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The colour of Valencian silk fabrics in the European market (1475-1513)

1. Innovation in silk dyeing and technical manuals

The silk dyers of Valencia (*tintorers de seda*) pitted a litigation during 1507-1513 against the silk velvet weavers (*velluters*) in a dispute over technical expertise. It contains very interesting declarations in its final part regarding how they dyed silks in fifteenth-century.¹ For example, the veil weaver Pere Falcó had known sixty or seventy years before, around 1437-1447, many silk dyers who worked in the zone of the old Jewish souk of the city of Valencia. They were no velvet weavers because at that time there were no artisans with that professional name in the city. Nevertheless, in his declaration he averred that, when Genoese *velluters* arrived in Valencia, they began to dye silks on their own, without the existence of a corporation of silk dyers in the city. Another veil weaver, whose name was Lluís Almenara, declared the same day as Falcó as a witness in the proceedings. In his case, he went back forty years to around 1467, to remember the silk dyers that worked then in Valencia such as Solanes, who was the father of Andreu Solanes, the Morells – father and son, Na Redona, Mas or Celma and sons. Additionally, the veil maker Francesc Serra gave testimony of the proceedings on 12 January 1508 and added the names of other silk workers who were also in the zone of the old Jewish souk such as the Boils or Martí Sentpol. In fact, silk dyeing was an activity monopolized by the Judeo-converting silk families in the Crown of Aragon (Navarro 2020a).

Matteo Grasso, a Genoese velvet weaver and resident in Valencia, testified as a witness on 16 April of the same year 1507. He explained that twenty-five years before, in 1482, there were many silk dyers in several zones of the city such as Morell, Solanes or the Miró brothers. He knew this because he was a velvet weaver and he gave them the silk skeins to dye that he needed to make his fabrics. Another Genoese velvet weaver named Cristoforo Machalufo remembered that thirty-five years before, in 1472, he also gave silks to the mentioned dyers, acknowledging that other velvet weavers were able to dye them themselves. On 12 January 1508, the silk dyer Bernat Clariana said that he was born in 1440 in a house of the old Jewish souk where his father Jaume Clariana worked, as well as other silk dyers like Gabriel and Galceran Morell or Andreu Solanes. He confessed that they dyed silks for velvet weavers when they began to arrive from Genoa. Years later, Bernat Clariana testi-

¹ Archivo del Colegio del Arte Mayor de la Seda de Valencia (ACAMSV), *Lg. 3.3.1., Procesos, 4*, 250 folios (Aleixandre 1987, doc. 647; Navarro 1999, 88-90).

fied again in these same proceedings on 14 January 1513. He affirmed that there was no velvet weaver in Valencia that knew how to dye silk in colours, because they only dyed it black. In addition, they had all learned how to obtain the colour black, from some servants of silk dyers that they had put to work in their houses. In fact, he said that there was no velvet weaver with examination by the guild of silk dyers.

Possibly, the predominance of the colour black in Valencian silks was due to Genoese influence, as 60 percent of the damasks and velvets commissioned by the silk merchants to the weavers in Genoa at the same years were black, which also was the case with regard to the percentages of pieces of silk sold in that city. Black thus became a fashionable colour representing virtue, austerity, morality but also social rank (Ghiara 1976, 1991). In fact, black velvet or *velluto nero* was the most important type of silk fabric in the Genoese industry during the fifteenth century (Massa 1981, 69). This fashion trend for black had to do with the success that the colour had attained in general at the end of the Middle Ages. So much so, that the black cloth suit inspired by the Spaniards became fashionable among the high classes of Europe, taking as a model the portraits of the Emperor Carlos V and his son Felipe II, dressed rigorously in black.

Some velvet weavers in fifteenth-century Valencia were artisans of the *officium de texir domasos e velluts e de tenyir la seda* in notarial documents. Valencian silk making, full of Genoese immigrants, must have also been influenced by the new ordinances of the *Arte dei Tintori di Seta* of Genoa of 1496. In fact, the Valencian silk dyers requested the establishment of their own corporation the following year in 1497. The two municipal council members who represented this new corporation together with the rest of the guilds of the city are included from 1507, the year in which they lodged a lawsuit against the velvet weavers to delimit their respective technical expertise. Both the analysis of the corporate statutes of dyeing of silks in Valencia and the quantitative study of the preserved fiscal sources taxing the export of silk in the city allow the reconstruction of product and process innovations in fashionable colours during the industrial silk expansion in the Late Middle Ages (Navarro 1999, 87-8).

There were similar judicial proceedings in subsequent centuries to fight for the monopoly of the profession, such as the one brought by the velvet weavers' guild from 1685-1689 in defence of the right they possessed from time immemorial to have in their workshops dye and every instrument necessary for dyeing silks.² In the year 1689, there was another complaint lodged by the master dyers José Valero, Francisco Pérez and Máximo Barbarroja against the Guild of the Art of Silk (*Colegio del Arte de la Seda*) intended to prohibit the velvet weavers from silk dyeing and possession of dyeing instruments. The Royal Court (*Real Audiencia*) closed the case because the velvet weavers continued arguing for the right they had to twist and dye silks for their own workshops.³ Nevertheless, on 4 July 1771, the General Board of Commerce (*Junta General de Comercio*) proclaimed an order prohibiting silk manufacturers from dyeing in detriment to the dyers. In this order was attached a copy of the proceedings followed in 1689 between dyers and velvet weavers in which the

² ACAMSV, L.g. 3.3.1., *Procesos*, 122 (Aleixandre 1987, doc. 765).

³ ACAMSV, L.g. 3.3.1., *Procesos*, 125 (Aleixandre 1987, doc. 768).

exclusive right was established of the former to dye silks.⁴ Between 24 January 1773 and 29 January of the following year 1774, the Royal Board of Commerce (*Real Junta de Comercio*) made successive orders prohibiting the dyeing of the colours called Prussian blue and Prussian green considered to be false, giving dyers a period of two months to consume the vitriol they had in their houses.⁵

What do we know about the colours of the fabrics in the technical manuals since the Middle Ages? For example, the document known as the *Innsbruck Manuscript*, copied around 1330 in the Stams Monastery in the Tyrol, contains some of the oldest recipes regarding the dyeing of textile fibres. They refer to dyeing in ochre with clay, in blue with dyer's woad, in black with gall and in red with brazilwood. With detailed instructions, it explains how to obtain up to four types of red dye, two greens, two yellows, one blue and one black. For the reds, mineral materials were used, like cinnabar and minium, mixed with vegetable extracts. Specifically, the black and dark colours were obtained from fabrics already dyed red to which iron oxide or gallnut was applied (Brunello 1968, 156-7).

