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World Views: Cartographers, Artisanship and Epistemology in Early Modern Italy

Who made maps in early modern Italy? It has become commonplace to observe that no unified discipline of cartography—and hence no occupation identified as *cartographer*—was familiar to fifteenth-century viewers or makers of maps (Woodward 2007, 22-23). Though by the later sixteenth century a conceptual identity for cartographers had begun to emerge, there was nonetheless little consensus on the attributes that such a designation might entail. On the one hand, the skills needed to produce many sorts of maps frequently combined those of illuminators, scribes, mathematicians, letterpress printers, block cutters, and engravers on copper (to name only a few of the most obvious). On the other, some artisans specialized in quite narrow genres of cartographic images. Thus, while the painter of a world map might well find his next paycheck by providing an elaborate frontispiece for an antiphonary, some of the specialists who produced marine charts in Livorno or Genoa would have found themselves at a loss if asked to provide a comprehensive image of the known world or a city plan.

For the most part, even though men like Egnazio Danti, painter of the extraordinary cycle of world maps in Cosimo de' Medici's *Guardaroba,* might be called "cartografo," or "geografo" the modern appellation of "cartographer" is either too narrow or excessively broad (Fiorani 2005; Rosen 2014). The Florentine team of painter Piero del Massaio and scribe Ugo Comminelli, though famous for their gorgeously illuminated copies of Ptolemy's *Geography* complete with modern maps and city views, produced a wide range of humanist and liturgical manuscripts (Aujac 1995, 187-189). In contrast, the Maggiolo family workshop of Genoa, for almost 150 years, crafted marine charts as official mapmakers to the state but produced few maps of any other sort (Astengo 2007, 177-181).

Cartographic scholars, intellectual historians, and art historians have explored unified author functions for many mapping projects. For atlases and illustrated world descriptions, such investigations have often centered on publishers, poets, and translators. In the fifteenth century, these were frequently humanist scholars or the purveyors of their wares—entrepreneurs whose names were self-servingly emblazoned on title pages and colophons alike. For sixteenth- and early seventeenth-century maps and atlases, attention has often focused on publishers and professional engravers like Jacob van Meurs (Schmidt 2016, 25-30) and Antonio Tempesta (Maier 2015, 167-177; Maier 2020, 79-85). The desire to see maps as expressions of discrete intellects can shed light on the intentionality of writers and printers and their intellectual and ideological relationships with patrons

and sponsors and enjoys a pedigree stretching back to period claims for such singular authority. Florentine poet Ugolino Verino famously described his city's *cosmographi* with particular pride in the *De illustratione Urbis Florentiae* of 1500. These men, we are told, "drew the whole world" (Roberts 2013a, 78-79). Likewise, Conrad Swenheym's prefatory remarks on his early edition of Ptolemy, printed in Rome in 1478, take full and enthusiastic credit for having organized, conceived, and fostered the execution of these important printed maps (Skelton 1966, x-vi). Those who made increasingly popular views and maps of cities like Rome described them—often improbably—as "by their own hand" from new surveys even when, like Mario Cartaro, their products could be wholly dependent on precedent (Maier 2015, 144-145). For portolan charts, the signatures of their makers are often prominently emblazoned across their surfaces throughout the sixteenth and seventeenth centuries, despite the fact that such objects routinely drew upon the skills not only of the named master and family apprentices, but often independent scribes as well (Astengo 2007, 190-191).

If it has become increasingly common to speak of maps as offering insight into historical and cultural world views, such views are often assumed to combine those of authors—conceived on intellectual and poetic models—and those of patrons and buyers. The role played by early modern maps in enforcing hegemony and projecting political power is increasingly uncontroversial. Map cycles depicting the known world and its principal cities, like those at the Gonzaga Villa of Marmirolo and the Medici *Guardaroba* staked imaginative claims of dominion for the lords and their entourages who served as their primary viewers (Bourne 1999; Rosen 2014). There can be little doubt that patrons like Cosimo I de' Medici saw in maps a means of fashioning and projecting power through territorial control, real and fictive (Rosen 2009). These broad, cultural histories of maps, their makers and viewers are indispensable parts of a revisionist history of cartography which is today encouragingly orthodox. Yet these readings can also seem frustratingly disembodied, removed from the social lives of artisans. The assumption of a harmonious relationship grounds Francesca Fiorani's claim of maps that "their techniques and conventions of representation emerged in relation to the intentions of their makers and the expectations of their patrons and users" (Fiorani 2015, 59). Missing in this reliance on intentions are the ways in which the artisanal experiences of diverse craftspeople in the workshop informed map making.

