ottava di 3' collocata fra le due cuspidi del Principale per un totale di 96 canne corrispondenti all'ambito della tastiera Fa1-Fa5 senza Fa#1.

Contrariamente a quanto sostenuto da Marco Tiella, i corpi sonori in cartone conservano nella quasi totalità la lunghezza originale e possono utilmente essere analizzati per determinare i registri di appartenenza e la loro posizione nel somiere." Pier Paolo Donati, "Relazione sull'organo di Lorenzo da Pavia, 1494, del Museo Correr di Venezia." Unpublished document preserved in Correr's archives.

48. "I valori teorici utilizzati, che più si approssimano alla lunghezza reale dei tubi sonori, sono i seguenti: $1/2$ per l'ottava, $2/3$ per la quinta, $3/4$ per la quarta, $4/5$ per la terza, $24/25$ per la seconda minore (semitone cromatico piccolo). Sono presenti casi sia di tono grande $8/9$, sia di tono piccolo $9/10$. [. . .] Risulta evidente che i corpi sonori conservati coprono la tessitura di un registro di 6' integralmente da Fa1 a Do4 (due ottave e una quinta), e di un registro di Ottava di 3' da Fa1 a Do3, con tre sole canne mancanti. La lacunosità del materiale pervenuto è pertanto assai meno grave di quanto all'apparenza potrebbe apparire (52 canne conservate su 96) [. . .] La presenza di un registro di Principale e di un registro di Ottava corrisponde a quanto risulta praticato nel Rinascimento per piccolo strumenti da camera o da studiolo. Il probabile temperamento di 'tono medio' adottato da Lorenzo da Pavia in questo strumento confermerebbe la tendenza tra Quattrocento e Cinquecento all'abbandono dell' 'accordatura gotica' per gli strumenti a tastiera e dell'assunzione del rapporto consonante $4/5$ per la terza maggiore, come è detto nell'allegato dei Proff. Oscar Mischiati, Luigi

Oddly enough, he counted only fifty-two surviving pipes, whereas there are currently fifty-five on the instrument. In his opinion, the tuning is a minor third higher than 440 Hz. He eventually favored a restoration toward playing condition:

This intervention could be the first step of a gradual programme of study and work intended to restore the instrument's complete functioning [...] we think that the instrument could be fully restored in all its functional aspects without the risk of losing technical and historical information which the instruments still preserves.⁴⁹

Some months later he sent to the Museum an estimate for organ restoration. A large number of official letters, from 1993 to 1999, describe the relationship between the Museum and the Soprintendenza:

- in 1993 the Museum asked for regional funds to restore the organ
- in 1996 Attilia Dorigato (former director of the Correr Museum) wrote to Giuseppe Basile (*Istituto Centrale di Restauro*) confirming the presence of 63 million lire for organ restoration, adding that she needed a written report estimating the sum necessary for the repair work
- in 1998 Dorigato wrote to Basile saying that preliminary operations could start
- between February and March 1998 there was a demarcation dispute between the Soprintendenze of Milan and Venice, as the Regional commission responsible for Organs had not been renewed.⁵⁰

On February 26, 1998, Giuseppe Basile, in the presence of Donati and others, decided that dendrochronology, X-radiography, and endoscopy examinations should be ordered.⁵¹ On June 27, 1998, Maurizio Ricci signed an in-depth study commissioned by the *Commissione* itself, after

Ferdinando Tagliavini e Agostino Ziino, presenti al sopralluogo effettuato il 13 novembre 1990." Ibid. There is no trace of this attachment in Correr's archives.

49. "Questo intervento potrebbe costituire la prima fase di un programma graduale di studi e operazioni destinate a restituire funzionalità allo strumento [...] lo strumento possa essere recuperato nel suo aspetto funzionale senza che sussista il rischio della perdita di informazioni di carattere tecnico e storico che lo strumento conserva." Ibid.

50. Unpublished documents preserved in Correr's archives.

51. Letter signed and dated March 16, 1998. Unpublished document preserved in Correr's archives. Ettore Merkel and D. Spezzani (*Soprintendenza Beni Archettonici e Paesaggistici di Venezia e Laguna*), Attilia Dorigato (former manager of Musei civici di Venezia) Giandomenico Romanelli (former director of Fondazione Musei civici di Venezia), and the dendrochronologist Olivia Pignatelli.

three surveys at the Correr museum.⁵² This is to date the most detailed study, with a careful description of the components of the instrument. In this study, the pedestal—or lower case—along with the bellows and the pedal, were not considered to be original, even if no indication of presumed dates are given.

Unlike Donati, Ricci suggested carrying out a conservation work rather than a restoration toward playing condition, but he agreed with the register's composition (6' Principal + 3' Octave). In addition, he gives a very good explanation of the functioning of the wooden feet, listing how many had been replaced and describing the geometry and the status quo of the paper pipes, providing a list of reasonably accurate measurements. He stated that fifty-five out of ninety-six pipes survived, most of them having been chamfered at the interior of the upper edge for tuning reasons; others had been reduced in length, sometimes without proper tools and methodology. He presented an hypothesis for the pitch tuning, estimated as follows: f^1 : 95,757 Hz, which is 8,45 Hz more than the f^1 at 440 Hz, different from Donati's minor third. He remarks:

Donati's pipes measurements, taken over by Tiella with his own personal procedure, were assembled and published in a chart without any preliminary comment; this fact forces us (if we want to use this data and to avoid committing mistakes) to interpret the data contained in the chart with great care.

Indeed, pipes measurements [. . .] do not include the part of the pipe which corresponds to the height of the mouth, i.e. the space between the lower and upper lip [. . .]

These measurements - *these mismeasurements* - were blindly used as real by Donati, who tried to put the pipes in descending order following lengths and diameters [. . .] an operation executed by means of fractional values - sometimes arbitrarily interpreted [. . .] the use of fractional values to reach certain conclusions has never been so incorrect.⁵³

52. Maurizio Ricci was a member of the *Commissione per la tutela degli Organi Artistici della Lombardia presso la Sovrintendenza ai Beni Ambientali di Milano e Ispettore onorario del Ministero dei Beni Culturali*. Ricci, "Relazione sull'organo di Lorenzo Gusnasco da Pavia (1494) del Museo Correr di Venezia." Unpublished document preserved in Correr's archives.

53. "Le misure delle canne dell'organo Gusnasco, rilevate dal Tiella con procedimento personale, sono state pubblicate e riunite in una tabella priva di note preliminari esplicative; questo impone - in caso di uso e se non si vuole incorrere in errori—una corretta interpretazione dei dati in essa contenuti. Infatti le misure dei corpi

The last document from the exchanges between Soprintendenza and Museum dates from March 10, 1999. The *Soprintendente* Giovanna Sciré Nepi wrote to the Correr Museum that the *Commissione per la tutela degli Organi Artistici e Storici della Lombardia* had sent her office (*Soprintendenza per i Beni Artistici e Storici di Venezia*) the name of two companies specializing in woodworms disinfection (gasification), and added that it would be necessary to draw up an estimate including the costs for a photo campaign and transport. It remains a question, therefore, why neither the woodworm treatment nor a restoration had been carried out.

In 2004, Luigi Collarile, then a PhD student of Basel University (Switzerland), submitted a plan⁵⁴ to study the instrument, to restore it, and to build a copy in association with the organ maker Francesco Zanin. A five-page document described how the instrument worked and also reviewed the previous studies by Tiella, Donati, and Ricci. Collarile pointed out the presence of fifty-five of ninety-six pipes and the fact that almost none of them were able to play due to the obstruction of the wind channel holes at the foot base. He also remarked on the presence of two different handwritings, dating “one surely of the 19th century” and another one, older, “which we cannot say that it does not date back to the 16th century.” He pointed out that five feet are recent while Ricci says there are eleven but agreed with him about registers, keyboards, and the instrument’s extension.

In all previous accounts the pipes were examined by arranging them in descending order of length. The analyses and the data have relative value, as they do not take into account their belonging to two different registers.

[. . .]

[. . .] non sono comprensive di quella porzione di quella canna corrispondente all’altezza di bocca, cioè di quello spazio che intercorre tra il labbro inferiore e quello superiore [. . .]

Tali misure—per così dire mutili - sono state ciecamente assunte come reali da P. Paolo Donati che tenta di ordinare le canne in scala decrescente secondo la lunghezza dei corpi e dei diametri esterni [. . .] operazione questa eseguita mediante l’impiego di valori frazionari—talora applicati arbitrariamente da Donati [. . .] l’impiego dei valori frazionari menzionati per arrivare a certe conclusioni è quanto mai improprio.” Maurizio Ricci, “Relazione sull’organo di Lorenzo Gusnasco da Pavia (1494) del Museo Correr di Venezia,” (Pavia 1998). Unpublished document preserved in Correr’s archives.

