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Isatis tinctoria & Indigo; A Spatiotemporal Culture in France and Elsewhere-Historical Review

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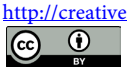


Abstract

This article is a summary of the historical background to *Isatis tinctoria* in France and elsewhere from the 12th to the 21st century. *Isatis tinctoria,* also called "Guède", "Pastel" or "Vouède" according to the French region origin, is a plant originally used to obtain indigo blue dye mainly to produce colored blue fabrics. A local memory is well established in the Amiens region (northern France) and the Toulouse region (south-western France). No global review of its culture and trade over the long term is known. The aim of this article is to summarize the historical background of *Isatis tinctoria* in France and elsewhere from the twelfth to the twenty-first century.

Keywords

Isatis tinctoria, Indigo, Historical, Reintroduction, Picardy

1. Introduction

Guède, Pastel, Vouède [1], or Waide are regional terms that define only one plant named universally *Isatis tinctoria*. A plant that seems little known to the layman, and whose dyeing properties, dyeing in blue the tissues, appear to us far away. And yet some material testimonies seem to demonstrate the predominant place of *Isatis tinctoria* in European societies until the seventeenth century. Its shifting culture over the centuries and the wealth obtained through its production, have forged a local memory well rooted in Amiénois [2] and Toulousain [3] French regions. This memory refers to a particular historiography as it is fragmented by the geographical translations of the culture of *Isatis tinctoria* over the centuries. Reference is made to the bibliography, which shows the fragmentation of its

culture between Picardy, Toulouse and Normandy, but also in England and Italy for later periods. Despite a few general works [4] that evoke the plant within the framework of a much broader studied theme, there is no global synthesis on its cultivation and trade during the long time. From this observation, and within the framework of the ValWaide project (**Figure 1**), it appears necessary to expose in a short synthesis, the historical ins and outs of *Isatis tinctoria* in France and elsewhere from the twelfth to the twenty-first century.

Figure 1. The ValWaide project, which aims to achieve zero waste from *Isatis tinctoria* after indigo extraction by re-establishing it in the Hauts-de-France Region (authors' personal source).

This article therefore aims to show and describe the different causes of appearance and or disappearance of the Waide, while demonstrating its strategic, economic and also political interest.

2. Materials and Methods

All the information and historical facts were collected over 1 year in the departmental, regional and national archives of France. These data come mainly from the archives centers in northern France, where sources were analyzed on site. Other documents were also consulted online. These documents are various but they are mainly handwritten letters, accounts and official records. Printed texts can also be found, mainly dating from the 19th century. The cross-referencing of these sources has made it possible to propose a comparative approach on the subject we intend to deal with here.

3. Dyeing Blue: The Historian's Contribution

Historically, indigo is the violet-to-blue dye extracted from the leaves and stems of the indigo plant. From the end of the 19th century onwards, chemists demonstrated that the blue-indigo color extracted from various dye plants (including indigo, dyer's woad in Europe, dyer's knotweed in China, Strobilanthes cusia in South-East Asia and *gara Philenoptera cyanescens* in Africa) corresponded to the

same dye, every product containing indigotine, also called indigo. The only difference between these dyes was the nature of the impurities co-extrates with indigo ad contained into the dyes. The language then adapted to the progress of knowledge, generalizing the term "indigo plants" for indigo as well as for woad, knotweed and gara. Indigo is used as a dye in many fields. Thus, in medieval and modern times, a fermentation process was put in place, after crushing leaves and could last almost a year. With the 1st Empire, a new method for extracting indigo from the plant consisted of crushing the leaves then, for 20 h, infusing them in water. To the substance thus obtained, diluted with an equal volume of lime water, sulfuric acid was added in order to precipitate the indigo at the bottom of the vat. The indigo thus collected, in the form of a paste, was dried for 30 days.

Alongside these technical aspects, economic and geopolitical aspects were also relevant due to the market value of this pigment.

4. The Hegemony of Picardy Culture and Some Subordinate Poles (12th - 14th Centuries)

The first testimonies of the culture of *Isatis tinctoria* in Gaul date back to the 5th century [5]. But it is in Picardy that we find the most important traces of the Waide from 1105 [2].