Many artisans who made maps relied upon a host of tools and materials that could vary significantly from city to city even within discrete geographic regions like Tuscany or Lombardy. In contrast, some skills and habits of picturing the world were held in common across the entire Mediterranean world. For those who put pen, brush, ink, and countless other media to parchment and paper, one such necessity was what we might describe as pictorial intelligence, but that within a theoretical context was usually described as one of the more pragmatic benefits of *disegno,* both a practical and theoretical command of the hand (Alpers and Baxandall 1994; Bambach 1999; Ames Lewis 2000). So too, these artisanal skills depended upon an uneven distribution of pictorial technologies—of information and of tools. At times, access to

such techniques was predicated upon trade secrecy and even industrial espionage and sabotage (Long 2001). This essay thus touches upon the experiences and know-how of mapmakers as a kind of prolegomena toward reconstructing their distinctive worldview, what Pamela Smith has dubbed their artisanal epistemology (Smith 2004; Long 2011). These ways of knowing were inflected not just by the materials in which mapmakers worked but equally by their social and geographic mobility encompassing, in the examples considered here, not only the peninsula from Florence and Urbino to Milan and Livorno, but also Spain and Hungary. I focus on three groups active in Italy from the end of the fifteenth to the mid seventeenth centuries: copperplate engravers, military architects, and marine chart makers exemplified by Francesco Rosselli, Giovanni Battista Clarici, and Giovanni Battista Cavallini.

Figure 1
Albrecht Dürer, View of Arco. Watercolor and gouache on paper, 1495. Musée du Louvre, Paris

Printed maps, understandably, have proved appealing for grounding narratives of Renaissance mobility and itinerancy. Engraving's aptitude for reproducing intricate topographic information and dense toponomy gave the technique an advantage over the initially more easily mastered and less costly technology of woodcut (Roberts 2019a, 233-234). Many of those involved in early publishing and book printing in Italy were foreigners, often Germans bearing their new tools and knowledge. Among the most significant for the history of fifteenth-century cartography we can point to Conrad Sweynheym and his partner Arnold Pannartz, the entrepreneurial force behind the Roman Ptolemy. Beginning their careers in the German-speaking lands, Swenheym and Pannartz recognized the eternal city's potential to provide both a ready market and lucrative papal patronage for would-be publishers (Skelton 1966, i-v). So too, Niccolo Tedesco who produced Francesco Berlinghieri's *Seven Days of Geography,* Landino's commentary on Dante, and several other of the most ambitious engraved books of the *Quattrocento* learned the trade in Ulm before banking on a tantalizing, untapped market in Florence (Roberts 2013a; Böninger, 2021). People – rather than just fugitive prints and maps – were on the move, and the early history of engraving was brimming with immigrant and itinerant artisans. Locally specific tools and practices of engraving, in particular, can speak to the importance of distance and geographic movement in fifteenth- and sixteenth-century Europe. Economic historians have long recognized that migrants rather than paper were often conveyors of Renaissance ingenuity and art historians have increasingly emphasized the pivotal role that travelling artists and their works played in such dissemination (Zerner

2003; Kim 2015a; Kim 2015b). For all of Albrecht Dürer's harnessing of print, the painter and printmaker's presence in Venice equally served to shore up his burgeoning reputation in Italy. Crucially, it was the lived experience of his travels that informed the intense naturalism of his work (Foister and van der Brink 2021). His watercolor view of the dramatic topography of the northern Italian fortifications of Arco and its surroundings point to the visceral power of travel to inform image making (figure 1).

Skills, technique and even style took form at the intersection of geographically defined traditions inflected by demands of the fluid economic and technical circumstances that prevailed in early modern Italy. Little serious thought, however, has been given to what this might mean for the engravers of cartographic images. In part, this is because we often have little sure information upon which to rely about who made the earliest Italian engravings. We possess only one signed engraving from the art's earliest decades in Italy, Antonio del Pollaiuolo's exceptional *Battle of the Nudes* (Langdale 2002; Wright 2005, 176-183). The little that we often know about engravers, however, suggests that itinerancy was a fundamental, rather than incidental component of their social and artisanal lives. the Milanese smith Bernardo Prevedari's contract to engrave a plate after Bramante's design in 1481 specified that he was to "work on it day and night according to custom from today until it is finished" (Beltrami, 1917). This is undoubtedly an aspirational turn of phrase, but there is little question that Bernardo engraved his *Ruined Temple*—the largest single plate produced during the fifteenth century—at a breakneck pace (Alberici 1978, 52-54; Alberici 1988, 5-13; Landau and Parshall 1994,

105-106; Kleinbub 2010, 412-414). Yet a second document signed only three weeks later found the master making preparations to depart for Rome where he would begin work in Antonio Meda's foundry by mid-January at the latest (Alberici 1988, 6; Landau and Parshall 1994, 106; Aldovini 2009, 38-40). Andrea Mantegna's attacks on a rival artisan, the engraver Simone Ardizoni, have inadvertently brought to light Ardizoni's travels which took the would-be printmaker from Reggio to Mantua and Verona in search of a market for his skills (Roberts 2013b, 199-202).

