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## **Income and working time of a Fencing Master in Bologna in the 15<sup>th</sup> and early 16<sup>th</sup> century**

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**Abstract** – Since ancient times, the master-at-arms profession has always been considered essential for the education of the nobility and the common citizenship, especially in the Middle Ages. Yet, we know nothing about the real standard of living of these characters. The recent discovery of documents, which report the sums earned by fencing masters to teach combat disciplines, has brought us the possibility to estimate how highly this profession was regarded, and what its actual economic value was in the Italian late Middle Ages. They also give us also a material view into the modes of operation of a *sala d'arme* in those times.

Using different comparative methods based on the quoted currencies, primary goods and the cost of living, it was possible to analyze prices and duration of various military teachings offered by the fencing Masters in the late Middle Ages and equivalent viable activities of the time. We use three ways to calculate equivalent income levels in euros: from the silver content of the coins (bolognini, equivalent to the soldo); from purchasing power in relation to bread prices; and from equivalent wages. As a result we were able to define more accurately both the accessibility of these services for citizens and the relative value to other professions.

This cursory research study also aims to estimate approximately the current equivalent wages of a fencing master operating in the Italian peninsula in the 15th and early 16th century, confirming that this job was comparable to a modern, highly specialized, profession.

**Keywords** – Fencing Masters, Medieval Economy, History of Fencing, Medieval Bologna, Ancient Coins

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## I. INTRODUCTION

The main source for this research is a bundle of documents kept at the Archivio di Stato of Bologna<sup>1</sup> and dated 1443, based on the date of the latest annotation (December 1443). These documents contain a series of letters, presumably written during a span of several years, between Filippo Dardi and the government of the city of Bologna<sup>2</sup>.

Filippo (or Lippo) di Bartolomeo Dardi was an astrologist and mathematician from Bologna, where he lived and held a *sala d'armi* starting from 1413 to his death, in 1464<sup>3</sup>. The *sala d'armi* was located on Pietralata Road where Dardi resided. From the archives of the University of Bologna we know also that he was Reader in Arithmetic and Geometry from 1443 to 1463. In 1444 he was also Reader in Astronomy<sup>4</sup>.

The second document to be taken into account is the treatise from the famous Master Achille Marozzo, also from Bologna, where some other price information is obtainable.

Achille Marozzo was born in 1484 and had a fencing school in Bologna at the beginning of the sixteenth century. His *sala d'armi* was located on Riva di Reno Road where he lived. He certainly studied fencing in the school of the great Bolognese master Guido Antonio di Luca<sup>5</sup>. His book is one of the most famous fencing treatises and was reprinted several times over the centuries<sup>6</sup>.

Due the quality of his treatise, Marozzo, who declares himself “General Master of the Arts of Weapons”, is considered the fundamental master of renaissance fencing in Italy. But also Dardi is a very important figure in the Historical European Martial Arts, because he is considered the founder of the Ancient Bolognese Swordsmanship, to the point that this school is sometimes known also as “Dardi tradition” or “Dardi school”.

This modern ascription probably derive from the supposed lineage between the Bolognese masters Dardi, De Luca and Marozzo<sup>7</sup>. Without detracting importance to Dardi, authors do not agree with this thesis. While the lineage between De Luca and

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<sup>1</sup> Dardi, *Letters* (see bibliography). These documents were recently discovered and transcribed by Prof. Trevor Dean. The first complete transcription of the manuscript document is on Medieval Crime History blog (<<https://medievalcrimehistory.wordpress.com/2015/06/>>, Transcription by Trevor Dean, dated May 2015, last accessed 27 January 2016). Full transcription of the document in Appendix (reproduced with permission of the author).

<sup>2</sup> Government inference to regulate prices of goods and services in medieval cities was a common practice in Italy due the difficulty of the society to regulate itself (Welch, *Making money*, pp. 73,74, 76).

<sup>3</sup> Gelli, *Scherma Italiana*, p. 6, and Orioli, *La scherma a Bologna*, p. 2.

<sup>4</sup> Mazzetti, *Repertorio di tutti i professori*, p. 110.

<sup>5</sup> Marozzo, *Opera Nova*, proem, where Marozzo cites de Luca as the one who showed him the art.

<sup>6</sup> Pantanelli, *Scherma e maestri di scherma bolognesi*, p. 47.

<sup>7</sup> First hypothesized by Orioli, *La scherma a Bologna*, p. 2, and then re-proposed by Pantanelli, *Scherma e maestri di scherma bolognesi*, p. 47.

Marozzo can be supported directly by Marozzo's words, the lineage between Dardi and De Luca actually is purely hypothetical and no fencing writings of these masters are known. Other treatises of the Bolognese masters of the same period are now known without any proved relation with the other cited masters<sup>8</sup>. Some masters, like one named Nerio, are known to operate in Bologna before Dardi<sup>9</sup>. Authors are of the opinion that the ancient Bolognese school of fencing was spread in Bologna and near territories by a plurality of masters, derived directly from a fencing medieval matrix through mutual interrelationships, but without a common well defined single founder or influencer like Liechtenauer in German fencing tradition.

However, no research on either of these masters has been published yet. There is some information from independent researchers available<sup>10</sup>, but it deserves further academic research outside of the scope of this article.

Despite this, documents found are very important because, for the first time, they tell us important information about a medieval fencing classroom, like payment required for every lesson, possible number of students and pace of training. Besides confirm some information already known about Dardi himself. Almost certainly these documents are the same used by fencing bibliographers that have wrote about Dardi<sup>11</sup>, but they are interested and have reported only bibliographic information, while the documents contain much more.

## II. PRICES IN SOURCES

The first part of previously mentioned letters shows how the work of Filippo Dardi was well regarded by the city government, to the point that he was granted annual wages of 200 *lire* of *bolognini* to practice astrology: "they will give you the stated 200 *lire* of *bolognini* each year, and they do this so that you have reason to practice astrology more willingly for our community." (App., l. 14-16).

The city council also stated the maximum price he could ask when teaching martial arts in exchange for these annual wages. In practice the prices requested by the Bolognese Master for his fencing lessons were more than halved in return for a fixed annual payment provided by the city itself. This public investment was justified by the benefits of teaching fencing to the youths of Bologna, something that was highly valued by the city government.

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<sup>8</sup> Manciolino, *Opera Nova*, and Anonymous, *Arte di Scherma*.

<sup>9</sup> Gelli, *Scherma Italiana*, p. 5.

<sup>10</sup> To learn more biographical details and read quotes on Filippo Dardi and Achille Marozzo refer to Scrimipedia (<<http://www.scrimipedia.it>>), only Italian, or Wiktenauer (<<http://www.wiktenauer.com>>) and related links on the relevant entries.

<sup>11</sup> Gelli, *Scherma Italiana*, p. 6, and Orioli, *La scherma a Bologna*, pp. 1-2.

