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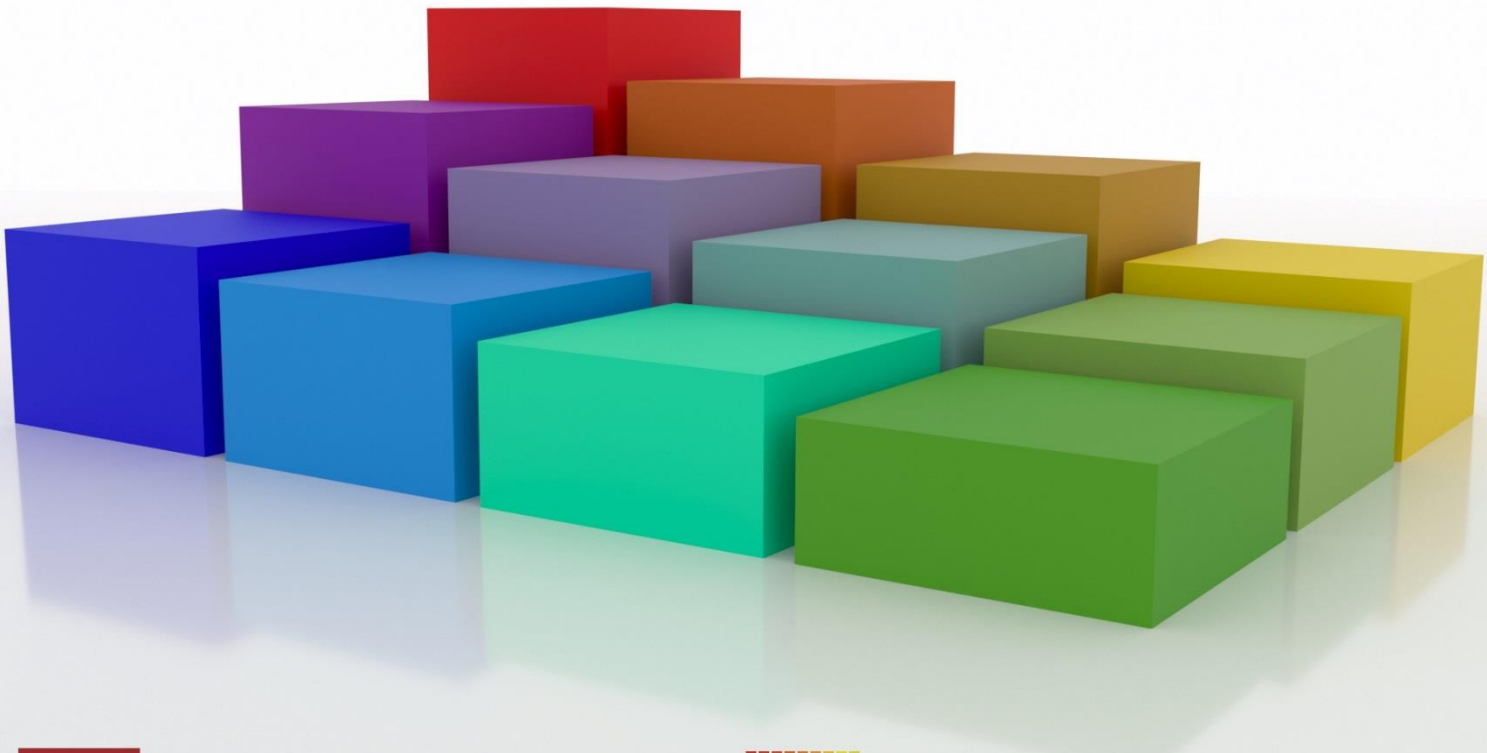

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The hidden history of woad blue: a path through technology and diffusion of "European indigo" in 18th-century technical literature

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Abstract

Woad, the famous "European indigo" plant, still hides some unknowns in its long history. This study wants to contribute to a better understanding of woad's diffusion and use in Italy throughout the 18th and first half of the 19th century, by analysing the technical-agricultural literature of this period. The research allowed to collect some information on the "geography" of Italian woad, on its processing techniques and on its relation to "rival" Indian indigo, showing that Italy still had some relevant woad-producing centres at the time, and that woad was still acknowledged to have a significant dyeing function.