There is perhaps no better example of this dependence upon movement than one of the most familiar protagonists of the history of cartographic printmaking, the Florentine engraver Francesco Rosselli. Trained primarily as a manuscript illuminator in the workshop of his older brother, the painter Cosimo, Francesco struggled in his early attempts to carve out a place for himself in a crowded and unpredictable marketplace (Boorsch 2001, 208-214; Gabrielli 2007, 34-39). Finding himself significantly in debt to a range of creditors with a family to support, the younger Rosselli fled his creditors, moving north over the Alps and eventually to Buda where he secured work from King Mathias Corvinus. Over the course of these travels, the illuminator acquired knowledge of techniques— including, importantly, the lozenge section burin—for engraving that were as yet unknown in the city of his birth. Returning to Florence, he established himself not merely as a successful engraver but rapidly as the single most prosperous purveyor of this trade in Tuscany (Boorsch 2004; Roberts 2011; Maier 2012).

Figure 2
Francesco Rosselli, World Map. Hand Colored Engraving, c. 1508. National Maritime Museum, Greenwich

At first, Francesco produced a remarkably wide range of images, cornering the Tuscan market with offerings that included devotional prints, games, astrological and festal works, and compositions derived from prominent painters' shops. A great many of these were close recreations of technically less proficient engravings of the previous generation. Beginning in the mid-1480s, however, Rosselli began an apparently lucrative specialization in engraved maps. These came to include some of the most celebrated views of major cities like Rome and Florence, regional maps of Europe, and world maps, including some of the earliest to depict newly contacted lands in the Americas (Friedman 2001; Maier 2012). Francesco was undoubtedly introduced to a range of cartographic images from manuscripts produced and copied in the family shop that his brother oversaw. The young artist would have painted wind heads and other pictorial elements on the Ptolemaic maps that were a significant part of Florentine manuscript makers' stock in trade in the second half of the fifteenth century (Aujac 1995; Elam and Kent 2015). More significantly, he surely took on a range of broadly mimetic epicartographic details including the mountain ranges, rivers, and thickets of trees of

a world in miniature, viewed as though seen from a great height. Rosselli translated these mimetic indices into legible and effective graphic icons on his later printed maps. Low survival rates make it difficult to assess the distribution of these images, but carefully and professionally hand-colored examples of works like the 1508 world map (figure 2) suggest that his works documenting the newly contacted lands of the Western hemisphere found an enthusiastic public (Van Duzer 2008, 200-201).

By the time that a shop inventory was written upon his son Alessandro's death in 1527, the family was synonymous with cartographic images in Florence. The inventory, detailing dozens of maps and views, along with their matrices, paints a picture of a bustling *bottega* in which Francesco's plates were still being printed decades after his death. The cartographic character of this family operation was advertised proudly with a painted wooden globe that hung outside (Hind 1938,: 301-309). Both Rosselli's itinerancy and his acquisition of new, specialized trade skills were hardly exceptional either among printmakers or among Florentine craftspeople generally. Indeed, the engraver's ability to slip out of Florence and into the employ of Matthias Corvinus was predicated upon an intensely productive period of artisanal exchange between Buda and Tuscany in which architects, woodworkers, stone carvers, painters, and musicians routinely made the transalpine trek (Farbaky and Waldman 2011).

**Figure 3
Francesco Rosselli, World Map. Engraving, 1506. British Library, London**

Within the literature on engraved maps the question of responsibility for what we might think of as the intellectual content of Rosselli's images has only been raised obliquely. The engraver, in a problematically modern conception of the painter-printmaker, is often assumed to have served as the designer of the maps that he engraved and that were sold in his shop for decades. This is made on the basis of limited (and late) evidence of an intellectual interest in mathematics, especially that Rosselli was recorded among the audience for lectures on Euclid's *Elements* by the mathematician Luca Pacioli in Venice in 1508. In that document he is called *cosmographus* (Armstrong 1996, 74-76). Remarkable as this document is, its significance for understanding Rosselli's maps is far from clear. Most of the shop's known maps were certainly engraved prior to this, sometimes decades earlier, and are often based on identifiable cartographic models. Those that incorporate new geographical information are often clear examples of collaboration with considerably more mathematically minded peers. His world map of 1506 is a bold image of the expanding globe on a spherical projection which includes Hispanola and Cuba (figure 3). That map, however,

was the result of collaboration with the Venetian patrician scholar Giovanni Matteo Contarini and we might reasonably surmise that Rosselli's contributions were those of an artisan translating this world picture into the graphic language of engraving.