The anonymous manuscript known as *Trattato dell'arte della seta* (1489), preserved in the Laurentian Library of Florence, contains up to thirty-two of its seventy-nine chapters devoted to the dyeing of silks. Greater attention is devoted to red, pink and violet tones than to the dark or black ones. The 32nd chapter titled *Del tigner nero* states:

A tignere negro, bolli la galla, e metti su la seta come lieva su il bollore, e dàlle quattro o sei volte sossopra, e così la lascia stare tutta la notte: e poi, tratta di galla, metti fuoco al nero tanto che bolla; e com'e' bolle, metti la seta dentro e dàlle quattro o sei volte, e tra'la fuori e freddala. Di poi la rimetti dentro e dagliene altrettante sempre freddando, e così fà insino la freddi sei volte. E così fatto, mésta la caldaia, e caccia sotto dette lavorio e lascialo istare sotto ore dua. Di poi lo cava e fà bollire la caldaia, e dàgli altrettante volte e mettilo sotto insino all'altra mattina, e questo s'intende a'peli: e gli orsoi si mettono poi di rieto nelle medesime volte, e così le trame, senza avere bollire; imperò, se bollsino in detto nero, gli orsoi hanno a durare gran fatica, e non reggerebbero poi al tessero. Non interviene così de' peli, però non durano fatica alcuna. E se'l tuo colore venisse per caso che fusse cieco, può venire che la caldaia avendo troppo in corpo nel bollire, detta materia vien su e acciecalo, e simile fa detto colore trarre al morone, cioè al nieraccio pieno e cieco. Questi mancamenti anche possono venire che se detta caldaia avesse poco in corpo, e'l tintore dà tanto fuoco alla caldaia ch'ella tigne per forza di quel fuoco alla caldaia ch'ella tigne per forza di quel fuoco, ma non di bontà; e anche può venire detto ciecho che, trato il nero di caldaia, e lavato bene, s'usa d'insaponarlo col sapone da panni, cioè istrutto il sapone in una caldaia d'acqua calda, e datogli'su in parucegli venti o venticinque volte: e non facendo questo tanto che fusse a bastanza, rimane cieco o aspro, e toccandolo con la mano, lo conoscerai tanto sia aspro; e quando è bene saponato, diven-

⁴ ACAMSV, Lg. 3.5.1., *Fábricas*, 14-1 (Aleixandre 1987, doc. 1063).

⁵ ACAMSV, Lg. 3.5.1., *Fábricas*, 14-4 (Aleixandre 1987, doc. 1066).

ta lucente e bello e morbido. E se tu trovassi in detta seta molte trafusole appastringiate e appicate insieme, questo viene che'l tintore ha messo di nuovo in sulla caldaia gommerabica, e inanzi l'abbia lasciata istrugere ha messo su detta seta. E detta goma va attorno per la caldaia appicandosi in sulla seta, e dov'ella s'appica, infracida e non se ne spicca se non col pezzo. E se tu vedessi che detto colore traesse a un certo rossonaccio e mal nero, questo nasce che'l tintore l'ha cavato troppo tosto fuori, e questo ha fatto per masserizia, ricordandoti che se detto colore s'asciuga, e tu lo voglia rimettere, mai sarà buono, e questo è per mezzo della gomma che mai lo lascia immollare, e dove e' non s'immolla, in quel luogo viene tutto macchiato. Pertanto è meglio lasciarlo istare di primo tratto, imperò che rimettendolo in sulla caldaia te lo farà bene un poco più pieno, ma sempre sarà cieco e morto e peggio che prima. E questo basti intorno al tignere il nero.

A racconciare detto colore nero che avesse il cieco, o il morone, o il morto, piglia detta seta e lavala di gran vantaggio nell'acqua chiara e fresca. Dipoi abbi adattato una caldaietta d'acqua calda, cioè tiepida, e disfavi dentro tre o quattro once di gromma di vino vermiglio, o di bianco, e lasciala molto bene istruggere, e istrutta ch'è, metti su detta seta in parucegli, e dàlle sei o otto volte, e tra'ne un saggio. E se non è venuto a tuo colore, rimetti su un poco di detta gromma, e fà un poco più calda l'acqua, e metti su detta seta. E così fà tante volte in modo che l'acqua venga quasi bollita. Questa gromma te lo farà lucente e bello quanto una spada: ma abbi avvertenza a mollarlo di primo tratto bene, e così dàgli la gromma tiepida, e di mano in mano vienla sempre un poco più iscaldando, acciò che con dolcezza tu smuova detto cieco, imperò che, volendolo fare a un tratto, tegliene bisognerebbe dare bollita, e morderestilo più in uno luogo che in un altro, e anche ti rimarrebbe iscarico di nero e carico di galla. E se vuoi conoscere detto colore grommato, toccalo con mano, chè canterà como uno inzolfato. E questo basti (Gargioli 1868, 59-61).

The fifteenth-century treaty titled *Segreti per colori*, preserved in the San Salvatore of Bologna Library includes fifteen recipes exclusively devoted to the dyeing of silk. Most of them are devoted to dyeing with brazilwood in reddish tones, at times with addition of madder and bleach made with ashes of vine shoots, all boiled in water with four ounces of soap per pound of silk. The lichen called *urchilla* was used for violet colours and gall for the blacks. In contrast, the dyeing manuscript, also of the fifteenth century, preserved in Como Municipal Library contains more than two-thirds of its chapters devoted to dyeing in red in diverse tones and with various products. The colourant most used is brazilwood, alone or mixed with madder, after which comes *grana* mixed likewise with madder. To a lesser extent, it reproduces recipes in ten chapters about dyeing in black, five devoted to green, two to grey and one to yellow with saffron, for example. To compare with the instructions reproduced before from the *Trattato dell'arte della seta*, the manuscript of Como states the following about the dyeing of silks in black:

