Mariano Taccola's Idea of Authorship across Technology and Historiography

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The essay analyses the authorial stance assumed by the Sienese Mariano di Jacopo Taccola (1381- ca. 1455) in his *De ingeneis* and *De rebus militaribus*, focusing in particular on the use of drawing as rhetorical element in the elaboration of the idea of authorship. Capitalizing on the artistic skills evident in these technical treatises, Taccola is able to reinvent himself as author and to move from the visual recording of civil and military technology in Siena to offering to record historical facts and imperial feats in illuminated manuscripts at the court of Sigismund of Luxembourg.

1. Taccola's Blended Identity

Ser Mariano di Jacopo called Taccola, the Sienese Archimedes, is an interesting liminal figure that bears witness to the passage from the middle ages to the renaissance, and to the cultural and social changes that characterized the early fifteenth century. He was not a great inventor or a scientist like those whose original discoveries and ideas have radically changed a discipline and dramatically advanced humanity over a short period of time. Notwithstanding his self-assigned moniker of 'Archimedes', in his notebooks and in the scant documents about his life or in the testimony of his contemporaries we do not find any trace of sudden illuminating *eureka* moments like those that marked the life of prominent figures from the ancient Syracusan inventor to Isaac Newton, to Enrico Fermi, and so on. Nonetheless, Taccola's life and his *De ingeneis* and *De rebus militaribus* reveal a process of 'blending' of knowledge and ideas from different fields that shows how he participated in and contributed to the formation of new ideas of engineering and of authorship that were further elaborated by other artists and writer-engineers of the early Renaissance, most famously, by Francesco di Giorgio Martini, whose hand is recognized in some of Taccola's pages, and Leonardo da Vinci[2].

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[2] Blending as the innate human ability to bring together knowledge from different areas to give rise to new ideas is discussed by Mark TURNER, *The Origin of Ideas. Blending, Creativity, and the Human Spark*, New York, Oxford University Press, 2014. In my analysis I have also been guided by Étienne KLEIN, *D'où viennent les idées (scientifiques)*?, Paris, coll. « Modélisation des imaginaires », Manucius, 2013 ; Roman JAKOBSON, « Einstein

Before Francesco and Leonardo, Taccola found himself straddling different worlds, different disciplines and fields of endeavor, and he found in drawing a language that was common to all of them. Consequently, he constructed his authorial strategy and presented himself to his readers and to his potential patron, the emperor Sigismund of Luxembourg, as an expert *ingeniarius* and an authoritative writer based on his ability to draw. The cultural and historical milieu was ripe for such an operation, and Taccola was able to take advantage of the opportunities it offered. When we analyze the roles he assumed in his city and read his works focusing specifically on his technical and artistic use of drawing, it becomes clear how Taccola could move with ease from the visual recording of civil and military technology in Siena to the recording of imperial history at the Hungarian court, reinventing himself as *ingeniarius* and as author.

2. The Cultural Environment in Siena

« Ser Marianus Taccole alias Archimedes vochatus de magnificha et potente civitate Senarum» is how Taccola presents himself at the opening of *De rebus militaribus*, which he completed in 1449, towards the end of his life[3]. The wording is of great significance to understand the 'blended' identity of the author and how he constructs his authorial persona in relation to the political and cultural environment in Siena, a small but very active city that was an ideal center for the exchange and creation of ideas.

'Ser', a title generally reserved for notaries and church officials, defines him as a person of good social standing. While nothing specific is known about Taccola's education, we can assume that he must have studied enough law to apply for a notarial license. Two documents attest that he was twice examined and admitted as notary into the Sienese Guild of Judges and Notaries, in 1417 and 1422, though his membership was terminated in both cases because he never returned within the year to have the appointment confirmed as required by the statutes of the

and the Science of Language », *Albert Einstein. Historical and Cultural Perspectives*, Princeton, Princeton University Press, 1982, pp. 139-50; and by Philippe LEJEUNE's writings on autobiography and self-fashioning.