54. Collarile and Zanin, “Organo “Gusnasco da Pavia” (1494), Venezia, Museo Correr. Relazione dei sopralluoghi effettuati da L. Collarile e Francesco Zanin.” Unpublished document preserved in Correr’s archives.

The pitch seems to be a tone upper than the current one (a'' 490 Hz approximately), as with the historical tradition.

[. . .]

[. . .] the 6' register has a diatonic disposition, with 21 pipes in the front and back, the remaining 6 pipes are placed chromatically on the right part of the wind chest on 2 ranks of 3 pipes each. Currently the 4 holes at each corner of the wind chest are plugged.

[. . .]

We can observe traces of a repair in the placement of one slider, which seems have been moved 2 cm towards the keyboard. This is confirmed by the presence, in the same slider, of at least 6 closed holes.⁵⁵

Franco Rossi in 2006 edited the *Bollettino dei Musei Civici Veneziani* and summarized some of the previous studies, dating the black and white photograph series to around 1950. He stated that fifty-two out of ninety-six pipes existed (Table 1).

New Insights into the Making of the Correr Organ

A Description and its State of Conservation; Incriptions.

The word used in the *Gazzetta Veneta* in 1874 was *resti*, which literally means "remains," and it is not too difficult to imagine, examining the current instrument, what the conservation conditions were: certainly the pipe rack was missing, as well as the double door of the wind chest, forty-one pipes and a certain number of wooden feet, the cloth bindings; the

55. "In tutte le precedenti relazioni il material fonico è stato analizzato disponendo le canne in ordine decrescente di grandezza. L'analisi dei dati (e i relativi grafici) hanno valenza relative, in quanto non tengono sufficientemente conto del fatto che le canne appartengono a due registri diversi.

[. . .]

Il corista dell'organo risulta essere di circa 1 tono superior a quello ora convenzionale la3 = 490 Hz circa).

[. . .]

[. . .] il registro di 6' piedi prevede una disposizione diatonica della canne sulle due facciate esterne dello strumento, ognuna di 21 canne; le ultime 6 canne del registro sono invece posizionate in maniera cromatica sulla parte destra del somiere, su due file di tre canne ciascuna. Attualmente i fori delle canne alle Quattro estremità delle facciate sono occlusi.

[. . .]

Nel somiere è possibile rilevare segni di un intervento di modifica sostanziale, con uno spostamento di una stecca, che sembra essere stata spostata di circa 2 cm verso la tastiera. Confermano questo dato i 6 fori occlusi nella stecca del somiere ma potrebbero essere molti di più)." Ibid.

TABLE 1. Summary of the main conclusions of the previous organological studies on the Correr organ.

	Tiella 1972 and 1976	Donati 1991 and 1993	Ricci 1998	Collarile 2003
surviving pipes	55	52	55	55
pipes in 1494	no more than 92 (or even 93)	96	96	96
Registers/ ranks	first rank of pipes tuned Pythagorean and the second one meantone	6' Principal, distributed in the front and back side and a 3' Octave placed between the Principal's cusps	6' Principal (front and back side) and 3' Octave (in the middle, with rank bellow)	the first 6', the second one 3'
Ambitus	F to f''' (without F#)	F'-F'''' without F#	F'-F'''' without F#	F'-F''''
Pitch	—	A=a minor third higher than 440Hz	F'= 95,757 Hz, which is 8,45 Hz more than the F' at 440 Hz	A'''= ~ 490 Hz

presence of pedestal with the belly and the pedal is uncertain (fig. 8 and fig. 9). The instrument is currently comprised of:

- a case or pedestal made in spruce (?) (containing a bellows, a wind magazine and the pedal necessary to use the bellows)
- the body (wind chest and mechanics, sides of the instruments and rack board)
- fifty-five paper pipes with foots in fruitwood (fig. 10)

The three inscriptions inlaid on the sides of the body and over the keyboard are reported in Table 2 (fig. 11a and 11b). In addition, a double series of handwritten numbers appear on pipes (at the lower end) and feet (at the upper end) (fig. 11c). It is possible to discriminate:

- Original parts: pipes, some feet, wind chest, valves
- Modifications to surviving original parts: some pipes have been reduced or augmented in size, some have been re-matched (for example, the two handwritten series of numbers on the foot do not correspond) with the feet; some feet have been glued to pipes and their air conduct modified. One pipe has three holes drilled as on a flute. One pipe is made of a very



FIGURE 8. The probable setup of the instrument in 1494. Photo by Emanuele Marconi, © Ministero per i Beni e le Attività Culturali. See color photo p. 198.



FIGURE 9. Detail of the non-original pipe rank. Photo by Emanuele Marconi, © Ministero per i Beni e le Attività Culturali. See color photo p. 199.

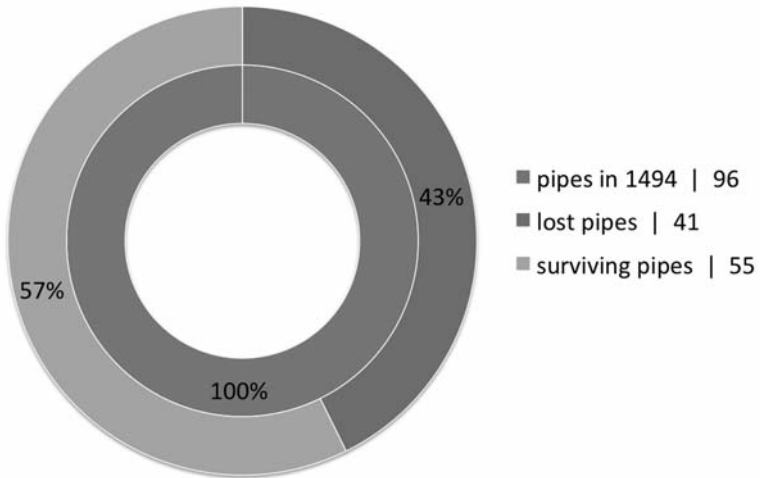


FIGURE 10. Percentage of surviving and lost pipes. See color photo p. 199.

TABLE 2. Inlaid inscriptions on the sides and over the keyboard of the Correr organ.

Bass side inscription	Treble side inscription
ΤΟΥΤΕΡΓΟΝ ΘΕΘΕΙΔΕΣ	ΘΕΛΓΟΝΑΜ ΑΝΘΡΩΠΩΝ
ΘΝΗΤΟΥ ΧΕΙΡΕΣ	ΟΥΠΑΝΙΩΝΤΕ
ΕΠΟΙΟΥΝ	ΘΡΕΝΑΣ

The divine work, made with human hands, is doomed to amaze the hearts of humans and celestials

front inscription

QUALES ASTRAS SONOS TALES EGO PULSA REMITTO
SI MODO ME FACILIS COMPRIMAT ARTE MANUS
LAURENTIUS PAPIENSIS FACIEBAT MCCCCLXXXIII

AS THE STARS EMIT HARMONIES, I PLAY, IF
A DELICATE HAND PLAYS ME WITH ART
LORENZO DA PAVIA MADE [ME IN] 1494

Pipes inscriptions

Two series of numbers, two different writings, the earliest dating from the sixteenth or seventeenth century, the other probably from the nineteenth century.



FIGURE 11. (a) detail of the bass side panel

(b)



(c)



FIGURE 11 (*continued*). (b) UV image of the bass side panel. One can clearly see the woodworm repairs and the green fluorescence of the inlaid Greek phrase. (c) The wooden foot of a pipe. Note the two different handwritings. Photos by Emanuele Marconi, © Ministero per i Beni e le Attività Culturali. See color photos p. 200.

different paper and rolling technique. The bottom of the nameboard over the keyboard has been replaced; some writing has been partially rewritten; one of the sliders probably moved 2 cm closer to the keyboard; 4 wind holes, one at each corner of the wind chest, have been plugged.

- Non-original parts: lower box or pedestal, (box + belly + pedal, showing some signs of wear); rack bellows and the front and back wooden cusps; cloths bindings; some foots; the fake keyboard (upper part of the keys glued on a board); the retouching on the upper part of wind chest; the sliders.

In addition, a fraction of the woodworm galleries have been filled to even out the appearance of the wood, and some inlays have been restored and refilled. Figure 12 presents the current map of the wind chest.

Mouldings and Inlays.

The body of the instrument is ornamented with many mouldings,⁵⁶ of different sizes and sections, seen on coeval portative organs,⁵⁷ and commonly used on harpsichords and spinets. Beside a double moulding at the bottom of the body, the decoration of the two side panels surmounted by the tympanum is an assortment of mouldings that form a canvas, denoting the skill and the taste of who carried it out in matching volumes and sizes. The two side panels, the panel over the keyboard, and two small decorations at its sides are inlaid with a triple purfling (black/white/black) of the same type that can be found on many violas da gamba or da braccio. Not only the purfling width but also the lozenge patterns, even if slightly different, could be connected to viol's soundboard and back decorations (fig. 13). The Greek and Latin inscriptions follow the technique used in lute family and baroque guitar construction, or more generally on plucked instruments: the wood is first carved and then filled with a black powder mixed with a binding medium, possibly a resin of vegetal origin or an animal glue (fig. 14).