Prima a far el pé del negro voiando far libre 5 de seda. Toi libra una de gala per libra de lavor, onze 6 de viriol, onze 6 de goma, libra una de limadura; questa si è la roba del pé del negro. Toi tutte queste cosse et mettile insieme in una calderuola et lasale boir uno quarto de hora et non piui et posa tirale fuora et mettile in una tinela et lasale posar fina al terzo dì. A ingalar ditti lavori toi libra I 1/2 de gala per libra de lavor et onze 2 de goma rabica per libra de lavor et parechia una caldiera et metti dentro sechi 4 de bagno et metti dentro questa gala et fali bon fuoco et fai che la lieva el boio et come l'ha levado el boio tira fora el fuoco et abi inbrulado li toi lavori et mettili denttro et menali denttro per spazio de uno quarto de hora et poi tirali fuora et sorali et quando i è fora dali volta in le brule et retornali denttro la caldiera et lasali star fin l'altra mattina, posa la matina tirali fora et strucali et mettili a sugare et vuoda quela ingalatura in una tinela e toi el bagno chiaro del pé del negro et mettilo in la ditta caldiera et zonzi denttro onze 6 de goma per libra de valor, libra una de limadura, onze 6 de viriol et fai fuoco sotto la ditta caldiera et fai che la lieva el boio et come l'ha levado el boio cava fora el fuoco de sotto la caldiera et abi el tuo lavor inbrulado et mettilo a sorar et dali volta et remettilo denttro et menalo uno quarto d'ora et cavalo fuora et mettile a sorar in tera et fai fuoco sotto la caldiera et fai levar el boio et cava fora el fuoco et metti in questa caldiera li ditti lavori et metili sopra uno gran cargo si che stia ben sotto et lasali star da la sera a la matina et quando è la matina tira fuora et lasale gozar moltto ben e torzile et mettile a sugar et posa la sera fai foco sotto la caldiera et fala levar el boio et cava fora el fogo et metti denttro li ditti lavori et lasali star per fina a la matina come dexedestua et posa la terza fiada come l'è sutta abi una tinela de aqua fresca et metti denttro libra una de mesura d'axedo over de vin marzo et lavalì li ditti lavori et posa fali lavar al canal moltto ben et possa indulzisili et insavonali. Avixotti che le savonade che se cuoxe i ditti lavori sie bona de insavonar. Fali lavar al canal et mettili a sugar. Avixotti che la crescerà onze 6 per libra et sarà bon et avantazado color (Rebora 1970, 64-5).

The manual of Gioanventura Rosetti titled *Plichto de l'arte de'tentori che insegna tenger panni* (1540) comprises four parts, the third of which describes the procedures for dyeing silk. In general, a third of this manual is devoted, in the same way as in the previous manuscripts, to the colour red in its diverse tones and secondly, to black, because both were the most requested by the society of the 16th century. In fact, it registers up to twenty-one recipes for obtaining the colour black with the use of iron salts and tannins derived from gall and from sumac or, to a lesser extent, using green vitriol or copperas. Another anonymous manuscript printed in Brussels in 1513 also emphasizes the colours black, grey, red, yellow, green, blue, purple and violet obtained from the most used colourants of the era such as madder, brazilwood, dyer's weed, sumac, gall, *grana* and dyer's woad (Brunelo 1868, 186-95).

The first known treatise on dyeing for the medieval and modern era in the Iberian Peninsula, called *Manual de Joanot Valero* (1497), also gives protagonism to the dyeing of red cloths or to the range of reds, rose pinks, purples, pinks or scarlets with almost fifty recipes of the sixty-six it contains. It devotes ten more to dyeing in

black and only six to green. It does not devote any recipe to the dyeing of silks or canvasses, only to wool fabrics, but the trend in colours in fashion seems to be the same (Cifuentes, Córdoba 2011).

Two and a half centuries later, the ordinances of the Silk Dyers Guild of Valencia of 1764 (Navarro 2018, 70-107) contain considerable information of interest regarding the colours of the silks that were dyed in the 18th century from four main dyes, which were the blues, carnations or reds, the yellows and the blacks (chap. 37). Then the main colour was blue, which was obtained from dyer's woad mixed with common madder, bran, ash and indigo, from which were derived greens, mauves, purple, amaranth and oleander (chap. 41). The dyers' ordinances in Spain of the 18th century were especially specific in the knowledge of those four main colours or dyes of blue, red, yellow and black (Molas 1994, 57-58). The ordinances of the Silk Dyers Guild of Valencia of 1764 underlined how to make and apply black, because it was precise for shadowing and darkening innumerable colours. Black must be done with a portion of sumac, gall and vitriol in the event that there was no other or it was not desired to use that which was assigned for black silk. For this purpose, a specific boiler was prepared and in another boiler or in a pot, a stick of sumac, gall, iron filings, vitriol, gum and vinegar should be mixed. The portions vary depending on the boilers in which the dyeing was done. With the use of gall serious damage can be caused if too much sumac was added or it was added when boiling; because of this the amount of sumac must be regulated, no more than was necessary should be added, and always when cold, because if there was an incorrect weight the silk will be lost. Neither pomegranate peel nor ordinary gall nor other bad mixtures will be used (chap. 44). It is necessary to compare all this information with the knowledge we have today about the natural dyes, a technology much of which is also present in the world's silk museums (Cardon 2014; Navarro, Huerta ed. 2020).

2. The Valencian silk dyer ordinances since 1497

The founding of the silk dyers guild in the city of Valencia began on 28 September 1497, with the presentation of a draft of the first ordinances to the municipal authorities for their approval. Nine years later, a privilege of King Fernando II of Aragon confirmed them on 29 April 1506. The archive of the Guild of the High Art of Silk in Valencia kept a manuscript of ordinances concerning to the silk dyers guild. A notary copied and witnessed them until 27 February 1578 by decision of the governor of the kingdom, reproducing all the statutes approved during that period. The transcription and analysis of this manuscript has brought to light a set of corporate acts of enormous interest in understanding the problems faced by the artisans of the sector. This book contains up to four series of consecutive provisions. The first ordinances (1506) are of silk weavers and dyers. The second ones (1537) pertain to those artisans known as 'little pot' dyers (*tintorers d'olleta*). The third ones

(1549) allude simultaneously to both silk dyers and *olleta* dyers, and the last text is a petition that refers to specific aspects of the previous statutes from 1553.⁶

With regard to the founding ordinances of 1506, the petition made some years before in 1497 was justified by the large number of people who practiced this profession (chap. 2). In addition, the manuscript reproduces a painting on parchment with the representation of the guild's patron saint, the Archangel Michael, which served to leave a record of what this corporate flag or banner looked like. It is a polychrome representation of the saint, flanked by two skeins of silk, coloured blue and red respectively, that hang from the ends of two long poles. The standard or banner of the guild must also be kept in the corporate house with other insignias and objects to embellish and ennoble the patron saint (chaps. 3, 4).