This falls squarely in line with what we can confidently say about Rosselli's graphic output. His body of work is characterized by close copies of anonymous engravings of the 1460s and 1470s and by those like his *Annunciation* which are often closely based on designs from workshops like that of Botticelli. Nothing, that is, suggests a distinctive style or visual imagination at work. Divisions of labor between technically skilled engravers and inventive draughtsman were probably common in the later fifteenth century. Andrea Mantegna, long held up as a model of the painter-printmaker is now known to have had his drawings engraved by the smith Gian Marco Cavalli (Canova 2001a; Canova 2001b). So too, there is no evidence that his son Alessandro who continued and perhaps even expanded the family operation, was either an engraver or a cartographer in any meaningful sense.

When Rosselli's engravings are novel in their visual content – like the 1506 Contarini world map – the skills needed are not only mathematics, projective geometry, or knowledge about the world, but equally design, drawing, and an ability to translate new lands into credible lines that give the impression of mimetic transcription without verifiable information (Armstrong 1996, 76-77). The engraver's presence in Venice on several occasions during the first decade of the sixteenth century is significant not only because of his

familiarity with the city's intellectual culture, but also must have been one of the ways in which the savvy entrepreneur networked with the movers and shakers of Italy's most vital printing and publishing centre. The 1527 inventory includes an entry for a folia-sized map of Hungary, but unfortunately no impression survives. The first plausibly up-to-date image of that region by an Italian (and one of very few produced anywhere at this early date), this map might have drawn directly upon his own experiences of travel across the Alps and the artisanal epistemology of an itinerant printmaker eager to employ the new technology he had mastered (Campbell 1987, 71, 77). In contrast to most of Rosselli's extant images, no clear source for such a map immediately presents itself. Even if the Florentine did not undertake anything like an original survey in the course of its production, he must have collaborated directly with artisan-intellectuals in Buda or drawn upon distinctive maps unavailable to his counterparts in Florence or Venice. So too, the large format of this map suggests a work that required considerable effort on the engraver's behalf, and which must have stood, over the next decade of his life, as a reminder of these travels.

The specialization in map printing that characterized the later years of the Rosselli shop was not uncommon for an increasingly established group of printers and publishers throughout Italy in the second half of the sixteenth century. Yet if map printing became increasingly tied to dedicated, commercial operations, other makers of cartographic images deployed an extraordinarily broad range of skills in their practice. The cartographer Giovanni Battista Clarici (1542–1602) might equally be described as an engineer, surveyor, painter and builder (Mara

2020). It was to this last occupation that Clarici seems to have dedicated the bulk of his efforts in fashioning an identity. Yet like that of cartographer, the profession of an architect was poorly defined and conceptually wide-ranging in early modern Italy, sometimes drawing upon a dazzling range of discrete skills while at others characterized by extraordinary specialization. Like mapmakers, architects were often defined by the particular genre of their works rather than by any set course of training or intellectual background (Merrill 2017, 13-14). Born and trained in Urbino, Clarici's education was conditioned, to a great degree, by an intellectual culture fostered by the Montefeltro (and later della Rovere) dukes since the mid fifteenth-century. In particular, the aspiring architect found a ready model in the figure of Count Giulio da Thiene, a preeminent exemplar of the emerging figure of the gentleman architect whose demonstrated mastery of mathematics grounded an aptitude for military engineering (Marr 2011; Mara 2020, 52-59). Unlike Rosselli, Clarici possessed mathematical training and aptitude from the very start of his career and his fluency in this universal language drew him into the circle of prominent patrons of Urbino's court.