Whereas the two side panels are in very good condition and seem close to their original state, the bottom of the nameboard has been extensively modified due to woodworm damage and subsequent repairs and retouching (fig. 15). Fortunately, these more recent interventions do not jeopardize the nature/content of the inlaid inscription. In the decoration one observes knowledge and skill of several types: that of the viol maker, of the keyboard instrument maker, and of the lute maker.

56. Not yet identified and studied.

57. See the 1476 marquetry representing the organ of Giovanni Castellano in the Urbino *Palazzo Ducale*.

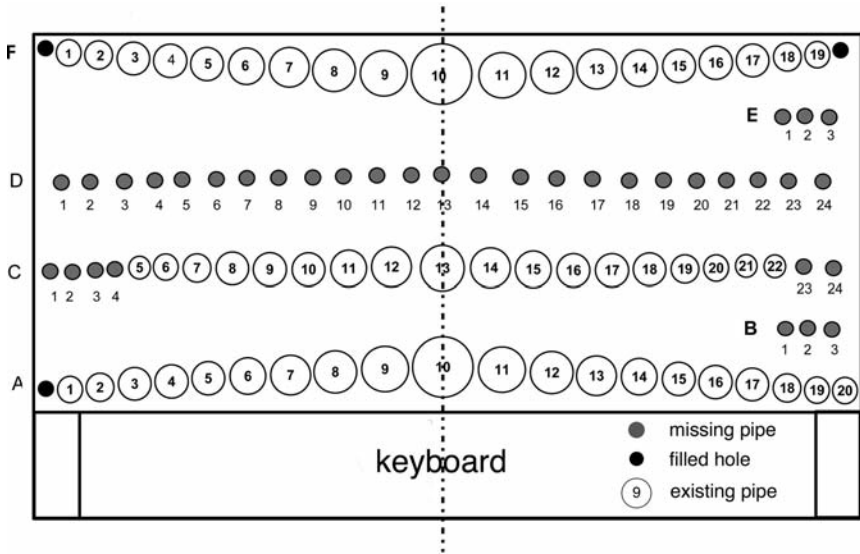


FIGURE 12. Map of the wind chest. By Leonardo Trotta.

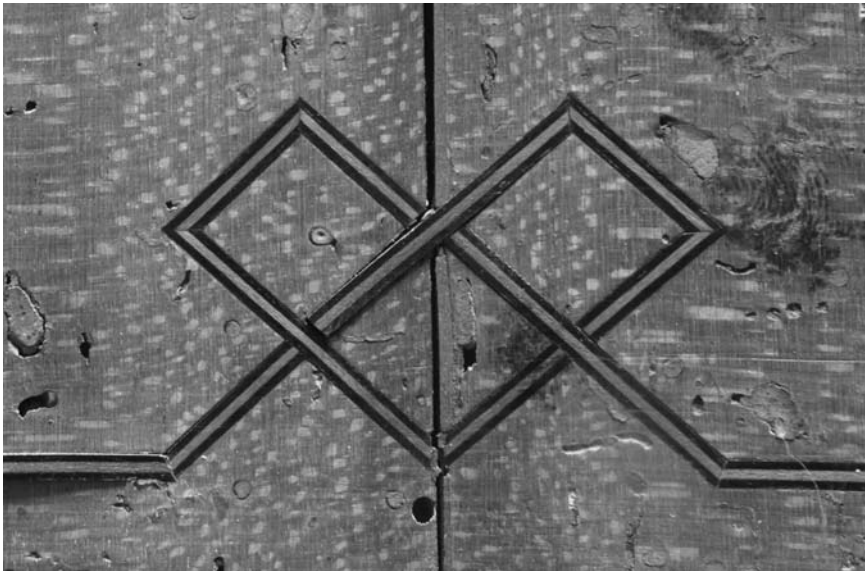


FIGURE 13. The lozenge pattern of the side panel. Photo by Emanuele Marconi, © Ministero per i Beni e le Attività Culturali.



FIGURE 14. Visible light and UV image of the date, inlaid on the front panel above the keyboard. The different fluorescence of the last letter is clearly visible. Photo by Jean-Philippe Echard, © Cité de la Musique. See color photo p. 201.



FIGURE 15. The nameboard with the inscription reporting Lorenzo Gusnasco and the date of construction. Photo by Jean-Philippe Echard, © Cité de la Musique.

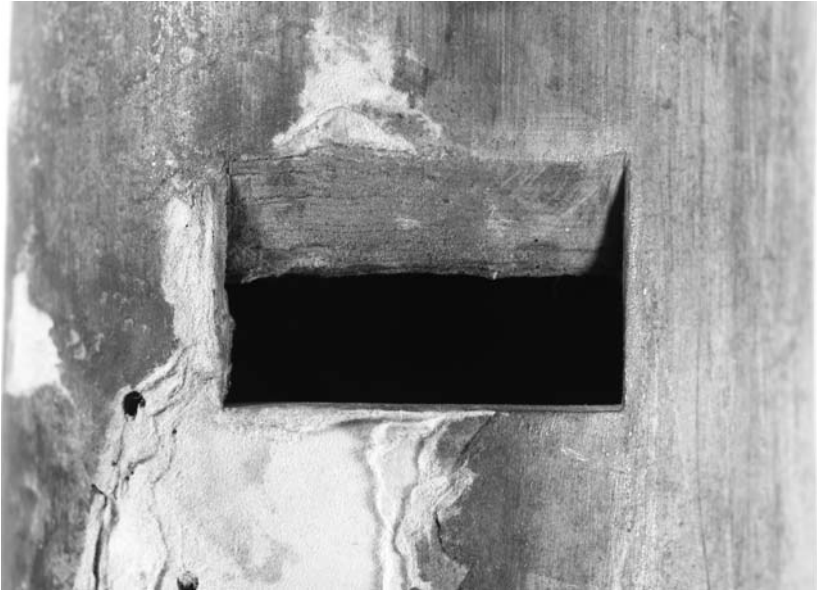
Construction of the Pipes.

In 2011, visual examinations of these paper pipes were carried out that introduced new elements in the materials of the paper pipes and their manufacturing technique. Each pipe was photographed and examined, sometimes with magnifying glasses. The condition of the remaining fifty-five paper pipes could be defined as excellent for artifacts more than five centuries old. From a longitudinal point of view they are still very straight, which makes one think of a high-quality construction technique. Only one of the larger pipes is slightly bent, and its section has been made slightly oval. The outer surface is coated with a film-making material and appears quite glossy, despite dust and dirt. Even if darker, uneven, and irregular traces show that the pipes were probably overcoated at various times, it is almost certain that an initial coating was applied at the time of making of the pipes.

The cylindrical part of pipes is made of rolled sheets of paper. The resulting multi-layer structure is particularly visible at the end of the pipes, at the mouth and in damaged areas or with tomographic investigation (fig. 16a, 16b, 16c) with up to twenty-two or twenty-three paper layers on one pipe. The outer layer of paper, corresponding to the outer surface of the pipe, is oriented and rolled perpendicularly along the pipe axis. This can be inferred from looking at the border of the paper sheets, which is often difficult to detect on the surface layer, because of possible thinning or burnishing to smooth the relief (fig. 17). On fifty-three of the fifty-five pipes, this paper joint is situated at the exact diametric opposite of the mouth. Other paper borders, perpendicular to the previous ones and to the pipe axis, are seen on long pipes. This is the vertical line visible in the middle of the picture. This will be discussed in the next section.

Information can also be gleaned about the rolling method of the intermediate paper layers. In these intermediate layers, the paper is not parallel or orthogonal to the pipe axis, but at an angle. On undamaged pipes a brownish line is sometimes visible and is revealed through the surface layer by the aging processes in the pipes materials, and a helix is drawn along the pipe. In the few damaged areas, the very careful helical arrangement of the paper strips is more obvious. No partial superimposition of contiguous papers was observed (fig. 18). If one tries to imagine the cutting and preparation of the paper strips and their rolling, it appears that the angle of the helix to the horizontal (where the pipe is held vertically), the pipe diameter, and the width of the paper

(a)



(b)



FIGURE 16. (a) Close-up image of mouth and labium of one of the smallest pipes. (b) close-up image of the edge of a pipe, showing the degradation and the partial detachment of the paper layers.