[3] For a complete analysis of *De rebus militaribus*, also known as *De machinis*, and its extant manuscript copies, see the introduction to the 1984 facsimile edition by Eberhard KNOBLOCH, Mariano Taccola, *De rebus militaribus (De machinis, 1449)*, Baden-Baden, Verlag Valentin Koerner, from which all quotations of the treatise are taken. The cited self-presentation is found only in Ms. 136 of the Spencer Collection in the New York Public Library. Cf. Giustina SCAGLIA (ed.) Mariano Taccola, *De machinis: The Engineering Treatise of 1449*, Wiesbaden, Reichert, 1971, 2 vols. facsimile edition of Codex Latinus Monacensis 28800 of the Bayerische Staatsbibliothek, München, with additional materials from the other manuscript copies.

corporation[4]. The autograph manuscripts show that his writing hand is that of a notary as is the Latin in which he writes. Additionally, Taccola held other public positions that may explain the continued use of the title and for which he may have benefited from his brief notarial status. In 1424, he was appointed *Camerarius* of the Casa della Sapienza, a residential college of the Sienese *studium* that housed primarily foreign students[5]. The dedication of the third book of *De ingeneis* and its colophon, « Feliciter finit tertia pars libelli de edifitiis ac ingeneis completa in domo Sapientie civitatis Senarum, in anno Domini millesimo.CCCCXXXII., die.XIII. mensis ianuarii, dum Senenses et Florentini mala viciniam paragebant » [The third part of the little book on structures and devices here comes to its propitious end, having been completed at the Domus Sapientiae in Siena, 13 January 1432, while Sienese and Florentine acted as bad neighbors] (f. 45v), clearly indicates that he remained in the post until 1433[6]. Subsequently, he held other offices in the Commune of Siena as appraiser of public works (since 1434) and as *viaio*, street inspector (since 1441), both of which he mentions in his tax return of 1453 with a certain pride, though clearly hoping to be exempted from payment. He writes, « A tutti Voi spectabili et honorevoli aliratori sempre mi racomando, so' vecchio et infermo et non o nessuno guadagno, et *in anni vinti one auto due offiti di Comune di Siena, uno como stimatore del Comune e Viaio* » [I recommend myself to all of You esteemed Officers of the Lira. I am old and sick and have no

[4] See James H. BECK (ed.), Mariano di Jacopo detto il Taccola, *Liber Tertius de ingeneis ac edifitiis non usitatis*, Milano, Il Polifilo, 1969, pp. 27-28, facsimile edition of Codex Palatinus 766 of the Biblioteca Nazionale Centrale di Firenze with the transcription of public documents related to Taccola's life and professional activities.

[5] A history of the University of Siena and the Casa della Sapienza is found in Paul F. GRENDLER, *The Universities of the Italian Renaissance*, Baltimore, The Johns Hopkins University Press, 2002, pp. 47-49 in particular with regard to the fifteenth century. It may be noticed that the University of Siena, which had been founded in 1246, was especially recognized as a law school.

[6] Taccola gives the date as 1432 because according to Sienese and Florentine custom the year began on March 25. For the quotation, see J. H. BECK (ed.), *Liber tertius de ingeneis, op. cit.*, p. 154. Before proceeding further, the division of *De ingeneis* must be clarified. Beck considers the manuscript a single book prepared for presentation to Sigismund but other scholars refer to it as *De ingeneis III-IV* due to the title « Incipit quartus liber de edifitiis cotidianis » in f. 31r. See Frank PRAGER and Giustina SCAGLIA, Mariano *Taccola and his Book De Ingeneis*, Cambridge, MA, The MIT Press, 1972, with a partial reproduction of the autograph of *De ingeneis I-II* (Codex Latinus 197 of the Bayerische Staatsbibliotek, Munich) and *De Ingeneis III-IV*. I will follow Beck's lead and will hereafter refer to the BNCF manuscript simply as *De Ingeneis III*.

earnings, and for twenty years, I held two offices in the Commune of Siena, as an appraiser of the Commune and as street inspector][7].

'Taccola', the name Mariano takes from his father Jacopo, a wine maker or dealer, and still a common family name in areas of Tuscany, means jackdaw (Corvus monedula), a small crow. Whatever the reason for which it was originally applied to Mariano's forebears, in conjunction with his father's occupation it can be viewed as an indication of the ongoing phenomenon of urbanization and of the fluidity of a communal society in which the acquisition of economic means by the artisans and merchants of the *popolo minuto* gave access to education. For Mariano, this meant the possibility to become a public servant with the knowledge and time to write and illustrate two treatises, though the previously mentioned tax return shows that in his old age he still benefited from the rental of the family vineyards even if he claimed 'nessuno guadagno'.