This culture has been gradually developed to flood the entire region between the 12th and 14th centuries. Picardy is characterized by having assembled on a large scale an efficient system to export the production resulting from the exploitation of this tinctorial plant. Two cities assert themselves by their pre-eminence in the organization of this great European trade in Picardy.

First of all, the best known remains Amiens. Close to crops, the city, especially in the Saint-Martin district, is in medieval times a center where the harvested Waide leaves were grounded to powder. The tax burden on the Waide's trade pays a lot to the city. The cathedral of Amiens is one of the concrete results of the wealth provided by its impositions (**Figure 2**).

Figure 2. On the south facade of Amiens cathedral, the facade of the Golden Virgin, a whole section of wall in three parts is dedicated to the Waide merchants. Marie Joan/FTV.

Finally, the city was also a home port on the Somme, and further to the sea, ultimately England. Lined with tolls [6] and crops, the river was impregnated with this trade, which upset the agriculture of the region [2].

Saint-Quentin, as the second city of influence, is not left behind in the polarization of the Waide trade in Picardy. Again, the plant seems to be the basis of the city's taxation. However, Saint-Quentin is distinguished by the lack of Waide transformation activities [7]. Indeed, the city can be identified as a hub of the Waide trade between northern Europe [5] eastern France and the Paris basin. The city, a member of the Hanseatic League of XVII cities, also organized two annual fairs that made its wealth by the trade of the Waide.

Yet, at the same time, despite the commercial polarization around Amiens and Saint-Quentin, other cultivated spaces are developing (**Figure 3**).

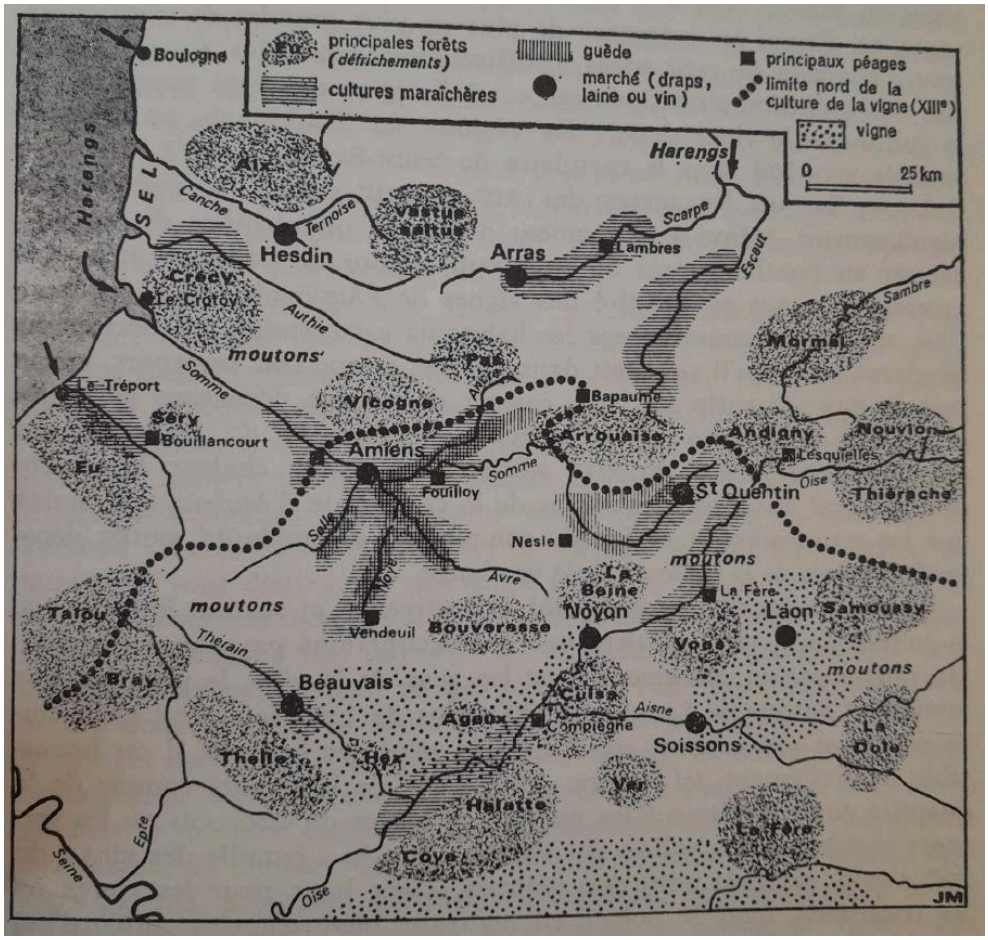


Figure 3. Overview of the Picardy economy in the 13th century.