(c)

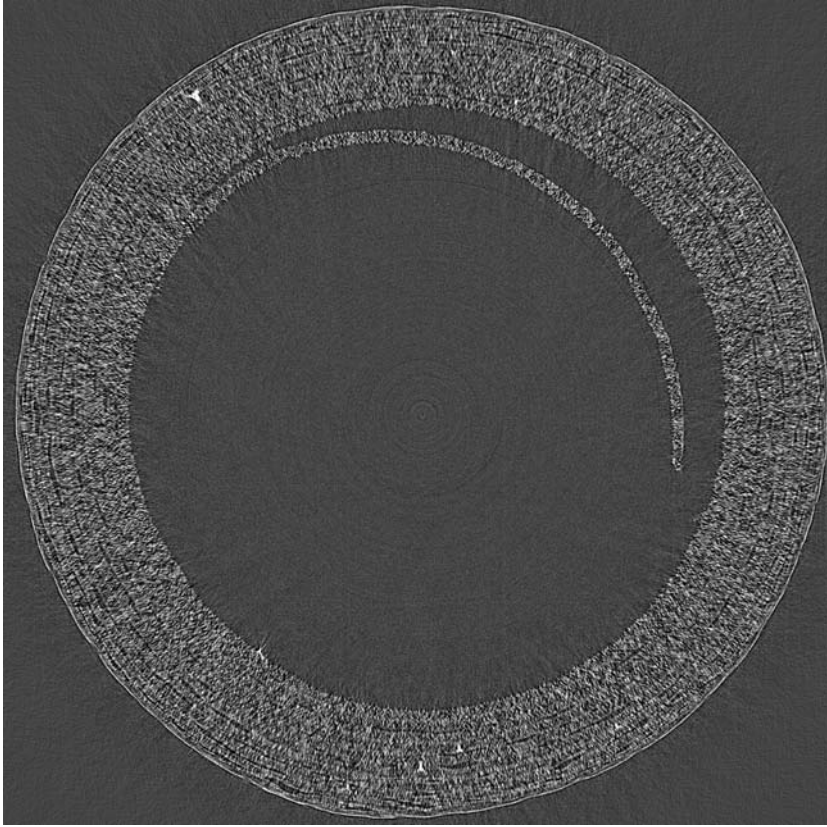


FIGURE 16 (*continued*). (c) cross section X-ray tomographic view of a paper pipe of the Correr organ, carried out at the Elettra Sincrotrone in Trieste. Photo by Emanuele Marconi, © Ministero per i Beni e le Attività Culturali.

strip are geometrically inter-connected. In such cases the width (between 5.1 and 11.4 cm) and angle (between 30° and 38°) of the paper strips can be assessed. The paper in the intermediate layers seems to be free of glue or other sizing material. The internal surfaces of the pipes were examined from the top end, or from the bottom end of the paper pipe, when it was possible to remove the wooden foot. It seems to be rolled the same way the upper layer is: perpendicular along the pipe axis. The general pipe construction can, therefore, be understood as in figure 19.

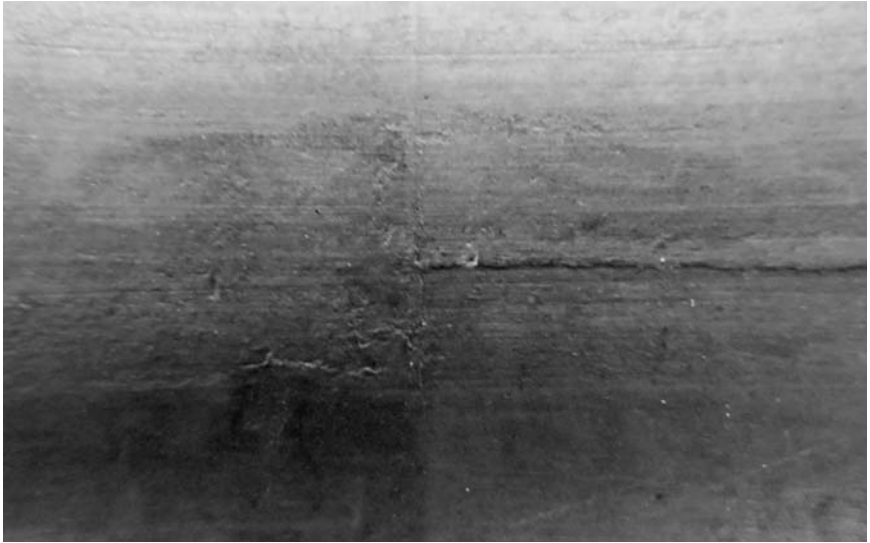


FIGURE 17. Close-up image of three joints. Photo by Jean-Philippe Echard, © Cité de la Musique.

First elements on the nature and the source of the paper used.

An outstanding feature of the organ is the material used for the pipes. Observation of the features of the paper sheets used for the pipes can provide information on the nature, quality, and provenance of these paper sheets. In the history of paper and bibliography, the usual methodology for identifying a sheet of paper and the mould (or pair of moulds) that produced it is based on four main factors:⁵⁸

- 1) the size of the sheet—probably modified by trimming in the case of the paper pipes;
- 2) the thickness and frequency of the wire-lines;
- 3) the chain-lines, most notably their distances apart;
- 4) the watermark(s) and countermark(s).

It was not possible to fully apply this methodology here, since it was not possible to find any trace of wire-lines and chain-lines in any of the pa-

58. Neil Harris, "Paper and watermarks: the shape of paper," Institut d'Histoire du Livre, <http://ihl.enssib.fr/siteihl.php?page=277&aflng=fr>.



FIGURE 18. Note the end of one strip at the beginning of the following. Photo by Emanuele Marconi © Ministero per i Beni e le Attività Culturali.

pers examined. However, the border of the surface sheets—described in the previous section—provided other interesting aspects. Clearly, the distance between opposite borders defines the minimal dimensions of the paper sheets used. The lengths of the paper sheets used were measured on each pipe for which two or more sheets were observed along the pipe length, numbering, for each pipe, the sheets from the bottom of the

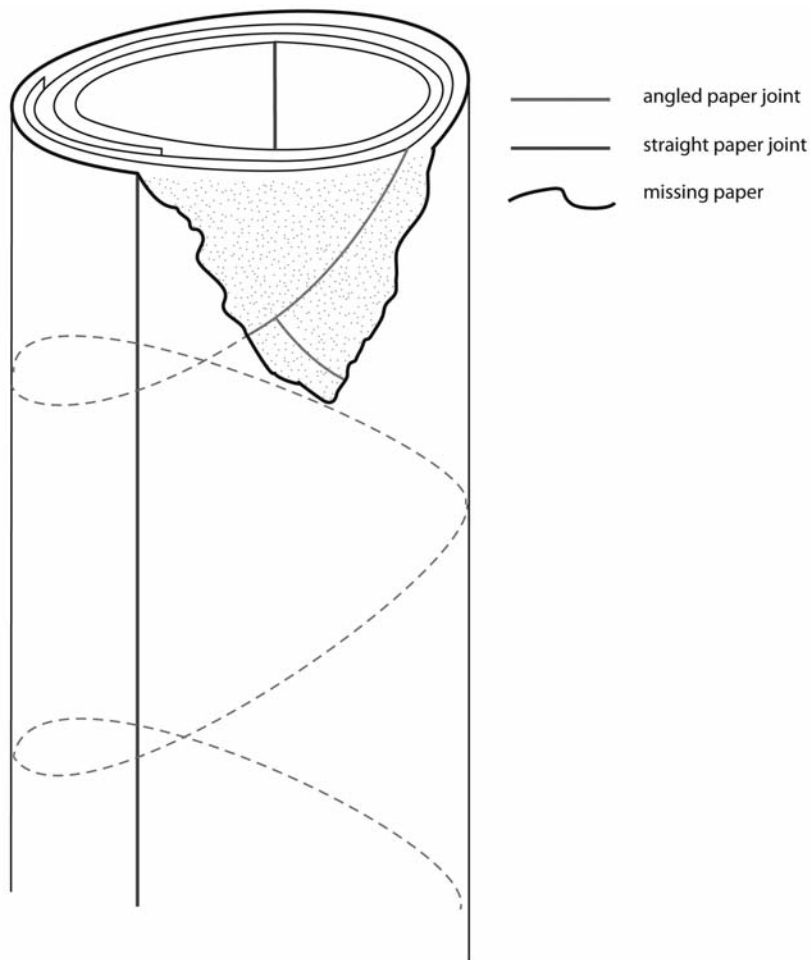


FIGURE 19. Possible construction method of the paper pipes. Photo by Emanuele Marconi, © Ministero per i Beni e le Attività Culturali. See color photo p. 202.

pipe to the top (fig. 20). The longest sheets are mostly those that do not make up the upper part of the pipes, regardless of the total length of the pipes. The maximum sheet length measured is about 59 cm. There are twenty-two strips whose length is not less than 5% of this maximum value (fig. 21). This indicates that the length of the paper sheets used to create the outer layer of the pipe was at least 59 cm long. It is likely that some cropping occurred during the manufacture of the pipes.