Clarici rose to prominence as a reliable engineer and architect of walls and fortifications across the peninsula. He ultimately maneuvered beyond the confines of localized patronage in Urbino, attracting the attention of the Spanish-Hapsburg lords eager to bolster defensive positions throughout their newly acquired territories. It was in Hapsburg service that he significantly expanded Cremona's city walls. Likewise, Clarici was one of a handful of designers and engineers called upon to renovate and fortify the former

ruling dynasty's Castello Sforzesco in Milan (Viganò 1997a, 44-54; Viganò 1997b, 67-78; Mara 2020, 117-122). These projects – and Clarici's evident skill in publicizing his role in them – brought not just steady employment but a leading place among the artists and intellectuals praised by Lombardy's literary elite. With only a touch of hyperbole, Gasparo Bugatti praised Clarici as the "great surveyor of waterways, rivers and lakes, of fortresses, of mountains and landscape" (Tosini 2002, 102). This distinctive combination of surveying, hydrological expertise, and knowledge of fortifications represents some of the skills most consistently sought in military architects and engineers in the later sixteenth century (Long 2018).

Yet even the developing category of military engineer fails to fully capture the range of Clarici's output and experiences. Bugatti, and likely many Milanese patrons, understood him primarily as an architect, others focused on Clarici's now less-known abilities as a painter. Closely following the chronicler's lead, Giovanni Paolo Lomazzo, the Lombard art theorist, praised him as "Architect and surveyor of the distances, heights and depths of mountains, hills, and waterways" in his *Trattato* (Lomazzo 1585, 255). In his *Rime,* short epithets dedicated to contemporary artists and intellectuals, Lomazzo provides a rather broader context for understanding Clarici's works. Here, Lomazzo calls him both architect and painter and praises him not only for his architecture – which he writes rivals that of Bramante – but also for his mastery of the proportions of the human body and for the beauty and invention of his art (Lomazzo 1587, 240).

Clarici was a competent if not exceptional figurative painter, judging by his few extant pictorial works. His style can probably best be judged from canvases of the *Annunciation* for Pesaro's church of San Giovanni Battista and *Coronation of the Virgin* for nearby Mercatello sul Metauro's church of San Francesco (Mara 2020, 109-115). Both date from the mid-1570s and are unsurprisingly close in the style to those of Barocci's workshop, which dominated the artistic environment of Urbino and its environs in the late *Cinquecento* (Bohn 2012, 48-53). The relatively poor state of conservation, particularly for the *Coronation* permits little more in the way of definitive stylistic analysis (Mara 2020, 115). Regardless, his reputation as a painter and his engagement with the community of artists was a matter of great importance to Clarici. He developed a friendship with Giorgio Vasari, founder of the most influential, if often misleading narratives of Italian art's history. While visiting Florence, he acquired a copy – perhaps a gift from the artist – of Vasari's *Ritratti*, a limited edition of the portraits intended ultimately for the expanded edition of the *Lives of the Artists* (Moretti and Roberts 2018). For an artist keenly aware of Vasari's Tuscan project, his own inclusion in Lomazzo's emerging Lombard pantheon must have been satisfying.

Clarici wrote from Florence to his younger brother Camillo in 1565, expressing his excitement about the city's vibrant artistic environment. This letter, today in the Uffizi (GDSU 22447F), was penned on the reverse of a sheet with several studies of the Madonna and Child attributed to Federico Barocci and based on one of that painter's compositions. Indeed, this drawing would benefit from closer study given the proximity of

Clarici's own hand to that of Barocci's workshop. Clearly, the architect-painter had a significant interest in artists' drawings as well as access to the most important workshop of his native Urbino. He seems likewise to have had at least some connection to the heirs of Leonardo's bottega in Milan, as Clarici came to own a small drawing of a youth attributed to Giovanni Antonio Boltraffio and today in the collection of the Ambrosiana (Bambach 2019, 322-327). A personal connection between the two artists is tantalizing. Boltraffio was a member of the Milanese minor aristocracy, and like Clarici was able to move among the courtly circles around the city's Sforza and later Hapsburg lords (Pederson 2014).

In his letter from Florence, Clarici observed that Marco da Faenza's paintings for the Palazzo Vecchio were the work of an artist who "seemed to me to paint very skillfully in creating grotesques" (Moretti and Roberts 2018, 119) His judgement that Florence was so pleasing to him that a month was not nearly enough time adequately acquaint himself with "all of its beautiful works, as many paintings as sculptures" all suggests that he was not just a painter himself, but a man deeply interested in the study, display, and theoretical underpinnings of art (Moretti and Roberts 2018, 119). His interest in Marco da Faenza's imaginative creations, for example, must have drawn upon an awareness of Lomazzo's systematic treatment of grotesques in the sixth book of his *Trattato* (Lomazzo 1585, 422-425). Though specific components of the decorative scheme cannot be definitively attributed to Clarici, ducal service found him at work on the *Palazzo Ducale* of Pesaro. He may well have been involved in