First of all, it is in Walloon Flanders that a first geographical translation takes place [8]. Indeed, from the 13th to the 14th century, the culture of Guède progressed between Lille and the south of Artois. It makes its place in the lands of Thierry D'Hireçon in Artois [9]. *Isatis tinctoria* also makes its place in Normandy, there are traces of its culture from the thirteenth century. It seemed to be grown more

on the coast than in the interior. Unfortunately, little is known about this. But outside France, in Namur for example, the Guède is also present at the end of the thirteenth century [10]. Production was exported to Liège and Maastricht.

Between the fourteenth and fifteenth centuries, despite the disparities of the sources, the gradual disappearance of the culture *Isatis tinctoria* in the north of France can be observed. Despite the general narrative of the Hundred Years War as a major cause of the decline of culture, the explanation seems more complex. Indeed, the factors are multiple: certainly the conflict between the two great European kingdoms had a significant influence, but the fire of Amiens in 1358 or the affirmation of the culture of the Waide in the Rhineland certainly destabilized the Picard trade of the Waide. It was also called Waide or Waid on the other side of the Rhine. There is in fact a multiplicity of terms close to the word Waide in the Germanic territories.

5. A Geographical Translation of Great Importance: Towards the Hegemony of the Toulouse Pastel (13th - 14th Century)

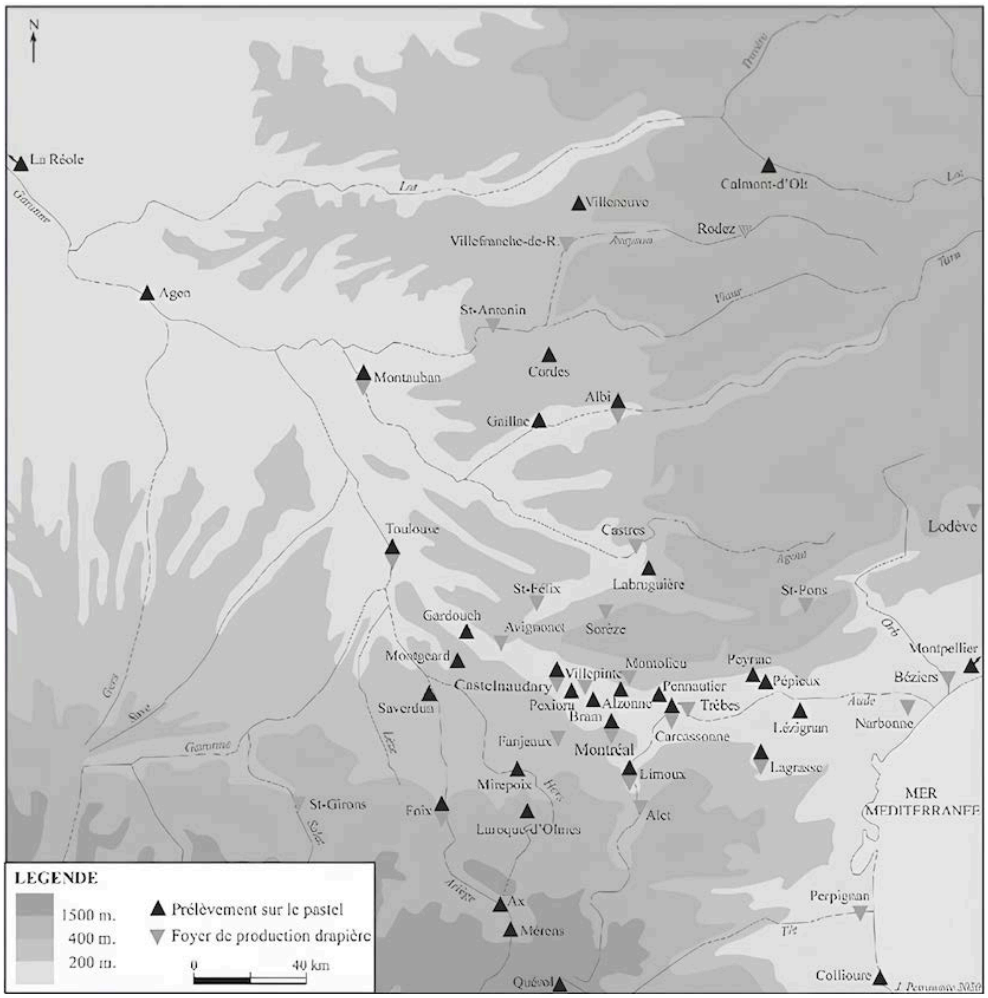


Figure 4. Map of the circulation of pastel and cloth production in the south of France during the first half of the 14th century.

Finally, there is another well-known factor in the commercial decline of Picardy: the gradual shift of the crop to Mediterranean France. However, according to Gilles Caster [11], the pastel was introduced in this area in the 15th century. But from the thirteenth century, *i.e.* in the period of the apogee of the Picard culture [12], we find traces of southern culture of the Guède [13]. Judicaël Petrowiste estimates that the plant was present as early as 1250 in the Albigensian, and in 1268 in the Lauragais, even if it is isolated. It was not until the end of the 13th century that production increased significantly, resulting in the multiplication of tariffs and taxes. In Montpellier, Guède is taxed from 1296 [13].

We see a concentration of the centers for pastel collection and draperies production between Toulouse and Béziers. This map shows that the production of pastel in France was linked to that of the draperie.