'Archimedes', the more elegant moniker that follows, stands in contrast with the modest origin of the name Taccola but it also endows Mariano with different characteristics than those suggested by the notarial honorific 'Ser'. It connotes him specifically as *ingeniarius* and inventor and, most importantly, it does so by placing him in a line of descent from one of the greatest authorities of antiquity in mathematics and physics as well as - and perhaps more significantly - in hydraulic and military engineering[8]. Taccola is thus situated within the humanistic context in

[7] J. H. BECK (ed.), *Liber tertius de ingeneis*, *op. cit.*, p. 31, my emphasis. We may also remember that Taccola was involved in the political life of the city since 1413, when Bindino da Travale reports he was part of a group of Sienese citizens sent to the fortress of Radicofani on the occasion of the meeting of Pope Giovanni XXIII (Baldassarre Cossa 1370-1419, later declared anti-pope) with the French ambassador. See Vittorio LUSINI, *La cronica di Bindino da Travale (1315-1416)*, Firenze, Seeber, 1903, p. 241 for the mention of Taccola.

[8] The role of Archimedes in medieval scientific thought is discussed by Marshall CLAGETT, *Archimedes in the Middle Ages*, Madison, University of Wisconsin Press, 1964-1984, 5 vols. Concerning the use of « Archimedes » by Taccola, see Paolo GALLUZZI, *Mechanical Marvels. Invention in the Age of Leonardo*, Florence, Giunti, 1996, p. 27. Galluzzi points out that Taccola's interest for Archimedes was primarily for the myth of the Syracusan as inventor but, in relation to the interest for Archimedes in fifteenth century Tuscany across mathematics and painting, see James R. BANKER, « A Manuscript of the Works of Archimedes in the Hand of Piero Della Francesca », *The Burlington Magazine* 147.1224 (2005), pp. 165-169.
Though unrelated to Taccola, it is worth pointing out that Archimedes is a particularly interesting figure in relation to the study of the birth of ideas, as he wrote specifically about the process by which he arrived at his *eureka* moments. A manuscript of his *Method*, repurposed with other Archimedean texts into a thirteenth century Byzantine prayer book, was first discovered and studied by Johan Heiberg in 1909 and re-discovered in 1998 when the volume that contains it resurfaced on the collectibles market and was deposited by its new buyer at Walters Art Museum in Baltimore. For the most recent digital scholarship on Archimedes stemming from the 1998 rediscovery, see http://archimedespalimpsest.org and Roger L. EASTON and William NOEL, « Infinite Possibili-

which the past is being studied with renewed interest and reborn into the Renaissance. His contacts with the famous jurist Mariano Sozzini the elder, for example, are documented in a note that records how he showed Sozzini some drawings in *De Ingeneis I-II* on 8 December 1438, at his home[9]. Through him and in his administrative role at the Sapienza, he met or had the opportunity to meet other notable humanists including Enea Silvio Piccolomini, one of Sozzini's most famous students at the University of Siena, who appreciated the jurist also as a mathematician, poet, and artist[10]. Other notables he may have met are the physician Ugo Benzi, who taught at the university until 1421; the humanist Antonio Panormita, who studied law in Siena in 1419-1425; and Francesco Filelfo, professor of Greek and Latin at the *studium* in 1435-1439.

Finally, the « magnificha et potente civitate senarum » in which Ser Mariano Taccola situates himself as Archimedes was an important if small commune in competition with the larger Florence for political as well as commercial and cultural power. Favored by its location on the Via Francigena that brought pilgrims and political figures from France and northern Europe to Rome, and busy with a program of public works that included the ongoing construction of the cathedral, the upkeep of its water supply system (the *bottini*), and the promotion of its university, the city was a privileged hub for the mixing of cultures and the exchange of ideas. Not only political and religious life but also work on the cathedral and the bottini led visitors to Siena. Artists and specialized workers from other areas of Tuscany, from northern Italy, and from across the Alps brought their skills and knowhow to the city[11].