Keywords: *dye plants, woad, indigo, technique, eighteenth century*

INTRODUCTION

Since the beginning of the second millennium, the art of dyeing in blue has always been of special importance to European industry. Up to the whole Medieval period, dyers all over Europe used to dye their cloths in a gorgeous blue colour with a colour-yielding plant that goes by the name of *Isatis tinctoria*: woad. Until then, the foreign "cousin" of woad, Indian indigo, coming from the East and yielding a more intense blue, was imported into Europe only in small quantities. Italy, which was at the forefront in Medieval woollen cloth production, had several praised dyeing centres that made great use of woad, and just as many woad cultivation areas which supplied them. The end of the 15th century, though, was a game-changer: the pioneer voyages undertaken by European navigators allowed to discover new trade routes to the East Indies, resulting in more and more indigo reaching the Old Continent. The praised Oriental dye had an enormous success, and woad, so far the undisputed queen of European blues, started a relentless downfall.

In contrast to what is sometimes assumed, though, the decline of woad was not abrupt. Several studies nowadays contribute to this evidence, but a precise measure of woad's use and diffusion after the spread of indigo is still lacking, especially when it comes to the 18th and first half of the 19th century.

In Italy, in particular, the diffusion of woad in this period has been little investigated by now. Some studies have allowed to gain a better understanding of "late" woad cultivation and production in certain territories, such as the precious contributions of Brunetti (1994), Palombarini (1995-98) and Petrongari (1994) respectively in relation to Piedmont, Marche, and the area of Rieti. Franco Brunello also discusses woad-related processes in 18th-century dyeing industry of the Venetian Republic, and Guarino et al. (2000) deal with woad in the Kingdom of Naples in this period. On the whole, however, many issues still remain unclear. Most importantly, it is difficult to estimate to what extent Italian woad was actually used, and therefore how important it was in the productive setup of early industrial times.

To get insight into this topic, the technical literature of the 18th and early 19th century is a privileged means of knowledge. The Age of Enlightenment was characterized by the pursuit of everything that could prove useful for the progress of humankind: its striving for "scientific" and "technological" improvement was conveyed by a literary production that embraced all fields of human knowledge, including several topics related to the art of dyeing. As to the Italian technical literature, specifically, only a limited part of it has been investigated by now in relation to dye plants and dyeing-related

processes. Therefore, this study wants to take advantage of this peculiar literary production to get some glimpses into the "hidden" history of woad blue throughout the 18th and early 19th century.

THE "PLACES" OF ITALIAN WOAD

The rush for systematization and improvement that marked the Age of Reason also involved the fields of botany and agriculture, resulting in a considerable number of dictionaries, periodic journals and monographs concerning agriculture being published in Italy between the second half of the 18th and the first half of the 19th century. Most botanists and agronomists were not specifically interested in dyeing processes, but dealt with dye plants in relation to agricultural issues: bearing in mind that providing the reader with an accurate "geography" of woad was not the authors' main aim, and that the lively exchange of knowledge between different intellectual environments across Italy and Europe may have sometimes led to reporting second-hand information, the Italian technical-agricultural literature can still offer some precious clues about the diffusion of woad. We hereby examine the points of view of various Italian regions: through the eyes of some selected authors, we can get a firmer grasp of Italy's woad cultivation, production and trade in this period.