the production of the impressive grotesques that adorn the ceiling of the so-called sala della Vittoria, frescoes that owe a rather significant debt to Marco da Faenza.
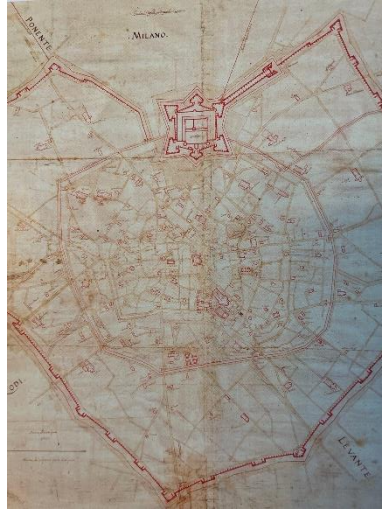

Figure 4
Giovanni Battista Clarici, Plan of Milan. Pen and colored ink on paper, 1584. Accademia di San Luca, Rome

Longstanding ties connected skilled visual artists to the practicalities of military engineering. Though Leonardo da Vinci most immediately comes to mind, his fantastical machines are only the best known of a tradition stretching back to Taccola (Mariano di Jacopo, 1382-c.1453), the so-called Archimedes of Siena (Galluzzi 2020). These ties are everywhere evident in Clarici's prolific output as a maker of maps, plans, and views. His wide range of surviving plans for fortifications and studies of topography suggest an artist equally at home with pictorial and mathematical demands. His plan of Milan (figure 4), created for the Spanish survey of 1587, is the work of a consummate draughtsman. Today in the archives of the Accademia di San Luca in Rome, the map sprawls across six folio sheets of

paper. In precise red and yellow inks, Clarici provided an exacting scale image of the city's core, emphasizing the relationship between roads and major structures, and especially the positions of the perimeter walls and the Castello Sforzesco, satisfying the objective demands of curious court administrator's while visually anchoring these claims in an accessible and direct visual naturalism (Viganò 1997a; Mara 2020, 116-121). This ability to graphically communicate, to bridge the gap between exacting geographical situation and visual appeal, even delight, characterized Clarici's cartographic *oeuvre,* one which included both true maps, like his surveys of Lombard territory, today collected in Madrid and Pavia, and picturesque vignettes, like the fresco view of Pesaro in the Villa Miralfiore.

Maps and views were fundamentally an extension of painterly practices, not only (or even principally) because they were 'imaginative,' but because the skills, and sometimes travel, necessary to make them were fundamentally acquired in workshop contexts and necessitated by the demands of shifting patronage. It is not to Leonardo's uncharacterizable genius but to his considerably more pragmatic connection between mind and hand that his remarkable plan of the town of Imola is owed. Clarici's own topographic surveys of Lombard holdings today in the Real Academia de la Historia of Madrid, continue and amplify that same tradition, recreating the fortifications of towns like Como and Tortona for their Hapsburg owners. Such sixteenth century-maps were a technology that was at times practical but perhaps equally often, rhetorically pragmatic. In all of these, drawing was the principal technique that activated this rhetoric.

Clarici's cartographic imagination was informed by the shifting needs of patrons from Urbino and Pesaro to Milan and Spain and by the experiences of an artist who found himself on the move across the peninsula in their service. That imagination found its clearest expression not in the commercial products that drove Rosselli's change of fortune, but rather in surveys and recordings, tools for limited display and dissemination for lords and their expanding administrative apparatuses.

Marine charts and their makers provide a final case study for cartographic images that bridged many of these diverse conditions of making, display, and use. The developing combination of practical ingenuity and a culture of rhetorical display that animated Clarici's plan of Milan found ready expression in the vibrant painted portolans that remained the stock in trade of mapmakers in coastal cities across the early modern Mediterranean. Rather little is definitively known about Giovanni Battista Cavallini, among the most prolific chart makers active in seventeenth century Livorno, the primary port of the Grand Duchy of Tuscany (Guarnieri 1932; Pinna 1977; Astengo 1985; Astengo 2000, 128-135; Astengo 2007, 180). Like Rosselli and Clarici, Cavallini was a man willing and able to relocate when work demanded. He identified himself as Genoese in origin, signing one of his carts as "geographo genoese." If he did indeed hail from Genoa, Cavallini must have been trained in the Maggiolo family's workshop since they controlled the chart trade there by official monopoly. It was the likely the grim prospects for advancement under such conditions that drove him to seek his fortune elsewhere. Settling in Livorno, he seems to have brought the skills he refined in

Genoa to the shop of the Catalan chart maker Joan Oliva, who had relocated there around 1615. Cavallini collaborated on at least one occasion with Oliva since a jointly signed chart by the two survives in the Newberry Library's collection in Chicago (Ayer MS.29).