Three trustees acted as first supervisors (*mayorales*) of the guild, namely, the masters Pere Vicent, Leonard Jordi and the Italian Agostino di Francisci, the system for election to positions being established (chap. 5). The minimum age to be examined was stipulated at twenty years with a registration fee of 100 *sueldos* (chap. 6). A *sueldo* was on average, a day's wage of an official at that time. Likewise, teaching of this craft was not allowed either to moors or to other infidels (chap. 7). Neither utensils of the profession nor silks to be dyed could be kept at home unless one was an examined master; otherwise, a fine had to be paid of 60 *sueldos* (chap. 8). That same punishment would be applicable against whoever did not do good and licit dyeing work (chap. 9).

Black dye was made by mixing gall and antimony (*alcofol*) (chap. 10). The gall was a protrusion caused in some trees and plants by insects depositing their eggs. *Alcofol* is an old name given to antimony or lead sulfide. The colour *grana* was produced with the bark of sumac, a bush with a high tannin content, and with gall on white. White was a colouring material of this name and not only the name of a colour. Likewise, red was made with the wood of the tree called brazilwood. Greens and blues were obtained from another well-known bush, the indigo bush. In chapter 10 of these founding ordinances of silk weavers and dyers of 1506, the dimensions are also detailed of the types of products that formed the official offer of the guild: wide or narrow silk strips and half-strips, wide or narrow Seville strips, reinforced silk strips, cords of thick or fine silk, silk fringes, wide or narrow strips of silk from broken cocoon (*biladizo*) or of yarn, thick or fine cords of *biladizo* or yarn, and patches of silk, both of satin and of hair.

To learn these trades of silk weavers and dyers, a time of four years was established (chap. 11), with the obligation to register the contract of the apprentices in a specific book that the supervisors of the corporation would administer (chap. 12). Two walkers would be in charge of acting as messengers of the guild (chap. 13) and accountants would proceed to carry out the audit of the accounts two months before finishing the mandate of the key holder (*clavario*) and of the supervisors (*mayorales*) (chap. 14). Masters and male or female workers paid one *sueldo* per head as an annual quota for being registered, up to four general meetings or ordinary chapters being established per year (chap. 15). Key holders and supervisors could

⁶ ACAMSV, *Varia*, 4.1. The edition of this manuscript has been published with other documents of the Valencian silk dyers guild (Navarro 2018).

impose corrective punishments on those who violated the rules and the children of masters were exempt from paying the registration fee in order to be examined (chap. 16). Tasks begun could never be left unfinished to assume tasks with several masters at the same time, as those who did not comply would pay a fine of 100 *suel-dos* (chap. 17). The silks woven could only be made by examined masters: bands, strips, cords (chap. 18). Lastly, any meeting that the guild held had to have the prior consent of the governor of the kingdom or of his lieutenant, also notifying the municipal authorities of Valencia (chap. 19).

Apart from those first ordinances, we know that an edict was issued on 30 October 1510 by the city that allowed silk dyers to dye with pomegranate until Christmas, as subsequently they had to do so with pure gall. Some velvet weaver ordinances of 27 March 1511 went beyond this, insisting on the exclusive use of fine gall from Romania until it was proven that Valencian gall alone was good for dyeing black without the need to mix it with pomegranate, antimony (*alcofol*) or sumac. With regard to coloured silks, the velvet weavers also established specific standards. For the colour red, *grana* (kermes) is used on white and not madder (*rubia*) another dye plant; as for the purples, a base of *grana* had to always be used. Meanwhile, another municipal edict on 24 October 1514 ordered the taking of a general inventory of all the gall of the land of indigenous production, as well as of antimony, stored in the houses of the velvet weavers or of the silk weavers and dyers of Valencia, or in any shop where it was known to be, so that in a period of fifteen days it would all be taken outside of the city limits under penalty of, if this were not done, its confiscation and burning in the public square (Navarro 1998).

The second ordinances of *olleta* dyers are from 13 October 1537. This designation of *olleta* (in Catalan) is because in the past, there were two guilds of dyers in the city, one that was called the silk dyers and the other that was in charge of the dyeing of wool and yarns, or *tintorers d'olleta*. These second ordinances are brief and only contain a preamble and three chapters. When they were approved, more than a year had passed since they had been requested before the municipal authorities of Valencia by the trade of silk weavers and dyers on 14 August 1536. Four years of learning were established as a minimum for this type of *tintorers d'olleta* (chap. 1). The examination for master consisted of knowing how to prepare a jug of cold dye and explain how to dye a fustian yellow or other colours (chap. 2). The widows of masters, until they married another man, could continue using the same trade of dyeing as their husbands and keep all the necessary tools in their home (chap. 3).

The municipal authorities approved new statutes for the trades of silk and *olleta* dyers on 1 August 1549, although the petition for them had been made more than a year before, on 23 June 1548. In the preamble of the said petition it was emphasized that, with such abundance of homegrown silk in the kingdom of Valencia, their ancestors, with the greatest diligence, had striven in every way to ensure that silks were worked and woven both in the city and in the kingdom, due to the enormous profits that this business provided for the municipal and *Generalitat* coffers, and due to the increase in population the capital was undergoing, as it was considered to be a true fact that each silk loom gave a living to four, five or six people. For these reasons, they intended to fight any frauds and dishonesty that appeared, especially regarding the use of pomegranate dye. They argued in the

preamble that the colour lasted less than when the silk was dyed with gall and in fact, a few days before the presentation of these ordinances to the municipal authorities, all the houses of the dyers in the capital had been inspected and all the pomegranate that was found was confiscated and burnt in the cathedral square.

Those third ordinances of 1549 are comprised of eight chapters that established, firstly, that silk was not to be dyed with pomegranate, or if it were, a fine would be paid of 300 *sueldos* (chap. 1). In addition, the dyeing boiler in which it had been proven that pomegranate had been used would be crushed and the copper it was made of would be donated to the General Hospital of Valencia, in addition to the dyer owning the boiler being disqualified perpetually. The sale of pomegranate was also prohibited within and outside of the municipality (chap. 2). The use of any mixture of sumac or of other substance with gall to dye black was not authorized, as only pure gall was to be used (chap. 3). Any person found to be in possession of pomegranates, or raw, cooked or powdered pomegranate peels would be fined 200 *sueldos* (chap. 4).