Interestingly, it is in connection with the embellishment of the cathedral that we first find Taccola in a professional role in 1408, not as notary or public official but as an artist, the carver of a set of sixteen wood heads for the choir of the main altar. We find him again in this role in 1438, when he received payment for more wood heads commissioned for the main altar of the cathedral by his friend Jacopo della Quercia, the director of the works, and again in 1441 and 1442 for gargoyles, « cioè animaluzzi di legname per mettere intorno al coro » [small wood animals to be

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ties : Ten Years of Study of the Archimedes Palimpsest », *Proceedings of the American Philosophical Society* 154.1 (2010), pp. 50-76.

[9] F. 82r. See J. H. BECK (ed.), *Liber tertius de ingeneis*, *op. cit.*, p. 15 and p. 36, n. 20, and F. PRAGER and G. SCAGLIA, *Mariano Taccola*, *op. cit.*, p. 44.

[10] See Paolo GALLUZZI (ed.) « Le machine senesi. Ricerca antiquaria, spirito di innovazione e cultura del territorio », *Prima di Leonardo. Cultura delle macchine a Siena nel Rinascimento*, Milano, Electa 1991, pp. 21-22, and *idem*, *Mechanical Marvels*, *op. cit.*, pp. 29-30.

[11] On the presence of specialized foreign workers in Siena, see for example P. GALLUZZI, « Le machine senesi», *op. cit.*, p. 16.

placed around the choir][12]. Besides the documented acquaintance with painter and chronicler Bindino da Travale, his sculptural work for the cathedral places him in likely contact with other artists like Domenico di Niccolò dei Cori, Domenico di Bartolo, and Donatello who were active in Siena at the time. It might be in relation to work on the cathedral that he met also Filippo Brunelleschi, possibly around 1430, and entertained with him an important conversation on building machines and professional secrecy on which he muses in *De ingeneis I-II*[13]. Additionally, James Beck, has proposed the attribution to Taccola of the painting on the *tavoletta di biccherna*, the wooden cover of the city expense roster of 1433, with the visual memory of the imperial coronation of Sigismund of Luxembourg[14]. The painting thus functions as a hinge tangibly linking Taccola's artistic and public servant *personae*.

3. Writing for the Emperor as a New Kind of Author

Sigismund of Luxembourg spent several months in Siena, from July 1432 to April 1433, awaiting his coronation by the pope in Rome, and he became the catalyst for the explicit formulation of the idea of authorship Taccola expressed in *De ingeneis III*, which he dedicated to the newly appointed emperor. In it, the artist, the *ingeniarius*, and the public servant blend into a new idea of author founded on Taccola's ability to draw and similarly elaborated throughout *De ingeneis I-II* and in *De rebus militaris* across a period of about 30 years (1419-1449)[15].

The genre of the illustrated technical manual on the art of war, architecture, and machines in general is re-born in the fifteenth century primarily as a presentation book. Treatises on military engineering with collections of drawings of war machines to be offered to powerful patrons and princes, regardless of their actual functioning and practicality, respond to the preoccupation of

[12] J. H. BECK (ed.), *Liber tertius de ingeneis*, *op. cit.*, p. 27 and 29, and Gaetano MILANESI, *Documenti per la storia dell'arte senese*, Siena, Onorato Porri, 1854, V. 2, p. 286.

[13] A valuable discussion of the idea of secrecy in Taccola and Brunelleschi is offered by Pamela O. LONG, « Invention, secrecy, and theft: Meaning and context in the study of late medieval technical transmission », *History and Technology*, 16:3 (2000), pp. 223-241.

[14] J.H. BECK, « The Historical 'Taccola' and Emperor Sigismund in Siena », *The Art Bulletin* 50.4 (Dec. 1968), pp. 309-320. The painting is reproduced in color in P. GALLUZZI, *Prima di Leonardo*, *op. cit.*, p. 191. Cf. G. SCAGLIA, « An Allegorical Portrait of Emperor Sigismund by Mariano Taccola of Siena », *Journal of the Warburg and Courtauld Institutes* 31 (1968), pp. 428-434.