The sources for describing the outlets for Guède's production are meager [14]. However, we know with near certainty that at that time it was towards the south that the production was directed. Carcassonne and the Iberian Peninsula (*via* the Pyrenees) appear as trade routes of primary importance. Indeed, the economy of the future "Pays de Cocagne" [11] was oriented by the needs of Catalan and Languedoc draperies. But the Catalan roads were soon cut, Philippe le Bel having banned the export of Guède in 1305 (**Figure 4**). Intended to protect the Languedoc drapery from foreign competition, the measure taken by the King of France came to restructure the entire region. From 1335 onwards, the culture of Guède grew rapidly. As a proof, the Abbey of Gimont went so far as to convert its fields of wheat into field of Guède [11]. Also, it was the exchange centers that were upset. Albi quickly became a trading center; the connection of trading centers with the countryside seems to be quite close in this trade.

But this tenfold production must find outlets, this is when the international routes of Guède will be disrupted.

6. The Polarization and Monopolization of Culture in Languedoc and Albigensian (14th - 16th Centuries)

The history of the apogee of the "Pastel toulousain" is quite elaborate, and Gilles Caster drew a temporality that was not modified thereafter, from 1450 to 1561 [11]. The richness of the work on the subject being immense, we cannot say everything. It is rather necessary to orient on some tracks a little less developed by historiography, and which can be defined in its majority as valuing the wealth of material heritage from this period, Material traces maintain this vision, such as the Hôtel d'Assézat in Toulouse (**Figure 5**).

Beyond the economic development of Toulouse and the socio-economic organization of the city [15] [16], it is the trade routes that can be questioned. The connection with Bordeaux seems quite special. Indeed, despite the Hundred Years War and the troubles in Guyenne, the Garonne, formerly a secondary road, has come to the fore for the export of the Pastel trade in France at this time. This new importance comes from the gradual weakening of Picardy cultures, to which we

must associate the fact that Guyenne was an English time, which facilitated trade with this region [17]. Faced with the closure of the Catalan roads, the Garonne becomes an ideal outlet for the production of Lauragais and Albigeois. A system of taxes and charges similar to that set up on the Somme was then introduced [17].

Figure 5. The Hôtel d'Assézat in Toulouse, a building built with the proceeds from the pastel trade (photo: Office du Tourisme de Toulouse).

However, these heavy fiscal constraints took time to undermine trade to England. It can be said that, from 1379 to 1430, the Pastel was mainly transported on river. But at the same time the Toulouse merchants tried to replace Bayonne in Bordeaux for the linen trade. Bayonne was a good outlet for England, as it avoided tolls on the Garonne. But the land route, equally expensive, was quickly abandoned in favor of a return almost exclusive to the waterway in the middle of the 15th century.