By the second half of the 18th century, the glorious Republic of Venice had long lost its former economic power and was facing its imminent end. In the field of dyeing, as thoroughly discussed by Brunello (1968), *La Serenissima* remained mostly anchored in ancient – and sometimes obsolete – treatises. Nevertheless, one of the first Italian attempts to echo the innovative European (mostly French) approach towards the art of dyeing comes from a Venetian treatise: Pietro Arduino, Professor of Agriculture at the University of Padua, gathers information and makes new experiments on dye plants that converge in his treatise, *"Memorie"*, published in Padua in 1766. From Arduino we learn that the woad used by dyers in the Venetian Republic at that time could be either imported from Germany and from Lombardy, or home-grown. *Ça va sans dire*, local woad is said to be the best.

A later author from Veneto, who is interesting to consult since he draws most of his information from earlier sources, is the agronomist Francesco Gera. His agricultural dictionary, "*Nuovo dizionario universale e ragionato di agricoltura"*, published between 1834 and 1850, is a colossal work that summarises current European knowledge on agricultural topics. As late as the mid-19th century, Gera decides to devote two articles to woad, in Vol. XII (1840) and in Vol. XXII (1844), describing its cultivation modalities as well as its processing techniques and uses: the very need to explain how to cultivate and use woad is an important clue, and is in all likelihood a sign of an actual and still diffused practice. Concurrently, the author also gives a brief geographical description of woad's diffusion at the time: he says that it is still cultivated in Germany, in England, both in northern and southern France in the surroundings of Caen, Valenciennes, Castres, Albi, Toulouse and Avignon (Vol. XXII), and that it is still extensively cultivated in many parts of Italy (Vol. XII), although he does not specify where.

Moving to Milan, a city that was at the forefront in Italy's enlightened literary production, we find another dictionary, the *"Dizionario universale economico-rustico"* written by the Milanese priest Glicerio Fontana under the pseudonym of Creneo Insubre and first published in Milan between 1773 and 1791. In its second edition, published in Rome, this agricultural dissertation devotes a long article to woad (*"Guado, Gualdo, Glasto, Pastello, Isatide"*) in Vol. IX (1794), providing a detailed description of cultivation modalities and processing techniques of woad in Italy. The reader learns that at the time this plant was not sufficiently cultivated in Italy, and particularly in Lombardy, to supply local dyers' needs, with the result that many provinces had to resort to importing expensive foreign woad.

Nevertheless, two areas in Italy still grew and traded fine and renowned woad: Castel nuovo Tortonese (likely to be identified nowadays with Castelnuovo Scrivia, in the heart of Piedmont's historical woad-growing area) and Rieti, part of the Papal States, today capital of the homonymous province in the region of Lazio. Other minor woad-production centres were also Borgo San Sepolcro and Città di Castello in the Valtiberina, another historically important Italian woad area. The author says that Rieti's *"pastello"* in particular was so renowned, that its trade all across Italy and Europe was a major income for the territory at the time: the main trade destinations were the towns of Matelica and Norcia in the Papal States and, above all, Capodimonte in the Kingdom of Naples. The information about the importance of Rieti's woad production supports the idea that Italy still had important woad centres in the late 18th century, which not only supplied many Italian regions, but also other European countries.

An insight into Tuscany's agriculture is given some years later by doctor and botanist Ottaviano Targioni Tozzetti, member of a notable Tuscan family of scholars. Among his various works on agricultural topics, his *Lessons on agriculture* ("*Lezioni di agricoltura specialmente Toscana"*), published in six volumes between 1802 and 1804, give a special account of Tuscany's cultivations. A lesson on dye plants is reported in Vol. II (1802) and a specific dissertation on woad in Vol. VI (1804): the author states that woad is still cultivated in Borgo San Sepolcro, in the Marche region and in the surroundings of Cortona, although not as extensively as in the past times of great Tuscan wool industry (Vol. II). The extension of such cultivation must have been especially limited in the *Cortonese* area, though, if we give credit to canon Andrea Zucchini, author of several botanical and agricultural writings related to Cortona: in a dissertation held in 1778 he states that woad, as well as madder, has *"fallen into total oblivion and disuse"* in Cortona (*"da molt'anni indietro andarono in totale oblio, non che in disuso"*).