[...] where you ask for the play of two-handed sword 23 *Lire* of bolognini, I want you to take up to 8 *Lire* of *bolognini*, and where you want 7 *Lire* for the play of sword and buckler I want you to take only 3 (*Lire*) of *bolognini*, and where you take 12 *lire* for the play of the dagger you'll take 5 *Lire* of *bolognini*, and where you want 7 *Lire* for the stick play you will take 3 L of *bolognini*, and where you take 10 L for the wrestling you will take 3 *Lire* of *bolognini*, and where you take 8 *Lire* for the play of rotella or targone you will take 3 *Lire* of *bolognini* (App., l. 22-27).

This obligation by the city council is probably dated back to the opening of the *sala d'arme*, and is summarized in Table 1.

Discipline	Requested by Dardi	Set by the Council
Two handed sword	23 <i>lire</i> of <i>bolognini</i>	8 <i>lire</i> of <i>bolognini</i>
Sword and buckler	7 <i>lire</i> of <i>bolognini</i>	3 <i>lire</i> of <i>bolognini</i>
Dagger	12 <i>lire</i> of <i>bolognini</i>	5 <i>lire</i> of <i>bolognini</i>
Stick	7 <i>lire</i> of <i>bolognini</i>	3 <i>lire</i> of <i>bolognini</i>
Wrestling	10 <i>lire</i> of <i>bolognini</i>	4 <i>lire</i> of <i>bolognini</i>
Sword and rotella or targone	8 <i>lire</i> of <i>bolognini</i>	3 <i>lire</i> of <i>bolognini</i>

*Table 1: Dardi - earnings before 1443*

Following this excerpt there is a letter in which Dardi express his concerns, after some years, that the low prices for his teaching could attract more students than he could handle and than would actually fit into the *sala d'armi*, which he sets at a maximum of 20 students at a time. He also writes about the optimal educational path for a fencer attending his lessons: two hours a day. He then declares he is not bound to teach a student for more than one year:

[...]he will learn the theory of the two-handed sword in two and a half months, and the practice in as many days, and the theory of the bucklers in one month and a half and in as much time the practice, and for each other play they learn the theory in one month each, and the practice in as much time (App., l. 40-43).

Table 2 shows the average learning times for each discipline, based on the documents.

Discipline	Theoretical Part	Practical Part	Total
Two handed sword	2.5 months	2.5 months	5 months
Sword and buckler	1.5 months	1.5 months	3 months
Dagger	1 month	1 month	2 months
Stick	1 month	1 month	2 months
Wrestling	1 month	1 month	2 months
Sword and rotella or targone	1 month	1 month	2 months

*Table 2: Dardi – learning times for each discipline*

In the end Dardi suggests to the city council that they transfer him into an academic tenure for teaching geometry, possibly with the same compensation. Since both astrology and fencing are subjects strictly related to geometry he was able to demonstrate his qualification. In this regard it has to be noted how the title of Reader was related to a tenure in the University; belonging to this corporation would guarantee, in the medieval Bologna, and elsewhere, a certain standing and some privileges<sup>12</sup>.

Following this request Lodovico Caccialupi and Simone Manfredi, both belonging to a corporation designated by the city council to collect taxes (created in 1440<sup>13</sup>), suggest that the council accept the proposal, but also reduce the annual wages from 200 to 150 *lire* of *bolognini*:

[...]in his practice and works of astrology and geometry and fencing he can continue and move on, and it will be that despite his higher demand, each year he will be payed only one hundred fifty *lire*, that is 150 L of *bolognini* (App., l. 79-82).

In compensation for this decreased wages, Dardi was granted an increase of his teaching prices, as reported in Table 3. “For the play of two-handed sword 10 L of *bolognini*, for the play of sword and buckler 4 L, and for the play of dagger 6 L, and for the play of stick 4 L, and for the play of wrestling 5 L, and for the play of rotella or targone 4 L of *bolognini*” (App., l. 84-87).

Discipline	Set by the Council
Two handed sword	10 <i>lire</i> of <i>bolognini</i>
Sword and buckler	4 <i>lire</i> of <i>bolognini</i>
Dagger	6 <i>lire</i> of <i>bolognini</i>
Stick	4 <i>lire</i> of <i>bolognini</i>
Wrestling	5 <i>lire</i> of <i>bolognini</i>
Sword and rotella or targone	4 <i>lire</i> of <i>bolognini</i>

Table 3: Dardi - earnings after 1443

An approximate calculation show a raise of 1 *Lira* for each discipline (except the two-handed sword, which was raised by 2). This related to a full capacity of 20 students with an average duration of 2.5 months for each course. This granted Dardi an average added revenue of 100 *lire* of *bolognini* per year, which well compensates the 50 *lire* annual decrease in wages. This was provided the school filled his classes, which seems evident given the previous proposal by Dardi. This deal favored both the Master and the city treasurers.

<sup>12</sup> Haskins, *The Rise of Universities*, p. 17.

<sup>13</sup> Muzzi, *Annali della città di Bologna*, Vol. IV, p. 269, where it also possible see that the ‘40s of the fifteenth century was a period of financial strain for the treasury of Bologna.

After this, it's possible to find a bit of other similar information analyzing Marozzo treatise. In effect, Achille Marozzo doesn't give hints on his prices in his treatise on the teaching of fencing, except for a sentence in the third book:

[...] because you know that for the wide play of sword versus sword, two-handed, I take seven *lire* of *bolognini*, and for the close play, also sword versus sword, and versus pole weapons, I take as much, which in total are fourteen *lire* of *bolognini*,<sup>14</sup>

From this excerpt we have a confirmation of the prices for two disciplines.

Discipline	Requested by Marozzo
Two handed sword – wide play	7 lire of bolognini
Two handed sword – close play and against pole weapons	7 lire of bolognini

Table 4: Marozzo – earnings mentioned in 1536

Even if limited to just one discipline, we can see how after little more than a century the price for the teaching of two-handed weapons has almost remained the same.

III. LIRE AND BOLOGNINI

In the Middle Ages the official currency in Italy was the *Lira*. The name *Lira* comes from the Latin *libra* (scale / pound). It represents a unit of weight, which varies considerably according to zones and time frames, whose equivalent in silver formed the currency unit. The measure, in weight, of one pound was, on average, from 300g to 350g (0.66lb to 0.77lb), with considerable variations. In Bologna it was reported to be 361.85g (0.79lb)<sup>15</sup>. Factually, the *Lira* didn't exist as a currency, and it merely represented the base of the monetary system, which was based on sub-multiples. This was the case until 1472, when the so-called *Lira Tron* was first forged in Venice (named after the Venetian Doge Nicolò Tron). From then on, the *Lira* started to be forged also in other cities, including Bologna in 1529<sup>16</sup>. The *Lira* was divided into 20 *soldi* (singular *soldo*), and each *soldo* was in its turn divided into 12 *denari*<sup>17</sup> (singular *denaro*).

<sup>14</sup> *perché sapendo tu che di gioco largo a spada contra spada da due mane io li toglïo lire sette di bolognini & de giôcho stretto, pure a spada contra spada e contra armi inastate, io toglïo altre tante, che sono in tutto lire quatordici de bolognini*; Marozzo, *Opera Nova*, book III, p. 58.

<sup>15</sup> Dornbusch, *Gewichts-Reductions-Tabellen*, p. 4.