7. The Dependence on French Culture in Toulouse and the Creation of a Policy of Sovereignty of the Pastel Culture in England (16th - 17th Centuries)

It is clear, through the exploration of trade routes, that the main outlet for the merchants of Pastel Toulousain was English [18]. A more distant market at the end of the Hundred Years War, but which does not prevent the city and the surrounding countryside from selling their production. However, the Wars of Religion in France came to destabilize the southern zone quite strongly. Around 1579, the impact of the troubles on production showed England its dependence on Toulouse pastel [19].

Figure 6. View de la filature de pastel Parson Drove UK (Notes by Pierre Dubois, curator of the Amiens library, on the Waide, its culture, history and social and economic aspects. (1927-1942).

This dependence plays in both directions, the culture of *Isatis tinctoria* in Toulouse slowly declining in favor of the only cereal crops.

Thus, throughout the sixteenth century, the English government hammered the need for the development of cultivation of Pastel on its soil. As early as 1582, the cultivation of Pastel was reported in abundance in Hampshire, but it was difficult to develop in the north of the territory. Too disorganized by the Wars of Religion, trade with France was sometimes even interrupted; England had no choice but to support more energetically the culture on its soil. After four centuries of dependence, the kingdom ensured its own needs from 1650. The implantation of the culture was therefore complex and long, and the peasant reticence surely numerous. This image (**Figure 6**) shows a beautiful example of the home of an English pastel producer.

While from the sixteenth century France, once a country with diversified cultures, turned for a time towards cereal monoculture on this southern fringe, England made an equally singular inverse path.

8. Attempts to Reimplantate Pastel under the 1st Empire

The appearance and use of indigo on a large scale, although prohibited in 1598, completes the decline made from the sixteenth century of the pastel culture. Although officially authorized in 1737, its use was tolerated by the royal administration long before. From then on, in the middle of the eighteenth century, there are only a few spaces cultivated in Pastel in Albigeois [20]. As a reminder, in Picardy the culture of pastel had broken out towards the fifteenth century. The reasons for

this decline were different: it was a redefinition of the commercial links between certain French producing regions and UK.