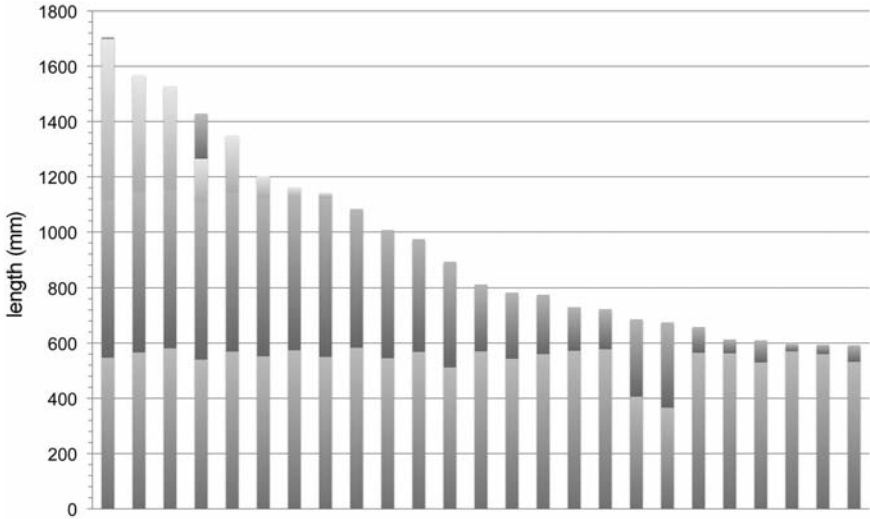


FIGURE 20. Length of each paper sheet of the pipes made with more than one sheet, sorted in decreasing order of the total pipe length. Each shade represents a different sheet on a single pipe.

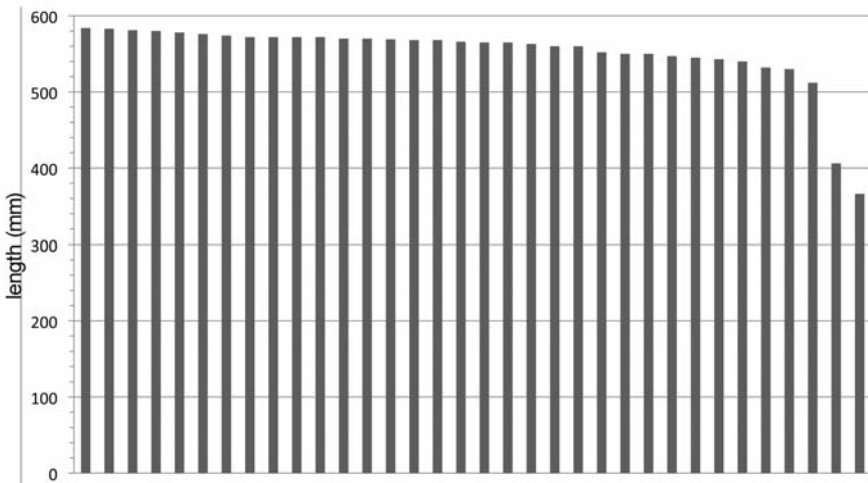


FIGURE 21. Length of the thirty-four longest paper sheets measured on the Correr organ pipes set. The similarity in length of the first thirty-one sheets suggest that they have not been cut except for the necessary slight cropping of the uneven edges due to the system of paper production.

TABLE 3. Four main paper sizes in use in the fifteenth century.

	height x length (mm)
<i>Imperialle</i>	500 × 740
<i>Realle</i>	445 × 615
<i>Meçane</i>	345 × 515
<i>Reçute</i>	315 × 450

In the fifteenth and sixteenth centuries, four main paper sizes were produced (see Table 3). The dimensions of paper sheets used on the organ would correspond to the “royal” (*realle*) format, non-folded (broadsheet, 1°), whose length is between 60.8 and 61.5 cm. This format is usually for book-making in higher quality, large format books. Indeed, this is consistent with the fact that several sheets of paper were needed for the pipes over 55/58 cm in length.

The second feature related to the manufacture of the paper sheets is the presence of watermarks on the pipe. Tiella mentioned this only briefly. During our study, fourteen watermarks (complete or in part)—but no countermark—were observed on the pipes of the organ. The watermarks appear in darker shades, contrasting with the yellowish hue of the paper (fig. 22 and fig. 23). Possibly, the watermarks were not intended to be visible: it may be the thicker accumulation of the coating on the watermarks and the darkening of this material over time that have gradually made the watermarks visible. All the watermarks show an anchor with bilateral flukes, in a double outline, encircled. The overall diameter is about 45 mm. All the anchor signs seen on the pipes have been recorded on transparent plastic sheets (fig. 24a, 24b). Superimposition of all the contours shows that they are all very similar (fig. 25), indicating that these paper sheets probably would have been produced in the same pair of moulds, in a single workshop.

The search for similar watermarks in written documents can cause confusion. This type of simple encircled anchor is Venetian, and it abounds in documents in Dalmatian and Croatian archives,⁵⁹ as the “anchor” family is one of the most numerous watermark families, and use of Venetian paper was widespread through Europe and the Levantine area. Furthermore, the search for identical watermarks implies that the paper

59. Vladimir Mošin, *Anchor watermarks*, trans. John Simon Gabriel Simmons and B. J. Van Ginneken-Van De Kastelee, vol. 13, *Monumenta chartæ papyraceæ historiam illustrantia* (Amsterdam: Paper Publications Society, 1973).



FIGURE 22. Anchor watermark as observed on one pipe of the Correr organ. Photo by Emanuele Marconi, © Ministero per i Beni e le Attività Culturali. See color photo p. 203.

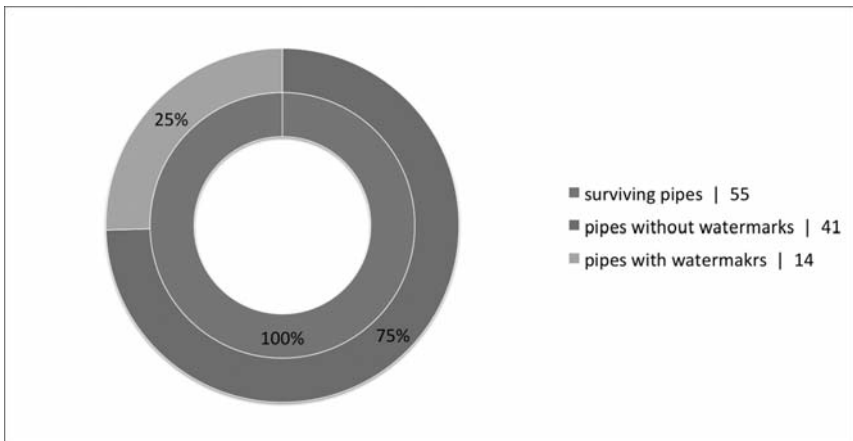


FIGURE 23. Number of watermarks on the surviving pipes. See color photo p. 203.