Silk dyeing was a guild that could be carried out without the authorities being able to control the numerous frauds committed. For this reason, no dyer that was not examined could have a boiler in their house for dyeing or otherwise it would be crushed and the copper it was made of would be given to the General Hospital of Valencia (chap. 5). Likewise, with the prohibition of the use of pomegranate, the dyeing of cloth and hats was usually done by the *tintorers d'olleta* using pomegranate peel; thus, only the key holder was empowered, or in his place, an examined master of the trade to buy all the pomegranate needed and to store it under his control in a house to which the artisans would go to acquire it (chap. 6). Accordingly, whoever bought or sold it on their own account or on the behalf of someone outside the guild would be fined 300 *sueldos* (chap. 7). Lastly, no dyer could dye silk and cloth for hats at the same time but had to declare which of the two trades they wanted to practice; otherwise, they would be fined an additional 300 *sueldos* as well as being disqualified from the profession. That is, either one was a dyer of silk or of *olleta*, but practicing the two specialities at the same time was prohibited (chap. 8). Finally, the public announcement or proclamation of these ordinances in the streets of the city was carried out on 8 August 1549 with trumpets as was the custom, one week after its approval by the municipal authorities.

On 6 October 1553, the notary Francesc Vives presented an appeal to the municipal authorities and the silk dyer Francesc Ontiveros, trustee of the guild, interpreting the statutes of 1549, approved four years before. It referred exclusively to the silk dyers, not *olleta* dyers. It again underscores the great abuses and frauds that occur when dyeing silks, cloths, *calicuchs*, *cotonines*, hats and any other type of fabrics with dye of pomegranate (*magrana* in Catalan), milled dyes (*molada*) and water of *roldón* (*raudor*, *roldor*, *roldó* in Catalan), a plant also known in Spanish as *emborrachacabras*, whose dry leaves ground into powder were used to dress hides and skins.

Still in the latter part of the seventeenth century, the Captain-General of the city and kingdom of Valencia ordered the issuance of a royal proclamation printed on 19 February 1685 regarding the prohibition of the ingredient of pomegranate

peels in the dyes of silks and of any other type of clothing.⁷ According to this proclamation, silk dyes of the city and of the kingdom of Valencia were in decadence according to a letter of 28 November of the previous year, 1684. In it a number of knights and citizens, together with a lawyer of the velvet weaver's guild reported frauds that were being committed in the mentioned dyeing workshops. They apparently used a greater amount of pomegranate peels than was suitable to improve the quality of silk fabrics, practices difficult to detect by inspectors. To this regard, King Carlos II issued an order on 30 January 1685 that was disseminated in the proclamation on 19 February in which several ordinances were established, prohibiting master silk dyers from having pomegranate peels, ground or unground, in their houses, even those mixed with gall. The reason was that any dye for cloths, fabrics or hats with these substances lasted a short time and was of poor quality. Additionally, from the day of the proclamation, the sale of pomegranate peels was also prohibited throughout the kingdom, so that in a period of eight days, the remaining amounts of dye contained in their boilers and warehouses had to be consumed.

3. The colours of Valencian silks in the fiscal registers of 1475-1513

The launch of the silk industry and commerce in the city of Valencia and in other populations of the kingdom during the second half of the fifteenth century was the beginning of a long history in which the silk business finally became one of the most important economic sectors for the Valencian territory over the sixteenth to eighteenth centuries (Franch 2012). Thanks to the documentation preserved of the tax that the Valencian Corts collected under the name of *Tall del Drap del General* on all types of fabrics that were exported, it was possible to find their oldest manuscripts in Catalan language with the title *Manifest de les Sedes*, regarding silk trade in 1475 and 1512-1513. Our research project for this *Settimana Datini* has allowed the complete transcription and the detailed study of these manuscripts, which together total 426 folios with 3,871 total fiscal registers, including here for the first time the unprecedented data corresponding to 1513, only January to July.⁸ Since 1440, those who declared this tax paid 29 *diners* for each *lliura* of value of the fabrics registered, that is 12.08 percent (Muñoz 1987, 308-15).⁹

The 1475 manuscript comprises three volumes with 237 folios and 1,414 fiscal registers. The first volume has 155 folios and 979 fiscal registers. The second volume with the name *Summari del procebit a la Taula del Jeneral del Tall en la ciutat de València* (Summary of the General Tax in Valencia city) includes 30 folios and only 4 fiscal registers, because it mainly contains the daily amounts of the tax collection. And the third volume has 529 tax registers along 32 folios, including information not only about silk trade but also from the leather trade (*Pelliceria*). The registers of

⁷ ACAMSV, *Lg. 3.1.3., Pregones*, 6 (Aleixandre 1987, doc. 639).

⁸ Archivo del Reino de Valencia (ARV), *Generalitat*, 3324-3325 (1475) and 5004 (1512-1513).

⁹ The Valencian account currency had the following system of equivalences: 1 *lliura* (pound) = 20 *sous* = 240 *diners*.

1475 manuscript appear in chronological order, according to the name of the people who sold or bought the declared fabric. After their name is normally written *dóna de manifest* (he declared) on specific date the quantity of *alnes* (in Catalan language; *varas* in Spanish), detailing the type of fabric and colour. Other alternative expressions were *comprà* (he bought), *tallà del teler de* (cut from the loom of), *vené* (he sold), *tragué* (he exported) o *sellà* (he sealed). Sometimes the value of the fabrics on which the tax is applied appears, but not always. The prices do not appear either. We have identified the name of 204 people, including 137 declarants. Export destinations are 28, mainly Castile but also Barcelona, Zaragoza or other places of the Crown of Aragon. There are not international places, that is, outside Iberian territories.

The global balance of those declaring in the 1475 manuscript (Tab. 1) shows a total of 38 specific combinations of silk fabrics and colours, apart from 99 more with other possibilities of colours and types of textiles. We have counted almost 21,000 *varas* registered if we add 5,142 *varas* cut directly from looms (column A), 12,060 *varas* in stock (col. B) or 3,774 *varas* of fabrics sold (col. E). Other expressions such as received fabrics (col. C), purchase of fabrics (col. D), exported fabrics (col. F) or sealed fabrics (col. G.) expand that sum to a total of 29,617 *varas* of silk fabrics registered in 1475. In terms of representation, black satin (7,258 *varas*), black velvet (4,929 *varas*) or black damask (1,758 *varas*) together make up 47 percent of the total silk fabrics registered in 1475.