<sup>16</sup> This *Lira* was dubbed *della carestia* (of the Famine), due the terrible famine of that year, and by the fact it was forged using funds from the Domenican fathers (Salvioni, *Il valore della lira bolognese*, p. 233).

<sup>17</sup> This monetary partition, commonly present in the whole of Europe, was derived from the Carolingian currency, the monetary form which replaced the old Roman currency, and ruled the monetary regulations until the French Revolution. Indeed the system was much

The *Bolognino* (plural *bolognini*), or *soldo bolognese*, was the coin forged and commonly used in Bologna. Starting from 1236, two variations of the *bolognino* began to circulate in the city: the small alloy *bolognino*, already forged from 1192, and the big silver *bolognino*<sup>18</sup>. A small *bolognino* was the equivalent of one denaro, while the big silver *bolognino* was the equivalent of the soldo, maintaining in this way a formal canonical match with the reference *Lira*<sup>19</sup>: 1 *Lira* = 20 big silver *bolognini*, 1 silver *bolognino* = 12 small *bolognini*.

Although *bolognino* in the 13<sup>th</sup> cent. commonly referred to the small alloy one, in the 15<sup>th</sup> cent. the official *bolognino* became the big silver one<sup>20</sup>. Later on, after 1380, Bologna also forged the gold *bolognino*, having the same weight and title of the *Ducato*. The initial exchange rate was established to be 1 gold *bolognino* to = 40 silver *bolognini*<sup>21</sup>, and after that the gold *bolognino* was used to commonly identify all the *Ducati* forged in Bologna.

It is worth noting that, although the silver content in the *bolognino* was held constant its quality was probably worse than the many equivalents of the *soldo*, forged by many foreign courts, which were commonly found in Bologna. The lower silver content could justify the higher diffusion among the population of Bologna, based on Gresham's law<sup>22</sup>. Starting from Bologna, in fact, the *bolognino* spread to all the Pontifical domains, sometimes even forcedly<sup>23</sup>, becoming the synonym and replacement of the *soldo*. This fact is confirmed by the references to the many currencies coined in several Italian cities from the 14<sup>th</sup> to 18<sup>th</sup> cent., which took their names from the exchange rate with the *bolognino*<sup>24</sup>. The nominal rate of 20 between *bolognino* and *Lira* was constant, and the term *bolognino* was so widespread in the Papal States to the extent that many currencies with the same name and nominal value were forged in several other cities, like for example the *bolognino*

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more complex. There were a wide variety of different coins circulating in a large medieval city, and it was difficult to find a fixed exchange rate between them (Welch, *Making money*, pp. 71,72, 80).

<sup>18</sup> Guidicini, *Cose notabili della Città di Bologna*, Vol. I, p. 32.

<sup>19</sup> Fanti, *Confraternite e città a Bologna nel Medioevo e nell'Età moderna*, p. 215

<sup>20</sup> The latest reference to the small *bolognino* is documented in 1377. After this date there are only references to the *denaro*.

<sup>21</sup> Guidicini, *Cose notabili della Città di Bologna*, Vol. V, p. 203. In Chimienti, *Monete bolognesi*, the author reports an exchange rate between Ducato and silver *bolognino* ranging from 34 in 1381 to 74 in 1520.

<sup>22</sup> Economic law stated by Thomas Gresham (1519-79), financial agent for Queen Elisabeth I, for which "When a government overvalues one type of money and undervalues another, the undervalued money will leave the country or disappear from circulation into hoards, while the overvalued money will flood into circulation." It's in fact worthy melting the higher silver content coins in order to obtain more coins of lower quality, but the same nominal value.

<sup>23</sup> Frati, *Statuti di Bologna dall'anno 1245 all'anno 1267*, Vol. III, p. 319, references to the obligation on using the *bolognino* as currency in Cesena and Ravenna.

<sup>24</sup> Entry about *Bolognino* in LaMoneta.it Network di Numismatica e Storia (<<http://numismatica-italiana.lamoneta.it/nominale/Bolognino>>, accessed 15 July 2015).

of Ravenna<sup>25</sup>. Even when Rome started imposing its own currency, the *bolognino* continued being forged in Bologna; together with the official ones imposed by the Church State<sup>26</sup>. Even when it stopped being forged, the old *bolognino* with its ratio of 20 to 1 with the Lira, continued to be used as the reference value for any other currency, and standard in commercial document of the northern Pontifical delegations, to the extent that in the 17<sup>th</sup> cent. the Papal States had to publish several bans to avoid the drafting of commercial documents using *bolognini*<sup>27</sup>.

It is, however, extremely difficult to have a complete picture of monetization in Italy, or in Bologna, due to the large amount of economical and territorial factors at play in such a large span of time. The present study is limited to a functional approach in order to obtain easily computable and deducible results, without any claim for completeness<sup>28</sup>.

#### IV. PURCHASING POWER

Establishing the current value of a currency is maybe even harder than retracing its history. The currency named *bolognino* could have different values from place to place<sup>29</sup>. Fortunately, the *bolognino* of Bologna was taken as a reference in the majority of the Papal States, as we have seen before.

We decided to show three different approaches to find the most realistic and consistent result. First, we defined the value based on the amount of metal. Second, we assessed its purchasing power to the price of primary goods. Third we compared modern wages with those of late Medieval Bologna using similar professions between then and now. We recognize that each of these approaches involves large simplifications and could thus be subject to obvious methodological critiques. Except for some data, here reported for completeness, we tried to apply a temporal frame ranging from 1380 to 1525. Those years

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<sup>25</sup> Battaglini, *Memorie istoriche di Rimino e de'suoi signori*, p. 63 and following.

<sup>26</sup> Entry about the mint of Bologna from 1506 to 1600 in Monete e dintorni site (<<https://sites.google.com/site/moneteedintorni/la-zecca-di-bologna/la-zecca-di-bologna-dal-1506-al-1600>>, accessed 15 July 2015).

<sup>27</sup> Decree by Pope Alexander VII, which states: ...*Prohibisce le Lire, e Bolognini nelle Province di Bologna, Ferrara, Romagna e Ravenna, volendo che vi si introduchino li giuli, e bajocchi*. Edita A.D. 1660. There we can also find the exchange rate applied to the official currencies, which is 2 giuli = 1 Lira and 1 giulio = 10/11 *bolognini*. This once again confirms the official rate of 20 to 1 of the *bolognino* to the Lira.

<sup>28</sup> For an insight on the interesting story of the Lira as a currency refer to Cipolla, *The adventures of the Lira*. For the complete evolution of the monetization in Bologna throughout the centuries, refer to the relevant item in Chimienti, *Monete bolognesi*.

<sup>29</sup> Argelati, *De monetis Italiae*, Vol. IV, p. 323 and following.

roughly include our case study and stand out due to a high amount of silver content in the bolognino<sup>30</sup> and strong stability in prices<sup>31</sup>.