[15] For the complicated dating of the manuscripts, see F. PRAGER and G. SCAGLIA *Mariano Taccola*, *op. cit.*, pp. 25-33.

the powerful at a time of frequent conflicts and changing technologies as well as to new antiquarian interests. The most famous authors of such works, the Lombard Guido da Vigevano (c. 1280-c. 1349), the German Konrad Keyser (1366-after 1405), and the Venetian Giovanni Fontana (1395-1455) were physicians who wrote on military technology for their lords in a philological key, 'drawing' their subject matter primarily from ancient sources[16]. The same can be said of humanist Roberto Valturio (1405-1475), whose *De re militari* was the first illustrated book on the art of war to be published in print in 1483. These writers authored the more or less extensive elegant Latin text of their treatises but they relied on anonymous artists for their illustration[17]. That is, though they recognized the value of illustrations, be it as ornament, explanatory visualization, mnemonic device or source of inspiration to generous patronage if not military feats, they generally viewed the drawings as ancillary and subordinate to the verbal text.

The works of Mariano Taccola are the first to combine words and images into a new kind of text and to reveal a new idea of drawing. Although a humanistic interest in ancient authors is evident in his pages and the devices he draws are not necessarily realistic or realizable, it is immediately clear that the relation between drawings and verbal text is very different. It reflects the fact that he is not just highly literate as someone educated for a notarial career. As an artist and as an appraiser and road inspector, he is also deeply steeped in the visual culture of his time and conversant in non-verbal forms of thinking and communication. He possesses a technical knowledge that he acquired in the bottega where he likely trained as a wood sculptor, through his contacts with fellow artists and important architects, and even in his administrative roles. It is a knowhow that cannot fully and exclusively be expressed verbally and is better communicated in a graphic technical language.

In Taccola's manuscripts, the drawings immediately impose their presence for their own visual nature as well as for the author's constant reference to them in the accompanying notes, which are always subordinate to the drawings and never explicitly recognized as written. When he re-

[16] Among the ancient authors who were known also to Taccola, we can remember the Roman Vitruvius, Frontinus, Vegetius, and the Byzantine poliorcetic treatises. See P. GALLUZZI, *Prima di Leonardo*, *op. cit.*, p. 32, and Pamela O. LONG, « Picturing the Machine : Francesco di Giorgio and Leonardo da Vinci in the 1490s », *Picturing Machines 1400-1700*, Wolfgang LÈFEVRE (ed.), Cambridge, MA, The MIT Press, 2004, pp. 117-141, specifically p. 119.

[17] See P. GALLUZZI, « Portraits of Machines in Fifteenth-Century Siena », *Non-Verbal Communication in Science Prior to 1900*, Renato G. MAZZOLINI (ed.), Firenze, Leo S. Olschki, 1993, pp. 53-90, and Marcus POPPLOW, « Why Draw Pictures of Machines ? », *Picturing Machines*, Wolfgang LÈFEVRE (ed.), *op. cit.*, pp. 17-48.

fers to his writing, Taccola always uses forms of 'dicere', 'narrare', 'fari' that emphasize the oral nature of words even in their written form and play down the graphic visual nature that writing shares with drawing, the privileged element of these texts. In fact, the author offers both *De ingeneis* and *De rebus militaribus* to his readers as collections of drawings of machinae, and as machinae themselves. This is especially evident in the wording of the introduction to the second treatise, from which comes Taccola's self-presentation analyzed above,