The 1512-1513 manuscript comprises two parts with 189 folios and 2,457 fiscal registers. The first part includes all the year 1512 with 117 folios and 1,473 registers, and the second part refers only to the period between January and July 1513 with 71 folios and 984 registers. As we have said, the study of this second part of the manuscript constitutes the main contribution of this new analysis that we present here. Except for a few exceptions, all the registers of 1512-1513 manuscript always express a chronological order with the name of each declarant and the person from whom he bought the fabrics, their type and their color, indicating length, price and purchase value. Sometimes the destination of these tissues is stated. The amount paid for the tax does not appear in each register, as in the manuscript of 1475. The sums of all amounts paid by declarants are together separate. We have identified the name of 495 people in 1512, more than double compared to 205 people of 1475, including 197 declarants, 60 more than the 137 of 1475. Export destinations are 27, one less than in 1475, mainly Castile and other places of the Crown of Aragon again, but now there are international places or territories: Cagliari, Naples, Palermo, France or Portugal.

Tab. 1. Colours of silk fabrics in Valencia (1475)

Quantities in *alnes* or *varas*. 1 Valencian *alna* or *vara* equals 0.9 Meters.

A: loom cut fabrics; B: stored fabrics; C: received fabrics; D: purchase of fabrics;
E: sale of fabrics; F: exported fabrics; G: sealed fabrics; Total: A+B+C+D+E+F+G.

| Colours | Silk Fabrics | A | B | C | D | E | F | G | Total |
|--------------|----------------|-------|--------|-------|-------|-------|-------|-------|--------|
| Black | Brocade | | 110 | 24 | | | | | 134 |
| Black | Camelot | 26 | 33 | | 26 | 26 | | 22 | 133 |
| Black | Damask | 109 | 1,344 | | 130 | 102 | 23 | 50 | 1,758 |
| Black | Satin | 2,378 | 1,325 | | 1,459 | 1,425 | 458 | 213 | 7,258 |
| Black | Velvet | 1,608 | 1,097 | 30 | 719 | 837 | 262 | 376 | 4,929 |
| Black | Velvety Velvet | | 129 | | | | | 2 | 131 |
| Blue | Brocade | | 236 | 27 | 26 | 14 | 26 | | 329 |
| Blue | Camelot | | 33 | | | | | | 33 |
| Blue | Damask | | 167 | | 28 | | | 4 | 199 |
| Blue | Satin | | 401 | | 46 | 9 | 9 | | 465 |
| Blue | Velvet | 13 | 43 | | 54 | 18 | | 10 | 138 |
| Dark | Camelot | | 24 | 53 | | 100 | 73 | | 250 |
| Dark | Damask | 55 | 318 | | 52 | 52 | | 28 | 505 |
| Dark | Satin | | 88 | 151 | | 32 | 32 | 24 | 347 |
| Dark | Velvet | 10 | 24 | | | | | 10 | 44 |
| Dark Red | Camelot | 37 | | | 28 | 36 | | | 102 |
| Dark Red | Damask | 92 | 625 | 14 | 137 | 103 | 46 | 28 | 1,045 |
| Dark Red | Satin | | 156 | 148 | | 119 | 120 | 11 | 554 |
| Dark Red | Velvet | 6 | 36 | | 6 | 6 | | 2 | 56 |
| Green | Brocade | | 58 | | | 3 | | | 61 |
| Green | Damask | 22 | 361 | 18 | 59 | 11 | | 43 | 514 |
| Green | Satin | | 93 | 309 | | 94 | 43 | 13 | 552 |
| Green | Velvet | 214 | 95 | 21 | 88 | 84 | 2 | 67 | 571 |
| Purple | Brocade | 130 | | | | | | | 130 |
| Purple | Camelot | 51 | 31 | | 77 | 77 | | 4 | 240 |
| Purple | Damask | 27 | 137 | | 40 | 40 | | 22 | 266 |
| Purple | Satin | 95 | 92 | | 28 | 28 | 16 | 6 | 265 |
| Purple | Velvet | 163 | 164 | 83 | 42 | 36 | 85 | 49 | 622 |
| Purple | Velvety Velvet | 13 | | | | | | | 13 |
| Red | Brocade | | 366 | 2 | 14 | 18 | 14 | | 414 |
| Red | Damask | | 172 | | | | | 3 | 175 |
| Red | Satin | | 1,315 | 183 | | | | 18 | 1,516 |
| Red | Velvet | | 127 | 19 | | | | 19 | 165 |
| White | Damask | 68 | 179 | | 36 | 116 | | 41 | 440 |
| White | Velvet | | | | | 6 | | | 6 |
| Yellow | Damask | | 33 | | | | | 16 | 49 |
| Yellow | Satin | | 74 | 25 | | 51 | 65 | 65 | 280 |
| Yellow | Velvet | | 31 | | 6 | | | 1 | 38 |
| <i>Other</i> | <i>Other</i> | 35 | 2,543 | 9 | 261 | 331 | 895 | 837 | 4,911 |
| | Total | 5,152 | 12,060 | 1,116 | 3,362 | 3,774 | 2,169 | 1,984 | 29,617 |

Source: Navarro 1999, appendix 9, 299-301.

Tab. 2. Colours of silk fabrics in Valencia (1512)

1 *vara* or *alna*: 0.9 meters.
Prices variation in *diners/alna*.

| Colours | Silk Fabrics | <i>Varas</i> | Prices |
|--------------|----------------|--------------|---------|
| Black | Damask | 3,864 | 432-240 |
| Black | Satin | 4,497 | 312-164 |
| Black | Taffeta | 2,675 | 156-72 |
| Black | Velvet | 23,788 | 468-336 |
| Black | Velvety Velvet | 1,126 | 660-450 |
| Blue | Damask | 23 | 324 |
| Blue | Satin | 240 | 276-252 |
| Blue | Velvet | 340 | 492-408 |
| Dark | Satin | 108 | 270-240 |
| Dark | Velvet | 68 | 528-408 |
| Dark Red | Damask | 10 | 328 |
| Dark Red | Satin | 108 | 276-252 |
| Dark Red | Velvet | 204 | 460-414 |
| Green | Damask | 56 | 336 |
| Green | Satin | 152 | 258-144 |
| Green | Velvet | 334 | 480-384 |
| Purple | Damask | 142 | 360-276 |
| Purple | Satin | 487 | 276-150 |
| Purple | Velvet | 408 | 480-396 |
| Purple | Velvety Velvet | 6 | 708 |
| Red | Damask | 109 | 414-360 |
| Red | Satin | 18 | 420-324 |
| Red | Velvet | 441 | 528-438 |
| Red | Velvety Velvet | 80 | 576-504 |
| White | Damask | 149 | 390-270 |
| White | Satin | 85 | 336-300 |
| Yellow | Damask | 73 | 336-312 |
| Yellow | Satin | 589 | 276-164 |
| Yellow | Velvet | 71 | 528-516 |
| <i>Other</i> | <i>Other</i> | 1,792 | |
| | Total | 42,043 | |

Source: Navarro 1999, appendix 10, 303-304.