#### IV.1. Value based on metal

The most common approach to assessing value is to convert the quantity of precious metal contained in the coin to its current value in the modern market. If we want to proceed in this way, we find that it's not really easy to find the exact weight and silver content in thousandths of the *bolognini* in Bologna between the 15<sup>th</sup> and 16<sup>th</sup> cent. On one side, there is the extreme heterogeneity of the coin in various cities of the peninsula, on the other, there are several famines and general crisis periods which can influence the quantity of precious metal added to the coins, which would, in spite of this, maintain the same nominal value.

We know that the silver *bolognino*, since its very origins, maintained a rather constant silver content throughout the years. The *bolognino* of 1236 had an official weight of 1.57g (24gr), with 883/1000 silver content<sup>32</sup>. However, the weight of the coin slowly decreased during the centuries. Even though we observe a match of 1.5g (23gr) in the 14<sup>th</sup> cent., this weight drifts down to 1.3g/1.2g (19gr) in the early 15<sup>th</sup> cent., oscillating down to 1g (15gr) in the following centuries<sup>33</sup>. Although the coins in Bologna in our reference period seem to have a constant weight, and never drop under 1.2g (18.5gr), in our calculations we have taken note of the natural deterioration of the existing, original, samples.

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<sup>30</sup> Other than the aforementioned introduction of the silver *Lira* in 1529, in 1526 the Mint of Bologna issued for the first time an mixed *bolognino*. This new coin became known as the *muraiola*, so called due to its color (*muro* means wall in Italian), whose value was 2 bolognini. Even the gold *bolognino*, issued in 1380, was replaced in 1553 by the golden *scudo* "of the sun", of French origins (Chimienti, *Monete bolognesi*).

<sup>31</sup> English economists divide the economy from the XII to XX cent. into 6 macro-periods: there are two phases of strong stability (1380-1510 and 1630-1760) and two phases where there is a general rise in prices (1270-1380 and 1815-1914). Between 1510 and 1630 there was a fall in prices, whose low point was reached in 1597 (Phelps-Brown and Hopkins, *Seven Centuries of the Prices of Consumables*). The time frame from 1380 to 1510 almost overlaps with our case study, with the closed link being at the end of the period. The inflation observed in this model doesn't only apply to the Anglo-Saxon world, but seems to be widespread in the whole of Europe with almost the same time scales. Similar statistics research performed on Tuscany, Lombardy and, in general, on the Central-Northern Italy, highlight very similar tendencies for prices. In particular, the first stability period tends to expand from 1381 to 1524 (Malanima, *Statistical Appendix*).

<sup>32</sup> Ditaranto et Al., *Caratterizzazione spettroscopica e morfologica di monete (bolognini) medievali*.

<sup>33</sup> As ascertained by consulting various Italian numismatic and auctions catalogs, especially for silver bolognini not forged in Bologna.

As an example, we report in Table 5 the values of the silver *bolognini* (the big ones) or equivalent ones forged in the Mint of Bologna and classified in the numismatics bulletin<sup>34</sup>:

Coin	Ruler	Years	Maximum weight
<i>Bolognino Grosso</i>	Republic (Emperor Enry VI)	1236-1337	1.49 grams 23 grains
<i>Grosso or Bolognino</i>	Giacomo and Giovanni Pepoli	1337-1350	1.34 grams 21 grains
<i>Bolognino</i>	Giovanni Visconti Lord of Milan	1350-1360	1.34 grams 21 grains
<i>Bolognino</i>	Urbano V Pope	1362-1370	1.31 grams 20 grains
<i>Bolognino</i>	Republic (Autonomous)	1376-1401	1.24 grams 19 grains
<i>Bolognino</i>	Martino V Pope	1421-1428	1.17 grams 18 grains
<i>Bolognino</i>	Pontifical Anonymous	2nd half XVI cent. 1st half XV cent.	1.15 grams 18 grains
<i>Bolognino</i>	Filippo Maria Visconti Duke of Milan	1428-1443	1.16 grams 18 grains

Table 5: Summary statistics of rediscovered *Bolognini*

As of today silver has a value of 430.15€ per kilogram (\$472.18 /Kg, \$14.69 /oz). Supposing a silver content of 883/1000 and an average weight of the *bolognino*, in the early 15<sup>th</sup> cent., of 1.2g (19gr), we can estimate an up to date value of the silver *bolognino* of  $1.2 \times 0.001 \times 0.883 \times 430.15 = 0.43€$  (\$0.47).

For the sake of completeness we will also report the calculation for the gold *bolognino* of 1380, even if, as mentioned before in contractual references like our case study, the referred exchange rate was for the silver *bolognino*. If we assume the gold *bolognino* had a gold content of 995/1000 and weighed 3.45g (53gr)<sup>35</sup>, considering a current exchange of 32,192.48€ /Kg (\$35,338 /Kg, \$1,099.13 /oz)<sup>36</sup>, we get a current value in gold of the *ducato*/gold *bolognino* of  $0.995 \times 32,192.48 = 110.51€$  (\$121.28).

If we move ahead 80 years, we can refer to the city council decree on the exact composition of the coin in 1464<sup>37</sup>. There we can find that the silver *bolognini* is made from

<sup>34</sup> State Numismatic Bulletin, IUNO MONETA database (<<http://www.numismaticadellostato.it>>, accessed 11 September 2015), research on currency coined by the Mint of Bologna.

<sup>35</sup> The *Bolognino* forged by the Mint of Bologna for the Republic of Bologna (1376-1401), <<http://www.gloriainarte.it/BOLOGNINO.pdf>>, accessed 26 December 2015 .

<sup>36</sup> There are several online sites that provide this financial information, for this article we used BullionVault (<<https://oro.bullionvault.it/Prezzo-Argento.do>>, accessed 25 July 2015).

<sup>37</sup> Argelati, *De monetis Italiae*, Vol. IV, p. 311 and following.

an alloy of 9 ounces and  $5/6$  of silver for every pound (=12 ounces), resulting in a silver content of  $819/1000$ . We can also find that a pound should make 396 coins, and an ounce 33 coins (12 ounces = 1 pound). With both these relations we can obtain a weight of 0.91g (14gr) per *bolognino*. This leads to a current value in silver equivalent to  $0.91 \times 0.001 \times 0.819 \times 430.15 = 0.32\text{€}$  (\$0.35) per *bolognino*. A pound should be equivalent to 103 gold *bolognini*, which gives us a weight of 3.51g (54gr) per coin, forged at  $18+76/103 = 18.74$  carats, equivalent to  $781/1000$  of gold. We can so obtain a current value of the gold *bolognino* equivalent to  $3.51 \times 0.001 \times 0.781 \times 32,192.48 = 88.25\text{€}$  (\$96.84).

In reviewing these actualized values for both silver and gold coins, we can obtain a relation of 1 to 250 in both cases, well away from the nominal relation of 1 to 40 in the 15<sup>th</sup> cent. This discrepancy can be linked to historical realities that separate modern life from the medieval one, especially the discovery of the New World, with the subsequent inflow of rare and precious metals, which caused a relative devaluation of silver. From 1344 up to 1830 there had always been an almost fixed ratio of 1 to 16 between gold and silver. In the late 19<sup>th</sup> cent., when silver was no longer used for monetization, this ratio began rising until reaching a record of 1 to 153 in 1939, then lowering to 1 to 28 in 1971, and raising back to 1 to 110 in 1992<sup>38</sup>.