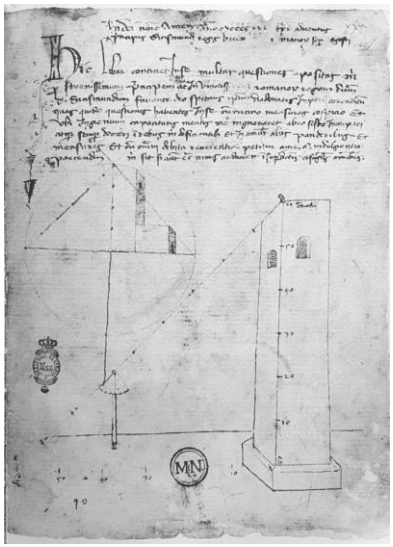
> *Liber iste* est salus anime necnon et corporis et est perditio anime et corporis. Salus est ilis qui operari semper desiderat ex amore et caritate sancte fideii domini nostri Jesu Christi verbo et opere contra infideles et barbarichas gentes preliantes pro arigumento prefate fideii et totius populi cristianorum. […] Ego autem Ser Marianus taccole alias archimedes vochatus de magnificha et potente civitate Senarum non *designavi ex mani mea ista ingenia machinas et tormenta* ea operente contra cristianos / sed *inveni composui ac designavi* ut veniant contra infideles et barbarichas gientes[18].
>
> [*This book* is the salvation of the soul as well as of the body and it is the perdition of soul and body. It is salvation for those who always desire to work with in words and deeds with love and holy charity for the faith of our lord Jesus Christ against the infidel and barbarian peoples by fighting for the affirmation of said faith and all Christianity. […] *I, Mariano Taccola* called "Archimedes" from the magnificent and powerful city of Siena, did not *draw with my hands* these devices machines and torments so that they may be used against the Christians, but *I invented composed and drew them* to be used against infidels and barbarians].

The « liber iste » that opens at once the passage and the treatise is one and the same with « ista ingenia machinas et tormenta » drawn by Taccola for use against the enemies of the Christian world. Furthermore, the book and the drawings of machines are produced to the same end and through the same rhetorical and technical process of *inventio* and *compositio*, which finds expression in words (the implicit written text) and visual images (the explicitly mentioned drawings) that faithfully reflect and even identify with visual material reality.

In *De ingeneis III*, dealing mainly with civil engineering, waterworks, mills, and construction machines for lifting heavy weights, we observe a similar rhetorical play between book and devices, written text and drawings, set up with even greater complexity and originality. The play

[18] E. KNOBLOCH, Mariano Taccola, *De rebus militaribus*, *op. cit.*, p. 53.

begins with the dates that open and close the treatise in f. 1r and 45v and give it an almost horological character, temporally framing it within the time of the imperial visit. Such temporal framing of the work is then reinforced by the juxtaposition of the rhetorically charged imperial portrait of Sigismund in f. 2v and the drawing of Saint Dorothy who offers the book to the emperor as a parting gift, in 42r. These structural elements belie the great formal care with which Taccola designed the manuscript for presentation[19]. But they also reflect the intricate relations between verbal and visual elements of the book and ultimately contribute to reveal the author's development of a new and more complex idea of drawing and of its 'literary' role.

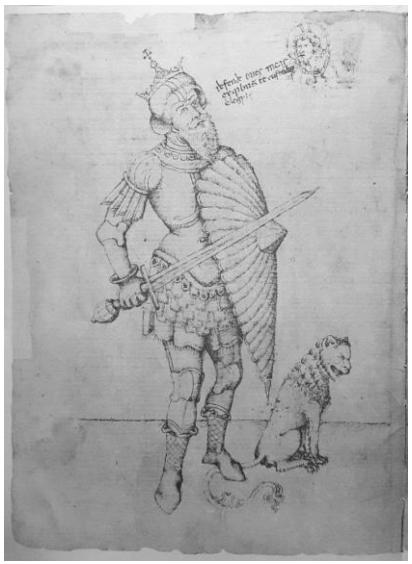


Biblioteca Nazionale Centrale di Firenze, Codex Palatinus 766, f. 1r

[19] Prager and Scaglia propose 1431-1433 for the composition of *De ingeneis III* based on the inscription at the top of the first folio, « mccccxxx… », on Sigismund's arrival in Italy in spring 1331, and the time Taccola would have needed to produce the polished well-composed drawings. The missing last cypher, however, might as easily be 'ii' instead of 'i' (cf. J. H. BECK (ed.), *Liber tertius de ingeneis*, *op. cit.*, p. 137, n. 1). The sentence has undoubtedly been added after the introductory text and the drawing below it, and it could be part of the rhetorical framing of the treatise to coincide with Sigismund's stay in Siena, rather than being an actual date for the beginning of the composition of the treatise. After all, this is part of a book Taccola had already begun to write well before the emperor's arrival in Italy to claim his crown.