The global balance of those declaring in 1512 (Tab. 2) shows the 29 combinations of colours and silk fabrics more important out of total of 59, that is to say that behind the expression *Other* there are 30 combinations with less quantity of *varas*. If we compare with the 137 varieties of 1475, the typology of fabrics and colours has been reduced considerably in 1512. We have counted 42,043 *varas* in total and only black velvet represents the 56.58 percent with 23,788 *varas*. If we add to that data the number of *varas* of black satin (4,497), black damask (3,864), black taffeta (2,675) or black velvety velvet (1,126), it reaches up to 35,950 *varas* in black that is to say the 85.50 per-

cent. The trend of black as a fashionable colour already present in 1475 reaches an even greater force in 1512, confirming what the artisans affirmed in the judicial proceedings that in Valencia black was the colour used most for dyeing. We should remember that in the fiscal registers of Genoa black fabrics totalled up to 60 percent. On the other hand, the most expensive fabrics were velvety velvet or velvet in purple, red, yellow or black. Some colours were an added cost factor because, without a doubt, they were the real luxury in silk fabrics.

Tab. 3. Colours of silk fabrics in Valencia (January 3 – August 1, 1513)

1 *alna* or *vara*: 0,9 meters.
Price variation in *diners/alna*.

| Colours | Silk Fabrics | Varas | Prices |
|--------------|----------------|------------|---------|
| Black | Damask | 3,047 | 330-162 |
| Black | Satin | 5,418 | 384-144 |
| Black | Taffeta | 1,475 | 252-72 |
| Black | Velvet | 12,302 | 498-336 |
| Black | Velvety Velvet | 1,105 | 520-420 |
| Blue | Damask | 145 | 332-312 |
| Blue | Satin | 81 | 252-216 |
| Blue | Velvet | 465 | 480-408 |
| Blue | Velvety Velvet | 19 | 581 |
| Dark | Damask | 47 | 348-320 |
| Dark | Satin | 117 | 264-228 |
| Dark Red | Damask | 65 | 320-312 |
| Dark Red | Satin | 127 | 264-138 |
| Dark Red | Velvet | 386 | 468-420 |
| Green | Satin | 20 | 144 |
| Green | Velvet | 458 | 492-360 |
| Green | Velvety Velvet | 29 | 624 |
| Purple | Damask | 73 | 321-312 |
| Purple | Satin | 92 | 228-156 |
| Purple | Velvet | 408 | 504-408 |
| Purple | Velvety Velvet | 16 | 600 |
| Red | Satin | 117 | 336-240 |
| Red | Taffeta | 23 | 216 |
| Red | Velvet | 668 | 528-384 |
| Red | Velvety Velvet | 68 | 648-605 |
| White | Damask | 163 | 384-276 |
| White | Satin | 280 | 342-216 |
| Yellow | Damask | 66 | 339-336 |
| Yellow | Satin | 483 | 348-216 |
| <i>Other</i> | <i>Other</i> | <i>942</i> | |
| | Total | 28,560 | |

Source: ARV, Generalitat, 5004, ff. 118-189.

Until now, the comparative study of the fiscal registers of 1475 and 1512 had shown a strong growth of exchanges and of the number of those declaring fabrics and of trade agents involved in the export of silks from the city of Valencia to the European market with a clear predominance of the black velvets. In this study, we will add, for the first time, the unprecedented data from 1513 to show how this trend of a colour in predominant fashion continued evolving. The new data we have obtained from the study of the fiscal declaration of silks in the city of Valencia corresponding to 1513 confirm this trend (Tab. 3). During the first seven months of 1513, from January to July, we have counted 28,560 *varas* of silk fabrics and 23,347 of them in black colour (81.74 percent), a proportion similar to that recorded in 1512. If the complete manuscript from 1513 had been preserved, with at an average of 4,080 *varas* a month (28,560 in seven months), the total amount for this year would reach to 48,960 *varas*, slightly higher than the 42,043 *varas* of 1512. Velvety velvet and velvet were the more expensive textiles, especially when they were red, purple, blue, green or black, according to the 29 main combinations of fabrics and colours.

According to the other manuscripts of the *Manifests de les Sedes* preserved in the sixteenth century in the Archive of the Kingdom of Valencia, the number of *varas* from 1475 (29,617), 1512 (42,043) or 1513 (about 50,000 for the full year as an estimate) were only the beginning of the take-off of the Valencian export trade that increased even more in subsequent years: 96,620 *varas* in 1529, 297,902 *varas* in 1598 or between 130,000 and 135,000 *varas* in 1600-1601 (Franch 2012). It is quite clear that, compared to the 42,000 *varas* of 1512, export doubled in excess the volume of the beginning of the sixteenth century. The definitive degradation of Valencian silk production would occur in the following century, specializing in the preparation of tafetas, cheaper and lower-quality fabrics than those of the end of the fifteenth century. In this regard, this situation would be very similar to the one experienced in parallel by the Genoese industry of that time (Massa 1992).

The trends shown below by the quantifiable results of the research (Tab. 4) constitute a very significant volume of information on the basis of more than 90,000 meters of Valencian silk fabrics (100,220 *varas*) analysed through the fiscal sources of the kingdom compared between 1475 and 1512-1513, with special emphasis on the 73.47 percent of black colour. The emergence of a specialised guild of silk dyers in the same way as other similar corporations were founded during those years in the main silk centres of the western Mediterranean. The fundamental key to the take-off of the silk business in Valencia was the strong commercial demand for these types of fabrics. Without a doubt this brought about strong commercial trade between Valencian and foreign agents that promoted the migratory movement of the Genoese artisans not only through merchants of their origin but also through local traders. The hegemony of the black colour had to continue throughout the sixteenth century as it also happened in Genoa (Massa 1981).