Even today, the values of these precious metals are unstable and not proportional to each other, especially in the past few years, so are unreliable as an absolute reference. Note that after a stable period of almost 20 years, the value of gold oscillated from almost 10,000€/Kg (\$10,974) in 2004 to over 42,000€/Kg (\$46,092) in 2012, while the value of silver rose to the equivalent of 124€/Kg (\$136) in 1996 to over 1,000€/Kg (\$1,097) in 2011.

It is also worth noting that a coin, although of good real value, always remains associated to a fiducial value, whose intrinsic worth is lower than its nominal worth, or rather its purchasing power as recognized in the community. As a matter of fact, this line of reasoning can give us an insight on the current “minimum” market value of the currency, equivalent to the mere value of the precious metal contained in the coin, extrapolating it from the social context in which it gets used. If we in fact analyze the exchange ratio between small (alloy) and big (silver) *bolognino* in 1236, conventionally stated as 12 to 1, it results in a higher ratio than that of the silver content, roughly equivalent to 8 to 1, contained in the coins<sup>39</sup>.

## IV.2. Purchasing power based on prime goods

A different approach, although not devoid of errors and approximations, is based on analyzing the acquisition price for several, commonly used, prime goods. One of the most used goods for these kinds of comparisons is bread, which we can find quoted in many

<sup>38</sup> McKinley-Degregori, *Le Opzioni*, p. 67, where there are also references to its highest value in 1477.

<sup>39</sup> Milani, *Monete, cambiatori e popolo*, pp. 133-134.

accounts and chronicles, even if its value is also greatly influenced by periods of famine and crisis in the place where it was produced. Fortunately though, precisely for its importance, a fixed price is often imposed in these periods<sup>40</sup>. Whether these prices were then respected or not is out of the scope of this analysis.

By consulting several chronicles of the 15<sup>th</sup> and 16<sup>th</sup> centuries, we can find how with one bolognino (we suppose a silver one) one could buy a widely variable quantity of bread, changing based on the year, the city, and obviously, whether there was famine or not. If we take, for example, the period of the Italian Wars (1494-1559) it is quite obvious how the value of bread rises up due to the famine generated by the war. In Table 6 we show some prices of bread in *bolognini*, for times when it was possible to retrieve it<sup>41</sup>:

Year	Place	Distance from Bologna	Price of bread	Note
1310	Forlì	65 km 40 mi	12 denari = 1 bol. = 12 or 18 oz of bread	Period of war
1430	Bologna	Countryside included	1 bol. = 36 oz of bread = 3 lb	Period of crisis, but abundance of goods
1464	Cervia	85 km 53 mi	33 bol. = 115 lb of bread from which 1 bol. = 3.48 lb of bread	Expences for the transit of Federico da Montefeltro
1477	Viterbo	240 km 149 mi	1 bol. = 8 or 6 oz of bread	Famine
1500	Forlì	65 km 40 mi	1 bol. 35 lb of bread	Imposed by Cesare Borgia
1505	Imola	30 km 19 mi	1 bol. = 8 to 4 lb of bread or less	Prices to be applied in function of the price of wheat
1505	Bologna		1 bol. = 4 oz of black bread	Famine

<sup>40</sup> Actually, calculations of this kind should be done through statistics based on the average prices of a full set of primary goods and services, carefully chosen among material for which there is historic data available during the years. A good example of a well chosen set of primary goods could be the sum of wheat, other minor cereals, meat, wine, olive oil, firewood, cloth and accommodation expenses (Malanima, *Measuring the Italian Economy 1300-1861*), but the current dissertation has a pure illustrative purpose, and we refer you to other publications on statistics on the medieval economy reported in the bibliography, for further details.

<sup>41</sup> Information obtained from: Muratori, *Rerum Italicarum*, vol. 14, p. 57; Muzzi, *Annali della città di Bologna*, Vol. IV, p. 204; Cognasso, *L'Italia nel Rinascimento*, Vol. 1, p. 248; Ciampi, *Cronache e statuti della città di Viterbo*, p. 414; Pasolini, *Caterina Sforza*, p. 352; Alberghetti, *Compendio della storia civile ecclesiastica e letteraria della città d'Imola*, Vol. I, p. 284 (in the same document it is stated how the price of wheat reached its maximum in 1505, but the relative price of bread is not indicated); Muzzi, *ibid.*, Vol. V, p. 468; Iacopi, *Pane e panettieri in assisi del medioevo*; Gionta, *Il fioretto delle croniche di Mantova*, p. 80; Muzi, *Memorie ecclesiastiche e civili di Città di Castello*, Vol. II, p. 111.

Year	Place	Distance from Bologna	Price of bread	Note
1514	Assisi	190 km 118 mi	1 bol. = 4 lb of bread	Decree of podestà
1526	Mantova	85 km 53 mi	1 bol. = 3 oz of bread	Famine
1539	Città di Castello and rest of Italy	135 km 84 mi	1 bol. = 1 lb of bread = 12 oz	Famine

Table 6: Prices of bread around 15<sup>th</sup> century

The weight of an ounce in grams is now fixed to 28.35 grams, while in the Middle Ages it strongly depended on the place and the year, ranging from 25 grams to 39 grams. The value of the ounce in Bologna, pre-unity, was 30.15 grams<sup>42</sup>, equivalent to 1/12 of the bolognese pound (361.85g). To ease calculation, we can assume a standard ratio of 30 grams throughout the peninsula.

We can also isolate the prices from relatively quiet times, or from those when prices were imposed (2, 3, 5, 6 and 8). Fortunately these are quite coherent and refer to places moderately near to Bologna, if not to Bologna itself, and are issued in the time frame of reference for our case study: the mid 15<sup>th</sup> cent. and early 16<sup>th</sup> cent. In all five cases, we see how a quantity of bread of 3 to 4 pounds was valued at 1 bolognino, approximately 1 to 1.5 kg (2.2 to 3.3 lb). The price seems to keep itself almost stable during those years, until the great changes of the 16<sup>th</sup> cent. (Italian Wars and discovery of America). Basically it seems the devaluation only affected the quality of the coin, as we have already seen, and not its real purchasing power. In periods of crisis, obviously, the quantity of available bread drops a lot, but we can assume that the documents we are analyzing were not taking these aspects into consideration, and were referring to “normal” periods.

Based on this reasoning, we can estimate the purchasing power of a *bolognino* based on the current value of a primary good, such as bread. As of June 2015, the price of bread in Bologna ranges from 1.29€ /kg (\$0.66 /lb) to 5.6€ /kg (\$2.87 /lb), with an average value of 4€ /kg (\$2.04 /lb)<sup>43</sup>. Using this average value, we obtain a cost of 0.004€ per gram of bread. We can then estimate the actual purchasing power of a silver *bolognino* to be from  $0.004 \times 361.85 \times 3 = 4.34\text{€}$  (\$4.90) to  $0.004 \times 361.85 \times 4 = 5.79\text{€}$  (\$6.54). Or more easily, we can propose 1 *bolognino* = 4-6 current euros.