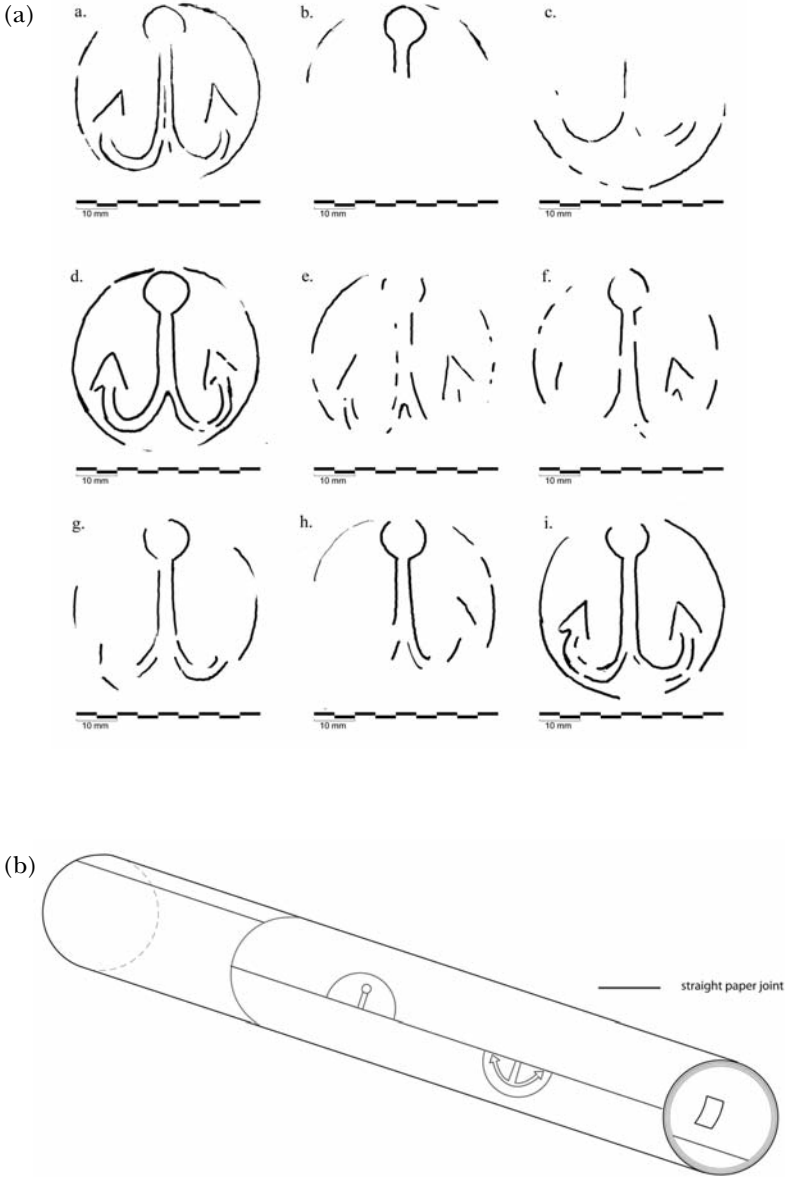


FIGURE 24. (a) Drawings of nine of the fourteen watermarks observed on the pipes. By Jean-Philippe Echard, © Cité de la musique. (b) Incomplete watermarks can be explained by the cutting of paper sheets to the diameter of the pipe. By Emanuele Marconi, © Ministero per i Beni e le Attività Culturali.



FIGURE 25. Superimposition of the fourteen observed watermarks. By Jean-Philippe Echard, © Cité de la musique.

format on which there are these particular watermarks should have the same “*realle*” format. These watermarks are much less frequent in the databases than those on smaller, more common paper formats. However, visual comparison of the recorded watermarks on the organ pipes with the marks of this type from the documentation led to a limited number of concordances that were all dated between 1489 and 1496 (fig. 26). This is in accordance with a dating of the organ’s manufacture in 1494 in Venice.

These paper sheets, therefore, would have been produced in one of the many paper factories in the lagoon, like the anchor used as a symbol by printers and publishers of the Venetian area in slightly different forms. Interesting similarities can also be found with anchor watermarks in books published by Aldo Manuzio. In particular, a 1498 Aldine edition of Aristotle’s works has a very similar watermark to that of the organ. However, the leaf format is 308 x 207 mm (2°), which would correspond to a “*realle*” sheet folded in four, making it unlikely that such a sheet format was used.⁶⁰

The correspondence between Lorenzo Gusnasco and Isabella d’Este mentions Aldo Manuzio:

60. *The Aldine Press: Catalogue of the Ahmanson-Murphy Collection of Books*, (Los Angeles: University of California Press, 2001).

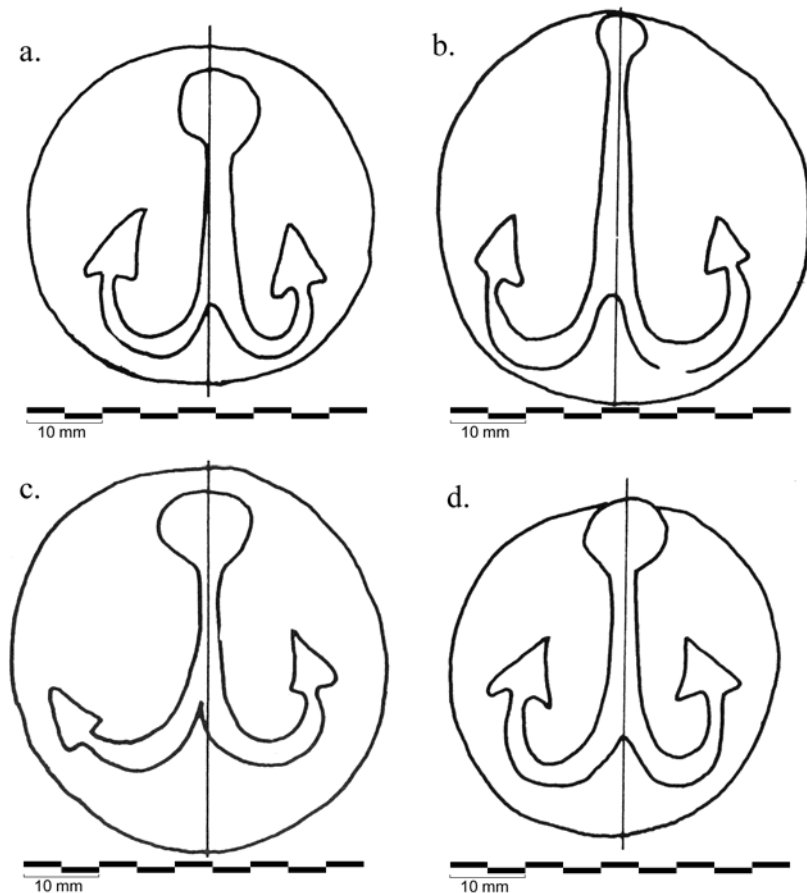


FIGURE 26. Four instances of watermarks found in the literature with features similar to the ones observed on the Correr organ (adapted from Mosin 1973).

[. . .] in one of your letters I saw you are asking to send these books—the Virgilio, the Petrarca and the Ovidio—in good paper quality; I went immediately to the home of Master Aldo [*Manuzio*] [. . .] the one who invented the first Greek font, my good friend. At the moment one can have only the Virgilio in good paper quality, so I am sending it to you with this letter. Petrarca is not yet finished, it's partway through—they told me that it will be ready in ten days, only about 15 have been made in good paper *se fosano cento* and this has happened for the lack of good paper, as they have found these with difficulty for Virgilio and Petrarca, so your Excellency will have

one of the above mentioned Petrarca as they have promised to me to select between that 15, sheet by sheet, so you could have the most beautiful.⁶¹

This especially highlights that Gusnasco was well aware of the paper quality used for the printing. Furthermore, he described the *carta bona* and talked about paper size and prize for *folio* in the continuation of the letter:

I ask you to get someone to look for some good paper of young goat⁶²—which has to be very clear and white, thin and all of the same thickness—and not thick in a place and thin in another one—such as I had some good ones in Mantua. The difficulty is to find good paper, in order to have for Dante and Ovidio the same dimension of the paper used to print Petrarca, with the whole *folio*. About the diligence and the care [of the printing], yours Excellency, leave it to me.⁶³

The close connection between Aldo Manuzio and Lorenzo Gusnasco is clear. Also, it seems to suggest that, as for other type of materials, Gusnasco was very aware of the quality of the paper, and its various grades (see also the choice of “*realle*” format, usually used for high-quality books). The technical construction of the pipes implies a know-how, which, to current knowledge, seems quite outstanding in musical instrument making. In terms of the history of techniques, this particular construction technique is still to be documented, maybe experimentally.

More generally, whereas papier-maché masks and a few other types of objects illustrate the use of paper to produce three-dimensional objects,

61. “[. . .] per una vostra ò visto como quela vorebe li mandase questi 3 libri coè el virgilio, el petrarcha e l’ovidio, in carta bona, et io subito andai a casa de mastro aldo [. . .] quello che fu ancora inventore de la prima stanpa grecha. È molto mio caro amico. Al presente non se pò avere se non el vergilio in carta bona, così, con questa, ve lo mando. Del petrarcha ancora non è finito: è a bono termine, m’ànò dito che fra X gornj sarà finiti, e non àno fato in carta bona se non cercha a 15 li quali li avevano alogati se fosano cento e questo è stato per calestria de carte bone, che c-on difficultade àno trovado queste poche così in li vergilii como in li petrarcha; siché la s. vostra averà uno de diti petrarcha e àme promiso de cernireme fora de quelli 15 a foio per foio acò che la s. vostra abia el pù belo.” Lett. 40, Lorenzo Gusnasco to Isabella d’Este, July 20, 1501, <http://aiter.unipv.it/lettura/IL/lettere/0.40>.

62. Lit., “paper of young goat”: *carte de cavereto*.

63. “Prego quela faci cerchare dele carte bone de cavereto che siano nete e ben bianche e sotile e gualide, che non siano grose in uno logo e sotile in uno altero, perché altere volte ie n’ò aute in mantova de bele. La difilcutade sta in trovare bele carte sì che se n’abia, per el dante e per l’ovidio, la grandeca como è questa carta del petrarcha con el foio intrego: dela diligencia, la s. vostra, lasi fare a me.” Ibid.

until now other contemporary artifacts in cylindrical form that would have been made of rolled paper have not been found.

The identification of the paper used in the pipes of the Correr organ is still being researched, and more data are needed to corroborate these preliminary evidence.