Tab. 4. Colours of silk fabrics in Valencia during 1475-1513

Data in number of *varas* from Tab. 1-3
(1 *alna* or *vara*: 0.9 meters)

| Colours | 1475 | 1512 | 1513 | 1475-1513 | % |
|-------------------------------|--------------|--------------|------------|--------------|-------------|
| Black | 14,343 | 35,950 | 23,347 | 73,640 | 73.47 |
| Blue | 1,164 | 603 | 565 | 2,332 | 2.32 |
| Dark (<i>burell</i>) | 1,146 | 176 | 164 | 1,486 | 1.48 |
| Dark Red (<i>tenat</i>) | 1,757 | 322 | 578 | 2,657 | 2.65 |
| Green | 1,698 | 542 | 507 | 2,747 | 2.74 |
| Purple (<i>moral</i>) | 1,536 | 1,043 | 589 | 3,168 | 3.16 |
| Red (<i>carmesí, grana</i>) | 2,270 | 648 | 876 | 3,794 | 3.79 |
| White | 446 | 234 | 443 | 1,123 | 1.12 |
| Yellow | 367 | 733 | 549 | 1,649 | 1.64 |
| <i>Other</i> | <i>4,911</i> | <i>1,792</i> | <i>942</i> | <i>7,645</i> | <i>7.63</i> |
| Total | 29,617 | 42,043 | 28,560 | 100,220 | 100 |

4. Conclusions

Half a century ago, Jacques Heers presented a study in the first *Settimana di Studi* of Prato of April 1970 on fashion and the wool fabric markets in Genoa and its region in the latter part of the Middle Ages. The said study continues to be an essential reference for the subject of fashion that this *LII Settimana* undertakes, because it placed attention on the observation of demand and consumption, underscoring that luxury not only was based on the quality of the fabrics, but obviously in the choice of colours. People of that time were sensitive to a certain idea of fashion, Heers said, of diversity and in that apparel changed from city to city, from year to year. The comparative study of the inventories of properties of the deceased registered in the Genoese notaries of the era, the news contained in the accounting books of the textile companies or the study of fiscal sources relating to the urban and rural consumer markets allowed him to observe how the colour red had become the symbol of great luxury for the Mediterranean bourgeoisie of the Late Middle Ages. In that regard, he asserted that the variations of fashion were a decisive factor for their great fortunes in the economic and social history of the clothmaking cities (Heers 1971, 1096-7; 1110; 1117).

The key question, however, was knowing why fashions varied at certain times and not at others. On the other hand, what is important is to reconstruct the context of the actors, as well as the dynamics of innovation and circulation that they generate and the complexity of their development between the public taxation, companies and business or the international activities as posed by Paulino Iradiel in his study on tax authority and economic policy of the urban industries (Iradiel 2019). Nevertheless, we should not forget that urban and rural manufacture was in many cases interchangeable and that in certain industrial districts the colours of the fabrics in the countryside repeated current trends in the cities. Almost half of the cloths dyed in the Comtat area in the south of the kingdom of Valencia were black

and the rest showed very diverse tones with a wide variety of possibilities, according to what is shown in this case by notarial sources (Llibrer 2020; García 2017).

In our analysis we have compared guild ordinances, judicial proceedings, technical manuals of dyeing and particularly, fiscal sources. The silk declarations in the city of Valencia from 1475 to 1512 in relation with the new unprecedented data of 1513 refer to the export of silk fabrics from the Valencian capital to other parts of Europe with multiple details regarding those declaring (buyers, sellers) and characteristics of the fabrics (type, colour, length, price and quantity), which makes it possible to establish a database of 3,871 fiscal registers with more than 90,000 meters of Valencian silk fabrics (100,220 *varas*) and the 73.47 percent of them in black colour.

This research project has therefore been centred on the process of consolidation of the art of silk in late medieval Europe to analyse fiscal series of documentation on the changes that took place in the production process of Valencian silk fabrics. Combining diverse sources such as corporate ordinances, technical manuals and fiscal registers is a wise and important approach to the analysis of demand and consumption patterns. Although we have given too much space to the titles of corporate ordinances and manual texts, we recognize that these types of sources have a theoretical value, in contrast to the more practical value of tax data. In that sense, it has been not possible to expand the tables of our study with the names of buyers and their quantities to see the differentiated consumption and the hypothetical social diffusion of fashion. Finally, we have not started in our introduction with the historiographical frame of reference and specify how this essay fits into it, but some of these aspects are instead found in the next last paragraphs.

The transfer of technology and of fashion trends from Genoa to Valencia was one of the causes that explain the predominance of the colour black over the course of the fifteenth to sixteenth centuries. Consumption patterns were transformed and influenced the stimulus of manufacturing. This is confirmed by the regulations that existed regarding the silk dyers corporation and the most important dyeing materials. What has been documented in Valencia is comparable to what was studied during those same years with regard to the silk industries of Genoa (Ghiara 1976; Massa 1981), Venice (Molà 2000) or Florence (Tognetti 2002; Goldthwaite 2005). These historiographic questions find another important perspective of comparison in the latest studies carried out on the silk trade of Granada, Toledo, Aragon, Catalonia or Portugal (Franch, Navarro, ed. 2017). Fifteenth-century Spanish velvet production was a business of the first magnitude for the textile industries of Multi-cultural Medieval Iberia (Navarro 2020; 2021).

Finally, we would like to conclude with a key reflection by Alberto Grohmann:

In relazione al Medioevo, data la carenza e la frammentarietà delle fonti, specialmente di quelle di natura quantitativa, e data la disparità dei mercati e delle strutture politiche e sociali, si giunse a studiare dei micro spazi e si fece largo uso del tempo breve. Così si scrissero lavori, pur assai raffinati, sul trasporto di alcune balle di stoffe, sul costo del lavoro in una data azienda in relazione a pochi anni, sull'entità della popolazione in un piccolo aggregato umano, per fare solo qualche esempio. Questi studi pionieristici, pur di gran-

de interesse, hanno avuto a mio avviso il difetto di non mettere in meritata luce la valenza globalizzante dell'economico (Grohmann 2020, 31).

We wish we had not fallen here into that defect. With our study from heterogeneous sources we have wanted to show that it is possible to quantify fashion trends in the fifteenth and sixteenth centuries in some cities as Valencia, interesting observatory on innovation in silk production and processes at the end of the Middle Ages.

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