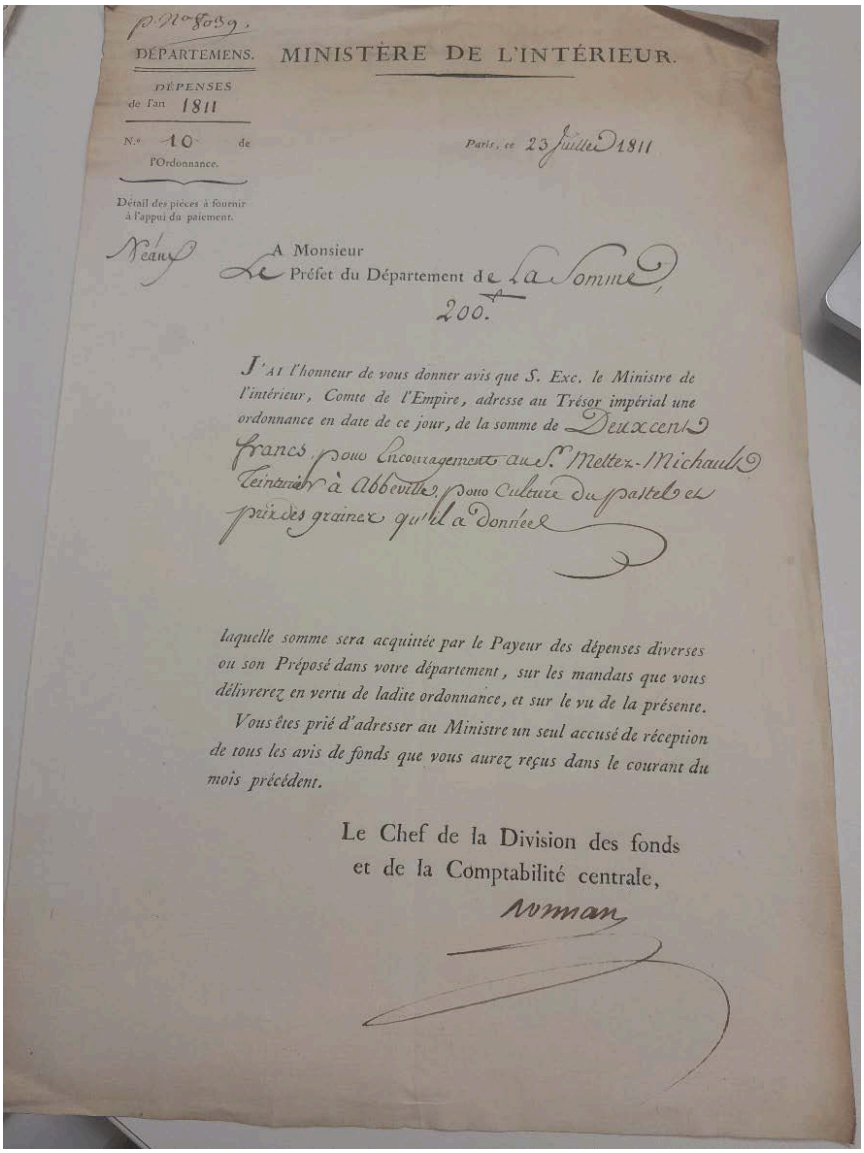
We had to wait until the 1st Empire to observe a return of the Pastel culture on a large scale in France. This one, and it is a first, takes place on the whole territory hexagonal, and also on the conquered territories like Italy. The continental blockade, effective in 1807, imposed, by the reduction of indigo imports, the search for an alternative solution to dye blue. Indeed, indigo came then from the French colonies, which were cut off from the hexagon. The sudden cessation of supply of blue dye had to be compensated. Indeed, it is a predominant color over the uniform of the revolutionary and Napoleonic armies, but also it is at this period that blue becomes the color of the French nation. The state has therefore tried to stop the drastic reduction of imports of indigo in the Hexagon. Many experiments have been carried out to find an alternative solution allowing French independence for the production of blue. From 1810 it became clear to the authorities, assisted by the chambers of agriculture, that *Isatis tinctoria* was the most ideal plant to replace the indigo [21]. Yet, and despite an incentive policy, the cultivation of Pastel does not grow; farmers are reluctant on this plant to which they do not know not. It is amazing to see the rapid erasure of the Pastel culture. It competed with colonial indigo. It was not until March and April 1811 that the State imposed, for each French department, a quota of land to sow in Pastel. In Haute Garonne, the decree of April 4, 1811 imposes the cultivation of 600 hectares of Pastel.

According to the departments, there is a diversity of reactions to this coercive policy. The picture is necessarily conditioned by the fragmentation of sources. In the Pas-de-Calais French county, it was planned, in 1811, the cultivation of 40 hectares of Pastel. Despite these initial attempts, the following year saw a complete disruption of the supply chain. Indeed, the elected officials of the department, answering a questionnaire of the prefect, affirm that they received their seeds only in May, that is to say with two months of delay. In addition, some mayors, sometimes for fear of opposing farmers, are reluctant about the benefit to be gained from this culture. For example, the mayor of Moyenneville says the land is too fresh to get what is expected, farmers see only a loss of arable land [22].

In the Somme county, for lack of sources, we do not know what quota was imposed. However, a certain Mets-Michault, resident in Abbeville, promoted *Isatis tinctoria* in the county (**Figure 7**). It is known that he had cultivated Pastel since 1806, and that he had succeeded in extracting more easily the tinctorial substance from the plant. He received, as an encouragement, 200 francs from the Minister of the Interior [23].

What often prevents the positive reception of this new plant by the agricultural environment remains the ignorance of the processes to extract indigo. The administration probably did not anticipate this phenomenon. It was not until 1811 that a series of works explaining the method of extracting indigo were massively printed and sent to the interests. As in the Somme, the authorities everywhere relied on certain local figures to make accept the culture of Pastel. Thus, in the

Toulouse region, Marcus de Puymaurin was an influential figure in this plan. In 1811, after publishing a book on the subject [24], he opened four schools of experimentation for the manufacture of Pastel. State supported him [20].