Finally, a collection of issues concerning Italian agriculture was printed in Milan between 1809 and 1814 in the scientific periodical that goes by the name of *"Annali dell'agricoltura del Regno d'Italia"*. Its eminent author, Filippo Re, at that time Professor of Agriculture at the University of Bologna, was one of the Italian agronomists whose works had most widespread circulation across the country.

When dealing with woad, Re's *Annals* are surely influenced by Napoleon's Continental Blockade, which in those years notably endorsed woad reintroduction as a consequence of the lack of indigo import. Nonetheless, several articles included in the *Annals* are prior to the Blockade-induced "woad rush". Not only do they mention the contributions of Arduino, Fontana and Targioni Tozzetti (*Annali*, Vol. IX), but also other dissertations on woad are reported. From a record written by the Friulan botanist Giovanni Brignoli, Professor of Botany and Agriculture in Urbino (Vol. IX), we learn that at the time woad was documented to grow spontaneously in many parts of Italy (in mountainous regions of Piedmont, in Valle d'Aosta, in the surroundings of Urbino, and all across the Kingdom of Naples), but it was also cultivated on small scale in Friuli. The author states that such cultivations were meant for local use: a certain Cesari, dyer in Udine, is said to have been cultivating woad for 40 years to meet the needs of his personal dyeworks, and the author himself asserts to have been supplying self-grown woad to local dyers for 10 years in the surroundings of Udine.

SOME OBSERVATIONS ON WOAD'S PROCESSING TECHNIQUES

The authors discussed above also provide accounts of how woad was prepared and used, which allow us to delve deeper into woad manipulation described from the point of view of Italian sources.

Overall, we learn that the main steps of the processes were more or less the same everywhere (in Italy as well as in Europe). Harvested woad leaves were ground in woad mills, and the resulting paste was arranged in heaps and composted. After some weeks, or sometimes one or two months, the paste underwent a second grinding step and was then shaped into loaves or elongated balls: when these woad loaves were dry, they were broken up again and sprinkled with liquid (usually water) to reactivate fermentation. The coarse powder obtained in the end was finally ready to be sold and used. The whole process, from the first harvest to the final product, took several months (even over a year according to Targioni Tozzetti). Such descriptions, aligned in their main steps, are spiced up with little details of "local taste" that probably stand for actual local processes: for example, Targioni Tozzetti is the only one to call *"barca"* the heap of woad paste, and to write that the *"barche"* are disinfected by sprinkling them with the juice of fresh woad leaves (*Lezioni*, Vol. VI).

Until now, records of eminent agronomists and botanists have been discussed. But the scientific literature of that period passed on to us also some singular, precious accounts of real woad growers and dyers: this is the case of Gioachino Cesari, dyer in Udine. Cesari must have been quite popular at his time, according to the different notices about him reported in Filippo Re's *Annali*: he is cited in the letter by Giovanni Brignoli mentioned above (*Annali*, Vol. IX) and a thorough description of his work is given in Vol. X (1811). The latter, in particular, is an interesting dissertation on woad cultivation and dyeing processes written by the Secretary of the Agrarian Society of Aquileia. While writing an account on local woad growers, he examines the case of Gioachino Cesari, reporting and discussing a sort of "interview" in which the dyer speaks about his work.

First of all, we learn that Cesari cultivated woad for the purpose of supplying his own dyeworks, so we are dealing with a rather small-scale cultivation intended for local use. When it comes to the description of woad's cultivation modalities, we get to know that some little differences occur between Cesari's ways and the methods recommended by scholars. This is probably due to a factor that distinguished Cesari from most of the authors: experience on the field.

As to woad preparation for dyeing purposes, on the contrary, it is said that between Cesari and the "authors" there are no significant differences but one: Cesari's process is simpler. It might be interesting to analyse this detail. It seems logical that woad cultivated for use on small and local scale was prepared in a different way than a product that was destined for sale and trade. Scholars' treatises usually give account of large-scale processes, since these were considered the most relevant ones for the welfare of society and economics, which was a key target of the enlightened enthusiasm for scientific progress. As a drawback, we rarely get to know small-scale processes like this one.