The preface in f. 1r states that *De ingeneis III* deals with questions brought up by the emperor in conversation with Taccola who is ready to answer them through mathematical analysis, « quasi quidem questiones habentes in se cum circino mensuras co[n]spicio / Et ubi ingenium capacitatis mentis mee ignoraret / ab eo sisto increpari atque semper docieri in rebus mihi deficientibus Et in omnibus aliis ponderibus Et mensuris » [I therefore examine with the compass the measurements that these questions entail, and where my intellect and mental capacity should be mistaken, I am here to be reproached and instructed by the sextant in the things I do not know and all other weights and measurements]. The drawing [fig. 1], which has clearly been traced on the page before the addition of the written text, demonstrates how to use a sextant to calculate the height of a building from a distance. Drawings of sextants and other surveying instruments are found in several folios as part of the mise en scène of the devices, machines, and buildings introduced in the book[20]. And while no drawing of a compass is found, its presence is clearly revealed in the treatise metonymically, as the draftsman's tool used to draw both the diagrams of measurements and the actual objects we can see on the page, such as the arc of the aqueduct in 6r and the round building on the other side of the same folio. Similarly, we can see where a straight edge has been used to draw neat lines in diagrams and object alike and where these straight lines, whether theoretical or material, have been segmented to indicate their scale measurement in *brachia*. Taccola is thus bringing together the graphic language of applied mathematics and artistic representational drawing to create a new non-verbal investigative and expressive language that may be visually appealing to potential patrons yet able to convey an adequate amount of technical information to specialists who are invited to use the same method. Whether the reader may want to actually build a fountain or just draw it accurately, in 2v the author tells his audience, « omnia fac con mensure linee et quatrante prout videre potes in posteriori istius foleii » [do everything with measurements, lines, and with the quadrant as you see here in the fountain drawn on the other side of this folio].

[20] Other sextants and similar instruments are found in 6v, 31r (a beautiful astrolabe), 32r (being used by a surveyor drawn in the hand of Francesco di Giorgio Martini), and 34r. Plumb lines are found in 2r, 32r, and 33r.



Biblioteca Nazionale Centrale di Firenze, Codex Palatinus 766, f. 2v.

Examples of the operation we witness in the preface to *De ingeneis III* can be found throughout the treatise and are to be put in relation also with the 'invention' by Taccola of the working sketch as documented especially in *De ingeneis I-II* where multiple drawings of a ship with different details suggest how he was thinking visually about technical issues. Sketching allowed him to visualize variations of a device and changes in its operation on the page in drawn rather than actual experiments. In these pages, we realize that we are witnessing the first steps towards the birth of the modern idea of engineering and machine design, in which drawing is the thinking platform on which theoretical and applied knowledge merge in the process of creation of a device[21]. The new technical language is however still imperfect, and in 41v Taccola is well aware that « de omnibus et singulis non potest assignari rationem quia ingenium magis consistit

[21] A valuable discussion on the subject is given by David MCGEE, « The Origins of Early Modern Machine Design », *Picturing Machines 1400-1700*, Wolfgang LÈFEVRE (ed.) Cambridge, MA, The MIT Press, 2004, pp. 53-84. Cf. Pier Gabriele MOLARI, « Il disegno illuminato dal testo », *Storia dell'Ingegneria. Atti del 2° Convegno Nazionale*, Salvatore D'AGOSTINO (ed.), Napoli, Cuzzolin Editore, 2008, V. 2, pp. 811-817.

in mente ac intellectu architectoris quam in designo et scriptura Et multe res accidunt in facto quas architector vel operaius numquam cogitavit » [it is not possible to assign a reason to all and every single thing, because invention consists more in the mind and intellect of the architect than in drawing and writing. And many things occur in practice that the architect or the builder never thought about].

4. Securing patronage

Besides the theoretical and practical importance of technical drawing in the construction and defense of the state, Taccola also very clearly understands the value of representational art as a weapon in the cultural arsenal of the state and of dynasties always in need to ensure the preservation of the line of succession. The opening portrait of Emperor Sigismund in 2v and the closing dedication of the treatise to him in 42r perfectly emphasizes this idea. Sigismund is portrayed in full armor, with drawn sword, and wearing his crown as he steps into the treatise and onto the tail of a lion, the Florentine Marzocco, while Christ appears above him and orders, « Defende oves meas ex quibus te custodem elegi » [Protect my herd that I chose you to defend]. Taccola thus visually expresses the support of his Ghibelline city for the emperor and positions him to listen to the request of employment he tactfully places at the end of the treatise where a beautifully drawn Saint Dorothy stands at the center of 42r holding the Christ child's hand. She faces the written text, her own words, as she turns towards the portrait of the emperor in 2v.