As we can see, this second approach leads us to an estimated value over ten times higher than the value calculated on the base of the precious metal content of the coin. This result

<sup>42</sup> Savigny, *Storia del diritto romano nel Medioevo*, Vol. III, p. 209.

<sup>43</sup> Prices and Fares Observatory, Ministry for the Economic Development, Goods and services of wide usage, observed prices – June 2015 (<<http://osservaprezzi.sviluppoeconomico.gov.it>, accessed 26 June 2015). It is impossible to have a valuable average for the whole of Italy, so we focused our research on the city of Bologna.

is certainly more realistic, but probably a bit low, based on the abundance of edible goods in today's everyday life.

### IV.3. Purchasing power based on equivalent wages

The last approach analyzes the wages of jobs in medieval Bologna to those commonly found in current times. Through the analysis of some chronicles of the city of Bologna<sup>44</sup> we were able to find examples for wages, assigned by the city council, on which we can base our study. When looking at this data, we need to take into account that different workers, with the same job title, conducted different tasks and there were no national contractual agreements to which we can refer. For these reasons each individual was a case on his own and earned based on his abilities. In this scenario it's really difficult to establish an average for any category.

Year	Profession	Salario
1390	Chief bricklayer	10 <i>bolognini</i> for every work day
1392	Architect or Engineer	30 <i>lire</i> al month
1393	Preacher Bishop	60 <i>lire</i> per year
1393	Notary	5 <i>lire</i> per month
1393	Keeper of the Asinelli Tower	5 <i>lire</i> per month
1429	Treasurer	12 <i>lire</i> per month
1429	Overseer	12 <i>lire</i> per month
1431	Member of the Elders' College	5 <i>lire</i> per month
1431	Chaplain	10 <i>lire</i> per month
1464	Architect	15 <i>lire</i> per month
1490	Organist	12 <i>lire</i> per month

Table 7: Wages in Bologna around the 15<sup>th</sup> century

In Table 7 we did not report borderline professionals, like the legate, who in 1447 earned more than 500 *Lire* per month<sup>45</sup>, or complex social figures like readers, auctioneers and law doctors, whose prestige affected their pay in Middle Age Bologna<sup>46</sup>. Among these it's interesting to report the wage of a Judge in the Merchants' Forum, who in 1490 received a 500 *Lire*/month salary, and of the relative wage of an Appeal Judge, who earned 100 *Lire*<sup>47</sup>. It was an important position, which was assigned once every six months only to

<sup>44</sup> Information obtained from: Guidicini, *Cose notabili della Città di Bologna*, Vol. III, pp. 361, 363, 364, 367, 371; Ghirardacci, *Della historia di Bologna*, p. 485; Muzzi, *Annali della città di Bologna*, Vol. IV, p. 214;

<sup>45</sup> Muzzi, *Annali della città di Bologna*, Vol. IV, p. 379.

<sup>46</sup> Wages of these individuals varied broadly and were more truly linked to the person and his actual political history in the city. We can find salaries of 300 *Lire* per year in 1384, 550 *Lire* per year in 1439, 400 *Lire* per year in 1444, and as high as 1200 *Lire* per year in 1460 and 1000 *Lire* per year in 1498 (Muzzi, *Annali della città di Bologna*, Vol. V, pp. 327, 324, 299, 367, 315).

<sup>47</sup> Muzzi, *Annali della città di Bologna*, Vol. V, p. 161.

the doctors of law who had shown themselves most worthy of consideration, and it was a source of pride for the whole profession. We would not be too wrong if we were to compare this position with the highest positions in today's State organizations.

On the base of these wages and on a pure empiric reasoning, we are confident in speculating the actual value of a *Lira* from 150€ to 200€ (\$170 to \$225), which equates the current value of one *bolognino* to be 7.5€ to 10€ (\$8.40 to \$11.30). This value is slightly higher than the one proposed using the price of bread, but certainly comparable. It should also be highlighted how the reported salaries are not those of popular jobs<sup>48</sup>, even so, we don't think this invalidates our analysis.

## V. CONCLUSIONS

Due the difference between fiducial and intrinsic value of a coin previously explained, we can discard the first approach. Leaving our analysis with the other two, we can postulate a hypothetical *bolognino*/EUR exchange rate of 1 to 7.5, with a possible variability range of 30%. We should always take note that the simplifying approximations we introduced make the following estimations a rough indicative value, which should be taken into consideration only to give an order of magnitude for comparison, and nothing more. Based on the previous analysis, we can make some assumptions and correlations between modern life and what we see in the documents. Supposing an exchange *bolognino*/EUR of 7.5 ( $\pm 2.5$ ), we find that, up to 1443, Filippo Dardi, through his city of Bologna wages, earned 200 *Lire* = 4000 *bolognini* = 30,000€ per year ( $\pm 30\%$ ), in order to work, we suppose for free, the job of astrologist/astronomer for the city. Wages that in 1443, in years of monetary crisis of the city, were lowered to 150 *Lire* = 3000 *bolognini* = 22,500€ ( $\pm 30\%$ ), granting the role of reader in Geometry, in exchange.

In the same way we can transpose in Table 8 his earnings as a fencing Master, as shown in Table 1 and Table 3. From now on, we consider all the actualized prices to have the 30% aforementioned margin:

Discipline	Requested by Dardi	Set by the Council before 1443	Set by the Council after 1443
Two handed sword	3450 euro	1200 euro	1500 euro
Sword and buckler	1050 euro	450 euro	600 euro
Dagger	1800 euro	750 euro	900 euro
Stick	1050 euro	450 euro	600 euro
Wrestling	1500 euro	600 euro	750 euro
Sword and rotella or targone	1200 euro	450 euro	600 euro

Table 8: Dardi - actualized earnings

<sup>48</sup> On the wages of the less wealthy classes, we can report the current daily wages that were found in the building sector, in Tuscany, in late XVI cent.: women 4-5 soldi; manual workers 8-12 soldi; chiefs 15-20 soldi (Pinto, *Il lavoro, la povertà, l'assistenza*, p.39); while in 1474 and 1475 the workers hired for the excavation of an irrigation ditch near Pavia were payed 3 soldi per day (Zanoboni, *Donne al lavoro nell'edilizia medievale*, p. 109-132).

We can actualize the earnings of Master Marozzo in the same way from Table 4:

Discipline	Requested by Marozzo
Two handed sword – wide play	1050 euro
Two handed sword – close play and against pole weapons	1050 euro

*Tabella 9: Marozzo - actualized earnings*

Other than that, we can estimate a monthly or even hourly cost based on the durations of the courses, as noted by Dardi in Table 2. We suppose that the 2 hours per day dedicated to each student were held 6 days per week, excluding Sundays. This places the total for each month, composed by an average of 26 days of study, at 52 hours. The result of the calculation is noted in Table 10.