Far from a unique situation, the chart maker's likely need to move beyond the reach of a local monopoly was an endemic one for early modern artisans. Early modern writers regularly disparaged jealousy and competition among artisans, the sorts of strife that forced craftsmen into itinerancy. Yet they accepted that these conflicts were ubiquitous among craftsmen and perhaps unavoidable. Livorno's novel status as a free port was, unquestionably, partially intended to profit from exactly these sorts of localized artisan rivalries. The relative secrecy of technical skills and tools and the anti-competitive maneuvering that characterized so many trades served to prevent upstarts from entering these industries without significant effort, connections, and often luck. They were also barriers that savvy lords like the Medici grand dukes knew had to be delicately transgressed and relaxed in places like Livorno if vital technologies were to flourish under their patronage.

Like many specialized, skilled trades, the craft of chart making was often learned and handed down within family workshops. Cavallini's own enterprise followed this general course, though the contours of his bottega's practice remain poorly defined. Surviving charts signed by a Pietro Cavallini, a son, nephew, or brother of Giovanni Battista, can be dated until at least 1688 (Astengo 2007, 180-181). Clearly, a storehouse of charts was kept as a model within the workshop,

allowing for copies of charts and views to be produced on demand sometimes decades apart, a fact demonstrated by closely related examples of an *isolario* today in New York and Cyprus (Roberts 2019b, 68). If such specialized skills and material models were often passed down in a relatively stable succession within families, their practitioners found themselves routinely on the move. The relative biographical anonymity of the Cavallini is hardly mysterious, then. It is rather a natural consequence of a technical economy that saw artillery casters, engravers, printers, smiths, and mapmakers alike building new lives in cities in which their families, customs, and even native tongues were often unfamiliar. Relocation, rather than just habitual itinerancy or travel, must be added to the conditions which tended to characterize the world view of early modern cartographic artisans.

For Giovanni Battista, the free port of Livorno proved precisely what Genoa had not been, a permanent and steady base for his workshop. Indeed, he would work there for the rest of his life and was active until 1656. For many of those who lived and worked there, trade was the port's lifeblood. Cavallini, though, was principally dependent on a related, but quite distinct, component of the Medici's maritime base. He may, of course, have produced some charts for merchant ships and those that brought pilgrims across the Mediterranean to the levant. Such maps, subject to the perils of storm and wreck, and to the more quotidian erosion at the hands of the waves and winds, rarely survived. Instead, like those of his contemporaries, Cavallini's known charts are lavish, decorated examples designed to invoke a sense of their more pragmatic cousins for usually elite patrons. In seventeenth-century Livorno that public was

overwhelming composed of the grand dukes, their supporters, and especially the military order they had founded, the Knights of Santo Stefano, whose fleet was based in the port. It was the presence of the Knights, above all, that ensured the longevity of the chart making trade in Livorno and Cavallini's place within it.

Cosimo I de' Medici had founded the order in 1561 and served as their first grand master, a role eagerly adopted by each of his successors. The Knights served, in large part, to protect the new shipping and pilgrimage routes that were vital to the Medici's primary goal of using Livorno to expand their influence into the Mediterranean and to bolster the Tuscan economy through maritime trade. Piracy proved a persistent threat to these ambitions and the Knights were the grand duchy's primary deterrent (Hanlon 1998; Angiolini 1999; Gemignani 2003). Yet, in a sea increasingly dominated by the Ottoman navy, the Knights themselves served as a powerful symbol of the continuity of crusader ambitions and as a visible projection of Medici's commitment to such popular, if entirely impractical, goals.
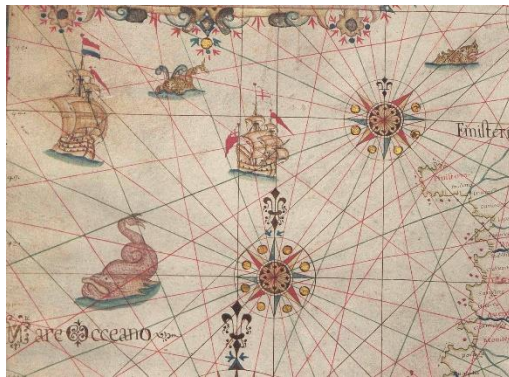