Biblioteca Nazionale Centrale di Firenze, Codex Palatinus 766, f. 42r.

After praying for Sigismund's continued health and safety from his enemies, she recommends « Maiestati sacre tue *Ser Mariano* Iacobi camerarium Domus Sapientie de Senis *qui libellum hunc composuit Et me designavit* » [to your sacred majesty Mariano di Iacopo, secretary of the Domus Sapientiae in Siena, who composed this little book and drew me]. The fact that a self-referential drawing voices this recommendation is quite original and revealing of the importance Taccola, the composer of the book and creator of her portrait, grants to the medium of drawing. The saint concludes by asking Sigismund to admit him to his Hungarian court as a familiar and master of waterworks. Finally, she offers Taccola's services to the emperor as court historian in such a way that it suggests that the author in fact thought drawing to be an essential component of the writing of books in general, whether in a functional or accessory role, technical or ornamental. In Saint Dorothy's words, he hopes to end his days in Hungary « et in codicibus omnia facta et gesta per vos reges Ungarie et anticessores vostros *describere*, iusta suum posse de quolibet loco recoligere et in dictis codicibus in principio marginis *designare ac miniari storias*» [and describe in codices all deeds and feats accomplished by you kings of Hungary and by your predecessors, thanks to his ability to collect information on any place and especially to draw and

illustrate the stories in the margins of said codices]. This idea of writing, drawing and illuminating history from collected information fits well Taccola's identity as artist, notary and surveyor, and it recasts the production of technical treatises delineated above in a literary historiographic key. Whatever the genre and the knowledge and experience it requires, it is the ability to draw that defines Taccola's authorship.

5. By way of conclusion

The emperor's presence in Siena did not provide lasting protection against Florence and, as he marked the propitious ending of the book in the colophon, Taccola ironically noted that the Sienese and the Florentine were behaving as bad neighbors again. There is no document to indicate that the author or even the autograph treatise so carefully composed for Sigismund ever left Italy for Hungary but Saint Dorothy's recommendations seem to have had at least some of the desired effects. Taccola first received from the emperor the title of *familiaris* (18 November 1432) and later also that of *comes palatinus* (24 September 1433)[22].

Sigismund's court in Siena included the humanist Ciriaco D'Ancona who mentions Taccola in one of his letters and may have sent the copy of *De rebus militaris* now at the Bibliothèque Nationale in Paris (Ms. Lat. 7239) to the Ottoman Sultan Mehemet II. Taccola's ideas and drawings of military devices thus traveled also outside Europe, precisely among the infidels his treatise was purportedly written to fight.

Most importantly, the idea of drawing as tool to investigate, develop, and express ideas continued to evolve in the drawings and writings of other technical and scientific authors, and most eloquently in the treatises of Francesco di Giorgio Martini and Leonardo da Vinci. Unlike Taccola, they did not have a strong knowledge of Latin nor a great formal education, and they had to contend with the *literati* for recognition of their authorship[23]. They did however have greater talent as artists and developed greater technical skills. For a long time, Taccola's work was eclipsed by their beautifully rendered, perfectly perspectival drawings, but he has finally been

[22] Wilhelm ALTMANN, *Regesta Imperii XI. Die Urkunde Kaiser Sigmunds (1410-1437)*, Innsbruck, Wagner'sche Universitäts-Buchhandlung, 1897-1900, II Band, p. 225 and 248.

[23] On Leonardo, see the author's « The Science of Art and the art of Science : Leonardo's Authorial Strategy in Codex Madrid I », *Explorations in Renaissance Culture* 26.2 (Winter 2000), pp. 229-255, and « Leonardo da Vinci : scriversi come uomo di scienza », *Mnemosyne o la costruzione del senso*, B. BARBALATO (ed.), n. 7 (2014), pp. 33-46.

recognized as an important protagonist in the history of technology and engineering for his role in the renaissance of technical literature, for having contributed to a new idea of authorship founded on drawing as investigative and communicative tool.