Specifically, Cesari only macerates woad, and after leaving it to rest he directly uses it in the vat; he does not make woad loaves or use any particular additives. What must have been most interesting for intellectuals of the time, longing for a replacement of Indian indigo, is Cesari's claim that – sadly – woad alone is not sufficient to make a beautiful blue tint: woad is used to get a solid basis, but an unspecified *"calculated dose"* of indigo needs to be added to gain in brightness and preciousness.

The relation between woad and indigo

The previously mentioned words of Gioachino Cesari are one of the "hints" the ancient literature gives us to estimate the relation between woad and indigo at the time, and similar information is hidden in other discussed sources. Almost all of them, when talking about woad, mention the fact that its blue colour needs to be combined with indigo, and the practice of mixing the two blue dyes in "woad vats" in that period is already well known today. Indeed, several authors nowadays wonder whether woad

balls were still used for their colour-yielding function at the time, or if their role in the vat was only to activate fermentation, thus creating the reducing conditions which are necessary to dye with indigo powder.

Pietro Arduino is very clear about woad: it is one of the most important dyes and forms every possible shade of blue and green, and it can be used either alone or combined with indigo, although the latter solution is said to be much better. In 1844, Francesco Gera writes that woad is mixed with indigo to increase the fastness and intensity of the latter: this statement seems to mark woad as the "best" colour between the two of them, in contrast to what other sources say, although later authors like Gera might be biased because of the enthusiasm for woad that arose during the Blockade years.

Fontana's dictionary provides us with interesting information on the relative prices of the two dyes. At the end of his article, he states that woad yields an excellent, very colourfast deep blue colour, which is used as a base for obtaining many other colours and also to "fix" indigo on cloths: *"woad* – he continues – *was once preferred to indigo* […], *but now indigo has prevailed over woad because it is more beautiful and maybe because it is cheaper than woad itself"*. Thus, if we give credit to Fontana's words, the convenience and the availability that marked woad's success over indigo during the Middle Ages had been turned around in favour of indigo at this point.

Overall, it appears that woad was still acknowledged to have a relevant dyeing function. The specific role of its blue colour was frequently mentioned. However, it was barely used alone by then: it mainly seems to have been used as a "base" or in mixtures, above all with its long-time rival indigo. In the eyes of today's reader, it seems that scholars and small-scale dyers had an important point in common: woad was still said to be an important dye, but indigo was an indispensable ingredient in the vat.

CONCLUSIONS

A selection of 18th to early 19th century technical literature dealing with woad in Italy has been presented. Although this sort of brief "review" does not claim to be exhaustive and will be enriched with other sources in the future, it can still lead to some conclusions.

A first observation is that woad was still a relevant topic at the time. Several different "intellectual environments" across Italy were interested in providing and discussing information on this plant. The very need to explain how to cultivate and prepare it most likely indicates an actual need for guidelines and a practical outcome: indeed, today's reader must bear in mind that enlightened authors mostly wrote about what was actually useful.

From the "geographical" analysis, we can conclude that the importance of several historical Italian woad-producing centres had changed. The major Medieval woad area of inner Tuscany seems to have significantly declined by then, whereas Piedmont's production was still quite renowned and supplied several Italian regions with "Lombard woad", although we learn that neighboring Lombardy also needed to import some woad from abroad. The area of Rieti, on the other hand, which was as well a historical woad area but had always been less important than the former two, was now at the forefront in Italy's woad production. A measure of Reatin woad's importance is given by its trade routes, which not only supplied many Italian areas, but even reached other European countries. The Kingdom of Naples, in particular, seems not to have grown enough woad within its boundaries to meet the needs of the factories promoted by the Bourbons, and had therefore to turn to Rieti's supplies.