Figure 5
Giovanni Battista Cavallini, Marine Chart (detail). Pen, Ink and Paint on

Vellum, 1635. Sylvia Ioannou Foundation, Cyprus

A lavishly decorated atlas today in the collection of the Sylvia Ioannou Foundation on Cyprus (figure 5), provides an example of the charts produced for the Knights that came to define Cavallini's output (Roberts 2019b). As a whole, these charts show a strong sense of stylistic continuity with those of Oliva, and – with relatively minor variations – represent an extremely visually coherent group. The most identifiable feature of Cavallini's maps was a preponderance of land and marine creatures that populate his miniature seas and coastlines. These beasts were based, as was typical in chart painter's workshops, on drawn templates contained within model books. Some of Cavallini's creatures, especially those referencing conventional heraldry, such as his lions and bears, seem indiscriminately and interchangeably placed across the largely blank land masses of his charts. A generic bear, for example, appears in different on several of the maps of this atlas, functioning as an entertaining and conventional means of filling conspicuously empty passages. Others, however, such as a monkey under the shade of a North African tree and a camel placed beneath a banderol for Africa were directly connected to specific places and served as a visual shorthand for geographic information. These exotic animals divide continents and climes and, like the flags flown from ships and cities, help to visualise great distances. For their painter, these beasts might also have served as a maker's mark or calling card; the forms of Cavallini's animals are recognizable and distinctive, appearing on his charts in significantly greater numbers than upon those of his contemporaries.

Cavallini's sea creatures are hardly menacing, though these whales, sharks and serpents dwarf the ships with which they share these waters. They are, like their terrestrial counterparts, highly conventional. Their haphazard positioning is likewise rather different from earlier examples in which such creatures gather in previously unknown, newly discovered, and dangerous waters. Still, one effect of drawing on these partially anachronistic conventions, for the chart maker, might have been a certain comfortable familiarity that they inspired in their patrons and viewers. This would have been especially true for the Knights, in whose collections both in Livorno and at their headquarters in Pisa Cavallini's maps took their place. They stress, and even exaggerate, the dangers of sea voyages and call to mind the distances involved in the pious, militaristic voyages. The apparent anachronism of Cavallini's sea monsters helped to situate the knights and their missions not in a bygone, chivalric past, but in an ongoing present in which crusader exploits continued to resonate.

Cavllini's Livorno was, in many ways, a success story for the Medici dukes. A program of tax protections, guild exemptions, and guarantees of religious tolerance begun during Cosimo I's rule but largely instituted by Ferdinando I, helped establish the port as a maritime base for the Grand Duchy (Danielson 1986; Guarini 1978; Rosen 2015). These policies were instrumental in realizing not just commercial and naval pre-eminence but also an ambitious plan for bringing technologies and skilled artisanship under the auspices of ducal protection, patronage, and surveillance policies promoted forcefully in Florence through those like Giovanni Stradano and Ludovico Buti, whose images of artillery, fireworks,

smithing, and casting decorated the walls and ceilings of ducal residences and civic buildings (Markey 2012). Chart making was one of the most important of these forms of ingenuity – even if it needed to be imported in order to take its place among specifically Tuscan trades. Ducal policy and the lure of profit were, in this regard, effective and Livorno attracted talented chart makers from around the Mediterranean.

How we might construct a worldview out of such investigations is a challenge going forward. The problem is not – or at least not principally – that we have not asked what artisans like Rosselli, Clarici, or Cavallini might have thought about the maps that became their stock in trade. More fundamentally, it is instead that we still have thought very little about who someone like Rosselli was – what his experiences were, what his travels entailed, the kinds of knowledge he likely held about the world that he portrayed with his burin. He seems neither armchair traveler nor, can we be sure, that he was truly much of a mathematician. In other words, his theoretical grounding in what we might consider a cartographic world view is uncertain. What is clear is that he was a traveler, an entrepreneur, an inventive adapter to new technologies, whose style, techniques, and tools can only problematically be thought of as Florentine, or even Italian. Uniting the chart painter, military architect, and engraver was a willingness to seek their fortune far from home, and understanding, that is, of the relationship between geographical and social mobility. Whether dodging creditors, currying the favor of foreign lords, or recognizing the opportunity to escape the constraints of longstanding monopolies, cartographers in early modern Italy leveraged practical

skills developed in trades as diverse as manuscript illumination and architecture as demonstrations of ingenuity. Rosselli, Clarici, and Cavallini shared a chameleon nature that embraced specialization and diversification in equal measure, fashioning, rather than adopting, the identity of cartographer.

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