Lorenzo: Historical Sources, Choices of Materials and Skills

Apart from the Correr organ, no other object made by or even attributed to Lorenzo Gusnasco is extant. Nonetheless, written sources of various types (preserved mainly at the State Archives in Mantua) help to trace biographical elements on this outstanding character:

- The well-known correspondence between Gusnasco and Isabella,⁶⁴
- Letters mentioning Gusnasco, between Isabella and various correspondents: Alberto da Bologna, Andrea Cossa, Michele Vianello, Francesco Malatesta, Alviso Marcello, Giovanni Bellini, and others,
- Lorenzo's will preserved at the *Archivio delle RegISTRAZIONI Notarili* in Mantua,
- Administrative documents concerning Gusnasco: contract for house rentals; decree granting to Lorenzo the duty-free right to transport foodstuffs from Mantua to Venice; decree conferring the Mantua citizenship in the *Archivio delle RegISTRAZIONI Notarili* and in the *Libri dei Decreti*,⁶⁵ which are both preserved at the State Archives in Mantua,
- Contemporary accounts: Gusnasco is mentioned in a letter by Ludovico Sforza⁶⁶ and in books by Sabba da Castiglione⁶⁷ and Teseo Ambrogio degli Albonesi.⁶⁸

Gusnasco was probably born in the city of Pavia, fifty kilometers from Milan, in northern Italy. He lived for many years in the district of Cannaregio in Venice, in the house of Michele Vianello (“in whose house I always lived—a very good friend of mine”).⁶⁹ He moved to Urbino in 1505 or 1506 and died in Mantua in 1517.

64. Brown, *Isabella d'Este and Lorenzo da Pavia: Documents for the History of Art and Culture in Renaissance Mantua*.

65. Books containing regulations or measures connected to the Court's administration.

66. Isabella d'Este was the sister-in-law of Ludovico Sforza, Duke of Milan. Motta, “Musici alla corte degli Sforza: ricerche e documenti milanesi,” 295.

67. da Castiglione, *Ricordi di monsignor Sabba da Castiglione cavalier gerosolimitano* [. . .], 56.

68. Ambrogio degli Albonesi, *Introductio in Chaldaicam linguam* [. . .].

69. “Quelo onde io sono senpre stato in casa sua, grandissimo amicho mio.” lett. 27, Lorenzo Gusnasco to Isabella d'Este, February 14, 1500, <http://aiter.unipv.it/lettura/II/lettere/0.27>.

In the correspondence with Isabella d'Este, five different kinds of musical instruments built by Gusnasco are referred to: clavichords, harpsichords, violas, lutes, and organs. In one letter Gusnasco describes a piece of bone he could use to make a flute (probably a recorder),⁷⁰ but the Marchesa, in her reply says that she was not interested in that kind of instrument.⁷¹ It is the only reference to a wind instrument that has been found. This suggests that Gusnasco was not only skilled as a stringed instrument maker but was also able to produce wind instruments by lathing wood, ivory and bone. On other occasions, he built various kinds of precious objects, such as a crystal mirror encased in a ebony frame,⁷² ebony or ivory combs, ebony maces, an ebony, ivory, and coral dart, although as he wrote to the Marchesa, "All my ability consists in making instruments out of sounding woods."⁷³ Gusnasco often used exotic woods and materials (for example, ebony, sandalwood, or ivory), which were fairly easy to find in Venice, the main port and trading center of southern Europe.

In his letters he demonstrated a deep knowledge of wood and its behaviour: sometimes he refused to build an instrument according to the Marchesa's wishes, because it would be contrary to the best sound production:

70. Lett. 15, Lorenzo Gusnasco to Isabella d'Este, August 3, 1497. <http://aiter.unipv.it/lettura/IL/lettere/0.15>: "I found a piece of bone that I have never seen anything so beautiful and we do not know to what animal it belongs, it is white as ivory. It is perfect for making a beautiful flute, has a nice shape, it is 2 *quarte* and half long and 2 fingers wide, and it is waiting for the command of your Excellency."

"M'è capitato a le mane uno oso che no vide maie la pù bela cosa né non se sa de che animale se sia, bianchissimo como avolio ed è per fare uno ecelentissimo fiauto, à una bela forma, è longo 2 quarte e meze e grosso quasi 2 dida, el quale sta al comando de la signoria vostra."

71. Lett. 16, Isabella d'Este to Lorenzo Gusnasco, August 1, 1497. <http://aiter.unipv.it/lettura/IL/lettere/0.16>: "About that bone, we do not go crazy for flutes, and I do not think we will get it." "Circa ala parte de quello osso, non se impazando nui de fiautti, non ne pare che lo togliati."

72. Lett. 102, Lorenzo Gusnasco to Isabella d'Este, December 8, 1505. <http://aiter.unipv.it/lettura/IL/lettere/0.102>: "In these days I have made a mirror of a very clear crystal, without scratches, and very big, with an ebony frame—made with my hands—for Cardinal Sanpiero a Vincula and I have shipped it to Rome." "A questi gornj ò fato fare uno spago de crestale neto senca un pelo e asai grande, con uno fornimento d'ebano fato de mia mano per el cardinanale sanpiero a vincula, così lo manda' a roma."

73. "Tuta la fantasia mia consiste in lavorare legni che sonano in instramenti." Lett. 15, Lorenzo Gusnasco to Isabella d'Este, August 3, 1497. <http://aiter.unipv.it/lettura/IL/lettere/0.15>.

It is not possible to make an ebony belly, as it would be not graceful to see.

But the problem would be this: it will not have voice, nothing more than if you played a piece of marble. I will do the belly, using a very beautiful cypress, which is very good for giving voice to the instrument.⁷⁴

In other situations, he referred to the difficulty in finding proper woods⁷⁵ or complained about the quality of the wood he found.⁷⁶ He also stated:

If the wood is not beautiful, I do not have enough love to carve it.⁷⁷

Lorenzo's skills seem to be more extensive than just instrument making. Being in Venice meant working in a place where all raw materials, timber, glues, pigments, were easily available and they were often of higher quality than in other areas in Italy. This was because they had just landed

74. "De fare el fondo de ebano non è possibile perché averia grande desgratia al vedere, ma questo saria el mancho, non averia vose, niente pù che se sonase uno peco de marmoro, ma faco uno fondo de cipresso molto belisimo e bono per darelì voce." Lett. 07, Lorenzo Gusnasco to Isabella d'Este, February 3, 1497. <http://aiter.unipv.it/lettura/IL/lettere/0.7>.

75. Lett. 46, Lorenzo Gusnasco to Isabella d'Este, September 1, 1501. <http://aiter.unipv.it/lettura/IL/lettere/0.46>: "[. . .] It will be not possible, because there is no more ebony with that color and I am very sorry. We can not find it at all, all that I obtained has been cut, I asked CL to look for it and I selected the most beautiful pieces. The remains were very *gofisimi* and worm eaten, it is not possible to find this ebony, but I have some pieces left over and I will send you all [. . .]." "[. . .] ma non sarà possibile perché non c'è pù de quello ebano con quela maga che me ne increse asai. Non se ne trova per niente: tuto quello che ebe lo taiài, unde che ne fece fare cercha a CL e de tuti questi io cernite fora li pù beli. El resto erano gofisimi e pura asai tarmadi siché non saria possibile a trovare de dito ebano, ma me n'avanca alcunj, li quali tuti ve li mando [. . .]." Lett. 05, Lorenzo Gusnasco to Isabella d'Este, November 14, 1496. <http://aiter.unipv.it/lettura/IL/lettere/0.5>: "I did not make it in only one piece, as I was not able to find the right ebony: one buys with great difficulty." "Non l'ò fata tuta de uno peco per non avere maie poduto trovare l'ebano belo: se acata con grande dificultade." Lett. 73, Lorenzo Gusnasco to Isabella d'Este, March 30, 1503. <http://aiter.unipv.it/lettura/IL/lettere/0.73>: "It is very hard to find good sandalwood." "*Duro fadicha a trovare sandolo che sia belo.*" Lett. 82, Lorenzo Gusnasco to Isabella d'Este, January 30, 1504. <http://aiter.unipv.it/lettura/IL/lettere/0.82>: "I have been looking for the ebony, but I can not find the good one, it is full of knots." "Ma io ò cercato l'ebano e non ne trovo che sia belo, è tuto gropi."

76. Lett. 100, Lorenzo Gusnasco to Isabella d'Este, September 17, 1496. <http://aiter.unipv.it/lettura/IL/lettere/0.100>: "I do not like it at all made of sandalwood, it loses its colour." "De sandelo non me piace niente, el perde el colore."