Overall, we get to know that the trade of Italian woad was still quite intense at the time, both between different Italian regions and outgoing towards Europe. But we also learn that woad had an important local dimension, being cultivated on small scale for local use. As to this last topic, the

literature of this period – typically searching for the useful – provides us with some precious records of authentic working procedures like the ones of Gioachino Cesari, "hidden" within learned dissertations.

In conclusion, the collected information shows that Italy still had some relevant woad-producing centres between the second half of the 18th and the beginning of the 19th century, which in some cases reached out to European trade routes. It seems that this woad was not just a supporting component in indigo vats, but that it still had an active role in dyeing in blue, although its combination with indigo was unavoidable. Finally, further insights into the trade of woad in Italy and additional observations about the following steps of woad's productive cycle – that is, the processing procedures that lead from the colouring matter to the final application product – will be discussed in future contributions.

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REFERENCES

Arduino, P. 1766. *Memorie di osservazioni e di sperienze sopra la coltura, e gli usi di varie piante che servono, o che servir possono utilmente alla tintura, all'economia, all'agricoltura, ec.* Padova: Stamperia del Seminario.

Balfour-Paul, J. 2011. *Indigo. Egyptian mummies to blue jeans*. London: The British Museum Press.

Borlandi, F. 1959. Il commercio del guado nel medioevo. In: *Storia dell'economia italiana. Saggi di storia economica vol. 1*, C. M. Cipolla, ed. Torino: Edizioni Scientifiche Einaudi, 263-284.

Brunello, F. 1964. L'arte della tintura a Venezia nel secolo XVIII. In: *Cultura e Scuola*, 10, ed. Roma: Ente Nazionale per le Biblioteche Popolari e Scolastiche, 270-275.

Brunello, F. 1968. *L'Arte della Tintura nella storia dell'umanità*. Vicenza: Neri Pozza Editore.

Brunetti, A. 1994. Il gualdo lombardo. In: *Beiträge zur Waidtagung*, 4/5 (1-3), H.E. Müllerott, ed. Arnstadt: Thüringer Chronik-Verlag, 64-66.

Cardon, D. 2007. *Natural dyes. Sources, tradition, technology and science*. London: Archetype Publications.

Fontana, G. 1793-97. *Dizionario universale economico-rustico. Seconda edizione corretta ed aumentata*. Roma: Michele Puccinelli.

Gera, F. 1834-50. *Nuovo dizionario universale e ragionato di agricoltura*. Venezia: Giuseppe Antonelli.

Guarino, C., Casoria, P., and Menale, B. 2000. Cultivation and use of *Isatis tinctoria* L. (Brassicaceae) in Southern Italy. *Economic botany*, *54*(3), 395-400.

Palombarini, A. 1995-98. Il Guado ed altri vegetali nell'economia delle Marche in Età moderna. In: *Actes/Papers/Beiträge. 2ème Congrès international "Pastel, Indigo et autres Teintures naturelles: Passé, Présent, Futur"*, D. Cardon & H.E. Müllerott, ed. Arnstadt: Thüringer Chronik-Verlag, 161-68.

Petrongari, A. 1994. Produzione e commercio di guado a Rieti nei secoli XVIII° e XIX°. In: *Beiträge zur Waidtagung*, 4/5 (1-3), H.E. Müllerott, ed. Arnstadt: Thüringer Chronik-Verlag, 67-72.

Re, F. 1809-14. *Annali dell'Agricoltura del Regno d'Italia*. Milano: Giovanni Silvestri.

Targioni Tozzetti, O. 1802-04. *Lezioni di Agricoltura Specialmente Toscana*. Firenze: Guglielmo Piatti.

Zucchini, A. 1778. *Sopra la Luteola sativa. Pianta, che sotto il volgar nome di Bietola gialla da tempo immemorabile si coltiva, ed è in commercio per la Tintura nell'Agro Cortonese*. Sine loco.

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