DÉPARTEMENS. MINISTÈRE DE L'INTÉRIEUR.

DÉPENSES de l'an 1811

N.° 10 de l'Ordonnance.

Paris, ce 23 Juillet 1811

Détail des pièces à fournir à l'appui du paiement.

A Monsieur
Le Préfet du Département de la Somme,

200.

J'AI l'honneur de vous donner avis que S. Exc. le Ministre de l'intérieur, Comte de l'Empire, adresse au Trésor impérial une ordonnance en date de ce jour, de la somme de Deuxcent francs pour encouragement au S.r Mettez-Michault teinturier à Abbeville pour culture du pastel et prix des graines qu'il a données

laquelle somme sera acquittée par le Payeur des dépenses diverses ou son Préposé dans votre département, sur les mandats que vous délivrerez en vertu de ladite ordonnance, et sur le vu de la présente.

Vous êtes prié d'adresser au Ministre un seul accusé de réception de tous les avis de fonds que vous aurez reçus dans le courant du mois précédent.

Le Chef de la Division des fonds
et de la Comptabilité centrale,

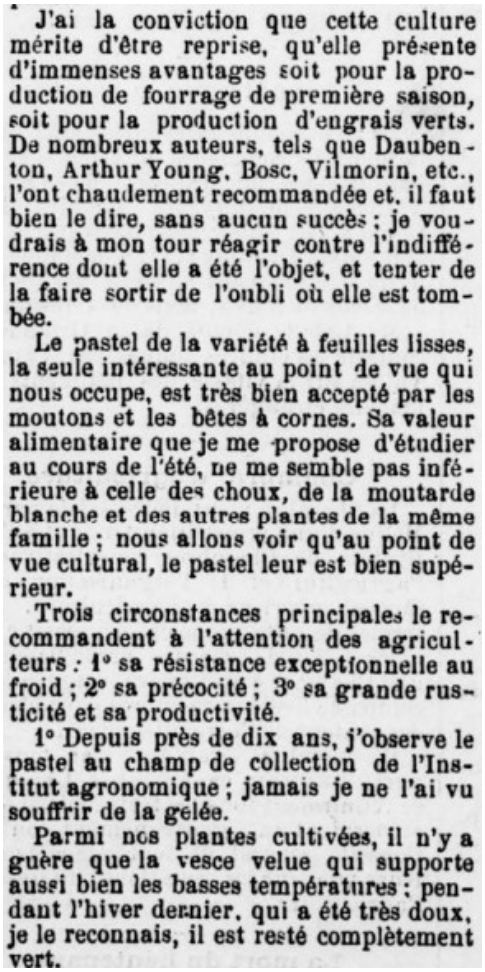
Norman

Figure 7. Letter from the Minister of the Interior ordering a reward of 200 francs to Monsieur Mettez-Michault (Culture du Pastel, correspondence, letter from the Minister of the Interior (28 June 1811).

Through the few documents still preserved today, it is possible to restore an overview of the importance of the Pastel culture according to departmental quotas. In Vaucluse, 250 hectares were allocated to the cultivation of Pastel [25]. In Isère, Pastel was to be planted on 25 hectares [26]. Sometimes, without knowing the number of hectares planted, some indications demonstrate the low importance of Pastel in the cultivated areas: in Ille-et-Vilaine only an owner would have sown Pastel [27].

9. Pastel in the Second Nineteenth Century, a Forage Plant of the Future?

The disappearance of the 1st Empire, then the return of the monarchy, in fine the end of the blockade, floods the French market with indigo. The culture of Pastel was only ephemeral since it declined instantly. Marcus de Puymaurin, now an MP, clings to the cultivation of this plant that had given him his fame in the Toulouse region, but nothing makes it. At the parliamentary sitting of 16 April 1826, he asked for the reduction of the rights of exit of Pastel. The plant would still be present in the Tarn and Albigensian, but its exports did not exceed 50000 Francs [28].



J'ai la conviction que cette culture mérite d'être reprise, qu'elle présente d'immenses avantages soit pour la production de fourrage de première saison, soit pour la production d'engrais verts. De nombreux auteurs, tels que Daubenton, Arthur Young, Bosc, Vilmorin, etc., l'ont chaudement recommandée et, il faut bien le dire, sans aucun succès ; je voudrais à mon tour réagir contre l'indifférence dont elle a été l'objet, et tenter de la faire sortir de l'oubli où elle est tombée.