77. "Se el legno non è belo, io non ò amore a lavorarelo." Lett. 126, Lorenzo Gusnasco to Isabella d'Este, January 16, 1507. <http://aiter.unipv.it/lettura/IL/lettere/0.126>.

in the lagoon city on the galleys from the main commercial ports of the Mediterranean Sea (for instance, Damascus is often quoted as the source for Syrian cats, perfumes, and ebony). Venice was also an important center for the purchase of pigments and varnishes for Renaissance painters and artists, including not only portrait painters but all the artisans who had to deal with colors: booksellers, glassmakers, potters, sculptors, and musical instrument makers. At least from 1490, the colors were sold by the *vendecolori*, color sellers who appeared in Venice more than half a century before than in the rest Europe.⁷⁸ Gusnasco promised Andrea Mantegna to let him have some varnish (probably the final varnish), as Isabella writes:

We remember you to send us some varnish for Mantegna's painting, as you promised to him and to us, and to be very careful, so that it be of good quality.⁷⁹

Gusnasco answered, about forty days later:

I sent a little cruet of marvellous varnish for the painting.⁸⁰

Some years later we find another letter, in which Isabella writes:

Send me so much varnish to varnish the Mantegna's painting, as you sent the last time for the other painting, and of the same perfect quality.⁸¹

Given the lapse in time between the two letters and that part of their correspondence has not survived, Gusnasco may have sent varnish to Isabella more than once. This would also make "as you sent the last time" easier to understand than a reference to five years earlier. In the correspondence, materials are often mentioned that Gusnasco sent to Isabella

78. Louisa C. Matthew and Barbara H. Berrie, "Memoria de colori che bisognino torre a Venezia. Venice as a Centre for the Purchase of Painters' Colours," *Trade in Artists' Materials. Markets and Commerce in Europe to 1700*, Jo Kirby, Susie Nash, and Joanna Cannon, eds. (London: Archetype, 2010), 245–53.

79. "Ve ricordamo ad mandarne de la vernise da invernigare el quadro de messer Andrea Mantinea, como vui prometesti a lui e nui, usando diligentia acìò sia bona." Lett. 11, Isabella d'Este to Lorenzo Gusnasco, June 6, 1497. <http://aiter.unipv.it/lettura/IL/lettere/0.11>.

80. "Mandai una impoleta de vernice mirabile per el quadro." Lett. 14, *Lorenzo Gusnasco to Isabella d'Este, July 23, 1497*. <http://aiter.unipv.it/lettura/IL/lettere/0.14>.

81. "Mandatine tanta vernice da vernigare el quadro del Mantinea, quanta fu l'altra ce mandasti per l'altro quadro et sij in perfezione como fu quella." Lett. 60, Isabella d'Este to Lorenzo Gusnasco, June 13, 1502. <http://aiter.unipv.it/lettura/IL/lettere/0.60>.

that were used in perfume making. Out of these, interestingly, amber and benzoin are also known as possible ingredients for musical instrument varnishes. About his working methods, he wrote to her:

And you do not have to marvel if I am lacking of rapidity, [anyone] who wants to be very diligent needs time, all the more so because I work alone and I do not want anyone in the world to help me to do the best made things.⁸²

Two points can be made from such a quote. First, it is possible that this choice of style is dictated by the formal writing codes between a craftsman and his noble commissioner. He might need to find a way to use pretexts and to reassure the Marchesa that he was dedicating all his time and efforts to completing her commission. Second, special care should be taken when interpreting this source in order to understand his working environment. In fact, several workers and apprentices probably worked for him, which was common practice in the workshops of instrument-makers, craftsmen, and painters.⁸³ Again, it may be his style of writing since as he often writes similar sentences:

In the last days I was very ill, with a terrible fever, so that I thought to die, as I was so breathless, especially thinking that this would keep me from the presence of your Excellency, and this was a great torment to me.⁸⁴

and

I cannot think of anything other than pleasing your most delightful Excellency.⁸⁵

82. "E quella non se maraveia se io mancho de presteca: in vero chi vole usare diligencia li bisogna tempo, tanto pù io che sono solo a lavorare, né volio che persona del mondo m'aiuta per fare le cose che staieno melio fate." Lett. 03, Lorenzo Gusnasco to Isabella d'Este, August 29, 1496. <http://aiter.unipv.it/lettura/IL/lettere/0.3>.

83. For social and economical organisation of instrument-makers workshops, cf., Sandro Pasqual, "Laux Maler (c.1485–1552)," *Lute News (The Lute Society Magazine)* 1999; Pier Luigi Polato, "Liutai veneziani nei secoli XVI, XVII e XVIII: ricerca documentaria nell'Archivio di Stato di Venezia," *Il Flauto Dolce*, no. 12 (1985): 6–15.

84. "A questi gorni pasati stete molto male con febra teribile che me credete mancare, trovandeme in grandissimo afano e tanto pù, pensando de privareme de la presencía dela ecelencia vostra, questa m'era un dolore estremo." Lett. 88, Lorenzo Gusnasco to Isabella d'Este, April 21, 1504. <http://aiter.unipv.it/lettura/IL/lettere/0.88>.

85. "Io non penso in altro che in fare cosa grata ala ecelencia vostra." Lett. 96, Lorenzo Gusnasco to Isabella d'Este, September 26, 1504. <http://aiter.unipv.it/lettura/IL/lettere/0.96>.

Gusnasco also had a close relationship with Aldo Manuzio, who was perhaps the most famous printer in Venice. In the sixteenth century, the printing industry played an important role in Venice, and there were more than 130 printers there, almost half those in all of Old Europe. Venetian editions were highly appreciated and very good quality; it is estimated that half of the books in circulation at that time were printed in Venice. The Aldine Press published the works of Dante and Petrarca that Gusnasco sent to Isabella. In sum, three aspects of Lorenzo as an instrument-maker are worth highlighting:

- his attention to minute details, for example, searching for the right quality wood with perfect characteristics
- the vast range of instruments that he built, and the techniques that he mastered
- the fact he was well-known as *magistro de orghani*.

In addition, the relationship between Gusnasco and many leading intellectuals, princes, artists, and merchants of his time, with whom he had written correspondence and often personal friendship, shows us a man who was not only luthier in the strictest sense, alone in his workshop, but a man of culture, perfectly at ease in high society, with working relationships with the most important printers, publishers and merchants of the city. The wide range and multiple aspects of his work, alongside the analysis of the traditional organization of the workshops of that time (far from a typical romantic vision of the solitary craftsman in his workshop) could allow us to describe Gusnasco as the head, or the “architect,” of an atelier with apprentices and skilled workers engaged in the guild system in use in the Venetian Republic and in Northern Italy. The fact that Venice was a cutting edge center for the paper industry of this time, added to the very specific work required by the paper rolling technique, may suggest that Gusnasco designed the organ and then took advantage of the Venetian paper industry for the manufacture of the pipes.

Conclusion

Our approach, considering the organ as an artifact with its own complex material history, differs significantly from previous studies. The material study introduced additional elements to assist in reconstructing the artifact’s material history and in describing its state of preservation. Given the sources gathered and studied, and the technical examinations performed, it appears that several elements—and in particular the paper

used for the pipes and the inlay techniques—strongly connect this artifact to its attribution. The modifications and reconstructions which have been performed are quite invasive, especially on the pipes and, moreover, on the furniture. The work by Antonio Biassiotto, between 1874 and 1880, is the only restoration work mentioned in the written sources. The (re-)constitution of the pedestal can probably be attributed to him, possibly reusing pieces from another instrument. Other restorations, such as the filling of woodworm galleries, cannot be as easily attributed. Despite its alterations and missing original parts, the Correr organ is a unique material evidence of high-quality instrument making and, more generally, of skilled craftsmanship in Venice around 1500. Many more studies still need to be carried out to fully document the Correr organ. This should include, among other aspects: a description of the assembly techniques and of the geometry of the various parts of the instrument and the characterization of the various materials and types of wood used. On-going research hopefully will soon reveal more information about this instrument. This could help strengthen plausible hypotheses (and eliminate others) about the nature of the organ at the time of its construction, and as a result, to study it from a musical point of view.

It was in the house of Caterino Zeno that he saw the famous organ built for Matthias Corvinus King of the Hungarians, and it was there that his fine idea came to him, in the course of a dispute with that Agostino Amadi who had succeeded in picking up for his collection of instruments a real Greek lyre, a great Lesbian heptachord adorned with gold and ivory . . .

[. . .]

Well, then, the master glazier, hearing the famous organ of Matthias Corvinus praised in the house of Zeno, cried: “*Corpo di Baco!* They shall see what organ I can make with my tube, my liquid Muse of song. I will make the god of organs. *Dant sonitum glaucae per stagna loquacia canne...* The water of the lagoon shall give forth its sound and the posts and the stones shall sing too. *Multisonum silentium* . . . They shall see! *Corpo di Diana!*” Giulia da Ponte, who did not laugh because her teeth were dark. And Sansovino straightway began a dissertation on hydraulic organs.

Gabriele D’Annunzio, *The Flame*⁸⁶

86. This is reminiscent of the history told by Sansovino that also influenced the famous Italian poet and writer Gabriele D’Annunzio, *The Flame of Life: a Novel* (Boston: L. C. Page, 1909), 360.