Discipline	Duration	Monthly/hourly cost before 1443	Monthly/hourly cost after 1443
Two handed sword	5 months = 260 hours	240 euro / 4.61 euro	300 euro / 5.76 euro
Sword and buckler	3 months = 156 hours	150 euro / 2.88 euro	200 euro / 3.84 euro
Dagger	2 months = 104 hours	375 euro / 7.21 euro	450 euro / 8.65 euro
Stick	2 months = 104 hours	225 euro / 4.32 euro	300 euro / 5.76 euro
Wrestling	2 months = 104 hours	300 euro / 5.76 euro	375 euro / 7.21 euro
Sword and rotella or targone	2 months = 104 hours	225 euro / 4.32 euro	300 euro / 5.76 euro

*Table 10: Dardi – actualized prices per discipline*

The first thing to note is how the most economic discipline to learn was sword and buckler, probably the most commonly diffused discipline in Bologna at the time<sup>49</sup>. The most expensive one is instead the dagger, which is quite obvious if you consider that it was the base for self-defense in a turbulent city like Bologna in the 15<sup>th</sup> century<sup>50</sup>.

These prices are more or less consistent with the prices of a modern martial arts gym. In an hypothesis of a two-day workout session per week, of 2 hours, approximately 17 hours per month, and basing on a monthly fee of 100€ (\$113), we have an hourly cost of about 6€ (\$6.8), which can often be lowered with multi-month or annual subscriptions. To this comparison it should be underlined how today offers for sports courses are much more

<sup>49</sup> The main known fencing treatises of early 16<sup>th</sup> century in Bologna are written by Marozzo Achille and Manciolino Antonio (see bibliography), the base discipline of the teachings of both Bolognese Masters is sword and buckler.

<sup>50</sup> Further information the law and the duels in XV century Bologna can be found in: Cavina, *Il sangue dell'onore*, and Dean, *Criminal justice in mid-fifteenth-century Bologna*.

diversified and widespread, while in the 15<sup>th</sup> cent. fencing was an exclusive teaching, and Dardi can be considered as a sort of luminary in the matter, to the extent he had to be limited by the city council so to diffuse his teachings as much as possible. It should be noted how in the start Dardi was requesting more than three times the wages the city council established.

Presuming the teaching was equally distributed in all the disciplines during the lessons, we have an average of 4.86€ per hour (\$5.50) before 1443, and 6.17€ per hour (\$7) after 1443. Supposing a working schedule of 6 days per week (approximately 310 days per year, removing Sundays and some holidays), limiting the teaching of fencing to 4 hours per day, so to leave the remaining hours for the job of astrologist, we can push the estimations of an hypothetical total annual earning for Filippo Dardi to around 120,000€ (c. \$138,000) per year before 1443, and 150,000€ (c. \$170,000) per year after 1443, for the teaching of fencing only. We also have to add wages of 30,000€/22,500 (c. 35,000€/26,000) per year for the job as an astrologist/astronomer. It should be noted that these estimates refer to years with a full schedule of 20 students in the classes, with courses of 2 hours, 2 times per day. It is highly probable that this estimate is quite optimistic and doesn't reflect the real rhythms of the sala d'arme. It's way more probable that the teachings were limited to only the 2 hours per day stated in the document. In this case the earnings would have to be halved to almost 60,000€ (c. \$70,000) per year before 1443 and almost 75,000€ (c. \$85,000) per year after 1443, always on the hypothesis of a full schedule. In any case, these estimates put Dardi's earnings to the level of a modern highly specialized professional, if not more<sup>51</sup>.

Moving the focus to Achille Marozzo, we don't have indications on the duration of his course on two-handed sword, but using the base of information from Dardi, we can presume about 3 months for the theory and practice of the wide play of two-handed sword, and the same for the close play. The additional month, not included by Dardi in his teaching of the two-handed sword, comes from the defense against pole weapons material, included by Marozzo. Pole weapons were slowly becoming the rulers of the battlefield. Results are in Table 11.

Discipline	Duration	Monthly/hourly cost
Two handed sword – wide play	3 months = 156 hours	350 euro / 6.73 euro
Two handed sword – close play and against pole weapons	3 months = 156 hours	350 euro / 6.73 euro

*Table 11: Marozzo – actualized prices per discipline*

These prices are aligned with the ones imposed on Dardi by the City Council. Although it seems the wages of Marozzo are higher than those of Dardi, the period of activity of

<sup>51</sup> Federica Micardi, on “Sole 24 Ore” of December 11th, 2014, states the average annual earnings of the wealthier professions of 2014, basing on the relative welfare treasury: Notaries 101130 euro, Medics 75308 euro, Journalists 61180 euro, Accountants 60288 euro, Bookkeepers 57033, Lawyers 43815 euro.

Marozzo is far nearer to the time frame of relative price stability we noted before. The year 1536, publishing year of his treatise, is already fully inside the Italian Wars, and several famines have already hit Italy, starting in the first two decades of the 16<sup>th</sup> century. It is possible that for this reason his wages, although being formally higher than Dardi's, are affected by a far lower purchasing power of the currency. It is also totally possible that the prices stated by Marozzo were written well before the publishing date of the treatise. We don't have (yet) other information on the courses held by Marozzo, so we cannot make other assumptions. That being said, the principles of the analysis done on the earnings of Dardi can be applied also to Master Marozzo, almost a century later.

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## APPENDIX

Archivio di Stato, Bologna, Comune, Governo, envelope N°318, “Riformagioni e provvigioni”, Miscellaneous series, envelope N°5.

Transcription by Trevor Dean, May 2015.

Dilecto nobis magistro Lippo quondam Dardi Bononie civi salutem. Exhibita nobis fuit tui parte petitio sive supplicatio tenoris et continentie subsequentis, vz

M.D.V. Magnifici e potenti Signuri, Io Lippo de Bartolamio de Dardo de Dardi vostro minimo servidore supplico ale V.M.S. [Vostri Magnifici Signori] che a vui piazza de essere cason de uno honoro e utilita a questa magnifica cita, zoe che le V.M.S. dignino inverso de mi de uno certo honore e bene, el quale za piu tempo fa mi fo proferto e promesso, non cerchando quello, da uno certo cittadino al quale iparve de volerme meritare per questa via, per caxon de le opere per mi facte in estrologia a quello stato popolare, el quale quello non e anche finito, e cusi piaqua a Jesu Christo che ello duri imperpetuo in felice stato E pertanto notifico ale V.M.S. como li detti beni proferti forno questi, zoe

Sapiti Lippo como io o deliberato per honore di questa cita che tu habii uno mandato de livre doxento de bolognini per zaschaduno anno sopra uno dacio, elquale quando se vendesse o no se vendesse che per li officiai de quello illi te debiano dare omne anno le dicte livre doxento de bolognini, e questo fo perche tu habii caxon de adoperarte piu volentiera in extrologia sopra el stato nostro, e anche per meritarte per quello che tu za fatto a questo stato, ma sapi che questo non e chuno motivo perche a ti fazo questo, avisandote che el dicto motivo sie che io voglio per utilita deli zuveni de questa cita, e onore de questo stato, e a utilita de ti, io voglio che tu adopri el to mistieri per altro modo che tu non ai facto per lo passato, quanto e per li presii grandi li quali tu toi ali zuveni de questa cita, e dimperzo te voglio tassare a mio modo tutti li tuoi zuoghi, zoe dove tu voi del zuogo dela spada da doe mane livre xxiii de bolognini, io voglio che to non toglii senon livre otto de bolognini, et dove tu toi livre sette del zuogo dela spada del bochilieri voglio che tu noe toglii che iii de bolognini, e dove tu toi L xii del zuogo dela daga tu ne tora L v de bolognini, e dove tu toi L vii del zuogo del baston tu ne tora L iii de bolognini, e dove tu toi L x del zuogo dele braze tu ne tora L iiii de bolognini, e dove toi L otto del zuogo dela rodella o targon tu ne tora L iii de bolognini.