Le pastel de la variété à feuilles lisses, la seule intéressante au point de vue qui nous occupe, est très bien accepté par les moutons et les bêtes à cornes. Sa valeur alimentaire que je me propose d'étudier au cours de l'été, ne me semble pas inférieure à celle des choux, de la moutarde blanche et des autres plantes de la même famille ; nous allons voir qu'au point de vue cultural, le pastel leur est bien supérieur.

Trois circonstances principales le recommandent à l'attention des agriculteurs : 1° sa résistance exceptionnelle au froid ; 2° sa précocité ; 3° sa grande rusticité et sa productivité.

1° Depuis près de dix ans, j'observe le pastel au champ de collection de l'Institut agronomique ; jamais je ne l'ai vu souffrir de la gelée.

Parmi nos plantes cultivées, il n'y a guère que la vesce velue qui supporte aussi bien les basses températures ; pendant l'hiver dernier, qui a été très doux, je le reconnais, il est resté complètement vert.

Figure 8. "A forage plant with a great future", L'Echo saintongeais, 21 June 1894, p. 2.

It was not until the end of the 19th century that there was a renewed interest in Pastel. The press specializing in botany did this. These articles boast, and this is new, the forage property of plants. Indeed, since the second half of the eighteenth century, in Central Europe, the plant was sometimes grazed by sheep [29]. However, it was not until the drought of 1893 that botanist's rediscovered *Isatis tinctoria* and its properties. To do this, many rely on the literature of the 1st Empire. It was reported that the plant had been carried away by botanists during the

Russian campaign and that it had resisted 40 days at -17 degrees [30]. Pastel is presented as a solution for soils and climates that do not allow the use of traditional forage plants [31]. It would be a miraculous plant, and yet sheep and cattle must be accustomed to this fodder. Indeed, they must undergo a fast and the plant must be accompanied by salt [32] in order to hope for its ingestion (**Figure 8**).

In addition, milk production appears to be reduced when cows only eat Pastel, although this plant has the same nutritional value as a forage cabbage. In fact, it was recommended to sow the plant in autumn and to make a first forage harvest in March, or to graze the sheep as early as February [33]. This made Pastel the earliest forage plant, even before vetch.

Despite this emulation, there has never been a large-scale application of the processes proposed by botanists; their work remained a dead letter.

10. Conclusion

The culture of *Isatis tinctoria* is not like an ordinary culture in the chronology of its geographical translations. Today forgotten, its reimplantation, like its historical study, requires an almost pedagogical work to make known its properties and its history to the general public. Obviously, this synthesis is not exhaustive, it still deserves further research, but it demonstrates the amazing history of a plant intended for dyeing, which will be proposed in the nineteenth century as a forage plant of the future. *Isatis tinctoria* deserves a long-term study, at least throughout France. This one, despite the weakness of the sources sometimes, can be oriented on certain episodes better documented. The historiography on the Toulouse period is the richest, but the reintroduction of the plant under the 1st Empire seems the most interesting. Indeed, the sources, even scattered, are still present in the departmental archives. The study of the distribution of quotas by department, but especially the reception by the agricultural community, demonstrates the full potential of a global study on the mentalities of the Napoleonic society regarding the reimplantation of the Pastel. This is one track among many others, the most open certainly, but like the others it would require a work of analysis in all the departmental Archives of France. The study of *Isatis tinctoria* throughout France is only in its infancy, it requires a real research work by the fragmentation of sources and historiography, but it is fully in line with the current dynamics of reintroduction of the plant. Perhaps it is a new page in its history that is being written today.

Author Contributions

CG: Investigation, Writing-original draft. EC: Data curation, Investigation. YC: Conceptualization, Investigation. RV: Data curation, Investigation. NJ: Formal analysis, Writing-original draft. PM: Project administration, Resources, Supervision, Validation, Visualization, Writing-review & editing, Conceptualization. PS: Funding acquisition, Project administration, Resources, Supervision, Validation, Visualization, Writing-review & editing, Conceptualization.

All authors agree to be accountable for the content of the work.

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Conflicts of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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