E io a questo rispuxi che io ero contento, cum queste conditione che se caso fosse che a uno tracto me vignisse troppo scolari per caxon del pocho prexio non consueto, io non voglio essere obligato a torre piu che vinte scolari per volta, azo che a quilli possa imeglio insegnarglie, e anche percaxon che la scola non e capace a piu scolari, e a questi voglio averglie insegnato la teoricha dela spada grande infra dui mesi e mezzo vignando quilli / do hore del di ala scola, et imparato che quelli avano la detta theoricha ne possa vignire altre tanti, e cusi distinguando per lordine detto, ma in men tempo voglio insegnare la teorica e arte del bocholieri, e cusi de tutti li altri zuoghi glieva men tempo a insegnare como e noto in la mia scola tale theoriche, avisando ali V.M.S. che la pratica illi se la convenno a fatichare in zugare cum li altri scolari. Ancora [...] che io non volea essere

tenuto ne obligato a insegnare a zaschaduno senon uno anno, seno quanto paresse a mi de mia nobilita, avisando ale V.M.S. che se uno fosse piu grosso chel da buda ello imparara la theoricha overo larte dela spada da doe mane in dui mixi e mezo, e la praticha in altri tanti di, e la theoricha del bocholieri in uno mexe e mezo e in altri tanti la praticha, e de zaschuno deli altri zuochi quanto e per theoricha impararano uno da persi da laltro in uno mese, e la praticha in altrotanto, siche zaschuno de quisti voleno li suoi dui misi, tra imparare larte e la pratica, siche zaschuno a sette misi piu a potere imparare, e de tali zuochi ano nove mixi, e tali x misi, siche se illi non impararano in li dicti tempi non impararano mai piu. Anchora che volea chel me fosse facto decieteti secondo li pacti novamente facti li quali fosseno de quella natura li quali e li decieteti che za trenta anni fa o ottenuti da tutti li stati de Bologna in suso li quali se contene che one zudexe competente dela cita de Bologna a mi debiano fare una raxon summaria, e che ale mie libri siano dati piena fede contra zaschuno minore de xxv anni e contra zaschuno che fosse in podesta del padre, e cusi contra zaschuno che fosse # [sic] segurta per caxon deli dicti zuochi secondo che se contene in su la tavola de mia scola, li quali zuveni dami havesseno principiadi o fenire o no fenire quilli, avisando ale V.M.S. como a tale arte non impara seno zuveni, e imperzo a mi e stato concesso tali decieteti. E pertanto supplico ale V.M.S. che siate casone de tale honore e utilita secondo lordine dato, azo che li zuveni de questa cita habiano casone de imparare tale virtu, perche considerato il pocho prexio non consueto multi vigniranno a imparare. Ma considerato che le V.M.S. non hanno per si soli a potermi fare tale domanda, io ve dimostra uno modo che cum vostro honore le V.M.S. il porano fare, zoe sopra le tasse di docturi, considerando che de lanno passato e del presente il sia insuso il rotulo ala lectura de zeumetria, la quale e conforma al arte del scrimere perche in quella non e altro che misura propria la quale posso per lectura dimostrare, cum zo sia chosa che ... facto libero ordinato a potere ... a chi ipiacesse, avisando ale V.M.S. che quilli liquali forno cason de farme mettere a tale lectura el... de quella si fo per meritarme dele fatiche passate in astrologia, la quale / e di natura geumetrale. E imperzo priego ale V.M.S. che inanci che se tassi ve piazza de tassirme como o detto per lo passato, e anche per li anni che ano adevenire perche a mi ne fariti grande apiacere, e anche utilita ad altri.

Qua quidem supplicatione per nos visa et lecta, de contentis in ea certam noticiam non habentes, commissimus Lodovico de Cazalupis et Simoni de Manfredis ut de ipsis omnibus se informarent nobisque refferent, qui postmodum nobis relationem eorum in scriptis fecrunt in forma infrascripta, viz:

Refferisseno ale V.M.S. Lodovico di Cazalupi e Simone Manfredi che vezuda la soprascritta domanda de Maestro Lippo de Dardo di Dardi, e quella examinata e conferitone cum piu persone circha quello che in essa se contene, ex parte considerando quanto beneficio torna le virtu del detto Maestro Lippo a questa nostra cita, perche lui e solcito a larte dela strologia, e poi avendo consideracione quanto esso il so mestiero dela spada da doe mane, buchulieri, e altri zuochi sopra zio sono utile ali zuveni de Bologna per deffesa de lora e etandio de la re publica, ce pareria che dale V.M.S. fosse provisto in

modo che neli soi exercitii e mestieri de strologia e geumetria e dela spada si potesse mantenere e perseverare, el quale serene che ogni anno non obstante la soa domanda de mazore soma fosse tassato solamente livre contocinquanta, zoe liv. 150 de bolognini, lanno insuso le tasse deli docturi, comenzando lanno mccccxliii e del mccccxliiii che cusi e rotolato, e cusi seguendo ... anno in anno, cum questo che deli zuochi infrascritti avesse infrascritte tasse e prexii, zoe del zuocho dela spada da doe mani livre diece de bolognini, del zuocho dela spada e buchelierii livre quatro, e del zuogo dela daga livre sie, e del zuocho del baston livre quatro, e del zuocho dele braze L cinque, e del zuocho dela rotella o targon L quatro de bolognini. E anche ce pareria che fosse dato piena fede ali soi libri contra qualonqua scolaro vignira a imparare da lui e che ogni zudexe consueto dela cita de Bologna li debia fare raxon sumaria e sianoli observati suoi decreti secondo se contene in li pacti dela scola. E cusi refferimo ale V.M.S., nientedemeno quelle provegono como a loro pare.

Cuius relationis tenore postea per nos viso et mature considerato precibus tuis utpote iustis benigniter annuentes nostri magistratus auctoritate in omni alio modo iure et forma quibus melius fieri potest, presenti nostro decreto decernimus et committimus fieri et tibi observari per omnia volumus et mandamus omnia et singula in suprascripta relatione contenta, expresse iniungentes omnibus et singulis ad quos spectat spectareque poterit in futurum quatenus presens nostre concessionis decretum observetur illudque faciant inviolabiliter observari sub nostri indignationis incursia. Dat. Bon. die xxiiii decembris 1443.